

Approved by the AUA
Board of Directors

October 2020

Authors' disclosure of potential conflicts of interest and author/staff contributions appear at the end of the article.

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American Urological Association (AUA)

Rationale and Strategies for Reducing Urologic Post-Operative Opioid Prescribing

Jennifer Robles, MD, MPH (Chair), Nitya E. Abraham, MD, Chad Brummett, MD, Benjamin Davies, MD, Veena Graff, MD, MS, Rajnish Gupta, MD, Vernon M. Pais, Jr., MD, MS, Kevan Sternberg, MD, Ruchika Talwar, MD

Overview

The current United States opioid epidemic originates from pharmaceutical overreach, regulatory oversight, large drops in manufacturing jobs, and a focus on pain scores rather than real clinical outcomes, resulting in a societal shift in physician overprescribing spanning several decades.

One component of this broad opioid use is surgeons relying primarily on opioids to treat post-procedural pain. With the rise of opioid addiction rates, in 2016 the Centers for Disease Control (CDC) released opioid prescribing guidelines for chronic pain. However, due to a lack of data, they only had one general recommendation for acute pain: "to prescribe the lowest effective dose...and no greater quantity than needed."¹ Though the CDC suggested a duration of three days or less would usually be sufficient, a lack of clear acute pain guidance exacerbated variations in the treatment of post-surgical pain, even within institutions and for the same operations.^{1,2,3}

Our present, highly variable post-operative pain management strategies have created exposures to opioid medications for many, carrying a risk of dependence and addiction. Furthermore, these practices have created an easily accessible supply of opioids for diversion into the community. A study utilizing a national insurance claims dataset found an approximately 6% rate of persistent use in opioid-naïve patients who were prescribed opioids after both major and minor surgery, including urologic surgery.⁴ A concordant rate of persistent use, approximately 6.2%, was found in a similar study of opioid-naïve patients post-urologic surgery.⁵

Although surgeons have contributed to the opioid epidemic, the use of multimodal analgesia, prescription drug monitoring programs, and general awareness of increasing rates of opioid addiction have led to opioid prescribing stewardship practices. Furthermore, contemporary evidence-based practice statements may minimize variations in pain management strategies. Multiple studies have shown that opioid prescribing can be greatly reduced without changes in pain, satisfaction or refill requests. The goal of this white paper is to explore evidence and outline strategies for managing post-operative urologic pain with minimal to no opioid prescribing.

What Happens When Opioids Are Prescribed?

Opioid use is commonly associated with problematic side effects for patients. Development of nausea, vomiting, urinary retention, or constipation can be low severity discomforts with opioids.⁶ However, more severe complications such as sedation, respiratory depression, or ileus can become life-threatening. The incidence of respiratory depression after major surgery can be as high as 17% when opioids are prescribed.⁷ These opioid-related adverse effects can result in higher hospital costs, longer length of stay, and significant healthcare utilization.⁸ Patients with gastrointestinal events related to opioids had significantly increased hospitalizations, length of stay, emergency

department visits, outpatient office visits, and prescription claims in the three months following opioid prescription resulting in thousands of dollars of additional healthcare costs per patient.^{9,10,11}

Over-prescription of opioids after surgery has a significant impact to the patient and society as a whole. Multiple studies show that regardless of surgical procedure most patients use significantly fewer opioid pills than were prescribed to them by their surgeons.¹²⁻²¹ Surgeons often prescribe more pills “just in case” and to “avoid that phone call,” but end up prescribing two to five times more than needed.^{13,14} For example, in the Orioles Initiative, 77% of prescribed postoperative opioids went unused after open and robotic radical prostatectomy.²² Many studies have shown that if opioids are prescribed, patients typically only use somewhere between four to ten tablets of opioid pills after surgery, especially when non-opioid pain medications such as acetaminophen or nonsteroidal anti-inflammatory drugs (NSAIDs) are utilized.^{16,20, 23-27} Additionally, it has been demonstrated that what patients take is directly correlated to how much pain medicine they are given rather than what they truly need, the so-called “portion size effect”. Howard et al. showed that for every additional pill prescribed after general surgery, pill use increased by 0.5.¹²

Ultimately some patients will continue taking opioids far past the recovery period - two studies have found that the rate of new persistent opioid use after urologic surgery in previously naïve patients is 6%.^{5,28} A recent large population study found that there was persistent long term use (2%) even after minor urologic procedures where 83% of patients received “weaker” opioids like tramadol.²⁹ Unfortunately, even unused pills can be harmful. Leftover pills become a reservoir to the general population for accidental ingestion as well as opioid sharing, selling, and diversion.^{14,30} Allen et al. found that pediatric admissions due to opioid overdose have tripled since 2000.³¹ Purposeful prescribing practices, education on appropriate use, and discussion of pill disposal plans can significantly reduce opioid use and increase the disposal of pills without significant aggravation of post-surgical pain.³²

The majority (71%) of opioid substance use disorder patients receive their drugs through diversion of a legally prescribed opioid.¹⁸ The current increase in illicit opioid use is directly correlated to high levels of prescription opioids.³³ Eight out of ten heroin users report that they used and abused prescription opioids prior to transitioning to heroin.^{19, 34-36} Thus, by reducing the number of people initially exposed to opioids and reducing the amount of opioids patients are exposed to when they are needed, it is possible to reduce the number of people turning to long term opioid misuse and illicit opioid substance use.^{37, 33}

OPIOID PRESCRIBING

Prescribing Recommendations Vary

Without evidence or guidelines about what to prescribe, historically there has been significant variation and excess prescribing of opioids for postoperative pain control after urologic surgery.^{27,38,39} Opioid prescribing practices also vary by setting and provider characteristics. In a statewide analysis, there was 4.7 times more variation in opioid prescribing seen in teaching hospitals compared to non-teaching hospitals, after adjusting for hospital case mix.⁴⁰ Another study noted that the amount of opioids prescribed by advanced practice providers was 18% higher compared to physicians.⁴¹ The opposite was seen in a different study suggesting local culture impacts opioid prescription practices.²⁷

Reducing Opioid Prescribing

Managing Postoperative Pain Expectations Preoperatively

The first step in reducing excess opioid prescriptions is managing patient expectations of postoperative pain. A survey of 951 respondents in a pre-admission testing clinic found that the average acceptable postoperative pain score was 4.1 on a scale of zero to ten.⁴² It is critical to communicate to patients that the goal is to reach a functional pain level for recovery, not zero pain. In one study, preoperative education on the benefits of “natural narcotics” (i.e. endorphins), the side effects of opioids, and the option of non-opioid analgesics led to 90% of patients declining an opioid prescription. Furthermore, pain scores were higher and longer in duration in the control group that did not receive preoperative education.⁴³ Similarly, the provision of preoperative counseling regarding postoperative pain expectations resulted in a reduction in time to opioid cessation.⁴⁴

Intraoperative and Postoperative (Inpatient) Non-Opioid Analgesia Can Reduce Postoperative Pain Needs

Intraoperative measures may decrease postoperative pain and medication requirements. Pre-emptive analgesia is the administration of analgesics prior to noxious stimuli (i.e., surgery), to avoid central sensitization or upregulation of pain centers after tissue injury.⁴⁵ Local blocks like a dorsal penile nerve block prior to penile prosthesis placement can reduce pain in the early postoperative period.⁴⁶ Transversus abdominis plane (TAP) block involves injecting local anesthetic between the internal oblique and transversus abdominis muscles to provide analgesia to the lower anterior abdominal wall.⁴⁷ Several studies including randomized controlled trials showed decreased overall postoperative opioid use after laparoscopic/robotic urologic surgery and radical cystectomy with TAP blocks.⁴⁸⁻⁵⁰

Opioid Prescription Dose Reduction

Despite previously held beliefs, evidence shows that significant opioid dose reduction can be successfully implemented without increased dissatisfaction, patient calls, or unplanned visits. This has most convincingly been shown on a statewide level via the Michigan Surgical Quality Collaborative⁵¹ but has been replicated by many including Dartmouth, Johns Hopkins, and the Michigan Urological Surgery Improvement Collaborative (MUSIC).^{52,53} Similarly, in the general surgery data, large decreases in prescribing opioids did not change patient reported outcomes (PROs) using validated surveys.⁵⁴

Multiple institutions have shown that even completely non-opioid post-ureteroscopy pathways have no significant change in patient reported outcomes.^{55,56} In female pelvic medicine and reconstructive surgery, reduction in opioids (or none) prescribed did not affect satisfaction with post-operative pain control.⁵⁷ Two randomized controlled trials have shown that robotic prostatectomy patients need minimal opioids immediately after surgery.^{48,58} The University of Pennsylvania demonstrated similar results following robotic urologic oncology procedures. Under their new protocol, 67.7% of patients (including 81% of prostatectomies, 59% of partial nephrectomies, and 44% of radical nephrectomies) were discharged without opioids and the remaining patients had significant reductions in discharge opioids with no increase in PROs or new encounters.⁵⁹ A study at the University of Pittsburgh replicated this, finding that PRO data on robotic prostatectomy patients were the same in every domain.⁶⁰ Mount Sinai reported the same findings for robotic radical cystectomies.^{60,61}

Thus, there is increasing evidence – particularly after endourologic and prostatectomy procedures – that the use of opioids postoperatively in minimally invasive surgery patients is often unnecessary. If needed, opioids can easily be prescribed electronically. Urologic surgery is not the first discipline to substantially decrease or stop opioids after surgery. Non-opioid multi-modal pain management has been shown to be effective in many other specialties including dentistry, general surgery, gynecology, and orthopedics.⁶²⁻⁶⁴

Technology to Reduce Opioid Prescribing & Abuse

Electronic prescribing (e-prescribing) of opioids is now nationally available and Congress passed the SUPPORT act in 2018 which requires all opioid prescriptions paid by Medicare part D to be prescribed electronically by 2021. E-prescribing eliminates the potential for paper prescription fraud and removes a major barrier to prescribing fewer opioids. Previously if a patient needed more pain medication after discharge, they had to travel to pick up a written prescription in person which could be a substantial inconvenience. Now an opioid prescription can be sent to their local pharmacy instantly. Danovich et al. (2019) showed that opioid prescribing in their institution decreased by 53% after electronic prescribing was mandated by New York state.⁶⁵

One of the easiest interventions to reduce opioid prescribing is to utilize an electronic medical record (EMR) system. Behavioral science suggests a role for reframing default choices to influence decisions without formal mandates or prohibitions, the so-called “nudge.” These have been championed as an inexpensive and effective means to affect change without impinging upon provider autonomy.⁶⁶ Multiple centers have shown that just reducing the default EMR opioid prescription pill quantities (ex: from 30 to 12 pills) significantly decreases opioid prescribing without consequence.^{67,68}

Safe Opioid Disposal to Further Reduce Community Diversion

The opioid epidemic began with over-prescribing but continues to diffuse through communities due to large amounts of unused opioids in homes. Encouraging safe disposal of unused opioids helps combat this issue. One option, used by some institutions and commercial pharmacies, is to provide activated charcoal drug disposal devices to patients who are prescribed opioids. The University of Michigan recently reported that providing activated charcoal bags to surgery patients nearly doubled the rate of safe medication disposal.⁶⁹

If bags are not an option, patients can be educated about the location(s) of nearby safe drug disposal boxes which are in most major pharmacies and hospitals. Finally, as a last resort, opioids are on the Food and Drug Administrations “Flush List” which recommends flushing the medication if a drug disposal site is not easily available. The Environmental Protection Agency has raised concerns about this practice, as it may expose the waterways to large quantities of opioids, though the FDA has ruled this “negligible.”⁷⁰

Multimodal Therapy and Non-Opioid Options for Reducing Postoperative Opioid Prescribing

Multimodal analgesia involves the use of two or more analgesics with different mechanisms of action that have synergistic effects. The goal is to improve pain relief while minimizing the use of perioperative opioids and decreasing opioid-related adverse effects (e.g., nausea, vomiting, sedation, ileus, pruritus, respiratory depression).

Pharmacologic Interventions

Acetaminophen

Acetaminophen is one of the world's most widely used analgesics; however, its mechanism of action has still not been fully elucidated. Acetaminophen has been used in multi modal pathways and shown to reduce postoperative pain, nausea, and vomiting when administered as a single systemic dose.^{71,72} When used in combination with opioids, it reduces opioid consumption.⁷³ Importantly, acetaminophen used in combination with NSAIDs has been found to have a synergistic effect and be more effective in terms of pain intensity and analgesic supplementation when compared to acetaminophen or NSAID alone.⁷⁴

Nonsteroidal Anti-inflammatory Drugs (NSAIDs)

NSAIDs act both peripherally and centrally to reduce pain predominantly by blocking cyclooxygenase (COX) enzyme mediated prostaglandin production. Numerous studies have found that NSAIDs reduce perioperative pain and opioid use.^{74,75,76} In urology, NSAIDs have been shown to be efficacious following a variety of procedures: endourologic, minimally invasive, and open.⁷⁷⁻⁸⁰ A 2018 meta-analysis of treatment for acute renal colic found that NSAIDs were equivalent to opioids with fewer side effects.⁸¹

NSAID side effects are dose and time dependent. Hence, most patients can tolerate a short course of around-the-clock NSAIDs after surgery. The majority of studies on adverse events of NSAIDs are based on chronic use of months, not acute use of less than 1 week.

Table 1: Common side effects of Nonsteroidal anti-inflammatory drugs (NSAIDs)

Organ System Affected	Side Effects
Cardiovascular (CV)	<ul style="list-style-type: none"> • Inhibition of COX-2 increases adverse CV events (myocardial infarction, stroke, heart failure, unstable angina) • Even with chronic use, risk is <i>very low</i>, estimated to be 0.002% per year in patients without CV disease and 0.008% per year in those with CV disease.⁶⁴ • Strong COX-2 selective NSAID was removed from market due to adverse CV affects but PRECISION trial did not find a difference in CV outcomes between non-selective NSAIDs (e.g., ibuprofen) and celecoxib, a weaker, COX-2 selective drug.⁸¹
Acute Kidney Injury (AKI)	<ul style="list-style-type: none"> • May cause acute kidney injury in patients whose kidneys are reliant on prostaglandins for normal function such as patients with chronic kidney disease (particularly eGFR<60), volume depletion (vomiting, heart failure, cirrhosis), and those taking diuretics, aspirin, angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers. • Cochrane review found that NSAIDs do not cause clinically significant AKI in healthy adults.⁸²
Gastro-Intestinal (GI)	<ul style="list-style-type: none"> • Increased in NSAIDs with strong selectivity for COX-1 (i.e. ketorolac). • Gastric erosions, peptic ulcer disease; mainly in chronic use & rarely clinically significant • Symptoms can be mitigated by concurrent use of a proton pump inhibitor.
Post-operative Bleeding	<ul style="list-style-type: none"> • NSAIDs may temporarily inhibit platelet aggregation via COX-1 inhibition • However, NSAIDs have not been shown to increase post-operative bleeding in multiple meta-analyses and large studies, even after high risk procedures like partial nephrectomy⁸³⁻⁸⁵ • If patient is on another blood thinner such as warfarin, weak COX-2 only inhibitors (e.g., celecoxib) can be considered if low CV risk

Choosing an NSAID: Different prescription NSAIDS provide equivalent analgesia, but differ in their pharmacodynamic and side effect profiles (Table 2).⁸⁶ Though they require more frequent dosing, NSAIDS with a shorter half-life (e.g. diclofenac, ketorolac) have a faster onset and provide windows for COX recovery between doses which may reduce adverse effects.⁸⁷ NSAIDS with COX-1 selectivity have greater GI and platelet effects, while some studies suggest that COX-2 selective NSAIDS have higher rates of adverse CV events.

Table 2: Pharmacologic Profiles of Common NSAIDS (in Order of COX-2 Selectivity)

Common NSAIDS	COX Selectivity	1/2 Life (hrs)	Comments
Ketorolac	1>>2	5	Most common IV formulation
Ibuprofen	1=2	2	Over the counter, no COX selectivity
Diclofenac	2>1	2	Most prescribed NSAID globally
Celecoxib	2	11	Only inhibits COX-2, no COX-1 inhibition
Meloxicam	2>>1	20	Long acting

Tramadol

Tramadol is a mu-opioid agonist and carries risk for dependence and addiction. Tramadol is a prodrug, which means it requires metabolism to have effect, thereby leading to highly variable activity. Up to 30% of some racial/ethnic populations are “ultra-rapid” metabolizers of tramadol with an increased risk of side effects including respiratory depression, while up to 30% of others are poor or intermediate metabolizers who get decreased effect.⁸⁸ Tramadol also inhibits the synaptic uptake of serotonin and can cause seizures or serotonin syndrome, especially if the patient has a history of seizure or is on other serotonergic medications. In general, unless the patient has tolerated it previously, tramadol is not a good alternative and should be used sparingly if at all.

Gabapentinoids

Gabapentin (Neurontin) and pregabalin (Lyrica) are anticonvulsant agents commonly used as perioperative analgesics. These medications were initially used for treatment of chronic neuropathic pain, but recent evidence suggests that they may reduce acute and chronic post-operative pain as part of multi-modal analgesia protocols.^{89,90} Use in an inpatient monitored setting may be safe, however in 2019 the FDA issued a warning about co-administration of gabapentinoids with other nervous system depressants (such as opioids), citing multiple studies showing an increase in respiratory depression and death when these drugs are given together.⁹¹

Muscle Relaxants

Muscle relaxants such as cyclobenzaprine (Flexeril), baclofen, tizanidine, and methocarbamol are common components of multi-modal anesthesia pathways, especially after musculoskeletal procedures.⁹² Many muscle relaxants have centrally acting sedative effects, and though evidence for their inclusion is mixed, they are increasingly being prescribed post-operatively as part of opioid-reduction protocols. Their addictive potential is considered low, but they are recommended for short term use only. Sedative effects can increase dangerously when combined with other central depressants such as gabapentinoids or opioids.

Some clinicians use benzodiazepines for muscle relaxation; however, they have been shown to significantly increase post-operative mortality when taken in conjunction with opioids.⁹³ In 2016 the FDA released a black box warning about the dangers of combining opioids and benzodiazepines. Furthermore, benzodiazepines have strong addictive potential. Benzodiazepine use is not recommended as there are safer, alternative medications.

Adjuncts for Stent-Related Pain

Pain after endourologic procedures represents a unique situation primarily due to the use of ureteral stents. Stent related symptoms impact daily activities and reduce quality of life in up to 80% of patients.⁹⁴ Current evidence suggests that a multimodal approach to stent-related symptoms and pain with alpha-blockers, anticholinergic medications, anti-inflammatory and opioid pain medications is likely the most effective.⁹⁵ Alpha-blockers when given

alone have been shown to decrease stent-related symptoms in terms of lower urinary symptom scores and body pain scores.^{96,95,97} Improvements can persist for more than four weeks, and both tamsulosin and alfuzosin have proven to be efficacious in this setting.⁹⁸

Anticholinergic medications have also shown to be well-tolerated for the treatment of lower urinary tract symptoms (LUTS), stent-related body pain and hematuria.⁹⁹ The beneficial effects of combined alpha-blockers and antimuscarinics have been demonstrated to be potentially superior to either alpha-blockers or antimuscarinics alone.^{100, 101} Phenazopyridine, an oral local anesthetic, has not been shown to improve stent-related symptoms over placebo although this mediation has not been studied extensively.¹⁰²

Non-pharmacologic Interventions

Non-pharmacologic interventions have been shown to be effective in improving pain control and can be used as part of the multimodal approach to postoperative pain. By targeting the emotional and psychological aspects of the pain experience, these adjunct techniques not only improve the perception of pain but also show changes in the central nervous system and neurotransmitter activity known to be involved in pain. Moreover, these techniques could offer a precision health approach to treating anxiety, which has been consistently associated with increased opioid consumption, new chronic opioid use and increased postoperative pain.^{4,103} While behavioral interventions have promise for the management of perioperative pain and anxiety, the data supporting their use in acute pain are still limited and future studies are needed.

Mindfulness Meditation and Alternative Medicine

Mindfulness meditation, generally defined as “non-elaborative, non-judgmental awareness” of the present moment experience, has been shown to mediate the subjective experience of pain. Studies have also shown that mindfulness meditation is superior to placebo in controlling pain and is independent of endogenous opioid mechanisms.^{83,84}

Alternative medicine practices (including hypnosis, acupuncture and acupressure) may present another venue to impact postoperative pain. Acupuncture analgesia involves insertion of needles into specific “acupoints.” Its mechanism of analgesia is not fully understood but involves multiple levels of the central nervous system and many signal molecules and receptors including the opioid peptides.¹⁰⁴ Similar pain reduction, although less sustained, has been shown in patients receiving acupuncture for renal colic when compared to acetaminophen and diclofenac.¹⁰⁵ While the data for acupressure are more limited, the low-cost, self-guided nature of acupressure offers many advantages.

Summary and Recommendations

Post-operative prescribing of large amounts of opioids has become routine practice in the United States, though there is no evidence or guideline indicating its necessity and despite clear documentation of its harms. Post-operative opioid use has significant potential morbidity, including nausea, vomiting, constipation, ileus, and resultant increased emergency department visits and readmissions. Additionally, post-operative new persistent opioid use is one of the most common surgical complications of many urologic procedures, with potentially devastating lifelong effects for our patients and their families. Even if the opioids we prescribe go unused by our patients, there is a high rate of diversion into the community, furthering the opioid epidemic.

Studies within endourologic, minimally invasive, reconstructive and oncologic urology populations have shown that the majority of opioid-naïve patients may not require a post-operative opioid prescription. With use of non-opioid multi-modal medications, equivalent patient reported outcomes and substantially reduced morbidity can be achieved. If an opioid prescription is later desired it can be sent electronically, supporting a paradigm shift away from default opioid prescriptions for all post-operative patients.

If a post-operative opioid prescription is deemed necessary prior to discharge, it should be for the lowest effective dose and duration. There are multiple methods to achieve this transition in practice. For those who have protocolized what they prescribe based on procedure, we recommend a tapered approach: start by prescribing non-opioid multi-modal medications and reducing default opioid prescribing amount by 50% (i.e. decrease from 30 pills to 15 pills). If no significant impact on patient outcomes/satisfaction is observed, decrease default opioid prescribing by 50% again.

Repeat until the minimum necessary dose for the patient population is reached. Alternatively, some institutions have successfully reduced prescribing by quantifying the opioids each patient uses the day before discharge and using this to determine what to prescribe. Those who used no opioids in the 24hrs prior to discharge required none afterwards.⁵²

Table 3: Best Practices

1	Counsel patients pre-operatively about realistic post-operative goals (i.e. performing Activities of Daily Living, not zero pain), the efficacy of non-opioid multi-modal therapies and the risks of opioids
2	Non-opioid multi-modal therapies such as a combination of acetaminophen and NSAIDs should be the first line treatment for pain, unless contraindicated
3	Transition prescribing for most opioid-naïve endourologic or minimally invasive surgery patients away from default "just in case" opioid prescriptions that are not based on clinical judgement. Utilize electronic prescribing to address outpatient needs
4	If a post-operative opioid prescription is required, it should be for the lowest effective dose, based on the last 24 hours of inpatient use. Duration of <3 days is usually adequate, rarely is >7 days required. Instruct patients to only fill the prescription if needed for functional activities. Provide information on safe storage and disposal of unused opioids

While there is substantial evidence on best practices for the opioid-naïve surgical population, there is a paucity of data on patients with chronic pain or those undergoing large open procedures. These patients are historically complex to treat and are commonly excluded from studies of post-operative pain management. Strategies for these patients are developing, but we recommend: 1) Incorporation of advanced multi-modal therapies as non-opioid naive patients may already be on high doses of opioids and patients with large incisions may have multiple etiologies for their pain (muscular, neuropathic, etc). Many large centers have acute/transitional pain services to help manage chronic pain medications and/or advanced therapies; 2) Consult the patient's usual prescriber (chronic pain specialist or primary care physician) to create a plan before surgery, including post-discharge management.

The management of acute post-operative pain is evolving away from relying exclusively on opioids, but many questions remain. For example, cannabinoids are being actively evaluated for acute pain, but the data is not yet mature. Multiple organizations are now working on guidance for managing post-operative pain – the Canadian "Consensus Statement for the Prescription of Pain Medication at Discharge after Elective Adult Surgery" was published in March 2020 and the American Society of Anesthesiologists is actively working on consolidating recommendations from varied surgical societies into a consensus document. This paper will be updated periodically as new evidence and guidance emerges.

Conclusion

During the era of "Pain as the 5th vital sign," surgeons were encouraged to routinely prescribe large quantities of opioids and unwittingly played a perilous role in creating our current crisis. Mounting data confirms that post-operative opioid prescriptions for urologic patients can be dramatically reduced without harm, and many have demonstrated the feasibility of eliminating default opioid prescribing. With multi-modal therapies, urologists have the ability to help curtail this crisis by enacting measures to dramatically reduce opioid exposure to our patients and communities.

ABBREVIATIONS

Acute Kidney Injury	AKI
American Urological Association	AUA
Angiotensin-Converting Enzyme	ACE
Cardiovascular	CV
Centers for Disease Control and Prevention	CDC
Cyclooxygenase	COX
Electronic Medical Record	EMR
Estimated Glomerular Filtration Rate	eGFR
Gastrointestinal	GI
Lower Urinary Tract Symptoms	LUTS
Michigan Urological Surgery Improvement Collaborative	MUSIC
Nonsteroidal Anti-Inflammatory Drugs	NSAIDs
Patient Reported Outcomes	PROs
Transversus Abdominis Plane	TAP

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Rationale and Strategies for Reducing Urologic Post-Operative Opioid Prescribing Workgroup

Jennifer Robles, MD, MPH (Chair)
Vanderbilt University Medical Center
Nashville, TN

Nitya E. Abraham, MD
Montefiore Medical Center
New York, NY

Chad Brummett, MD
University of Michigan Medical Center
Ann Arbor, MI

Benjamin Davies, MD
University of Pittsburgh Medical Center
Pittsburgh, PA

Veena Graff, MD, MS
University of Pennsylvania Health System
Philadelphia, PA

Rajnish Gupta, MD
Vanderbilt University Medical Center
Nashville, TN

Vernon M. Pais, Jr., MD, MS
Dartmouth–Hitchcock Medical Center
Lebanon, NH

Kevan Sternberg, MD
University of Vermont Medical Center
Burlington, VT

Ruchika Talwar, MD
University of Pennsylvania Health System
Philadelphia, PA

Staff

Marybeth Farquhar, PhD, MSN, RN
Leila Rahimi, MHS
Karen Johnson, PhD
Emily Calvert, MSN, RN
Suzanne Pope, MBA
Jennifer Bertsch
Margaret Hoogland, MLS, AHIP (Medical Librarian)

The American Urological Association gratefully acknowledges the assistance of the American Society of Anesthesiologists in the creation of the white paper.

Conflict of Interest Disclosures

All workgroup members completed COI disclosures. Disclosures listed include both topic- and non-topic-related relationships.

Meeting Participant/Lecturer: *Nitya E. Abraham, MD* - Urovant
Intellectual Property: *Chad Brummett, MD*- Recro Pharma Inc., Heron Therapeutics, NIH, NIDA, MDHHS, Peripheral Perineural Dexmedetomidine
Health Publishing: *Vernon M. Pais, Jr., MD, MS*- Clinical Nephrology, Journal of Urology
Investment Interest: *Vernon M. Pais, Jr., MD, MS*- Sonomotion

Peer Reviewers

We are grateful to the persons listed below who contributed to the White Paper by providing comments during the peer review process. Their reviews do not necessarily imply endorsement of the White Paper.

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Brian Eisner, MD
Amy Krambeck, MD
Daniel Lee, MD
Una Lee, MD
Brian Linder, MD
Nicole L. Miller, MD
Hiten Patel, MD
Brian D. Sites, MD

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Justin B. Ziemba, MD