Managing Postoperative Pain

Identifying knowledge gaps and putting evidence-based guidelines into practice.

ABSTRACT: Acute postoperative pain remains undertreated despite the dramatic increase in opioid prescribing in the United States over the past 20 years. Inadequately relieved postoperative pain may be a risk factor for persistent postoperative pain, chronic pain, and disability. In an effort to promote evidence-based strategies for optimal postoperative pain management, the American Pain Society published a new postoperative pain management guideline in 2016. Its 32 recommendations for interdisciplinary and multimodal postoperative pain management are stratified according to risks and benefits, based on varying levels of evidence. This article aims to help nurses translate the recommendations into clinical practice, while providing the historical context in which the guidelines emerged and describing current events that may affect guideline implementation.

Keywords: evidence-based guidelines, opioids, pain management, postoperative pain

The consequences of widespread opioid misuse have focused the nation's attention on the issue of pain and the limited options for treating pain. Both our conceptual models for understanding pain and our efforts to improve pain management through evidence-based approaches have evolved over the past five decades and continue to do so (see Table 1[1-19]). But while public advocacy and legislative efforts focus on combating prescription opioid misuse, nurses must continue providing evidence-based care to patients with pain, which includes opioid administration as part of a multimodal approach to postoperative pain management.

In this article, we review the evidence-based clinical practice guideline on the management of postoperative pain, which was approved by the American Pain Society (APS), the American Society of Regional Anesthesia and Pain Medicine (ASRA), and the American Society of Anesthesiologists' (ASA) Committee on Regional Anesthesia, Executive Committee, and Administrative Council.[12] We explain the strength of guideline recommendations and the quality of supportive evidence, point to evidentiary gaps that provide research opportunities for nurses, and suggest ways that nurses can implement this guideline. In addition, we provide the historical context in which the guideline emerged and highlight current health care policy initiatives that may influence guideline implementation.

THE IMPORTANCE OF ADEQUATE POSTOPERATIVE PAIN RELIEF

More than 50 million surgeries are performed in the United States each year.[20-22] Research suggests that fewer than half of patients undergoing surgery will report adequate postoperative pain relief and more than 80% will report moderate to severe postoperative pain.[12,23] Inadequately controlled postoperative pain is well known to impede functional recovery and reduce quality of life. Several studies of postoperative pain further suggest an association between the intensity of pain following various types of surgery and the subsequent development of chronic pain.[24]

By Renee C.B. Manworren, PhD, APRN, PCNS-BC, AP-PMN, FAAN, Debra B. Gordon, DNP, RN, FAAN, and Robert Montgomery, DNP, RN-BC, ACNS-BC

Nurses at the Ann and Robert H. Lurie Children's Hospital of Chicago manage the postoperative pain of a baby boy following a heart transplant. Photo courtesy of the Ann and Robert H. Lurie Children's Hospital of Chicago.

Postoperative patients with chronic pain. It may be particularly challenging to manage acute postoperative pain in patients who have been using analgesic opioid therapy to treat their chronic pain. In the United States, more than 100 million adults have chronic pain,[25] and those who require surgery may be at risk for inadequate postoperative pain relief, particularly if they have been treating their chronic pain with opioids and are now opioid tolerant. Managing acute postoperative pain in patients who have developed opioid tolerance may require the use of higher opioid dosages, with the accompanying dose-dependent risks.[13]

THE APS GUIDELINE

The clinical practice guideline on the management of postoperative pain endorsed by the APS, ASRA, and ASA sought to promote safe and effective evidence-based postoperative pain management for children and adults, including pregnant women.[12] To develop the guideline, investigators reviewed more than 6,500 abstracts published between 1992—when the Agency for Health Care Policy and Research (now the Agency for Healthcare Research and Quality [AHRQ]) released the clinical practice guideline *Acute Pain Management: Operative or Medical Procedures and Trauma*—and December 2015. The guideline committee also considered reference lists of relevant articles, including 107 systematic reviews and 858 primary studies not included in the systematic reviews, and suggestions from expert reviewers. The stated goal of the resulting guideline is "to promote evidence-based, effective, and safer postoperative pain management in children and adults."[12] The evidence review and final guideline includes 32 recommendations for the management of postoperative pain, covering preoperative education, perioperative pain management planning, use of pharmacologic and nonpharmacologic treatment strategies, organizational policies and procedures, and transition to outpatient care (see Table 2[12]).

Strength of recommendations and quality of evidence. The APS guideline development process used methods adapted from the Grading of Recommendations Assessment, Development and Evaluation (GRADE) working group and the AHRQ Effective

Table 1. Historical and Current Events That Have Influenced Pain Care

Year	Event
1965	Melzack and Wall articulate the gate control theory.[1]
1968	Margo McCaffery, MS, RN, defines pain: "Pain is whatever the experiencing person says it is, existing whenever he says it does."[2]
1979	The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage."[3]
1980	J.D. Loeser, MD, explains pain as a biopsychosocial construct.[4]
1992	The Agency for Health Care Policy and Research (now the Agency for Healthcare Research and Quality) publishes the guideline *Acute Pain Management: Operative or Medical Procedures and Trauma*.[5]
1995	James Campbell, MD, president of the American Pain Society (APS), coins the term "fifth vital sign," suggesting that "quality care means that pain is measured and treated."[6] This idea emphasizes that assessing pain is as important as assessing the four traditional vital signs (pulse, blood pressure, respiration, temperature) and that clinicians need to act when patients report pain.
2001	For the first time, hospitals are surveyed by the Joint Commission on Accreditation of Healthcare Organizations (now the Joint Commission) using standards for pain assessment and management.[7]
2006	Patient satisfaction with pain management becomes part of the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey.[8]
2012	• The HCAHPS survey becomes part of the Hospital Value-Based Purchasing program.[8] • The Joint Commission publishes a *Sentinel Event Alert*, "Safe Use of Opioids in Hospitals," urging hospitals to take specific steps to prevent deaths from opioid use.[9]
2015	• The U.S. Department of Health and Human Services (HHS) makes the opioid epidemic a top priority, aiming to reverse opioid overdoses by targeting prescription practices, expanding substance abuse treatment, and increasing access to naloxone.[10] • The Joint Commission standard PC.01.02.07 EP 4 is revised to clarify that both pharmacologic and nonpharmacologic approaches, as well as potential patient benefits and risks, may be considered when determining the most appropriate interventions for pain. When using medications to treat pain, the risks of dependency, addiction, and opioid abuse should be considered.[11]
2016	• Call for reexamination of Joint Commission pain standards • Call for the Centers for Medicare and Medicaid Services (CMS) to remove patient satisfaction with pain management from the HCAHPS survey
February 2016	The APS publishes a clinical guideline on the management of postoperative pain.[12]
March 2016	The Centers for Disease Control and Prevention publishes a guideline for prescribing opioids for chronic pain in response to the opioid epidemic, creating controversy among providers and policymakers.[13]
April 2016	The *Joint Commission Statement on Pain Management* corrects misconceptions about pain standards.[14]
November 2016	The CMS begins finalizing removal of the pain management dimension from the scoring formula used in the Hospital Value-Based Purchasing program, with payment adjustments beginning in fiscal year 2018. Pain management questions remain on the HCAHPS survey and the pain management measure will continue to be publicly reported on Hospital Compare.[15]
June 2017	The CMS publishes newly proposed rules regarding pain in the Hospital Inpatient Prospective Payment System for Federal Fiscal Year 2020 for public comment by June 13, 2017.[16]
July 2017	The Joint Commission releases new standards for pain and opioid stewardship.[17]
October 2017	• President Trump directs the HHS to declare the opioid epidemic a public health emergency.[18] • The Federal Pain Research Strategy is released.[19]
January 2018	The Joint Commission begins surveying hospitals using the new pain standards.

Health Care Program to rate each recommendation based on the strength (strong or weak) and quality (high, moderate, or low) of the evidence.[12, 26, 27] Strong recommendations are those that "can apply to most patients in most circumstances without reservation,"[26] or those for which the benefits clearly outweigh potential harms.[12] Recommendations were rated weak when the "best action may differ depending on circumstances or patients' or societal values,"[26] or when the evidentiary weight of benefits to risks is smaller.[12] Grading of the evidence "considered the type, number, size, and quality of studies; strength of associations or effects; and consistency of results among studies."[12] Of the 32 recommendations, four were judged to be based on high-quality evidence and 11 on low-quality evidence.

nonpharmacologic interventions, combination or multimodal analgesia, monitoring of patient response to postoperative pain management, neuraxial and regional analgesic techniques, and delivery of organizational care.[30] Further investigation in each of these areas is needed to advance our understanding of postoperative pain management.

CONCERNS ABOUT LONG-TERM OPIOID USE

Since long-term opioid use to treat chronic pain often begins with acute pain treatment, some recommendations from the Centers for Disease Control and Prevention (CDC) guideline for prescribing opioids for chronic pain[13] may be relevant in managing acute postoperative pain. For example, the CDC guideline, which is based on scientific evidence, informed expert opinion, and public input, recognizes that opioids are indicated for the treatment of severe acute pain and recommends they be prescribed at the lowest effective dose for no longer than the expected duration of severe pain. The guideline, however, makes no recommendation for postoperative use of opioids, clearly stating that opioid treatment for postsurgical pain is outside its scope.[13]

Guideline recommendations with low-quality or insufficient evidence ratings represent research opportunities for nurses, whose knowledge of pain integrates the behavioral and biological sciences and is critical for furthering postoperative pain management.

Research opportunities for nurses. Guideline recommendations with low-quality or insufficient evidence ratings represent research opportunities for nurses, whose knowledge of pain integrates the behavioral and biological sciences and is critical for furthering postoperative pain management. The APS, ASRA, and ASA guideline panel found insufficient evidence to either support or discourage the use of a number of therapies commonly used to treat postoperative pain. Ice, for example, is often applied to surgical sites to provide local analgesia and reduce swelling. However, studies of localized cold therapy have reported inconsistent results, often finding no differences in postoperative pain or analgesic use among patients who did and did not receive cold therapy for pain or swelling.[28, 29] The application of ice is relatively safe, inexpensive, and acceptable to most patients, and its recommendation is within the nurse's scope of practice in most states. Nursing studies seeking to clarify the comparative effectiveness of postoperative cold therapy in different patient populations undergoing various surgical procedures could, therefore, fill significant research gaps. Other areas identified by members of the guideline panel as providing insufficient evidence to inform clinical practice include best timing and optimal methods for delivering perioperative patient education,

Although the CDC guideline recommends limiting opioid prescriptions for acute pain that is *nonsurgical* and *nontraumatic*, it does so on the basis of experts' clinical experience, rather than on scientific evidence—and the expert opinion cited ranges widely from three or fewer days to rarely more than seven.[13] The expert opinions expressed in this guideline may have been erroneously applied as evidence for developing health care policy initiatives regarding acute pain management, including postoperative opioid use. Because of the lack of evidence supporting any particular practice for prescribing opioids for inpatient or at-home use following surgery, the APS guideline provides no recommendation for duration of postoperative opioid prescribing.

The Centers for Medicare and Medicaid Services (CMS) has prioritized the use of evidence-based practices for managing acute and chronic pain as a strategy

Table 2. Recommendations from the Clinical Practice Guideline on the Management of Postoperative Pain endorsed by the APS, the ASRA, and the ASA[12]

Strong recommendation, High-quality evidence
• Offer multimodal analgesia for the treatment of perioperative pain in children and adults.
• Provide children and adults who have no contraindications acetaminophen or NSAIDs as part of multimodal analgesia for the management of postoperative pain.
• Offer neuraxial analgesia with opioids, local anesthetics, or both for major thoracic and abdominal procedures, particularly in patients at risk for cardiac complications, pulmonary complications, or prolonged ileus.
• Consider surgical site–specific peripheral regional anesthetic techniques in children and adults for procedures with evidence indicating efficacy.
Strong recommendation, Moderate-quality evidence
• Consider a preoperative dose of oral celecoxib for adult patients without contraindications.
• Consider gabapentin or pregabalin as a component of multimodal analgesia.
• Choose oral over IV administration of opioids for postoperative analgesia in patients who can use the oral route.
• Use postoperative IV patient-controlled analgesia when the parenteral route is needed.
• Use topical local anesthetics in combination with nerve blocks prior to circumcision.
• Use continuous, local anesthetic-based peripheral regional analgesic techniques when the need for analgesia is likely to exceed the duration of effect of a single injection.
• **AVOID** using the intramuscular route in the administration of analgesics for the management of postoperative pain.
• **AVOID** the neuraxial administration of magnesium, benzodiazepines, neostigmine, tramadol, and ketamine in the treatment of postoperative pain.
• **NOT RECOMMENDED:** routine basal infusion of opioids with IV patient-controlled analgesia in opioid-naive adults
• **NOT RECOMMENDED:** intrapleural analgesia with local anesthetics for pain control after thoracic surgery
Strong recommendation, Low-quality evidence
• Have an organizational structure in place that allows policies and processes for postoperative pain control to be developed and refined.
• Provide access to consultation with a pain specialist for patients who have or are at risk for inadequately controlled postoperative pain.
• Have policies and procedures that support the safe delivery of neuraxial analgesia and continuous peripheral blocks and training in the management of these procedures.
• To guide the perioperative pain management plan, conduct a preoperative evaluation of comorbidities, medications, history of chronic pain, substance abuse, and prior postoperative treatment and responses.
• Use a validated pain assessment tool to track postoperative pain treatment response and adjust the treatment plan accordingly.
• Adjust the postoperative pain management plan based on adequacy of pain relief and adverse events.
• Provide appropriate monitoring of patients receiving systemic opioids for postoperative analgesia.
• Provide appropriate monitoring of patients who receive neuraxial interventions for perioperative analgesia.
• Provide patient- and family-centered, individually tailored education on the management of postoperative pain; document the plan and goals for postoperative pain management.
• Provide education to all patients and primary caregivers on the pain treatment plan.
• Provide instruction to parents (or other adult caregivers) of children undergoing surgery on developmentally appropriate methods of assessing pain as well as counseling on appropriate administration of analgesics.

Table 2. Continued

Weak recommendation, Moderate-quality evidence
• Consider IV ketamine as a component of multimodal analgesia in adults.
• Consider IV lidocaine infusions in adults undergoing open and laparoscopic abdominal surgery.
• Consider surgical site–specific local anesthetic infiltration for procedures with evidence indicating efficacy.
• Consider addition of clonidine as an adjuvant for prolongation of analgesia with a single-injection peripheral neural blockade.
• Consider TENS as an adjunct to other postoperative pain treatments.
• Consider using cognitive modalities as part of a multimodal approach.
Insufficient evidence
• Use acupuncture, massage, or cold therapy as adjuncts to other postoperative pain treatments.

APS = American Pain Society; ASRA = American Society of Regional Anesthesia and Pain Medicine; ASA = American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council; NSAID = nonsteroidal antiinflammatory drug; TENS = transcutaneous electrical nerve stimulation.

for combating opioid misuse. On April 28, 2017, the CMS proposed new rules for pain management in the Hospital Inpatient Prospective Payment System for Federal Fiscal Year 2020; the proposed rules were open for public comment through June 13, 2017.[16] The proposed rules would update the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey measure, revising the three questions that address Communication About Pain During the Hospital Stay to eliminate any perceived financial pressure to overprescribe opioids. Two of the newly proposed questions focus on the following issues[16]:

- shared decision making
- discussion of treatment options, including opioid, nonopioid, and nonpharmacologic pain management strategies
- patient understanding of treatment options
- patient engagement in pain care

Analyses of the new Communication About Pain composite measure, which includes how often staff talked about pain and how often staff discussed how to treat pain while in the hospital, reveal that the measure has strong reliability and validity; however, pain management nurses are calling for evidence to support the proposed response options—never, sometimes, usually, or always—as measures of hospital processes and performance expectations. In the past, "always" has been the desired patient response for HCAHPS questions, but it is unclear how patient responses to these proposed measures will be interpreted going forward. At press time, the new rules had not yet been finalized.

A FEDERAL RESEARCH AGENDA

The planning committee of the Federal Pain Research Strategy, an initiative of the Interagency Pain Research Coordinating Committee and the National Institutes of Health, Office of Pain Policy, developed an organizational and structural plan that fosters a federal research agenda seeking to improve our understanding and management of pain, including postoperative pain.[31] The five key areas that provide the framework for identifying research priorities are as follows:

- prevention of acute and chronic pain
- acute pain and acute pain management
- the transition from acute to chronic pain
- chronic pain and chronic pain management
- disparities in pain and pain care

The five work groups of the Federal Pain Research Strategy planning committee completed their discussions and posted a draft of research priorities for public comment from May 25 through June 6, 2017. The Federal Pain Research Strategy was released in October 2017.[19]

Nurses must be able to distinguish clinical practices supported by strong evidence from those with insufficient or weak evidence, as well as evidence-based recommendations from expert opinion.

GUIDELINE IMPLEMENTATION

The Joint Commission has approved revised pain assessment and management standards for its hospital

accreditation program. The standards were released in July 2017[17] and will become effective January 1, 2018. Revisions will be included in the 2018 hospital accreditation manual. The standards stress the need to focus on evidence-based care. Nurses must be able to distinguish clinical practices supported by strong evidence from those with insufficient or weak evidence, as well as evidence-based recommendations from expert opinion.

Nurses are in a position to improve the quality of acute pain management by advocating for evidence-based strategies. Although many of the APS guideline recommendations are not new, some that are well supported by good quality evidence are still infrequently implemented in the clinical practice setting. For example, transcutaneous electrical nerve stimulation (TENS) is seldom used for postoperative pain, though the guideline panel found moderate-quality evidence supporting the use of these small portable devices as an adjunct to other postoperative pain treatments.[12, 32] The source for the evidence was a systematic review of more than 20 randomized trials that found that TENS use was associated with 26.5% less analgesic consumption than placebo.[32] Before using TENS, nurses should review proper placement of electrodes, optimal treatment parameters, and patient education guidelines.

Organizational readiness. Assessing an organization's readiness to implement any or all of the APS guideline recommendations is a critical first step. For each recommendation, an interdisciplinary team of committed clinicians and organizational leaders must consider how the change will affect the organization's people, processes, resources, and systems and ask themselves the following questions:

- What steps or elements of the recommendations are currently in place?
- What are the institutional strengths for implementing the recommendations?
- Are there any institutional barriers or weaknesses to implementing the recommendations?

The team should outline strategies and actions needed to implement specific recommendations. Patient outcomes, quality metrics, and feedback mechanisms must be defined in order to measure the practice change. Targets for change completion and plans to measure changes in patient outcomes over time will ensure that the change is sustained.

Change often starts with clinical education. In 2012, the U.S. Food and Drug Administration (FDA) approved a "Blueprint for Prescriber Education for Extended-Release and Long-Acting Opioid Analgesics" as part of a risk evaluation and mitigation strategy (REMS) for these drugs.[33] The goal of the voluntary continuing education REMS was to reduce serious adverse outcomes as a result of inappropriate prescribing, misuse, and abuse of extended-release and long-acting opioid analgesics while maintaining access to opioid analgesics for patients with pain. A recent version of the blueprint represents a shift from a previous focus on risks and the use of opioids to a more holistic educational focus on acute and chronic pain management that includes pain assessment methods as well as use of nonpharmacologic interventions, nonopioid analgesics, immediate-release opioid analgesics, and extended-release and long-acting opioid analgesics. The FDA sought public comment on this version through July 10, 2017.[33] At press time, proposed additions and changes to the REMS are with the FDA for review. The release date has not been announced, but the FDA has sent formal letters to all manufacturers of immediate-release opioid analgesics, requiring them to participate in the FDA opioid REMS once it is approved.

CONCLUSION AND ACTION

Optimal postoperative pain management requires evidence-based guidance from published guidelines and clinical experts, and must consider individual patient values and preferences. We encourage nurses to use the information provided by the expert interdisciplinary panel that developed the APS guideline on the management of postoperative pain to help their patients and health care institutions navigate changing standards and regulations. Nurses can advocate for their patients by promoting evidence-based practice, implementing the recommendations of the APS guideline panel, ensuring appropriate resources are available to safely translate this guideline into practice, and further developing the scientific basis for postoperative pain management clinical practices.

READER RESPONSE

We encourage readers to share their feedback. Which APS guideline recommendations would you, could you, or did you implement in your clinical setting? What barriers to implementation were difficult or insurmountable? What new challenges to postoperative pain management were not addressed by these clinical practice guideline recommendations? Please e-mail your response to AJNPOP@luriechildrens.org. ▼

For more than 70 continuing nursing education activities on pain management topics, go to www.nursingcenter.com/ce.

Renee C.B. Manworren is director of nursing research and professional practice at the Ann and Robert H. Lurie Children's Hospital of Chicago and associate professor of pediatrics at Northwestern University's Feinberg School of Medicine. Debra B. Gordon is co-coordinator of the Harborview Integrated Pain Care Program, University of Washington, Seattle. Robert Montgomery is clinical coordinator of the Acute Pain Service, University of Colorado Hospital, University of Colorado Denver School of Medicine,

Aurora. Contact author: Renee C.B. Manworren, AJNPOP@luriechildrens.org. Debra B. Gordon is a member of the health economic advisory board of Pacira Pharmaceuticals. The authors and planners have disclosed no other potential conflicts of interest, financial or otherwise.

REFERENCES

1. Melzack R, Wall PD. Pain mechanisms: a new theory. *Science* 1965;150(3699):971-9.
2. McCaffery M. *Nursing management of the patient with pain*. Philadelphia: Lippincott; 1972.
3. International Association for the Study of Pain. Pain terms: a list with definitions and notes on usage. Recommended by the IASP Subcommittee on Taxonomy. *Pain* 1979;6(3):249.
4. Loeser JD. Perspectives on pain. In: P. Turner, editor. *Clinical pharmacy and therapeutics*. London: Macmillan; 1980.
5. Acute Pain Management Guideline Panel. *Acute pain management: operative or medical procedures and trauma*. Rockville, MD: Agency for Healthcare Research and Quality; 1992 Feb. AHCPR clinical practice guidelines, No. 1.; https://www.ncbi.nlm.nih.gov/books/NBK52153.
6. Campbell JN. APS 1995 presidential address. *J Pain* 1996; 5(1):85-8.
7. Joint Commission. *Pain management: history of the Joint Commission pain standards*. 2016. https://www.jointcommission.org/topics/pain_management.aspx.
8. Hospital Consumer Assessment of Healthcare Providers and Systems. *HCAHPS fact sheet: CAHPS hospital survey*. Baltimore, MD: Centers for Medicare and Medicaid Services; 2017 Nov. http://www.hcahpsonline.org/Files/HCAHPS_Fact_Sheet_November_2017a.pdf.
9. Joint Commission. Safe use of opioids in hospitals. *Sentinel Event Alert* 2012;(49):1-5.
10. U.S. Department of Health and Human Services. *The opioid epidemic: by the numbers*. Washington, DC; 2016. https://www.hhs.gov/sites/default/files/Factsheet-opioids-061516.pdf.
11. Joint Commission. Clarification of the pain management standard. *Jt Comm Perspect* 2014;34(11):1. https://www.jointcommission.org/assets/1/18/Clarification_of_the_Pain_Management__Standard.pdf.
12. Chou R, 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):131-57.
13. Dowell D, et al. CDC guideline for prescribing opioids for chronic pain—United States, 2016. *MMWR Recomm Rep* 2016;65(1):1-49.
14. Baker DW. *Joint Commission statement on pain management*. Oakbrook Terrace, IL: Joint Commission 2016 Apr 18. https://www.jointcommission.org/joint_commission_statement_on_pain_management.
15. Centers for Medicare and Medicaid Services. 42 CFR Parts 414, 416, 419, 482, 486, 488, and 495. Medicare program: hospital outpatient prospective payment and ambulatory surgical center payment systems and quality reporting programs; etc. [final rule with comment period and interim final rule with comment period]. Washington, DC: Federal Register, vol. 81, no. 219 / Monday, Nov 14. Rules and Regulations 2016 79562ff.
16. Department of Health and Human Services, Centers for Medicare and Medicaid Services. 42 CFR Parts 405, 412, 413, 414, 416, 486, 488, 489, and 495. Medicare program; hospital inpatient prospective payment systems for acute care hospitals, etc. Proposed rule. Washington, DC: Federal Register vol 82, #81 (Apr 28) 2017 19796 ff.
17. [no author.] Joint Commission enhances pain assessment and management requirements for accredited hospitals. *Jt Comm Perspect* 2017;37(7):1-4.
18. Hirschfeld Davis J. Trump declares opioid crisis a 'health emergency' but requests no funds. *New York Times* 2017 Oct 26. https://www.nytimes.com/2017/10/26/us/politics/trump-opioid-crisis.html.
19. Interagency Pain Research Coordinating Committee. *Federal pain research strategy overview, final report*. Bethesda, MD: National Institutes of Health; 2017. https://iprcc.nih.gov/Federal-Pain-Research-Strategy/Overview.
20. Cullen KA, et al. Ambulatory surgery in the United States, 2006. *Natl Health Stat Report* 2009(11):1-25.
21. DeFrances CJ, et al. 2006 National Hospital Discharge Survey. *Natl Health Stat Report* 2008(5):1-20.
22. National Center for Health Statistics. *Health, United States 2015: with special feature on racial and ethnic health disparities*. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2016.
23. Apfelbaum JL, et al. Postoperative pain experience: results from a national survey suggest postoperative pain continues to be undermanaged. *Anesth Analg* 2003;97(2):534-40.
24. Kehlet H, et al. Persistent postsurgical pain: risk factors and prevention. *Lancet* 2006;367(9522):1618-25.
25. Committee on Advancing Pain Research, Care, and Education, Board on Health Sciences Policy, Institute of Medicine of the National Academies. *Relieving pain in America: a blueprint for transforming prevention, care, education, and research*. Washington, DC: National Academies Press; 2011. https://www.nap.edu/catalog/13172/relieving-pain-in-america-a-blueprint-for-transforming-prevention-care#orgs.
26. Guyatt G, et al. Grading strength of recommendations and quality of evidence in clinical guidelines: report from an American College of Chest Physicians task force. *Chest* 2006;129(1):174-81.
27. Agency for Healthcare Research and Quality. *Methods guide for effectiveness and comparative effectiveness reviews*. Rockville, MD; 2015 Feb 26. AHRQ Publication No. 10(14)-EHC063-EF. https://effectivehealthcare.ahrq.gov/topics/cer-methods-guide/overview.
28. Secrist ES, et al. Pain management after outpatient anterior cruciate ligament reconstruction: a systematic review of randomized controlled trials. *Am J Sports Med* 2016;44(9):2435-47.
29. van den Bekerom MP, et al. What is the evidence for rest, ice, compression, and elevation therapy in the treatment of ankle sprains in adults? *J Athl Train* 2012;47(4):435-43.
30. Gordon DB, et al. Research gaps in practice guidelines for acute postoperative pain management in adults: findings from a review of the evidence for an American Pain Society clinical practice guideline. *J Pain* 2016;17(2):158-66.
31. National Institutes of Health, Interagency Pain Research Coordinating Committee. *Federal pain research strategy*. n.d. https://iprcc.nih.gov.
32. Bjordal JM, et al. Transcutaneous electrical nerve stimulation (TENS) can reduce postoperative analgesic consumption. A meta-analysis with assessment of optimal treatment parameters for postoperative pain. *Eur J Pain* 2003;7(2):181-8.
33. Department of Health and Human Services, Food and Drug Administration. Draft revisions to the Food and Drug Administration blueprint for prescriber education for extended-release and long-acting opioids; availability [Docket No. FDA–2017–D–2497]. Notice of availability; request for comments. Washington, DC: 82 FR 21818. Federal Register, vol. 82, no. 89. May 10 2017 21818-9.