AMERICAN ACADEMY OF OTOLARYNGOLOGY–HEAD AND NECK SURGERY FOUNDATION

Supplement

Otolaryngology–Head and Neck Surgery
2021, Vol. 164(2S) S1–S42

DOI: 10.1177/0194599821996297
http://otojournal.org
SAGE

Clinical Practice Guideline: Opioid Prescribing for Analgesia After Common Otolaryngology Operations

Samantha Anne, MD, MS[1], James "Whit" Mims, MD[2], David E. Tunkel, MD[3], Richard M. Rosenfeld, MD, MPH, MBA[4], David S. Boisoneau, MD[5], Michael J. Brenner, MD[6], John D. Cramer, MD[7], David Dickerson, MD[8,9], Sandra A. Finestone, PsyD[10], Adam J. Folbe, MD, MS[11], Deepa J. Galaiya, MD[3], Anna H. Messner, MD[12], Allison Paisley, CRNP[13], Ahmad R. Sedaghat, MD, PhD[14], Kerstin M. Stenson, MD[15], Angela K. Sturm, MD[16,17], Erin M. Lambie, MS, MPH[18], Nui Dhepyasuwan, MEd[18], and Taskin M. Monjur[18]

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

Abstract

Objective. Opioid use disorder (OUD), which includes the morbidity of dependence and mortality of overdose, has reached epidemic proportions in the United States. Overprescription of opioids can lead to chronic use and misuse, and unused narcotics after surgery can lead to their diversion. Research supports that most patients do not take all the prescribed opioids after surgery and that surgeons are the second largest prescribers of opioids in the United States. The introduction of opioids in those with OUD often begins with prescription opioids. Reducing the number of extra opioids available after surgery through smaller prescriptions, safe storage, and disposal should reduce the risk of opioid use disorder in otolaryngology patients and their families.

Purpose. The purpose of this specialty-specific guideline is to identify quality improvement opportunities in postoperative pain management of common otolaryngologic surgical procedures. These opportunities are communicated through clear actionable statements with explanation of the support in the literature, evaluation of the quality of the evidence, and recommendations on implementation. Employing these action statements should reduce the variation in care across the specialty and improve postoperative pain control while reducing risk of OUD. The target patients for the guideline are any patients treated for anticipated or reported pain within the first 30 days after undergoing common otolaryngologic procedures. The target audience of the guideline is otolaryngologists who perform surgery and clinicians who manage pain after surgical procedures. Outcomes to be considered include whether the patient has stopped using opioids, has disposed of unused opioids, and was satisfied with the pain management plan.

The guideline addresses assessment of the patient for OUD risk factors, counseling on pain expectations, and identifying factors that can affect pain duration and/or severity. It also discusses the use of multimodal analgesia as first-line treatment and the responsible use of opioids. Last, safe disposal of unused opioids is discussed.

This guideline is intended to focus on evidence-based quality improvement opportunities judged most important by the guideline development group. It is not a comprehensive guide on pain management in otolaryngologic procedures. The statements in this guideline are not intended to limit or restrict care provided by clinicians based on their experiences and assessments of individual patients.

Action Statements. The guideline development group made *strong recommendations* for the following key action statements: (3A) prior to surgery, clinicians should identify risk factors for opioid use disorder when analgesia using opioids is anticipated; (6) clinicians should advocate for nonopioid medications as first-line management of pain after otolaryngologic surgery; (9) clinicians should recommend that patients (or their caregivers) store prescribed opioids securely and dispose of unused opioids through take-back programs or another accepted method.

The guideline development group made *recommendations* for the following key action statements: (1) prior to surgery, clinicians should advise patients and others involved in the postoperative care about the expected duration and severity of pain; (2) prior to surgery, clinicians should gather information specific to the patient that modifies severity and/or duration

of pain; (3B) in patients at risk for OUD, clinicians should evaluate the need to modify the analgesia plan; (4) clinicians should promote shared decision making by informing patients of the benefits and risks of postoperative pain treatments that include nonopioid analgesics, opioid analgesics, and nonpharmacologic interventions; (5) clinicians should develop a multimodal treatment plan for managing postoperative pain; (7) when treating postoperative pain with opioids, clinicians should limit therapy to the lowest effective dose and the shortest duration; (8A) clinicians should instruct patients and caregivers how to communicate if pain is not controlled or if medication side effects occur; (8B) clinicians should educate patients to stop opioids when pain is controlled with nonopioids and stop all analgesics when pain has resolved; (10) clinicians should inquire, within 30 days of surgery, whether the patient has stopped using opioids, has disposed of unused opioids, and was satisfied with the pain management plan.

Keywords

opioids, analgesia, otolaryngology surgery

Received November 12, 2020; accepted January 29, 2021.

Introduction

The prescription of opioids has come under scrutiny due to the nationwide epidemic of opioid dependence and overdose-related deaths.[1-4] The number of opioid prescriptions written by surgeons is surpassed only by the number written by pain specialists.[5] Otolaryngologists in particular wrote nearly 1 million days' worth of opioids to Medicare beneficiaries in 2015.[6,7] Of the 65,277,932 claims made to Medicare Part D by 90,253 surgeons, otolaryngologists (who consist of 7.7% of the surgeons) accounted for nearly 10% of the claims.

The large number of opioid prescriptions can lead to chronic use, misuse, and diversion. Reported rates of misuse range from 21% to 29%, and addiction ranges from 8% to 12% in patients with chronic pain. Studies have shown that there is a significant risk of chronic opioid use even when used as short-term treatment for acute pain.[8] Nearly 10% of opioid-naïve patients who were prescribed opioids after low-pain short-stay surgery were shown to continue use of opioids at 1 year.[9] According to data from the National Survey on Drug Use and Health, >6 million individuals aged ≥12 years misuse prescription pain relievers in a given year, representing >4% of the US population.[10] Furthermore, >40% of misused prescription pain medications were attained by diversion from the intended patient.[8,11,12]

For the purpose of this guideline, we adopted the following definitions[3,13]:

- ''Pain'' is an unpleasant sensory and emotional experience associated with actual or potential tissue damage and is categorized as mild, moderate, or severe.
- ''Postoperative period'' is the period of patient recovery up to 30 days after a surgical procedure.
- ''Opioids'' are a class of medications that interact with opioid receptors, have addictive potential, and are used to treat moderate to severe pain. They are legally available for health care providers to prescribe as synthetic opioids, such as fentanyl, or prescription pain relievers, such as oxycodone, hydrocodone, and others.
- ''Analgesia'' is the absence or reduction of pain in response to stimulation that would normally be painful.
- ''Opioid use disorder,'' or ''OUD,'' is when individuals are unable to cease or appropriately reduce opioids and when their opioid use negatively affects work, school, or social responsibilities.[14]
- ''Opioid diversion'' is the transfer of prescription pain medications from the intended person to another person.

Pain management after surgery can be in the form of opioids, nonopioid analgesics, adjunctive remedies such as acupuncture, or a combination of these options. Management of pain has been addressed in guidelines published by the American Pain Society and the American Society of Anesthesiologists.[15,16] These guidelines provide recommendations on addressing perioperative pain management, including preoperative education, use of different pharmacologic modalities, and assessment of efficacy and patient well-being. This specialty-specific clinical practice guideline (CPG) has been developed through the guideline development process of the American Academy of Otolaryngology–Head and Neck Surgery Foundation (AAO-HNSF) to provide recommendations on appropriate prescribing practices for postoperative

[1]Head & Neck Institute, Cleveland, Ohio, USA; [2]Wake Forest School of Medicine, Winston-Salem, North Carolina, USA; [3]Johns Hopkins University School of Medicine, Baltimore, Maryland, USA; [4]SUNY Downstate Medical Center, Brooklyn, New York, USA; [5]Private Practice (ENT), Waterford, Connecticut, USA; [6]University of Michigan Medical School, Ann Arbor, Michigan, USA; [7]Wayne State University School of Medicine, Detroit, Michigan, USA; [8]NorthShore University Health System, Evanston, Illinois, USA; [9]University of Chicago Medicine, Chicago, Illinois, USA; [10]Association of Cancer Patient Educators, Irvine, California, USA; [11]Oakland University William Beaumont School of Medicine, Royal Oak, Michigan, USA; [12]Baylor College of Medicine/Texas Children's Hospital, Houston, Texas, USA; [13]University of Pennsylvania Otorhinolaryngology, Philadelphia, Pennsylvania, USA; [14]University of Cincinnati College of Medicine, Cincinnati, Ohio, USA; [15]Rush University Medical Center, Chicago, Illinois, USA; [16]Angela Sturm, MD, PLLC, Houston, Texas, USA; [17]University of Texas Medical Branch, Galveston, Texas, USA; [18]American Academy of Otolaryngology–Head and Neck Surgery Foundation, Alexandria, Virginia, USA.

Corresponding Author:
Samantha Anne, MD, MS, Head & Neck Institute, Cleveland Clinic, 9500 Euclid Ave A71, Cleveland, OH 44195, USA.
Email: annes@ccf.org

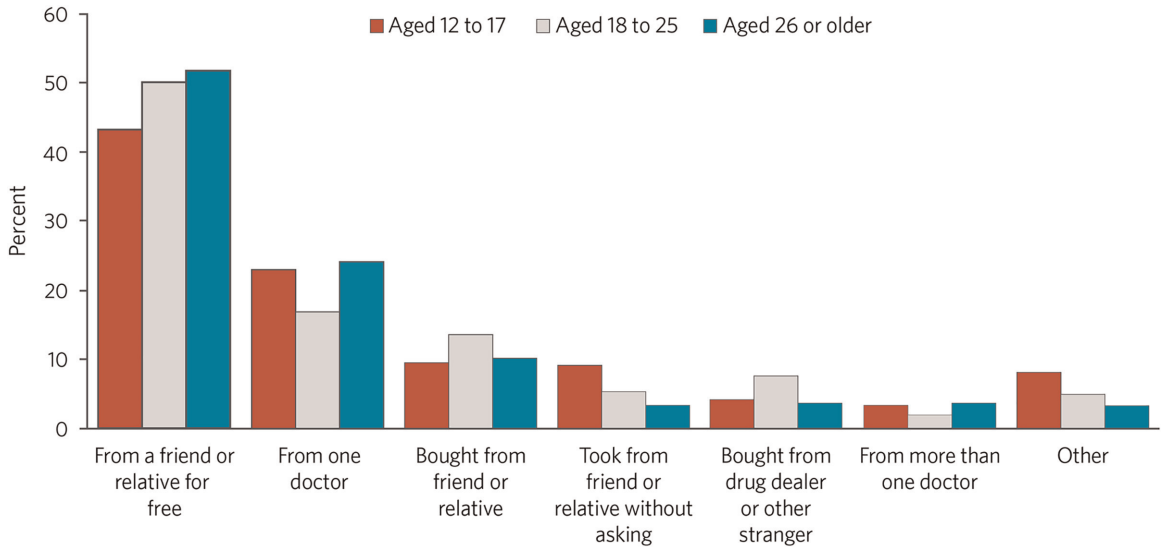

Figure 1. Source of misused prescription pain medications, by age. Source: Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, National Surveys on Drug Use and Health.[44]

pain management after common otolaryngologic surgical procedures.[17]

Guideline Scope and Purpose

The purpose of this specialty-specific CPG is to provide clinicians who treat patients with otolaryngologic disorders with evidence-based recommendations on perioperative opioid-based pain management for common otolaryngologic surgical procedures. This guideline also identifies quality improvement opportunities, including patient assessment, side effect and complication prevention, and reduction in unnecessary variation in practice. Where evidence is lacking, expert consensus is provided and detailed in the guideline.

This guideline's target patient is any individual who requires treatment for anticipated or reported pain within the first 30 days after undergoing common otolaryngologic procedures. The guideline focuses on nonparenteral opioid receptor agonists but also discusses alternatives and adjuncts to these opioids. The guideline does not apply to patients diagnosed with chronic pain (pain lasting >3 months or past the time of normal tissue healing), including those with pain related to cancer itself and not from surgery for cancer or patients already enrolled in chronic pain management.[18]

The target audience of this guideline is otolaryngologists who perform surgery and clinicians who manage pain after surgical procedures. A plain language summary will be produced for use by patients and nonclinicians. Outcomes to be measured include reduction of variation of care in prescription practices, efficacy of pain management, and safety in treatment of pain.

The focus of the guideline is on developing evidence-based recommendations and identifying quality improvement opportunities deemed most important by the developmental group after consideration of public comments. The guideline is not a comprehensive guide on pain management in otolaryngologic procedures and is not intended to limit or define care of patients.

Health Care Burden

The epidemic of opioid misuse, abuse, and overdose (collectively OUD) in the United States has overwhelmed resources available for treating substance abuse[18] and has led to lost productivity, increased health care costs, and significant mortality.[19] In addition to recreational drug abuse and opioid use for chronic pain, inappropriate opioid-prescribing practices for acute surgical pain have contributed to OUD, opioid diversion, and the opioid epidemic.[20,21]

Opioid Prescribing and Misuse

A large number of opioid prescriptions are written in the United States, some of which are used by patients with OUD. Health care providers wrote 58.2 opioid prescriptions per 100 persons in 2017, an improvement from 72.4 opioid prescriptions per 100 persons written in 2006. Despite this decrease in the number of prescriptions, 56 million persons (17.4% of the US population) filled at least 1 opioid prescription in 2017 per the Centers for Disease Control and Prevention (CDC) surveillance report and the average days of supply per prescription filled increased from 13.3 to 18.4 from 2006 to 2018.[22] The prevalence of prescription opioid misuse was surveyed at 3.6% (11.5 million persons) of the US population in 2018.[23] Sources of diverted pain medications are detailed in **Figure 1**.[24]

In a 2018 study utilizing claims data, duration of initial postoperative opioid prescription was an independent risk factor for subsequent opioid misuse.[25] In a different study, the risk of an opioid-naïve adult still taking opioids 90 days after various surgical procedures was 6%.[26] Alam et al found that opioid-naïve patients who underwent ambulatory surgery and were prescribed an opioid within 7 days of surgery were 44% more likely to have claimed an opioid prescription 1 year after

surgery (adjusted odds ratio, 1.44; 95% CI, 1.39-1.50) as compared with patients who did not receive an opioid prescription.[9] A correlation between the number of doses of prescribed opioids and the risk of prolonged opioid use has also been found. Shah et al noted that the risk of taking opioids 1 year after the initial prescription for surgery increased starting on the fourth day of opioid use and increased by 1% per day subsequently.[27]

Drug Overdose Mortality

The overall rate of death attributed to drug overdose in 2018 was 20.7 per 100,000 persons, with 46,802 overdose deaths from opioids overall.[28] Synthetic opioids other than methadone—primarily, illicitly manufactured fentanyl—accounted for the most deaths (>31,000). Prescription opioids were the second-leading cause, followed by heroin as the third, among all opioid drug overdose deaths.[23] There were 613,293 persons reported to have died from unintentional or undetermined drug overdose between 1999 and 2017 per the CDC's WONDER database.[29] Even when these medications are taken as prescribed, opioid-related deaths have been reported in otolaryngology patients. One example of inadvertent prescription opioid–related mortality is a US Food and Drug Administration (FDA) investigation that found 8 codeine-associated pediatric deaths after tonsillectomy between 1969 and 2012. This prompted a black box warning against any use of codeine for children after tonsillectomy, with or without adenoidectomy.[30,31]

Opioid Substance Abuse Direct and Indirect Costs

The medical literature contains varied terminology and criteria for inappropriate opioid use. Currently, ''OUD'' is listed in the *DSM-5* (*Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*), but opioid ''abuse,'' ''dependence,'' and ''addiction'' have also been utilized with varying diagnostic criteria.[18] Opioid ''tolerance'' and ''physical dependence'' can occur with or without OUD. Opioid tolerance is defined as needing increasing doses of opioids to maintain a defined analgesic effect.[32] Physical dependence refers to withdrawal symptoms after abrupt discontinuation or a significant dosage reduction of a drug.[32] Both tolerance and dependence are physiologic changes in the body that occur with chronic opioid therapy.[32]

In 2007 the direct health care costs of opioid abuse were estimated at $25 billion annually (all sums in US dollars).[33] A systematic review (SR) of publications on the cost of prescription opioid abuse and misuse from 2009 to 2014 estimated the societal costs (direct and indirect costs of prescription opioid abuse) at $50 billion per year.[34] In 2015 there were 44.0 emergency department visits and 23.2 hospitalizations per 100,000 persons for opioid-related poisonings.[23] In 2011 the US Department of Health and Human Services estimated that >420,000 emergency room visits were related to the misuse of prescription opioids.[35] Over the years, despite the number of prescriptions decreasing, the annual cost of the opioid crisis has continued to increase from $29.1 billion in 2001 to $78.5 billion in 2013 and an estimated $115 billion in 2017.[36,37]

Kirson et al compared 9342 matched pairs of patients with opioid abuse, overdose, or dependence with nonabusers and calculated an increase of direct medical costs in the opioid abuse cohort of $14,810 per patient per year (2012-2015). This study was done in a commercially insured population.[38] The findings were consistent with prior research that estimated costs between $10,000 and $20,000 annually per patient.[38] Similar costs per patient per year were reported in a US Veterans Affairs population (2006-2012, $15,277 to $18,847)[39] and in a Medicaid population (2002-2012, $5874 to $15,183).[40]

Indirect costs of OUD have been assessed in a small number of studies, and there is considerable variance in how prescription opioid misuse is defined and how indirect costs are measured.[19] Lost wages due to opioid-related deaths make up the largest component of the total indirect costs of the opioid epidemic. In 2011 the indirect cost of prescription opioid-related mortality was estimated at $33,664 per case and $13.9 billion annually in the United States. Average absenteeism and productivity costs were estimated at $256 million annually (2011).[41,42]

Overprescribing and Diversion of Opioids for Postoperative Pain

In a study of opioid use in ambulatory otolaryngology surgery, 75% of patients had excess opioids remaining.[42,43] Some of the unused opioid medication is diverted and has been identified as a contributor to opioid overdose and misuse.[12] Of the 11.5 million misusers of pain relievers, about half obtained the pain reliever from a relative or friend according to the 2016 National Survey on Drug Use and Health. **Figure 1** shows the sources of misused prescription pain medications.[24,44] There were age-related differences, with a statistically significant difference between those aged 12 to 17 years and those aged 18 to 25 years, 12 to 17 years and ≥26 years, and 18 to 25 years and ≥26 years.

Methods

This guideline was developed by using an explicit and transparent a priori protocol for creating actionable statements based on supporting evidence and the associated balance of harm as outlined in the third edition of ''Clinical Practice Guideline Development Manual, Third Edition: A Quality-Driven Approach for Translating Evidence Into Action.''[17]

Stakeholder Involvement

The Guideline Development Group (GDG) consisted of 16 panel members representing otolaryngology–head and neck surgery generalists and subspecialists, pain management, nursing, and consumers. The GDG conducted 3 conference calls and 2 in-person meetings, during which members defined the scope and objectives of the guideline, reviewed comments for each key action statement (KAS), identified other quality improvement opportunities, reviewed the literature search results, and drafted/revised the document.

Literature Search and Selection

An information specialist conducted 3 systematic literature searches from July through September 2019 using a validated filter strategy to identify CPGs, SRs and meta-analyses (MAs), randomized controlled trials (RCTs), and observational studies. The date range for all 3 searches was from January 1, 2009, to October 29, 2019.

The following databases were searched for relevant studies: National Guidelines Clearinghouse, CMA Infobase (Canada), National Library of Guidelines (United Kingdom), NICE (United Kingdom), SIGN (Scotland), New Zealand Guidelines Group, Australian National Health and Medical, Research Council, TRIPdatabase, PubMed, Guidelines International Network, Cochrane Library, Embase, CINAHL, BIOSIS Previews, ISI Web of Science, AHRQ, and HSTAT. The databases were searched by controlled vocabulary words and synonymous free-text words for the topic of interest (opioids and analgesics). The search strategies were adjusted for the syntax appropriate for each database/platform. The search was not limited to clinical study design and was limited to the English language. The full strategy is found in Appendixes A to D. To narrow the search for RCTs, GDG members representing general and subspecialty otolaryngology provided their most commonly encountered otolaryngologic procedures in practice and experience to include as potential search terms in the literature search. These procedures were cross-referenced and combined with a list of otolaryngology case-log coding recommendations provided by the Accreditation Council for Graduate Medical Education for otolaryngology residency programs and utilized in the RCT literature search.

The initial English-language searches identified 27 CPGs, 64 SRs/MAs, 14 RCTs, and 64 observational studies published through September 2019. CPGs were included if they met quality criteria of (1) an explicit scope and purpose, (2) multidisciplinary stakeholder involvement, (3) systematic literature review, (4) explicit system for ranking evidence, and (5) explicit system for linking evidence to recommendations. SRs/MAs were emphasized and included if they met quality criteria of (1) clear objective and methodology, (2) explicit search strategy, and (3) valid data extraction methods. RCTs were included if they met the following quality criteria: (1) trials involved study randomization; (2) trials were described as double-blind; and (3) trials denoted a clear description of withdrawals and dropouts of study participants. Once initial results were received, the chair and assistant chair of the GDG reviewed and appraised the studies for relevance and quality. After removal of duplicates, irrelevant references, and non-English-language articles, the 2 reviewers retained 3 CPGs, 40 SRs/MAs, 10 RCTs, and 53 observational studies that met predefined inclusion criteria. The GDG did not conduct any de novo SRs but instead used SRs, as described earlier, to locate, appraise, and synthesize the best evidence. Additional background evidence included observational studies, as needed, to supplement and fill knowledge gaps when a review was not available. Therefore, in total, the evidence supporting this guideline includes 7 CPGs, 35 SRs/MAs, 28 RCTs, and 136 observational and other studies.

Classification of Evidence-Based Statements

Guidelines are intended to produce optimal health outcomes for patients, to minimize harm, and to reduce inappropriate variations in clinical care. The evidence-based approach to guideline development requires that the evidence supporting a policy be identified, appraised, and summarized and that an explicit link between evidence and statements be defined. Evidence-based statements reflect both the *grade (level) of aggregate evidence* and the *balance of benefit and harm* that is anticipated when the statement is followed. **Table 1** defines the grades of aggregate evidence,[45] and **Table 2** defines the strength of action (obligation) based on the interaction of grade and benefit-harm balance.[46]

Development of KASs

KASs were developed following the 3 literature searches and the assessment of the evidence. The GDG proposed topics within the scope of the guideline supported by the evidence and where there are perceived gaps in care. A preliminary list of quality improvement topics was released for public comment. The resulting topics gathered from the public comment were ranked by importance among the GDG members. In total 19 topics were determined and ranked by the GDG prior to the first in-person meeting. An explicit and transparent a priori protocol was used for creating actionable statements based on supporting evidence and the associated balance of benefit and harm, with assistance from electronic decision support software (BRIDGE-Wiz; Yale Center for Medical Informatics) to facilitate creating actionable recommendations and evidence profiles.[47]

After the KASs were derived, the GDG debated the strength of the recommendation and the strength of evidence. The KASs are followed by action statement profiles as determined by the GDG. GDG members were then assigned primary and secondary writing assignments for the KASs, and the final drafts were compiled for GDG review. The guideline then used GuideLine Implementability Appraisal to assess adherence to methodologic standards, to improve clarity of recommendations, and to predict potential obstacles to implementation.[48] The GDG received summary appraisals and modified an advanced draft of the guideline based on the appraisal. The draft was again revised based on comments received during multidisciplinary peer review, open public comment, and journal editorial peer review, resulting in the final manuscript. A scheduled review process will occur at 5 years from publication or sooner if new compelling evidence warrants earlier consideration.

Guidelines are not intended to supersede professional judgment but rather may be viewed as a relative constraint on individual clinician discretion in a particular clinical circumstance. Less frequent variation in practice is expected for a strong recommendation than for a recommendation. Options offer the most opportunity for practice variability.[49] Clinicians should always act and decide in a way that they believe

Table 1. Grades of Aggregate Evidence.[a]

Grade	OCEBM level	Treatment	Harm	Diagnosis	Prognosis
A	1	Systematic review[b] of randomized trials	Systematic review[b] of randomized trials, nested case-control studies, or observational studies with dramatic effect	Systematic review[b] of cross-sectional studies with consistently applied reference standard and blinding	Systematic review[b] of inception cohort studies[c]
B	2	Randomized trials or observational studies with dramatic effects or highly consistent evidence	Randomized trials or observational studies with dramatic effects or highly consistent evidence	Cross-sectional studies with consistently applied reference standard and blinding	Inception cohort studies[c]
C	3-4	Nonrandomized or historically controlled studies, including case-control and observational studies	Nonrandomized controlled cohort or follow-up study (postmarketing surveillance) with sufficient numbers to rule out a common harm; case-series, case-control, or historically controlled studies	Nonconsecutive studies, case-control studies, or studies with poor, nonindependent, or inconsistently applied reference standards	Cohort study, control arm of a randomized trial, case series, or case-control studies; poor-quality prognostic cohort study
D	5	Case reports, mechanism-based reasoning, or reasoning from first principles			
X	NA	Exceptional situations where validating studies cannot be performed and there is a clear preponderance of benefit over harm			

Abbreviation: NA, not applicable; OCEBM, Oxford Centre for Evidence-Based Medicine.
[a]Adapted from Howick and colleagues (Oxford Centre for Evidence-Based Medicine Work Group).[45]
[b]A systematic review may be downgraded to level B because of study limitations, heterogeneity, or imprecision.
[c]A group of individuals identified for subsequent study at an early uniform point in the course of the specified health condition or before the condition develops.

will best serve their patients' interests and needs, regardless of guideline recommendations. They must also operate within their scope of practice and according to their training. Guidelines represent the best judgment of the GDG addressing the current evidence for a particular topic.[46] Making recommendations about health practices involves value judgments on the desirability of various outcomes associated with management options. Values applied by the GDG sought to minimize harm and diminish unnecessary and inappropriate therapy. A major goal of the GDG was to be transparent and explicit about how values were applied and to document the process.

Financial Disclosure and Conflicts of Interest

The cost of developing this guideline, including travel expenses of all panel members, was covered in full by the AAO-HNSF. Potential conflicts of interest for all panel members in the past 2 years were compiled and distributed before the first conference call. After review and discussion of these disclosures,[50] the panel concluded that individuals with potential conflicts could remain on the panel if they (1) reminded the panel of potential conflicts before any related discussion, (2) recused themselves from a related discussion if asked by the panel, and (3) agreed not to discuss any aspect of the guideline with industry before publication. Last, panelists were reminded that conflicts of interest extend beyond financial relationships and may include personal experiences, the ways that a participant earns a living, and the participant's previously established stake in an issue.[51] Conflicts were again delineated at the start of the in-person meeting and each teleconference meeting, with the same caveats followed. All conflicts are disclosed at the end of this document.

Guideline KASs

Each evidence-based statement is organized in a similar fashion: a KAS is in bold, followed by the strength of the recommendation in italics. Each KAS is followed by an action statement profile that explicitly states the quality improvement opportunity, aggregate evidence quality, level of confidence in evidence (high, medium, low), benefit, harms, risks, costs, and a benefits-harm assessment. Additionally, there are statements of any value judgments, the role of patient preferences, clarification of any intentional vagueness by the panel, exceptions to the statement, any differences of opinion, and a

Table 2. Strength of Action Terms in Guideline Statements and Implied Levels of Obligation.

Strength	Definition	Implied obligation
Strong recommendation	A strong recommendation means that the benefits of the recommended approach clearly exceed the harms (or, in the case of a strong negative recommendation, the harms clearly exceed the benefits) and that the quality of the supporting evidence is high (grade A or B).[a] In some clearly identified circumstances, strong recommendations may be based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits strongly outweigh the harms.	Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
Recommendation	A recommendation means that the benefits exceed the harms (or, in the case of a negative recommendation, the harms exceed the benefits) but the quality of evidence is not as high (grade B or C).[a] In some clearly identified circumstances, recommendations may be based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits outweigh the harms.	Clinicians should also generally follow a recommendation but should remain alert to new information and sensitive to patient preferences.
Option	An option means that either the quality of evidence is suspect (grade D)[a] or that well-done studies (grade A, B, or C)[a] show little clear advantage to one approach versus another.	Clinicians should be flexible in their decision making regarding appropriate practice, although they may set bounds on alternatives; patient preference should have a substantial influencing role.

[a]Adapted from the classification scheme of the American Academy of Pediatrics.[46] **Table 1** provides definitions of evidence grades.

repeat statement of the strength of the recommendation. Several paragraphs subsequently discuss the evidence supporting the statement. An overview of each evidence-based statement in this guideline can be found in **Table 3**.

For the purposes of this guideline, ''shared decision making'' refers to the exchange of information regarding treatment risks and benefits, as well as the expression of patient preferences and values, which result in mutual responsibility in decisions regarding treatment and care.[52]

Key Action Statements

STATEMENT 1. EXPECTED PAIN: Prior to surgery, clinicians should advise patients and others involved in the postoperative care about the expected duration and severity of pain. *Recommendation based on observational studies with a preponderance of benefit over harms.*

Action Statement Profile: 1

- Quality improvement opportunity: Align patient expectations with actual pain severity and duration and reducing uncertainty regarding recovery (National Quality Strategy Domain: Engaging Patients).
- Aggregate evidence quality: Grade C, based on observational studies in otolaryngology populations; indirect evidence from RCTs in other specialties.
- Level of confidence in evidence: High.
- Benefits: Educate about expected pain severity, manage expectations for pain and treatment, ensure that expectations are aligned with the experience of clinicians, relieve patient anxiety, enable informed decisions for elective procedures, ensure shared decisions for surgery.
- Risk, harm, cost: Increased patient anxiety, potential for discrepancy between predicted and observed pain, delay or deferral of treatment.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: None.
- Intentional vagueness: Method of counseling not specified (oral, written, videos).
- Role of patient preferences: None to limited regarding counseling; high regarding inclusion of caregivers/others in the counseling process.
- Exclusions: None.
- Policy level: Recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to ensure that patients are informed, prior to surgery, about the expected duration and severity of postoperative pain and the plan to manage postoperative pain.

Data and clinical experience indicate that presurgical patients have concerns about postoperative pain. Jawaid et al surveyed preoperative patients awaiting elective surgery, and 78.8% identified postoperative pain as a source of anxiety.[53]

Table 3. Summary of Guideline Key Action Statements.

Statement	Action	Strength
KAS 1: Expected pain	Prior to surgery, clinicians should advise patients and others involved in the postoperative care about the expected duration and severity of pain.	Recommendation
KAS 2: Modifying factors	Prior to surgery, clinicians should gather information specific to the patient that modifies severity and/or duration of pain.	Recommendation
KAS 3A: Risk factors for opioid use disorder	Prior to surgery, clinicians should identify risk factors for OUD when analgesia using opioids is anticipated.	Strong recommendation
KAS 3B: Patients at risk for opioid use disorder	In patients at risk for OUD, clinicians should evaluate the need to modify the analgesia plan.	Recommendation
KAS 4: Shared decision making	Clinicians should promote shared decision making by informing patients of the benefits and risks of postoperative pain treatments that include nonopioid analgesics, opioid analgesics, and nonpharmacologic interventions.	Recommendation
KAS 5: Multimodal therapy	Clinicians should develop a multimodal treatment plan for managing postoperative pain.	Recommendation
KAS 6: Nonopioid analgesia	Clinicians should advocate for nonopioid medications as first-line management of pain after otolaryngologic surgery.	Strong recommendation
KAS 7: Opioid prescribing	When treating postoperative pain with opioids, clinicians should limit therapy to the lowest effective dose and the shortest duration.	Recommendation
KAS 8A: Patient feedback	Clinicians should instruct patients and caregivers how to communicate if pain is not controlled or if medication side effects occur.	Recommendation
KAS 8B: Stopping pain medications	Clinicians should educate patients to stop opioids when pain is controlled with nonopioids and to stop all analgesics when pain has resolved.	Recommendation
KAS 9: Storage and disposal of opioids	Clinicians should recommend that patients (or their caregivers) store prescribed opioids securely and dispose of unused opioids through take-back programs or another accepted method.	Strong recommendation
KAS 10: Assessment of pain control with opioids	Clinicians should inquire, within 30 days of surgery, whether the patient has stopped using opioids, has disposed of unused opioids, and was satisfied with the pain management plan.	Recommendation

Abbreviations: KAS, key action statement; OUD, opioid use disorder.

Preoperative anxiety is associated with multiple poor postoperative outcome measures, including increased use of analgesics.[54] The duration of postoperative pain is also a patient concern because it may affect child care, school, work, and need of assistance after surgery.

Studies have reported that counseling and education about postoperative pain reduces anxiety,[16,55-58] prescribed opioids,[59] postsurgical opioid consumption,[60-62] and length of hospital stay.[57,60,63,64] Timing of the counseling also has been shown to be important. Alter and Ilyas found that early preoperative counseling was more effective than counseling on the day of surgery in reducing the consumption of opioid pills after carpal tunnel surgery.[62] Studies examining preoperative education focus on surgical procedures where substantial postoperative pain is expected, and less is known about less painful surgery.[16] Within otolaryngology, Wittekindt et al found that preoperative pain counseling before septorhinoplasty led to higher satisfaction, fewer breathing disturbances, and less mood disturbance.[65]

Pain duration and severity after other common otolaryngologic surgical procedures is not fully researched, and there is no consensus on how postoperative pain is best measured or treated. **Table 4** summarizes available data on the severity of postoperative pain from articles based on this guideline's literature searches (see Methods). Of note, oral and pharyngeal surgery, including tonsillectomy, is associated with more postoperative pain than most other common surgical procedures performed by otolaryngologists.

Surveys have assessed how many opioids were taken after common otolaryngologic surgical procedures (refer to KAS 7 and Appendix E). While the studies are heterogeneous in methods and outcomes, they collectively provide an overview of how many pain medications are consumed on average for a range of otolaryngologic surgery.

Preoperative counseling has been shown to improve patient experience and anxiety. Counseling on expected pain severity and duration from a procedure may help shape patient expectations as a pain management plan is discussed. Topics

Table 4. Duration of Analgesia Use and Severity of Pain After Common Otolaryngology Surgical Procedures.

Procedure	Expected duration of pain, days	Expected severity of pain[a]
Adult		
Tonsillectomy[66,164,166-169,217,218]	10-14	Moderate-severe
Mandibular fracture repair[66,184,192]	3-5	Mild-moderate
Midface fracture repair[192]	2-4	Mild-moderate
Septoplasty[66,153,172,182]	2-5	Mild-moderate
Rhinoplasty[66,152,153,182,200]	2-5	Mild-moderate
Endoscopic sinus surgery[66,147,150,152-154,172-174,219]	3-5	Mild-moderate
Turbinate surgery[173]	1-3	Mild-moderate
Otologic surgery[66,152,176,177,210]	2-4	Mild-moderate
Thyroid surgery[66,151,152,165,170,171,187,220,221]	1-3	Mild-moderate
Parathyroidectomy[151,152,164,171,187,220,221]	1-3	Mild
Parotidectomy[66,165]	3-5	Mild-moderate
Cervical lymph node biopsy[66]	1-3	Mild
Microdirect laryngoscopy[152,178]	1-3	Mild
Adolescent (age, 12-18 years)		
Adolescent tonsillectomy[183,222,223]	5-10	Moderate-severe
Pediatric (age, 0-12 years)		
Adenotonsillectomy[126,222,224-226]	5-10	Mild-moderate
Adenoidectomy[224]	1-2	Mild
Myringotomy and tube placement[180,181]	0	Mild

[a]Mild, unlikely to need opioid medication; moderate, may need small amount of opioid medication; severe, likely to need opioid medication for breakthrough pain.

that could be included in preoperative counseling are listed in the box.

An Example of Preoperative Counseling on Postsurgical Pain.

Discuss:

- Patient expectation of postoperative pain
- Expected duration and severity of postoperative pain
- Plan to control postoperative pain, including quantity of medications prescribed
- Risks/benefits of postoperative pain medications
- Ways to store and discard opioid medications

STATEMENT 2. MODIFYING FACTORS: Prior to surgery, clinicians should gather information specific to the patient that modifies severity and/or duration of pain. *Recommendation based on observational studies with a preponderance of benefit over harms.*

Action Statement Profile: 2

- Quality improvement opportunity: Individualize assessment and plan for patient pain management and to encourage explicit thinking by clinicians about factors that will modify pain after surgery (National Quality Strategy Domain: Promoting Effective Prevention/Treatments).
- Aggregate evidence quality: Grade C, based on observational studies.
- Level of confidence in evidence: High.
- Benefits: Individualize the plan for analgesia for the specific patient and clinical setting, improve patient satisfaction/expectation, minimize overtreatment or undertreatment of pain, engage patient in design of postoperative pain management, reduce potential bias, and decrease disparities in pain management.
- Risk, harm, cost: Information may lead to inaccurate estimates of pain, administrative burden of gathering and documenting information, heightened implicit bias.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: This inquiry may not be done routinely; this is independent but complementary to assessing risk profile for OUD.
- Intentional vagueness: Method of inquiry not specified; may involve written survey, interview, or standardized history.
- Role of patient preferences: None.
- Exclusions: None.
- Policy level: Recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to encourage the clinician to consider procedure-related factors and to take a preoperative

patient history that may identify factors that may increase postoperative pain.

Although the evidence is relatively weak, there is a published CPG and study about management of postoperative pain that addresses patient- and procedure-related factors.[16,66] Based on a patient's history, the postoperative pain plan may need to be adjusted to reflect the likelihood of increased postoperative pain. It is also important to ask about the patient's experience with prior postoperative pain control to help guide the surgeon in the postoperative care.[16]

Investigators have tried to study preoperative factors that may lead to increased need for pain medications after surgery. The evidence is heterogeneous in the literature. Patients with a history of preoperative pain treatment are likely to experience increased postoperative pain and may need increased pain management throughout the postoperative period. The amount of opioids used in the preprocedure period may result in patient tolerance of opioid medications and the need for an increased dosage scheme.[16] Demographic factors, such as age and sex, have been studied. Some studies demonstrated that younger patients, female patients, and patients who abuse tobacco have higher analgesic requirements, although other studies demonstrated no difference between sexes.[67,68] There have been several studies about the differences in postoperative pain among races. Studies of children after tonsillectomy and adults after orthopedic surgery demonstrated that African American patients experienced increased pain when compared with Hispanic and White patients.[69,70]

Psychological factors such as anxiety, psychological distress (mood), and poor coping strategies have also been shown to be important predictors of increased postoperative pain and analgesic usage, with anxiety being the most common psychologic predictor of increased analgesic usage.[71]

Patient Factors for Increased Pain

- Preexisting pain treatment
- Anxiety
- Psychological distress
- Poor analgesic experience with previous surgery
- Current smokers
- Marijuana use[72]
- Race

Several observational studies and case series[67,68] examined postoperative opioid use in otolaryngologic procedures. A recent article looked at postoperative opioid use in sinus surgery and found no significant difference in opioid use in the types of surgery,[67,68] although a different study found that frontal sinus drillout procedures were associated with increased postoperative pain.[73] Based on expert opinion, it was noted that certain procedural factors may cause increased pain. As such, procedure-specific factors such as revision surgery, operating through scar tissue, radiated tissue, and use of powered instrumentation on bone may lead to increased postoperative pain and should be considered.

Thus, several patient and procedural factors can influence a patient's perception of postoperative pain. In addition to these factors, as discussed in KAS 1, certain procedures may be associated with increased or decreased postoperative pain. Ultimately, by gathering this information preoperatively, the clinician, patients, and/or caregivers can develop a plan for the patient's pain management postoperatively.

STATEMENT 3A. RISK FACTORS FOR OPIOID USE DISORDER: Prior to surgery, clinicians should identify risk factors for OUD when analgesia using opioids is anticipated. *Strong recommendation based on systematic reviews of RCTs with limitations and observational studies with a preponderance of benefit over harm.*

Action Statement Profile: 3A

- Quality improvement opportunity: Identify patients at risk for OUD for preoperative intervention and postoperative vigilance (National Quality Strategy Domain: Safety).
- Aggregate evidence quality: Grade A, based on systematic reviews.
- Level of confidence in evidence: High.
- Benefits: Increased monitoring for OUD after surgery, increased use of nonopioid modalities of analgesia, increased coordination of care with other providers (including pain specialists), limited opioid use after surgery and monitored duration of use, and identification of patients at risk for opioid use–associated respiratory depression.
- Risk, harm, cost: Undertreatment of pain, false-positive assessment of risk for OUD, implicit biases about OUD are heightened, strained therapeutic alliance.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: Risk assessment for OUD is not routinely done prior to surgery and opioid prescription.
- Intentional vagueness: None.
- Role of patient preferences: None.
- Exclusions: None.
- Policy level: Strong recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to identify patients preoperatively who are at increased risk of OUD. By identifying patients with risk factors, clinicians may monitor for signs of OUD and take measures to eliminate or limit the probability of OUD[74] (**Table 5**).

Clinicians should be aware of a personal or family history of alcohol or drug abuse, as this is the factor most strongly

Table 5. Risk Factors for OUD.

Risk factors	
• Sustained opioid use within 6 months preceding surgical intervention	• Has a prescription for anxiolytic
• Prior opioid exposure within 6 months preceding surgical intervention	• Has a prescription for antipsychotic
• Personal history of alcohol or drug abuse	• Preoperative pain
• Family history of alcohol or drug abuse	• Self-perceived risk of addiction
• Diagnosis of psychiatric disorder	• Tobacco use
○ Anxiety	• Current use of opioids or benzodiazepines
○ Depression	• Age 16-45 years
○ Personality disorder	• Hospital length of stay
	• Intensity of surgical procedure
	• Lower socioeconomic status

Abbreviation: OUD, opioid use disorder.

predictive of OUD.[75-77] Other factors that place the patient at a significantly increased risk are being in the age range of 16 to 45 years and having psychiatric conditions, including personality disorders, depression, or anxiety.[75,76] In addition to those diagnoses, taking prescription anxiolytic or atypical antipsychotics is strongly associated with OUD.[77] Other factors associated with OUD are patients with preoperative pain, a self-perceived risk of addiction, tobacco use, or current use of opioids or benzodiazepines.[74,75]

The need for risk assessment prior to prescribing opioids has been recognized, and several tools exist as a mechanism to evaluate these risk factors for OUD. Unfortunately, most have been developed and validated in the context of chronic nonmalignant pain, not in patients undergoing otolaryngologic surgery. Therefore, those tools are available and may be able to be adapted, but the data obtained should be interpreted as such. The surgeon should also recognize that preoperative assessment could lead to biases in pain management and undertreatment; therefore, OUD risk assessment should be used only for monitoring and early intervention, if needed. The assessment should also facilitate discussion of any concerns about pain management preoperatively with the patient to open the lines of communication in advance of any issues.

Although a focused history has been found to be effective in identifying patients at risk for OUD, assessment tools may be more practical, standardized, and efficient to use in a busy clinical setting. The Opioid Risk Tool (ORT) has been recommended by government agencies due to its brevity and ease of patient administration. However, this tool was validated in patients with chronic pain and includes sensitive questions.[78] The Revised Opioid Risk Tool removes the gender-specific history of preadolescent sexual abuse and has superior sensitivity and specificity to the ORT. Given that the intended use was for patients already on opioid therapy, the Revised Opioid Risk Tool may be useful at the time of a refill request for a patient currently on opioid medications to screen for OUD or persistent use prior to granting the refill.[79]

The Screener and Opioid Assessment for Patients With Pain and the Screener and Opioid Assessment for Patients With Pain–Revised (SOAPP-R) are both patient administered and were developed and validated to predict OUD, also in patients with chronic pain.[78] The Brief Risk Interview (BRI) was developed from a diagnostic interview in combination with reports on patient risk and discharge. The Brief Risk Questionnaire (BRQ) was developed from the BRI to create a self-reported form to reflect the content of the BRI.[78] In the study by Jones et al, the BRI was found to have better sensitivity and better overall predictive accuracy than the ORT or the SOAPP-R, but it can be time-consuming.[80] Both the BRI and the BRQ were validated in patients referred for opioid treatment, not a population of surgical candidates who include opioid-naïve patients.[78] The Current Opioid Misuse Measure was validated as a means for regular monitoring in patients who were already undergoing opioid therapy in a pain management center and screens for misuse over the past 30 days. Although for a different population, the Current Opioid Misuse Measure is also a tool that can be considered for monitoring in the postoperative period at the time of refill requests[78] (**Table 6**).

Unlike the ORT, BRI, and BRQ, which are assessments for patients with chronic pain, Stopping Opioids After Surgery (SOS) was developed and validated in postoperative patients, so it may be the most useful assessment tool for otolaryngologists (**Table 7**). The SOS was developed to evaluate sustained prescription opioid use, defined as uninterrupted use for 6 months, after surgery in adults undergoing the 10 most common surgical procedures per TRICARE (the insurance program of the US Department of Defense); it was also validated in patients undergoing spine surgery.[81,82] Prior opioid use had the strongest association with sustained opioid use. On the basis of this SOS validated risk score, the low-risk cohort (<31 points) had a 4.1% risk of sustained opioid use after surgery; intermediate (31-50 points), 14.9% risk; and high (>50 points), 35.8% risk[81] (**Table 8**). Whether gathered by a focused history based on the risk factors most strongly associated with OUD or a self-administered assessment tool, this information can be used by the otolaryngology provider to have conversations with the patient about the pain management plan, close monitoring, and referral, if required.

Precautionary Measures for Patients at Risk for OUD

Potential special provisions for patients at risk for OUD:

- Increased monitoring for OUD after surgery
- Increased use of nonopioid modalities of analgesia
- Purposeful coordination of care with pain specialists
- Limited opioid use after surgery
- Strong discouragement of opioid refills postoperatively
- Monitored duration of opioid use
- Identification of opioid-associated respiratory depression risk

STATEMENT 3B. PATIENTS AT RISK FOR OPIOID USE DISORDER: In patients at risk for OUD, clinicians should evaluate the need to modify the analgesia plan. *Recommendation based on observational studies with a preponderance of benefit over harms.*

Action Statement Profile: 3B

- Quality improvement opportunity: Actively intervene for at-risk patients to reduce risk of OUD (National Quality Strategy Domain: Promoting Effective Prevention/Treatment).
- Aggregate evidence quality: Grade C, based on observational studies.
- Level of confidence in evidence: Medium.
- Benefits: Decrease risk of developing OUD, decrease risk of opioid complications in patients with OUD, increase safety of analgesia plans, modify analgesia regimen to nonopioid methods, heighten awareness of need for referral to addiction specialist, educate patient about identified risk of OUD.
- Risk, harm, cost: Potential delay of care, need for more perioperative resources, risk to therapeutic alliance, stigma of labeling at risk for OUD.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: None.
- Intentional vagueness: Modifications to the analgesic plan are not specified but include vigilance with monitoring for development of OUD.
- Role of patient preferences: Patients may decline or modify referral or interventions for being at risk.
- Exclusions: None.
- Policy level: Recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to illustrate steps that can be taken to inform patients of potential risk and signs of OUD and optimize the analgesic plan for these patients.

Table 6. Screening Tools for Predicting Opioid Use Disorder.[a]

Screening tool	Validated Population	Questions or duration	Sensitivity (95% CI), %	Specificity (95% CI), %
SOAPP	Patients with chronic nonmalignant pain	14 questions	91	69
SOAPP-Revised	Patients with chronic nonmalignant pain	24 questions	79	52
Brief Risk Interview	Referrals to pain clinic	7-15 minutes	83	88
Brief Risk Questionnaire	Referrals to pain clinics	12 questions	80[b]	41[c]
Opioid Risk Tool	Predicts OUD in patients with chronic nonmalignant pain before starting LTOT	10 questions	94.4[d]	90.9[e]
Revised Opioid Risk Tool	Predicts OUD in patients with chronic nonmalignant pain before starting LTOT	9 questions	85.4 (0.799-0.898)	85.1 (0.811-0.885)
SOS	General, orthopedic, cardiovascular, and spine surgery	9 questions	72	99
Current Opioid Misuse Measure	Patients in pain management center	17 questions	94	73

Abbreviations: LTOT, long-term opioid therapy; OUD, opioid use disorder; SOAPP, Screener and Opioid Assessment for Patients With Pain; SOS, Stopping Opioids After Surgery.

[a]Adapted from Lawrence et al.[78]

[b]If dropouts excluded, 75%.

[c]If dropouts excluded, 45%.

[d]Percentage of low-risk patients did not have OUD.

[e]Percentage of high-risk patients had OUD.

Table 7. SOS: Risk Score.[a]

Characteristic	Score
Age, years	
18-24	0
25-34	3
35-44	4
45-54	4
55-64	4
Sex	
Male	0
Female	3
Discharge status	
Home	0
Nonhome	11
Socioeconomic status	
High[b]	0
Low[c]	5
Procedure category	
Minor[d]	0
Major[e]	4
Length of stay, days	
≤3	0
>3	1
Clinical diagnosis	
Depression	4
Anxiety	4
Prior opioid use	
No use	0
Prior opioid exposure	17
Prior sustained opioid use[f]	36
Total	100

Abbreviation: SOS, Stopping Opioids After Surgery.
[a]Adapted from Chaudhary et al.[81]
[b]Defined as officer sponsor rank, proxy for high economic status.
[c]Defined as enlisted sponsor rank, proxy for low socioeconomic status.
[d]Appendectomy, inguinal herniorrhaphy, transurethral resection of prostate.
[e]Requires access to major organ spaces or osseous resection, including colectomy, coronary artery bypass graft, nephrectomy, radical cystectomy, total knee arthroplasty, total hip arthroplasty, and hip fracture repair.
[f]≥6 months of continuous prescription without interruption exceeding 7 days.

Table 8. SOS: Risk Score Categorization.[a]

Opioid risk score	Risk category	Likelihood of sustained opioid use, % (SD)
<31	Low	4.1 (2.5)
31-50	Intermediate	14.9 (6.3)
>50	High	35.8 (3.6)

Abbreviation: SOS, Stopping Opioids After Surgery.
[a]Adapted from Chaudhary et al.[81]

During preoperative evaluation, patients identified as having increased risk of developing OUD should be informed of this risk as well as the signs and symptoms of OUD. The diagnostic criteria for OUD are detailed in **Table 9**. Patients and their family members should be directed to notify the surgeon and primary care provider's office if patient behavior indicates aberrant opioid use. Including patients' family members or caregivers in these discussions preoperatively can heighten monitoring for concerning opioid use behaviors during surgical recovery.[83] Surgical facilities should provide clinicians with access to consultation with pain specialists for patients with such a concern and for inadequately controlled postoperative pain.[16] If concern for potential misuse is voiced preoperatively, consultation with a pain specialist can identify additional nonopioid strategies that could benefit the patient preoperatively, intraoperatively, and postoperatively. This plan should be communicated to the surgeon, intraoperative anesthesia team, and postoperative care team for implementation.

Postoperative vigilance recognizes patient requests for refills, increased opioid dosages, or a longer duration of opioid therapy as potential indicators of opioid misuse or abuse.[25] If pain is uncontrolled or out of proportion to the anticipated trajectory for recovery, patients may require reevaluation and further assessment. Reassessment identifies the need for broadening nonopioid pain treatments when pain is reported as uncontrolled with consideration of pain specialist referral. Reassessment of risk with the SOAPP-R and ORT can implicate aberrant opioid use behavior and potential OUD.

If continued opioid therapy is indicated after initial prescription, prescription-monitoring databases should be queried to verify the absence of other concurrent opioid prescriptions, if available. Timely recognition of potential OUD and referral for treatment are recommended by the consensus panel and may include evaluation by specialists in pain management, behavioral health, primary care, addiction medicine, or psychiatry. While data are limited in surgical patients, failure to initiate treatment for OUD increases morbidity and mortality in nonsurgical populations.[84] Evaluation for OUD should be nonjudgmental, and providers should be conscious of potential stigma and implicit bias.

STATEMENT 4. SHARED DECISION MAKING: Clinicians should promote shared decision making by informing patients of the benefits and risks of postoperative pain treatments that include nonopioid analgesics, opioid analgesics, and nonpharmacologic interventions. *Recommendation based on expert opinion with a preponderance of benefit over harms.*

Action Statement Profile: 4

- Quality improvement opportunity: Educate patients in preparation for shared decision making regarding analgesic plan (National Quality Strategy Domain: Engaging Patients).
- Aggregate evidence quality: Grade C based on observational studies.
- Level of confidence in evidence: Medium, as the studies are not specific to pain management after otolaryngology surgery.

Table 9. *DSM-5* Diagnostic Criteria for Opioid Use Disorder.

A problematic pattern of opioid use leading to clinically significant impairment or distress, as manifested by at least 2 of the following, occurring within a 12-month period:

1. Opioids are often taken in larger amounts or over a longer period than was intended.
2. There is a persistent desire or unsuccessful efforts to cut down or control opioid use.
3. A great deal of time is spent in activities necessary to obtain, use, or recover from the effects of opioids.
4. Craving, or a strong desire or urge to use opioids.
5. Recurrent opioid use resulting in a failure to fulfill major role obligations at work, school, or home.
6. Continued opioid use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of opioids.
7. Important social, occupational, or recreational activities are given up or reduced because of opioid use.
8. Recurrent opioid use in situations in which it is physically hazardous.
9. Continued opioid use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.
10. Tolerance, as defined by either of the following: a. A need for markedly increased amounts of opioids to achieve intoxication or desired effect, or b. Markedly diminished effect with continued use of the same amount of an opioid. Note: This criterion is not considered to be met for those taking opioids solely under appropriate medical supervision.
11. Withdrawal, as manifested by either of the following:
    a. The characteristic opioid withdrawal syndrome, or
    b. Opioids (or a closely related) substance is taken to relieve or avoid withdrawal symptoms.

    Note: This criterion is not considered to be met for those taking opioids solely under appropriate medical supervision.

Mild: Presence of 2-3 symptoms

Moderate: Presence of 4-5 symptoms

Severe: Presence of 6 or more symptoms

- Benefits: Incorporation of patient values and preferences in the analgesia plan, promotion of shared decision making, encouragement of use of nonopioid medications, encouragement of nonpharmacologic pain management, opportunity for discussion of risks of opioids/OUD, opportunity to address misperceptions, curtailment of overuse of opioids, opportunity to counsel about opioid use.
- Risk, harm, cost: Time expended, increased anxiety when opioids are used, possible reduced use of opioids when needed, increased potential for nonadherence to plan based on risk assessment.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: The GDG felt that patient education and counseling are valuable parts of formulating analgesic plan and may increase adherence to the plan.
- Intentional vagueness: None.
- Role of patient preferences: None.
- Exclusions: None.
- Policy level: Recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to educate patients about analgesic options to promote informed, shared decision making while developing the postoperative analgesia plan. The objective of a postoperative analgesia plan is to control postoperative pain while minimizing adverse events associated with analgesics. Opioids are effective analgesics, but they also have risks ranging from adverse effects such as nausea or constipation to addiction and death from respiratory failure. Nonopioid analgesic medications and nonpharmacologic interventions may be incorporated into the analgesic treatment plan to decrease the need for opioids, but these may also have risks that counter their beneficial effects.

CPGs by anesthesiology and pain medicine societies in the United States and Europe recommend that a postoperative analgesia plan be developed in conjunction with the patient and agreed upon through shared decision making.[16] A component of this recommendation for shared decision making is that patients be informed about all elements of analgesic treatments options, including risks and benefits.

Shared decision making, which is centered on the principle of self-determination by the patient, has been shown by many RCTs to improve knowledge gain by patients, increase patients' confidence in decisions, and lead to more active patient involvement.[85,86] A key element of shared decision making is not only to outline options available to patients but also to describe those options.[85]

There are no studies that measure the outcomes from informing patients specifically about the benefits and risks of postoperative analgesics. However, previous clinical practice guidance has recommended that the risks and benefits of

analgesia treatment options be discussed with patients as a means of engaging patients and implementing shared decision making.[16] These recommendations are based on several lines of reasoning. First, a discussion of risks and benefits of available analgesia medications is prerequisite to informing patients and implementing shared decision making.[85] Prior research in other areas of health care showed that patients included in shared decision making with their clinicians experience more engagement, empowerment, and satisfaction.[85] Decision aids, which are designed to effectively explain risks and benefits of treatment choices, have been shown to increase patients' knowledge and involvement in their care and also improve understanding of outcomes without adversely affecting outcomes or patient satisfaction.[86] Specific to analgesia, one study showed that decision aids presented to women in the antepartum period for analgesic treatment options for child birth during labor improved knowledge about analgesics without increasing anxiety.[87] At present, however, it remains uncertain whether shared decision making or tools implementing shared decision making consistently improve outcomes, adherence to treatments, or cost-effectiveness of treatments.

It is recommended that clinicians inform patients of the benefits and risks of postoperative analgesic treatment options, including nonopioids and opioids as well as any nonpharmacologic interventions, based on a preponderance of benefits over harms. Discussing the benefits and risks of analgesic treatment options is an important aspect of engaging patients and implementing shared decision making that does not adversely affect outcomes but, in contrast, may lead to greater knowledge, empowerment, and satisfaction by patients. An option grid has been provided as a tool for implementing shared decision making regarding nonopioid and opioid medications (**Table 10**), based in part on the severity of patient-perceived pain (**Table 11**). Nonpharmacologic options exist in many forms—including ice/heat, acupuncture, massage, aromatherapy—but with less available data regarding benefits and risks; these options may be discussed on a case-by-case basis.

STATEMENT 5. MULTIMODAL THERAPY: Clinicians should develop a multimodal treatment plan for managing postoperative pain. *Recommendation based on observational studies with a preponderance of benefit over harms.*

Action Statement Profile: 5

- Quality improvement opportunity: Promote adherence to plan for pain management; establish goals and objectives of the plan (National Quality Strategy Domain: Promoting Effective Prevention/Treatments).
- Aggregate evidence quality: Grade C, based on observational studies.
- Level of confidence in evidence: High.
- Benefits: Establish mutual expectations, encourage proactive thinking for best practice, ensure shared decision making, create template for structured pain management, coordinate care, reduce ad hoc decisions that could lead to increased opioid use.
- Risk, harm, cost: Conflict between clinician and patient, potential delay or deferral of surgery if patient does not accept plan, costs of alternate therapies (may not be covered by insurance plans).
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: Articulation of the plan for pain management will promote adherence.
- Intentional vagueness: Factors related to procedures and patients are specified in prior action statements; multimodal treatment plan will include nonpharmacologic interventions, opioids, and nonopioid medications.
- Role of patient preferences: High. Patients will participate in selection of specific components of the analgesic plans.
- Exclusions: None.
- Policy level: Recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to aid clinicians in developing an effective multimodal postoperative analgesia plan. A postoperative multimodal strategy has been shown to improve overall postoperative pain, patient satisfaction, and recovery process and decrease the need for, amount of, and/or frequency of opioid use.[87-90] Multimodal analgesia is the ''use of a variety of analgesic medications and techniques that target different mechanisms of action in the peripheral and/or central nervous system'' for management of postoperative pain.[16] A multimodal regimen results in synergistic analgesia, improved pain control, lower total opioid doses, and fewer side effects[86] (**Table 12**). In addition, nonopioid strategies can provide more effective pain relief than opioids alone.[91] A multimodal analgesia regimen should be adapted to the specific needs of the individual patient, with an awareness of patient factors[92] and availability of social/family support.

Pain management strategies and the benefits of multimodal regimens are intuitively patient and procedure specific. Unfortunately, most evidence-based guidelines for postoperative pain management are generalized for all surgical procedures.[93] Although good data exist that support the multimodal analgesia approach, research is lacking with respect to procedure specificity of this method. Enhanced recovery after surgery (ERAS)[88] programs are inherently procedure specific and are currently being developed for multiple surgical specialties.[89-91] Within head and neck surgery, ERAS multidisciplinary teams have utilized evidence-based measures to improve quality of perioperative care. Specifically, ERAS protocols in head and neck surgery have been shown to decrease opioid use and improve postoperative analgesia.[89-91]

Multimodality pain management can include use of medications in the preoperative, intraoperative, and postoperative period (**Table 13**). Medications often used preoperatively

Table 10. Patient Option Grid.[a]

Frequently asked questions	Opioids	NSAIDs	Acetaminophen	Gabapentinoids
Can I be addicted to this?	Yes	No	No	Yes
When are they used—what level of pain?	Severe pain	Mild-severe	Mild-severe	Mild-moderate
Should I start with this medication?	No, use only if around-the-clock nonopioid medications are not sufficient.	Yes, you may start with this medication.	Yes, you may start with this medication.	No, only use if NSAIDs and/or acetaminophen is not sufficient.
Is this used alone? Or with other medications?	Should be used in combination with other pain medications.	Can be used alone or in combination.	Can be used alone or in combination.	Should be used in combination with other pain medications.
Can I stop using this medication, and how do I stop?	Sometimes this needs to be slowly stopped ("tapered") depending on how much you have taken. Discuss this with your surgeon.	This can be stopped at any time.	This can be stopped at any time.	Sometimes this needs to be slowly stopped ("tapered") depending on how much you have taken. Discuss this with your surgeon.
Common side effects (reported in $\geq$3% patients)	Dizziness, nausea (very common), headache, drowsiness, vomiting, dry mouth, itching, and constipation	Upset stomach	Nausea, vomiting, headache, and insomnia	Dizziness, drowsiness, swelling in the hands and feet, weight gain, and blurred vision
Serious risks and risk of addiction or dependence	Respiratory depression (very slow breathing), misuse, abuse, addiction, overdose (taking too much of the medication), and death from respiratory depression. Your risk of opioid abuse increases the longer you take the medication.	Stomach bleeding or ulcers, heart attack, kidney damage, and stroke. Celecoxib has a lower risk of stomach bleeding and/or ulcer formation over the short term.	Liver damage may occur at high doses ($>$3000 mg in 24 hours).	Suicidal thoughts, respiratory depression Risks increase if you have kidney, liver, or heart disease or have suicidal thoughts.

Abbreviation: NSAID, nonsteroidal anti-inflammatory drug.
[a]Adapted from the American College of Surgeons patient education brochure *Safe and Effective Pain Control After Surgery.*[227]

Table 11. Defining Mild, Moderate, and Severe Pain for the Patient.[a]

	Mild	Moderate	Severe
Scale of 1-10	1 2 3 4	5 6	7 8 9 10
How noticeable is your pain?	• Not at all • Hardly • Noticeable and can be distracting	• Noticeable • Hard to ignore	• Focused on pain • Awful • Can't bear the pain • As bad as it could be
Does the pain interfere with activities?	• No, can do usual activities	• Interferes with some activities • Avoid usual activities because of the pain	• Prevents doing daily activities • Hard to do anything • Unable to do anything • Nothing else matters

[a]Adapted from Polomano et al[228] and Defense and Veterans Pain Rating Scale.[229]

Table 12. Risks and Benefits of Analgesic Medication Classes.[a]

Pharmacologic agent	Benefits	Risks
Opioids	1. Broadly effective and highly potent analgesics 2. No effect on risk of postoperative bleeding	1. Side effect profile a. GI (nausea, vomiting, constipation) b. Respiratory depression 1. Increased risk in combination with other sedating medications or alcohol consumption 2. Addiction 3. Misuse 4. Diversion 5. Rapid metabolizers 6. OUD 7. Physical addiction 8. Slow metabolizer
Acetaminophen	1. Broadly effective as an analgesic 2. May spare opioid usage	1. Overdose risk a. Narrow therapeutic window (<3-4 g/d) b. Liver failure, potentially fatal c. Overdose risk is increased by the often unnoticed inclusion of acetaminophen into other pain medications
NSAIDs	1. Broadly effective as an analgesics 2. May spare opioid usage	1. Side effect profile a. GI (gastritis, ulcers, bleeding) b. Nephrotoxicity 2. Surgical site bleeding risk (except celecoxib)
Gabapentin (off-label)	1. May be particularly effective for neurogenic and incisional pain 2. May spare opioid usage	1. Side effect profile a. Sedation b. Not FDA approved for acute surgical pain

Abbreviations: FDA, Food and Drug Administration; GI, gastrointestinal; NSAID, nonsteroidal anti-inflammatory drug; OUD, opioid use disorder.
[a]Adapted from Wick et al.[98]

Table 13. Multimodal Therapies.[94,98,228]

Perioperative period	Analgesia choices	
Preoperative	Acetaminophen	
	NSAID or COX-2 (celecoxib)	
	Gabapentinoid (off-label)	
	IV ketorolac	Incisional lidocaine injection
	IV or rectal acetaminophen	Superficial cervical plexus blocks
	IV ketamine	
	IV clonidine	
	IV steroids	
Postoperative	Acetaminophen	Lowest dose of short-acting opiate for breakthrough pain
	NSAID or COX-2 (celecoxib)	
	Gabapentinoid (off-label)	

Abbreviations: COX-2, cyclooxygenase-2; IV, intravenous; NSAID, nonsteroidal anti-inflammatory drug.

include acetaminophen, a nonsteroidal anti-inflammatory drug (NSAID), or cyclooxygenase 2 (COX-2) inhibitor (celecoxib).[92-98] Celecoxib does not interfere with platelet function and has no effect on bleeding time.[99] Some medication choices intraoperatively include intravenous (IV) ketorolac, IV or rectal acetaminophen, IV ketamine, clonidine, and IV steroids.[100] Use of incisional injection (local anesthetics such as lidocaine or bupivacaine) has also been shown to add to the multimodal analgesia effect.[101] Postoperatively, most references recommend continuous treatment with NSAID or COX-2 inhibitor and acetaminophen. Short-acting opioids can be used for breakthrough pain.

Gabapentinoid has been used in both preoperative and postoperative settings. An MA of 17 RCTs (1793 patients)

found that those who received preoperative gabapentin had statistically lower opioid consumption postoperatively.[96] However, opioids and gabapentin together can cause respiratory depression; caution is advised when used by the elderly or those with respiratory conditions.[102] Although gabapentinoids have been studied as a perioperative analgesic for nearly 20 years, use of gabapentinoids for acute postoperative pain is off-label per the FDA. The FDA approved gabapentinoids for neuropathic pain for diabetic pain, spinal neuropathy, and postherpetic neuralgia. An FDA warning has been issued for the use of gabapentin with respiratory depressants.[102] Also of note, the ERAS Society published guidelines from many surgical specialties, many of which utilize gabapentin as part of a multimodal protocol.[103-106] A SR analyzed 14 studies of gabapentin use in the postoperative setting for otolaryngologic surgery.[106] The authors found reduced analgesic consumption in tonsil, thyroid, and rhinologic surgery.

Regional blocks can be considered for open neck surgery. Local anesthetic infiltration (such as lidocaine or bupivacaine) in the lesser occipital, greater auricular, transverse cervical, and supraclavicular nerves (superficial cervical plexus block) was shown in an MA (1154 patients) to decrease analgesia requirements and hospital stay in patients undergoing thyroidectomy.[107]

Nonpharmacologic techniques may include preoperative patient education (setting expectations), transcutaneous electrical nerve stimulation, cognitive behavioral therapy, and hypnosis.[92] Acupuncture may also be considered. An MA of 13 studies (682 patients) revealed that patients treated with acupuncture had less pain and used fewer opioids on postoperative day 1 as compared with those treated with control ($P < .001$).[108] Although well designed, this SR included heterogeneous studies of nonotolaryngology surgical procedures. Overall, these nonpharmacologic methods have not been extensively studied and merit further investigation.

Several groups evaluated costs of incorporating a multimodality perioperative pain regimen.[109-112] The studies uniformly showed consistent reduction in health care utilization and/or costs. For example, a study of patients undergoing orthopedic surgery compared IV opioid monotherapy (110,000 patients) with those also receiving IV acetaminophen as part of a multimodality regimen (33,954 patients). The group receiving multimodality therapy with IV acetaminophen had statistically significant lower costs than the IV opioid monotherapy group.[110] In a phase III randomized double-blinded global clinical trial (113 institutions, 14 countries), the authors found a statistically significant reduction in clinically meaningful events (eg, constipation, confusion, drowsiness, nausea) in patients treated with a COX-2 and opioid drug versus opioid alone. This decrease in clinically meaningful events resulted in shorter hospital stays and reduced doctor/nurse time, directly translating into decreased costs and resource utilization.[109]

In conclusion, multimodal pain management has been shown to reduce opioid use, adverse events, and health care costs in other surgical specialties. Developing multimodal pain management protocols for otolaryngologic surgical procedures that result in moderate to severe pain merits further investigation.

STATEMENT 6. NONOPIOID ANALGESIA: Clinicians should advocate for nonopioid medications as first-line management of pain after otolaryngologic surgery. *Strong recommendation based on randomized controlled studies with a preponderance of benefits over harm.*

Action Statement Profile: 6

- Quality improvement opportunity: Emphasize the effectiveness of nonopioids for pain control and reduction of opioid risks (National Quality Strategy Domain: Promoting Effective Prevention/Treatments).
- Aggregate evidence quality: Grade A, based systematic reviews and randomized controlled trials.
- Level of confidence in evidence: High.
- Benefits: Reduce the use of opioids, reduce risk of OUD, more effective pain control, enhanced recovery after surgery with reduced nausea and vomiting, better ambulation, avoiding opioid diversion, maintaining opioid-naïve state.
- Risk, harm, cost: Potential undertreatment of pain, overuse of nonopioids when not needed.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: Threshold for use of opioids may be too low, and nonopioids may not be considered.
- Intentional vagueness: Types of nonopioids are not specified, as they are many and may depend on patient and specific factors.
- Role of patient preferences: None.
- Exclusions: Patients who have specific contraindications to nonopioid medications.
- Policy level: Strong recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to encourage the clinician to preferentially recommend nonopioid medications, such as acetaminophen and/or NSAIDs, as first-line pain management for most otolaryngologic procedures. Anesthesiology and pain management specialty guidelines consistently recommend a multimodal pain regimen that may include local anesthetics injected into the surgical site, regional blockade, acetaminophen, NSAIDs, and gabapentin, while reserving opioids for pain not adequately controlled with the initial regimen.[16,113-132]

Acetaminophen, also referred to as N-acetyl-paraminophenol (APAP) or paracetamol, is one of the most widely used over-the-counter analgesic-antipyretic drugs in the world, for both adults and children. Unlike NSAIDs, acetaminophen does not have anti-inflammatory properties. There

Table 14. Common Medications Used for Postoperative Pain.[a]

Drug	Dose, mg	NNT to achieve >50% pain relief[b]	95% CI
Acetaminophen	600/650	4.6	3.9-5.5
Acetaminophen	975/1000	3.6	3.2-4.1
Ibuprofen	400	2.5	2.4-2.6
Celecoxib	400	2.6	2.3-3.0
Naproxen	500/550	2.7	2.3-3.3
Ibuprofen + acetaminophen	200 + 500	1.6	1.5-1.8
Ibuprofen + oxycodone	400 + 5	2.3	2.0-2.8
Acetaminophen + oxycodone	1000 + 10	1.8	1.6-2.2

Abbreviation: NNT, number needed to treat.
[a]Adapted from Moore et al (Summary Table B).[155]
[b]NNT for the proportion of patients with at least 50% pain relief over 4-6 hours as compared with placebo in randomized double-blind single-dose studies in patients with moderate to severe pain.

are thought to be 2 mechanisms of action. Acetaminophen has been shown to cross the blood-brain barrier and selectively inhibit the COX pathway within the brain. It has also been proposed that the analgesic properties of acetaminophen are due to modulation of the endogenous cannabinoid system. While generally a safe medication, acetaminophen overdose is now the most common cause of acute liver failure in the United States and several countries in Europe.[133,134]

NSAIDs such as ibuprofen and naproxen are also widely used over-the-counter analgesic and antipyretic medications. The established mechanism of action for NSAIDs is to nonselectively and reversibly inhibit the cyclooxygenase isozymes COX-1 and COX-2, which are responsible for the conversion of arachidonic acid into prostaglandins and thromboxane A2.[135,136] Prostaglandins are important in inflammatory and pain processes; thus, inhibiting their production leads to less pain and inflammation.

Celecoxib is a selective COX-2 inhibitor most often prescribed for relief of chronic pain associated with osteoarthritis and rheumatoid arthritis.[137] It has been shown to have fewer gastrointestinal adverse effects as compared with ibuprofen or naproxen in chronically treated patients.[138,139] In 2005 the COX-2 inhibitor rofecoxib (Vioxx) was removed from the US market after studies showed an increased risk of cardiovascular thrombotic events, including myocardial infarction and stroke.[140,141] Celecoxib was allowed to stay on the market with warnings about the increased cardiovascular risk.[142] Following conclusion of the PRECISION trial (Prospective Randomized Evaluation of Celecoxib Integrated Safety vs Ibuprofen or Naproxen), the FDA approved a labeling supplement in 2018 for Celebrex (celecoxib), stating that it was similar to moderate doses of naproxen and ibuprofen with regard to cardiovascular safety.[143,144] In addition to osteoarthritis, rheumatoid arthritis, juvenile rheumatoid arthritis, ankylosing spondylitis, and primary dysmenorrhea, celecoxib is licensed in the United States for acute pain in adults, including postoperative pain. In a Cochrane review of 8 prospective randomized trials, 200 mg of celecoxib was found to be as effective in relieving postoperative pain as 1000 mg of acetaminophen, and 400 mg of celecoxib was at least as effective as 400 mg of ibuprofen.[145]

Use of nonopioid medications such as acetaminophen and/or NSAIDs has been shown to decrease or even eliminate the amount of opioid medications needed in the postoperative period.[146-151] Patients enrolled in opioid-sparing protocols for pain management after common otolaryngologic procedures report a high level of satisfaction with pain control, even when using minimal or no opioids.[147,151-153] Several authors have concluded that there is limited or even zero opioid requirement for most procedures, including thyroid/parathyroid surgery, endoscopic sinus surgery, and septoplasty/rhinoplasty[151-154] (**Table 4**).

Randomized prospective acute postoperative pain trials measure efficacy by comparing the number of patients needed to treat (NNT) to achieve at least 50% maximum pain relief over 4 to 6 hours. The smaller the NNT, the more efficacious the medication. **Table 14** compares several common medications used for postoperative pain (adapted from Summary Table B from Moore et al[155]). The table demonstrates that combinations of acetaminophen and ibuprofen were more effective at relieving pain as compared with either drug alone. Despite the general belief that opioids provide better pain relief than nonopioids, combinations of either acetaminophen or ibuprofen with the opioid oxycodone were not more effective at relieving pain than the combination of acetaminophen and ibuprofen. Randomized prospective trials have shown that multimodal therapy involving simultaneous use of combinations of several medications acting at different receptors is associated with superior pain relief and decreased consumption as compared with use of a single medication.[146,148,156] Gabapentin is sometimes recommended in addition to other pain medications. Studies similar to those summarized in **Table 14** have calculated the NNT for gabapentin 250 mg to be 11 (95% CI, 6.4-35).[155]

The optimum timing of postoperative pain medication is unknown, particularly with regard to the question of as-needed versus fixed schedule analgesics. Although data are limited, anesthesia and pain management guidelines recommend

around-the-clock dosing of pain medication as compared with as-needed pain medication.[9,119,157-159]

STATEMENT 7. OPIOID PRESCRIBING: When treating postoperative pain with opioids, clinicians should limit therapy to the lowest effective dose and the shortest duration. *Recommendation based on observational studies with a preponderance of benefit over harms.*

Action Statement Profile: 7

- Quality improvement opportunity: Reduce the exposure to opioids and reduce complications and risk of OUD (National Quality Strategy Domain: Safety).
- Aggregate evidence quality: Grade C, randomized trials and observational studies reporting opioid consumption in common otolaryngologic procedures.
- Level of confidence in evidence: Medium.
- Benefits: Reduce risk of OUD, reduce adverse effects of opioids, reduce opioid diversion, optimize pain control, encourage use of nonopioid strategies.
- Risk, harm, cost: Ineffective pain control, administrative burden, potential increase in patient encounters.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: None.
- Intentional vagueness: Shortest duration and lowest dose not specified, as dependent on the patient, procedure, and pain assessments.
- Role of patient preferences: None.
- Exclusions: None.
- Policy level: Recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to limit the duration and dosage of opioids when they are used as part of the analgesic plan. All opioids have a risk of abuse, dependence, fatal overdose,[160] as well as adverse effects such as respiratory depression, constipation, nausea, and vomiting.[161] Thus, opioids should be reserved for severe or breakthrough pain.

When opioids are prescribed, determining a reasonable estimate of strength and quantity is necessary, as excess opioid prescribing exposes patients and communities to the risks of opioids. As the duration of initial opioid exposure increases, the risk of developing OUD increases.[27] Furthermore, excess opioid prescribing anchors expectations, and patients consume an average of 0.53 more pills for each additional pill prescribed.[162] An MA of opioid consumption after surgery found that 42% to 72% of opioids prescribed are unconsumed and available for misuse or diversion into the community.[163-165] To provide guidance to prescribers on how to select the lowest effective dose and duration, a literature review was performed for articles describing opioid consumption after common otolaryngologic procedures. There were 24 studies identified, including 6 RCTs, 13 prospective observational studies, and 5 retrospective observational studies, that described mean or median consumption with either the standard deviation or the 75th percentile.[147,152,153,164-185] Opioid consumption was initially converted into morphine milligram equivalent (MME) units[186] (**Table 15**), and individual procedures were compared. MME is a value assigned to compare the opioid dosage equivalency to another opioid. Final opioid consumption was then converted to 5-mg doses of oxycodone.

Table 15. Oral Conversion of Commonly Prescribed Opioids.

Opioid	Dose, mg	Conversion factor[186]	MMEs
Oxycodone	5	1.5	7.5
Hydrocodone	7.5	1	7.5
Morphine	15	1	15
Tramadol	50	0.1	5

Abbreviation: MME, morphine milligram equivalent.

The distribution in opioid consumption after common otolaryngology operations identified from our literature search is shown in **Table 16**. These data identify 3 tiers of postoperative opioid consumption based on the MME amount to provide enough pain medicine for ~85% of patients. The most common procedure associated with a high amount of pain in otolaryngology is tonsillectomy in adults (~85th percentile for opioid use, 59.1 oxycodone 5-mg tablets). Intermediately painful procedures include thyroidectomy, parotidectomy, endoscopic sinus surgery, septoplasty, rhinoplasty, turbinate reduction, and otology surgery (~85th percentile for opioid use, from 8.9 to 21.7 oxycodone 5-mg tablets). Low-pain procedures include parathyroidectomy, microdirect laryngoscopy, and pediatric myringotomy and tube placement. Notably, these data on opioid consumption closely track with data on pain duration and severity discussed in KAS 1. This indicates that although there is heterogeneity in terms of patients and perioperative pain control strategies, the data are broadly applicable. The maximum recommended prescribing dose for opioid-naïve patients on discharge after common otolaryngology operations is based on the MME consumed by approximately 85% of patients, as done in other published guidelines.[164,187,188] In these recommendations, tonsillectomy is an outlier as the only high-pain operation examined. The recommended opioid-prescribing *maximum* after an adult tonsillectomy is 60 doses. Clinicians are encouraged to prescribe below the stated maximum for adult tonsillectomy, and some otolaryngologists have eliminated use of opioid prescribing after adult tonsillectomy. It is also important to emphasize that NSAIDs were used in only 420 of the 2667 (15.7%) patients studied to create these recommendations. Patients treated with multimodal nonopioid analgesia (eg, acetaminophen and NSAIDs) may require substantially fewer or no opioids.

Patient factors that may predispose to higher opioid consumption include preoperative opioid dependency, age 18 to 39 years,[171] and clinical or surgical characteristics that may

Table 16. Distribution in Opioid Consumption After Common Otolaryngology Operations.[a]

	No. of patients	Oxycodone 5-mg tablets		
		Consumed, mean (median)	Consumed, ~85th percentile	Recommended dose range[b]
Adult				
Tonsillectomy[164,166-169]	340	31.2 (22.8)	59.1	0-60
Mandibular fracture[230]	60	15.2	30.9	0-30
Septoplasty ± turbinate reduction[153,172,173]	223	9.7	21.7	0-20
Rhinoplasty ± septoplasty[152,153,182]	98	8.5	17.5	0-20
Endoscopic sinus surgery + septoplasty[172-174]	206	7.7	15.3	0-20
Endoscopic sinus surgery[147,152,172-174]	147	4.9 (0)	12.0	0-15
Turbinate reduction[173]	18	8.9	12.0	0-10
Otology surgery[152,176,177,c]	140	6.1 (6.7)	12.7	0-10
Parotidectomy[165]	37	5.7	12.8	0-10
Thyroidectomy[147,152,165,170,171]	677	2.8 (0)	6.6	0-5
Parathyroidectomy[152,164,171]	149	0.2	3.4	0-3
Microdirect laryngoscopy[152,178]	60	0.5	0.9	0
Adolescent (age 12-18 years)				
Adolescent tonsillectomy[179]	66	11.3	23.8[d]	0-25
Adolescent septoplasty[179]	22	6.3	12.3	0-10
Adolescent endoscopic sinus surgery[179]	19	3.3	9.7[d]	0-10
		MME/kg, mean (doses)		
Pediatric (age ≤12 years)				
Pediatric adenotonsillectomy (age 5-12 years)[183,185]	285	0.9 (4.3)	1.2 (5.7)	0
Pediatric myringotomy and tube placement (age 6 months–8 years)[180,181]	120	0.001	0.01	0
Total	2667			

Abbreviations: MME, morphine milligram equivalent; NSAID, nonsteroidal anti-inflammatory drug.

[a]Mean, median, 75th percentile, and approximate 85th percentile are reported. The 85th percentile for opioid consumption was approximated by combining the mean and standard deviations; however, this may vary depending on the degree to which opioid consumption distribution is skewed.

[b]The maximum recommended dose in the range is designed to provide enough pain medicine for approximately 80% of patients informed by the 75th and ~85th percentiles. Patients treated with multimodal nonopioid analgesia (acetaminophen and NSAIDs) may require significantly less than the maximum recommended dose or no opioids. There is significant variability in opioid consumption depending on patient factors and preferences, and it is advised that prescribers adapt these recommendations into their own practice. Clinical factors known to be associated with increased pain after surgery may provide a rationale for prescribing more than the recommended maximum dose.[164]

[c]Two studies reported opioid consumption in aggregate for various otology procedures (tympanoplasty, tympanomastoidectomy, cochlear implantation, and stapedectomy), and only transcanal procedures were found to have lower opioid consumption.[176,177]

[d]Data represent the 75th percentile. No ~85th percentile data were available for these procedures.

predispose to higher pain; opioid consumption postoperatively may require higher than standard doses in these patients.[164] Clinical factors such as these may justify prescribing quantities greater than the recommended range. These recommendations are not designed to apply to patients taking opioids preoperatively (**Table 16**). For these patients, a postoperative pain management plan should be developed before surgery based on shared decision making with the patient and collaboration with the primary prescriber. Usage of multimodal analgesia in addition to opioids varied across included studies, and utilization of a multimodal strategy may result in significantly lower consumption.[147,152,166,169] The low-dose recommendation is zero opioids for all procedures, recognizing that use of a multimodal nonopioid analgesia strategy may obviate the need for opioids.

STATEMENT 8A. PATIENT FEEDBACK: Clinicians should instruct patients and caregivers how to communicate if pain is not controlled or if medication side effects occur. *Recommendation based on observational studies with a preponderance of benefit over harms.*

Action Statement Profile: 8A

- Quality improvement opportunity: Coordination of care; person- and family-centered care (National Quality Strategy Domain: Engaging Patients).

- Aggregate evidence quality: Grade C, based on observational studies.
- Level of confidence in evidence: Medium.
- Benefits: Improved pain management, implementation of stepwise multimodal therapy, reduce or avoid side effects/complications.
- Risk, harm, cost: None.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: None.
- Intentional vagueness: Methods of communication may vary.
- Role of patient preferences: None.
- Exclusions: None.
- Policy level: Recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to highlight the importance of patient and caregiver education to encourage communication regarding pain control and side effects of pain medications. Patients and caregivers must understand postoperative pain expectations, expected time to recover, and the importance of communication, particularly if patients are prescribed opioids.[189] Education should be individually tailored to patients and caregivers.[16] A multidisciplinary approach, involving physicians, nurses, and pharmacists, allows for multiple avenues of clear communication for patients/caregivers after surgery. Possible modes of communication can be in the form of office telephone calls, electronic messaging, or other ways to contact clinicians.[190] If pain is not controlled or if there are side effects, patients and caregivers should be aware of how to communicate concerns with their clinician, and education on these options is beneficial.

STATEMENT 8B. STOPPING PAIN MEDICATIONS: Clinicians should educate patients to stop opioids when pain is controlled with nonopioids and to stop all analgesics when pain has resolved. *Recommendation based on observational studies with a preponderance of benefit over harms.*

Action Statement Profile: 8B

- Quality improvement opportunity: Reduce duration of opioid use to reduce OUD and other risks (National Quality Strategy Domain: Promoting Effective Prevention/Treatments).
- Aggregate evidence quality: Grade C, based on observational studies.
- Level of confidence in evidence: Medium.
- Benefits: Reduced risk of OUD, reduced side effects of opioids or other medications.
- Risk, harm, cost: None.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: Clinicians are not informing patients about end of therapy.
- Intentional vagueness: Method of informing and education is not specified.
- Role of patient preferences: None.
- Exclusions: None.
- Policy level: Recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to emphasize the importance of patient education and counseling on stopping opioid medication when pain is controlled with nonopioids or has resolved. There is literature to support the provision of comprehensive education around opioid use, particularly through a multidisciplinary approach.[16,190-192] However, additional research regarding methods of opioid education and their outcomes would be beneficial.

Education for patients should include when and how to stop opioid medication when pain is controlled by nonopioids or has completely resolved. Prolonged opioid use is a possible complication of elective surgery and can eventually lead to opioid misuse. Opioids are often overprescribed after surgery, with amounts actually used ranging from about 6% to 60% of that prescribed.[16] Therefore, providing education on the discontinuation of opioids after surgery is recommended. Weaning off opioids should start when pain has diminished and function starts to return[118] (**Table 17**).

STATEMENT 9. STORAGE AND DISPOSAL OF OPIOIDS: Clinicians should recommend that patients (or their caregivers) store prescribed opioids securely and dispose of unused opioids through take-back programs or another accepted method. *Strong recommendation based on observational studies with a preponderance of benefit over harms.*

Action Statement Profile: 9

- Quality improvement opportunity: Reduce instances of accidental overdose, decrease opioid diversion, reduce prevalence of OUD (National Quality Strategy Domain: Safety).
- Aggregate evidence quality: Grade C, observational studies associating the practices of secure storage and disposal with diminished opioid misuse and opioid diversion.
- Level of confidence in evidence: Medium.
- Benefits: Reduce risk of opioid diversion, decrease risk of side effects (including overdose), decrease risk of subsequent OUD.
- Risk, harm, cost: Cost of disposal.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: The GDG felt that opioids are seldom stored securely and that disposal of unused

Table 17. Patient Frequently Asked Questions About Opioids.

When should I begin taking my opioid pain medication?
- Pain medication should be taken for severe pain as needed but only if pain is not controlled with nonopioid medication.
- If you need opioids for severe pain, take as prescribed on the medication's bottle.

How many should I take at any given time?
- Refer to the instructions on the bottle or ones given to you by your health care provider.

Can I take Tylenol, aspirin, or Advil instead of this medication or with this medication?
- Probably yes, but please check with your health care provider.
- Some prescribed pain medications combine acetaminophen with opioids. Taking additional acetaminophen with the prescribed combination pain medication could be unsafe.

Do I need to finish the entire bottle of pills?
- No, pain medication should be taken when needed and must be stopped when pain is controlled.
- If your severe pain is under control, there is no need to finish the bottle.

What should I do with the pills that are left over?
- Leftover pills should not be left in your home where someone else can have access to them.
- There are facilities that will take these leftover medications. Check with your health care provider.

Can I give these pain medications to family members?
- No, medications should never be shared with a family member or anyone else.
- If you have any pills left over, check with your health care provider or take them to a facility that will dispose of them safely.

opioids is not routinely performed. Strong recommendation because benefits are much greater than harms, and high-quality studies about storage and disposal of opioids are not likely to be performed.
- Intentional vagueness: Methods of storage and disposal are not explicitly specified.
- Role of patient preferences: Patients may elect methods of storage and disposal within the range of accepted safe practices. Patients may expend time, money, or other resources to obtain opioids; some patients may perceive that the opioids are their personal property and that it is their prerogative to save medications for future use even after pain resolves.
- Exclusions: None.
- Policy level: Strong recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to encourage prescribers to counsel patients, family members, and caregivers to store opioids securely and to safely dispose of unused opioids. SRs show that 67% to 92% of patients do not discard their unused medication.[163,193,194] Having these unused medications in homes for indefinite durations increases risks of accidental ingestion, theft, and misuse.[195] Opioids are seldom stored securely,[196] and only a small percentage of opioids are returned via take-back programs. When prescribing opioids and discussing the pain management plan with patients, the clinician should recommend secure storage of opioid medication, locked and out of reach of children, and review available options for disposing of unused medication. In a large series of surgical patients, 42% to 71% of all opioids prescribed went unused,[163] and these unused opioids create significant latent opportunities for unintended diversion.[147,197] Diversion of opioids, which is one of the foremost concerns in opioid prescribing, has been considered in several otolaryngology-specific procedures, including tonsillectomy,[198,199] rhinoplasty,[200] otology/neurotologic surgery, and endoscopic sinus surgery.[150]

The number of individuals who currently misuse prescription-controlled substances is estimated to be double that of individuals using heroin, cocaine, inhalants, and hallucinogens *combined*. Take-back programs, supported by the US Drug Enforcement Administration, represent the optimal approach for safe disposal. Recognizing the imperative to get opioids out of homes, however, the FDA and CDC also identify alternative options for disposal; the current approved flush list (**Table 18**) includes all of the most common opioids (hydrocodone, oxycodone, hydromorphone, meperidine, methadone, buprenorphine, and fentanyl).[201] The options for safe storage and disposal are depicted in **Figure 2**. Providing drug disposal bags to families of children undergoing surgery also improves the disposal of leftover opioids.[202]

Safe storage and disposal are important considerations across the age continuum. In homes with young children, opioids that are not securely stored introduce a risk for accidental ingestion and overdose. From adolescence into adulthood, storage and diversion are both serious concerns. Misuse of opioids is a major gateway to heroin addiction and OUD. The National Institute on Drug Abuse has prioritized measures intended to decrease risk of OUD in older adolescents and adults (ages, 16-30 years), noting the high susceptibility to OUD during transition from childhood to adulthood.[203,204] Only 26% of high school students consider occasional recreational use of prescription opioids to be high risk,[205] which is disquieting in the face of data showing that the likelihood of exposure to opioids ranges from 22% to 45% in these students.[11,206] Almost 75% of heroin users report that prescription medications afforded their first exposure to opioid use.[207,208] Among adolescents who reported consuming

Table 18. Abbreviated List of Medicines Recommended for Disposal by Flushing.[a]

Active ingredients	Found in brand names (click links to view medicine instructions)
Benzhydrocodone / acetaminophen	Apadaz
Buprenorphine	Belbuca, Bunavail, Butrans, Suboxone, Subutex, Zubsolv
Diazepam	Diastat/ Diastat AcuDial rectal gel
Fentanyl	Abstral, Actiq, Duragesic, Fentora, Onsolis
Hydrocodone	Anexsia, Hysingla ER, Lortab, Norco, Reprexain, Vicodin, Vicoprofen, Zohydro ER
Hydromorphone	Dilaudid, Exalgo
Meperidine	Demerol
Methadone	Dolophine, Methadose
Methylphenidate	Daytrana transdermal patch system
Morphine	Arymo ER, Embeda, Kadian, Morphabond ER, MS Contin, Avinza
Oxycodone	Combunox, Oxaydo (formerly Oxecta), OxyContin, Percocet, Percodan, Roxicet, Roxicodone, Targiniq ER, Xartemis XR, Xtampza ER, Roxybond
Oxymorphone	Opana, Opana ER
Sodium oxybate	Xyrem oral solution
Tapentadol	Nucynta, Nucynta ER

[a]This list was reproduced from the US Food and Drug Administration (FDA). The FDA states that the known risk of harm, including death, to humans from accidental exposure to the medicines listed here, especially potent opioid medicines, far outweighs any potential risk to humans or the environment from flushing these medicines. Disposal information for other medications can be found in the FDA Drug Database (https://www.accessdata.fda.gov/scripts/cder/daf/).

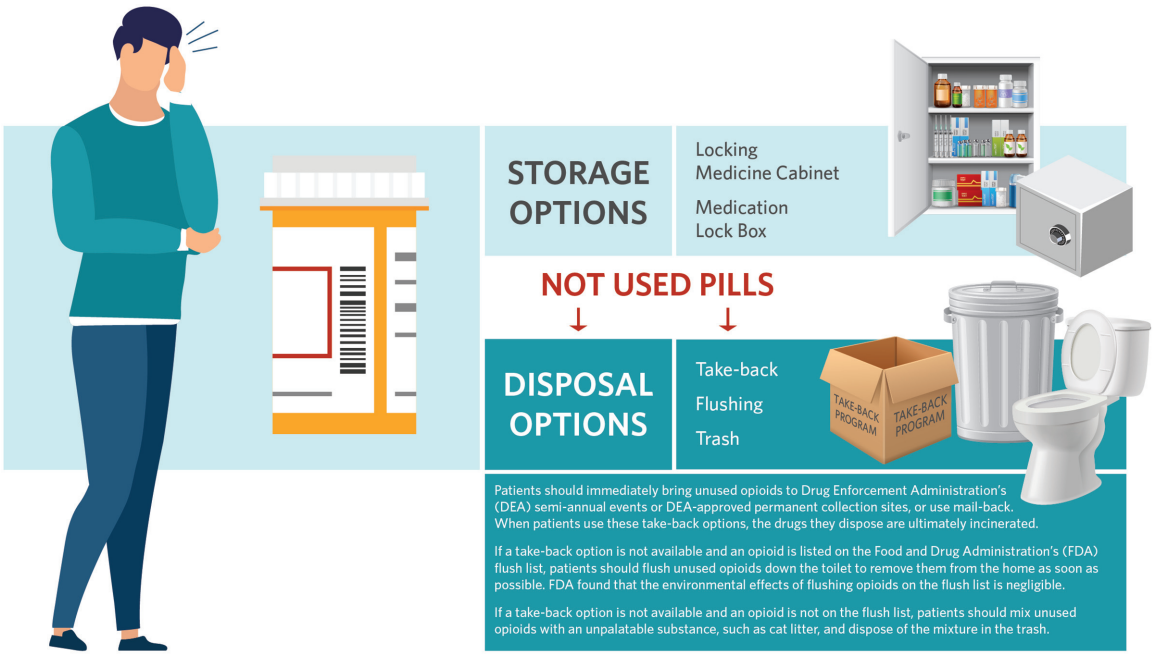

Figure 2. Secure storage and disposal of opioids.

prescription opioids for nonmedical use, 36.9% identified leftover opioids as the source.[209] In older patients, risk of OUD persists, and there is added concern since opioids tend to exacerbate risks linked to obstructive sleep apnea, coronary artery disease, and polypharmacy.

In terms of surgeon counseling on opioid storage and disposal, data are limited and largely speculative in otolaryngology.[199,200,210] Data from other surgical subspecialties reveal that perioperative counseling on appropriate storage and disposal of opioids is surprisingly rare, occurring for only 8% to 22% of patients.[211,212] When patients are educated on opioid storage and disposal, they improve their practices.[213] Some states now require that clinicians provide such counseling whenever prescribing opioids.[214] It is helpful to encourage patients to describe how they will store or dispose of opioids.[215] Written information can be a valuable supplement

to counseling, providing visual reinforcement and promoting retention of information. In situations where the risk of adverse events is increased (eg, prescribing opioids to an individual with a history of substance dependency), a collaborative approach that engages a family member may improve safety. Promoting secure storage and disposal of unused medication reduces the societal impact of opioid misuse, OUD, and opioid-related mortality.[33] Although empirical data on diversion are largely absent in the literature,[195] these strategies provide a cost-effective approach to decrease the volume of opioids in circulation and reduce opioid-related disorders.

STATEMENT 10. ASSESSMENT OF PAIN CONTROL WITH OPIOIDS: Clinicians should inquire, within 30 days of surgery, whether the patient has stopped using opioids, has disposed of unused opioids, and was satisfied with the pain management plan. *Recommendation based on observational studies with a preponderance of benefit over harms.*

Action Statement Profile: 10

- Quality improvement opportunity: Collect outcomes on pain management plan and methods to reduce OUD and diversion (National Quality Strategy Domain: Promoting Effective Prevention/Treatments).
- Aggregate evidence quality: Grade C, based on observational studies.
- Level of confidence in evidence: Medium.
- Benefits: Identify patients with persistent pain, identify patients at risk of OUD and need for referral, assess effectiveness of pain management plan, utilize ability to adjust plan for future patients.
- Risk, harm, cost: Administrative burden of obtaining information and referral.
- Benefit-harm assessment: Preponderance of benefit over harm.
- Value judgments: None.
- Intentional vagueness: The methods of collecting this information are not specified.
- Role of patient preferences: None.
- Exclusions: None.
- Policy level: Recommendation.
- Differences of opinion: None.

Supporting Text

The purpose of this statement is to encourage clinicians to elicit timely feedback from patients, assessing the effectiveness of the clinician's opioid-prescribing strategy and evaluating for safe disposal of unused opioids. The combination of unused opioid pills, unsafe storage practices, and lack of disposal paves the way for opioid misuse and diversion, reinforcing the need for ongoing assessment.

Continual reassessment of clinicians' postoperative pain management strategies can help clinicians modify their practices for future patients and procedures. Asking patients at their follow-up visits about their ongoing pain management

1. In the first four days after surgery, how much did pain interfere with your ability to sit in a chair, stand or walk?
   - ☐ Not at all
   - ☐ Occasionally
   - ☐ About half of the time
   - ☐ Most of the time
   - ☐ All of the time
2. In the first four days after surgery, how much did pain interfere with your ability to eat and swallow?
   - ☐ Not at all
   - ☐ Occasionally
   - ☐ About half of the time
   - ☐ Most of the time
   - ☐ All of the time
3. What medications did you use to manage your pain? Please check all that apply:
   - ☐ Non-medication therapies
   - ☐ Acetaminophen (Tylenol)
   - ☐ NSAIDS:
     - ☐ Aspirin
     - ☐ Ibuprofen (Advil, Motrin)
     - ☐ Naproxen (Aleve)
     - ☐ Celecoxib (Celebrex)
   - ☐ Nerve pain medications:
     - ☐ Gabapentin (Neurontin)
     - ☐ Pregabalin (Lyrica)
   - ☐ Opioids:
     - ☐ Tramadol (Ultram)
     - ☐ Codeine with acetaminophen (Tylenol #3 or #4)
     - ☐ Hydrocodone (Norco, Vicodin, Lorcet)
     - ☐ Hydromorphone (Dilaudid)
     - ☐ Oxycodone (OxyContin)
     - ☐ Oxycodone with acetaminophen (Percocet)
   - ☐ Other (Please describe):
4. If you were given a prescription for opioids, how many opioid pills were you prescribed?
5. Did you fill the prescription?
   - ☐ Yes
   - ☐ No
6. Did you need more pills?
   - ☐ Yes
   - ☐ No
7. How long did you need opioids for pain control (e.g. 5 days, 7 days, 14 days, 1 month)?
8. Were you instructed to use the lowest dose of opioids for the shortest amount of time?
   - ☐ Yes
   - ☐ No
9. Did you experience any of the following opioid side effect symptoms (check all that apply):
   - ☐ Nausea
   - ☐ Vomiting
   - ☐ Constipation
   - ☐ Drowsiness
   - ☐ Itching
   - ☐ Dizziness
   - ☐ Depression
10. Where did you store your opioids, and was this location locked and secure?
11. How many pills did you have leftover?
12. How did you dispose of the leftover opioids?

Adapted from the American College of Surgeons patient education brochure on Safe and Effective Pain Control After Surgery[227]

Figure 3. Patient education materials on postoperative pain control and opioid use. NSAIDs, nonsteroidal anti-inflammatory drugs.

needs and whether opioids have been successfully stopped can help to identify patients at risk for developing OUD. This discussion also serves as a useful impetus to reeducate patients on tapering, cessation, and disposal. This should be done within the first 30 days postoperatively for early identification. Opioid refill requests warrant investigation to ascertain the cause of ongoing pain.[216] Patients requiring opioid therapy beyond 30 days after surgery warrant multidisciplinary evaluation by primary care and/or pain specialists to develop a long-term plan for pain management. Examples of standardized questions to assess the effectiveness of a patient's postoperative pain management are noted in **Figure 3**, which was adapted from the American College of Surgeons' patient education brochure *Safe and Effective Pain Control After Surgery*. It is appropriate to assess the accuracy of the preoperative counseling, the severity of postoperative pain at different time points during recovery, the patient's pain management strategy (including nonopioid and opioid medications), the need for refills, the safe disposal of unused opioids, and the severity of opioid-related side effects.

Implementation Considerations for Opioid Use

The complete guideline is published as a supplement to *Otolaryngology–Head and Neck Surgery* to facilitate reference and distribution. An executive summary of the recommendations will also be published to more concisely present the KASs to clinicians. The guideline was presented as a panel presentation to American Academy of Otolaryngology–Head and Neck Surgery members and attendees at the AAO-HNSF 2020 Virtual Annual Meeting & OTO Experience prior to publication. A full-text version of the guideline will also be accessible free of charge at www.entnet.org.

The primary barriers to implementing the quality improvements of the opioid-prescribing guideline are the time and resources needed for patient counseling and education.

Clinicians may need to expand the time and patient resources used prior to surgery to appraise patients of the severity and duration of expected postsurgical pain and develop a pain management plan. Identifying patients at risk for difficult postoperative pain control and those at risk for developing postoperative OUD also takes clinician time and expertise. For patients with substance abuse, chronic pain, and other risks, coordinating pain management strategies with primary care, pain specialists, anesthesiologists, psychiatrists, family members, and others involved in the patients' health care also requires clinician and administrative staff time.

The development of care pathways to inform patients about when and how to use nonopioid analgesics, when opioids should be used and stopped, the possible risks and side effects of recommended pain medications, the safe storage of opioids, and the disposal of opioids also is a barrier to implementation.

Additional clinician or administrative staff time is needed to obtain feedback from patients after surgery, assessing the duration of their recovery, severity of postoperative pain, adequacy of pain control, opioid use, and opioid disposal.

Quality measures of opioid prescribing include control of pain, use of multimodal pain control, number of opioids prescribed, and compliance with secure opioid storage and disposal.

Finally, we include an algorithm of the guideline action statements as a supplement to clinicians in **Figure 4**. The algorithm allows for a more rapid understanding of the guideline's logic and sequence of action statements. The GDG hopes that the algorithm can be adopted as a quick-reference guide to support the implementation of the guideline's recommendations.

Research Needs

Development of this guideline was based on the current body of evidence regarding the opioid-prescribing practices for common otolaryngologic procedures. As determined by the GDG's review of the literature, assessment of current clinical practices, and determination of evidence gaps, research needs were determined as follows:

1. What are the benefits of preoperative counseling on postoperative pain outcomes?
2. What is the duration and severity of pain for specific otolaryngology surgical procedures?
3. How do specific procedural and patient factors modify postoperative pain?
4. In patients at risk for increased postoperative pain, how is that effectively managed?
5. What is the optimal way to counsel patients preoperatively?
6. How have prescription-monitoring programs influenced management of postoperative pain?
7. Are there specific predictors of OUD in otolaryngologic surgical patients?
8. How do opioid risk assessment and postoperative prescribing differ in the pediatric otolaryngologic population?
9. What interventions reduce risk of OUD for patients after surgery?
10. Is gabapentin helpful to control postoperative pain and reduce opioid use in otolaryngology patients?
11. Are some otolaryngology patients at higher risk for cardiovascular morbidity from COX-2 inhibitors?
12. Which otolaryngology surgical procedures are associated with prolonged opioid use and symptoms of postoperative opioid withdrawal?
13. What is the risk of bleeding after surgery, by procedure, when using ibuprofen postoperatively?
14. What specific combinations of medications optimally balance pain control, risks, and cost?
15. Are scheduled doses of acetaminophen and NSAIDs superior to as-needed regimens?
16. Does staggering the timing of acetaminophen and NSAIDs improve postoperative pain control?

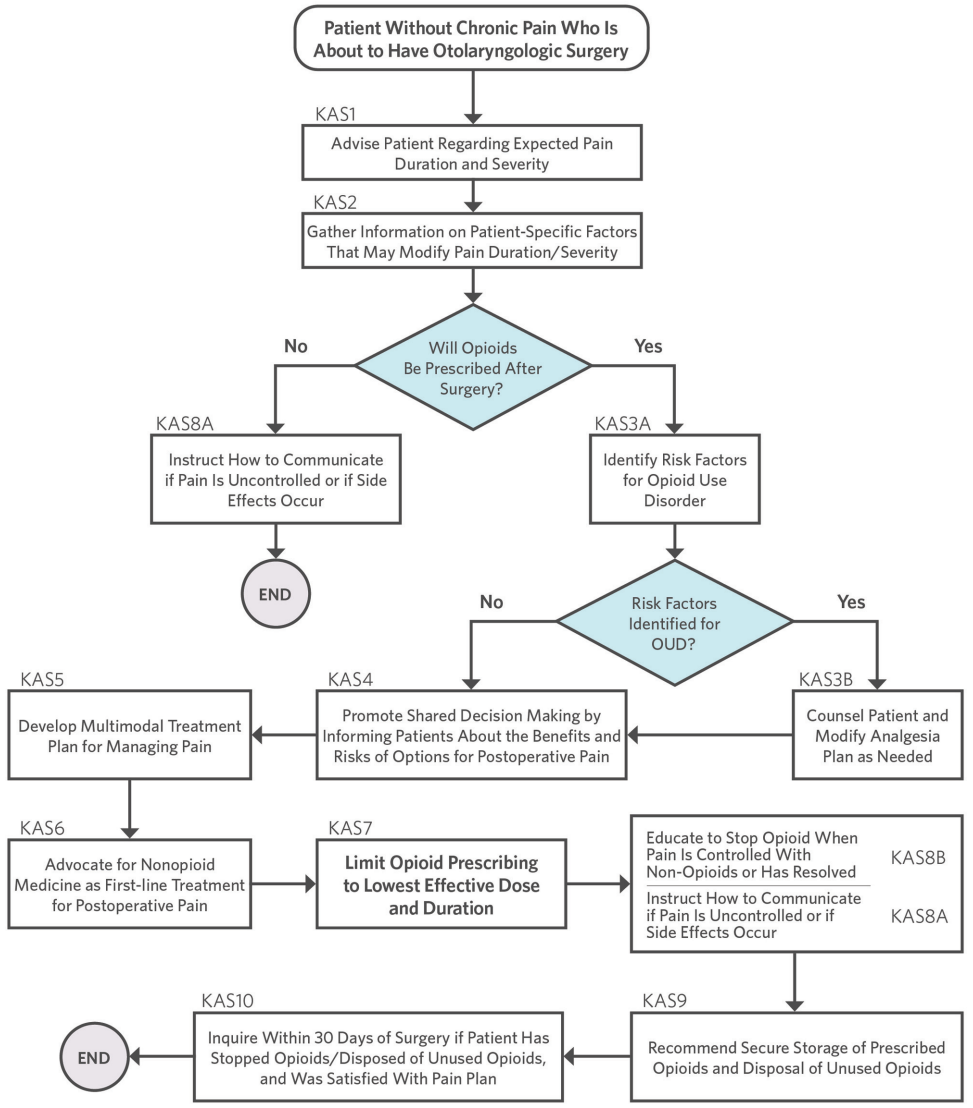

Figure 4. Opioid guideline key action statements (KASs). OUD, opioid use disorder.

17. What are the current trends in opioid prescribing for otolaryngologic surgery, and what are the key factors (eg, patient awareness, patient education, provider awareness, and provider education) that affect the trends?
18. When nonopioids are used as first-line therapy, what is the impact on opioid consumption?
19. What are the usual durations for opioid therapy after each of the most common otolaryngologic surgical procedures?
20. What is the best strategy to de-escalate postoperative pain treatment?
21. What percentage of patients dispose of unused opioids after recovery from otolaryngologic surgery?
22. What is the most effective educational approach to promote disposal of unused opioids?
23. Do the expectations of the duration and severity of surgical pain by providers correlate with postoperative assessments by patients?
24. What are optimal measurements/scales for pain and indicators for quality of recovery after otolaryngology surgery?
25. Are there racial or gender biases that influence the prescribing of opioids, the education about opioids, or the risk of developing OUD after surgery?

Appendix A: Search Strategy for Clinical Practice Guidelines

PubMed (27 Results)

(((post-operative[tiab] OR postoperative period[Mesh: NoExp] OR postoperative period[tiab] OR postoperative[tiab]) AND pain[tiab]) OR (pain, postoperative[Mesh:NoExp]))
AND

(Opioids[tiab] OR opioid[tiab] OR analgesics, opioids [mesh] OR ''Opiate Alkaloids''[Mesh] OR ''Opioid Peptides''[Mesh] OR opiate[tiab] OR opiates[tiab])
AND
(Administration, Oral[mesh] OR oral[tiab] OR drug prescriptions[mesh] OR orally[tiab] OR prescribed [tiab] OR prescribe[tiab] OR prescription[tiab] OR Practice Patterns, Physicians'[mesh] OR prescribing[tiab] OR prescriptions[tiab] OR outpatient[tiab] OR outpatients[tiab] OR outpatients[mesh])
Publication Dates: last 10 years (''2009/07/19''[PDat] : ''2019/07/16''[PDat])
Limit: ''Practice Guideline'' [Publication Type] OR ''Practice Guidelines as Topic''[Mesh] OR ''practice guideline''[ti] OR ''practice guidelines''[ti]

National Guideline Clearinghouse (0 Relevant Results)

No longer updated; archived in 2018 Archived web page not searchable, but Otolaryngology section and Anaesthesia and Analgesia section checked (https://web.archive.org/web/20180713131313/https://www.guideline.gov/)

Canadian Medical Association Infobase (18 Results; 0 Relevant Results)

Opioid OR opioids
Limited to English
18 results
Limited to postoperative topics

Australian National Health and Medical Research Council (0 Relevant Results)

Opioid OR opioids OR opiates OR opiate

National Institute for Health and Care Excellence (0 Relevant Results)

Opioid* OR opiate*
Limit to NICE Guidelines

Scottish Intercollegiate Guidelines Network (0 Relevant Results)

Opioid OR opioids OR opiates OR opiate

Appendix B: Search Strategy for Systematic Reviews

PubMed (69 Results)

(((post-operative[tiab] OR postoperative period [Mesh:NoExp] OR postoperative period[tiab] OR postoperative[tiab]) AND pain[tiab]) OR (pain, postoperative[Mesh:NoExp]))
AND
(Opioids[tiab] OR opioid[tiab] OR analgesics, opioids [mesh] OR ''Opiate Alkaloids''[Mesh] OR ''Opioid Peptides''[Mesh] OR opiate[tiab] OR opiates[tiab])
AND
(Administration, Oral[mesh] OR oral[tiab] OR drug prescriptions[mesh] OR orally[tiab] OR prescribed [tiab] OR prescribe[tiab] OR prescription[tiab] OR Practice Patterns, Physicians'[mesh] OR prescribing[tiab] OR prescriptions[tiab] OR outpatient[tiab] OR outpatients[tiab] OR outpatients[mesh])
Publication Dates: last 10 years (''2009/07/19''[PDat] : ''2019/07/16''[PDat])
Limit: Systematic[sb] or ''systematic review''[ti] or ''Meta-analysis''[ptyp] or ''meta-analysis''[ti] or Cochrane[ti]

Embase (197 Results)

('postoperative pain'/exp OR (('postoperative period'/exp OR postoperative OR 'post operative' OR 'post-operative analgesia'/exp OR 'postoperative care'/exp) AND (pain OR 'pain'/exp)))
AND
('opiate addiction'/exp OR 'opiate'/exp OR opiate* OR opioid*)
AND
('prescription'/exp OR 'oral drug administration'/exp OR 'outpatient'/exp OR 'clinical practice'/exp OR prescription* OR prescrib* OR oral OR orally OR outpatient*)
AND ('meta analysis'/de OR 'systematic review'/de)
AND (2009-2019)

Cochrane Library (20 Results)

(opioid* OR opiate*):ti,ab,kw AND (postoperative): ti,ab,kw AND (prescription* OR outpatient* OR prescrib* OR oral OR orally):ti,ab,kw with Cochrane Library publication date Between Jan 2009 and Dec 2019, in Cochrane Reviews

Database of Abstracts of Reviews of Effects, Health Technology Assessment Database, NHS Economic Evaluation Database (19 Results)

(opioid* OR opiate*):ti,ab,kw AND (postoperative): ti,ab,kw AND (prescription* OR outpatient* OR prescrib* OR oral OR orally):ti,ab,kw with Cochrane Library publication date Between Jan 2009 and Dec 2019

Cumulative Index to Nursing and Allied Health Literature (36 Results)

(((MH ''Postoperative Period'' OR MH ''Postoperative Care'' OR postoperative) AND (MH ''Pain'' OR pain)) OR MH ''Postoperative Pain'')
AND
(Opioid* OR MH ''Analgesics, Opioid+'')
AND
(MH ''Administration, Oral'' OR oral OR MH ''Prescriptions, Drug'' OR orally OR prescrib* OR prescription* OR MH ''Practice Patterns'' OR MH ''Outpatients'' OR outpatient*)
AND (''cochrane database'' OR ''systematic review'' OR ''meta-analysis'' OR metaanalysis OR meta analysis)
Publication Dates: last 10 years (''2009/07/19''[PDat] : ''2019/07/16''[PDat])

Web of Science (146 Results)

(opioid* OR opiate*) AND pain AND postoperative AND (prescription* OR outpatient* OR prescrib* OR oral OR orally)
''systematic review'' or ''meta-analysis'' or metaanalysis
Removed proceedings paper

Turning Research Into Practice (14 Results)

(opioid* OR opiate*) AND pain AND postoperative AND (prescription* OR outpatient* OR prescribe* OR oral OR orally)
Limited to Systematic Reviews

BIOSIS (15 Results)

(opioid* OR opiate*) AND pain AND postoperative AND (prescription* OR outpatient* OR prescrib* OR oral OR orally)
''systematic review'' or ''meta-analysis'' or metaanalysis

Agency for Healthcare Research and Quality Evidence-Based Practice Centers Reports (3 Results)

Opioid

Health Services/Technology Assessment Texts (19 Results)

hstatcollect[filter]
AND
(((post-operative[tiab] OR postoperative period[Mesh: NoExp] OR postoperative period[tiab] OR postoperative[tiab]) AND pain[tiab]) OR (pain, postoperative[Mesh:NoExp]))
AND
(Opioids[tiab] OR opioid[tiab] OR analgesics, opioids [mesh] OR ''Opiate Alkaloids''[Mesh] OR ''Opioid Peptides''[Mesh] OR opiate[tiab] OR opiates[tiab])
AND
(Administration, Oral[mesh] OR oral[tiab] OR drug prescriptions[mesh] OR orally[tiab] OR prescribed [tiab] OR prescribe[tiab] OR prescription[tiab] OR Practice Patterns, Physicians'[mesh] OR prescribing[tiab] OR prescriptions[tiab] OR outpatient[tiab] OR outpatients[tiab] OR outpatients[mesh])
Limit to 2009-2019

Appendix C: Search Strategy for Randomized Controlled Trials

PubMed (113 Results)

((post-operative[tiab] OR postoperative period[Mesh: NoExp] OR postoperative period[tiab] OR postoperative[tiab]) AND pain[tiab]) OR (pain, postoperative[Mesh:NoExp]))
AND
(Opioids[tiab] OR opioid[tiab] OR analgesics, opioids [mesh] OR ''Opiate Alkaloids''[Mesh] OR ''Opioid Peptides''[Mesh] OR opiate[tiab] OR opiates[tiab])
AND
(list of procedures- see page at end)
AND
(Randomized Controlled Trial[Publication Type] OR randomized[tiab] OR randomised[tiab] OR random*[tiab])
Filters: published in the last 10 years; English

Embase (125 Results)

('postoperative pain'/exp OR (('postoperative period'/exp OR postoperative OR 'post
operative' OR 'postoperative analgesia'/exp OR 'postoperative care'/exp) AND (pain
OR 'pain'/exp)))
AND ('opiate addiction'/exp OR 'opiate'/exp OR opiate* OR opioid*)
AND
(list of procedures- see page at end)
AND
('randomized controlled trial'/exp OR randomized:ab,ti OR randomised:ab,ti OR
random:ab,ti OR randomly:ab,ti)
AND [english]/lim
AND (2009-2019)

Cochrane Central Register of Controlled Trials (173 Results)

(opioid* OR opiate*):ti,ab,kw
AND

(postoperative):ti,ab,kw
AND
(list of procedures- see page at end):ti,ab,kw
AND
with Publication Year from 2009 to 2019, in Trials

Cumulative Index to Nursing and Allied Health Literature (50 Results)

(((MH ‘‘Postoperative Period’’ OR MH ‘‘Postoperative Care’’ OR postoperative) AND
(MH ‘‘Pain’’ OR pain)) OR MH ‘‘Postoperative Pain’’)
AND
(Opioid* OR MH ‘‘Analgesics, Opioid+’’)
AND
(list of procedures- see page at end)
AND
((MH ‘‘Randomized Controlled Trials’’) OR randomized OR randomised OR randomly
OR random)
Limiters - Publication Year: 2009-2019
Narrow by Language: English

Appendix D: Search Strategy for Observational Studies

PubMed (68 Results)

((post-operative[tiab] OR postoperative period[Mesh: NoExp] OR postoperative period[tiab] OR postoperative[tiab]) AND pain[tiab]) OR (pain, postoperative[Mesh:NoExp]))
AND
(Opioids[tiab] OR opioid[tiab] OR analgesics, opioids [mesh] OR ‘‘Opiate Alkaloids’’[Mesh] OR ‘‘Opioid Peptides’’[Mesh] OR opiate[tiab] OR opiates[tiab])
AND
(list of procedures- see page at end)
AND
(‘‘Observational Studies as Topic’’[Mesh] OR ‘‘Observational Study’’ [Publication Type] OR observational OR case-control OR cohort)
Filters: published in the last 10 years; English

Embase (68 Results)

(‘postoperative pain’/exp OR ((‘postoperative period’/exp OR postoperative OR ‘post operative’ OR ‘postoperative analgesia’/exp OR ‘postoperative care’/exp) AND (pain
OR ‘pain’/exp)))
AND (‘opiate addiction’/exp OR ‘opiate’/exp OR opiate* OR opioid*)
AND
(list of procedures- see page at end)
AND
(‘observational study’/exp OR observational OR ‘case control study’/exp OR ‘case
control’ OR ‘case-control’ OR ‘cohort analysis’/exp OR cohort)
AND [english]/lim
AND (2009-2019)

Cochrane Central Register of Controlled Trials (79 Results)

(opioid* OR opiate*):ti,ab,kw
AND
(postoperative):ti,ab,kw
AND
(list of procedures- see page at end):ti,ab,kw
AND
(observational OR case-control OR cohort)
with Publication Year from 2009 to 2019, in Trials

Cumulative Index to Nursing and Allied Health Literature (23 Results)

(((MH ‘‘Postoperative Period’’ OR MH ‘‘Postoperative Care’’ OR postoperative) AND
(MH ‘‘Pain’’ OR pain)) OR MH ‘‘Postoperative Pain’’)
AND
(Opioid* OR MH ‘‘Analgesics, Opioid+’’)
AND
(list of procedures- see page at end)
AND
(MH ‘‘Prospective Studies’’) OR (MH ‘‘Nonexperimental Studies’’) OR (MH ‘‘Case Control
Studies’’) OR observational OR case-control OR ‘‘case control’’ OR cohort
Limiters - Publication Year: 2009-2019
Narrow by Language: English

Appendix E. Distribution in Opioid Consumption After Common Otolaryngology Operations.

Author[a]	Year	Design	Procedure type	Nonopioid analgesia	No. of patients	Opioid consumption, MME				
						Mean	Median	SD	75th percentile	85th percentile
Choo et al[167]	2019	Retrospective observational	Tonsillectomy	87.5% used some nonopioid	64	302.8		206.2		509.0
Ng et al[168]	2017	RCT	Tonsillectomy	Celecoxib group (also paracetamol)	40		165.0		397.5	
Ng et al[168]	2017	RCT	Tonsillectomy	Placebo group (also paracetamol)	40		138.8		435.0	
Thiels et al[164]	2018	Prospective observational	Tonsillectomy	Not described	60	180.0			405.0	
Tolska et al[166]	2017	RCT	Tonsillectomy	Ropivacaine group with ibuprofen and rescue acetaminophen / codeine	62		137.5		317.3	
Tolska et al[166]	2017	RCT	Tonsillectomy	Control group with ibuprofen and rescue acetaminophen / codeine	57		234.0		396.0	
van Daele et al[169]	2016	RCT	Tonsillectomy	Celecoxib group	9	100.3		30.3		130.6
van Daele et al[169]	2016	RCT	Tonsillectomy	Control group	8	235.4		34.9		270.3
Adult tonsillectomy					**340**	**249.7**	**170.9**		**385.5**	**443.4**
Dang et al[165]	2020	Prospective observational	Thyroid / parathyroidectomy subset	87% acetaminophen / hydrocodone	47	30.0		37.0		67.0
Hallway et al[147]	2019	Prospective observational	Thyroidectomy / parathyroidectomy	Acetaminophen + ibuprofen first line; rescue opioids	31		0.0		2.0	
Ngyuen et al[b]	2019	RCT: ibuprofen first line; acetaminophen / hydrocodone for rescue cohort	Thyroidectomy	Mean 3282-mg ibuprofen	15	6.35		12.0		18.4
Ngyuen et al[b]	2019	RCT: acetaminophen / hydrocodone first-line cohort	Thyroidectomy	Mean 1974-mg ibuprofen	17	15.9		13.5		29.4
Tharakan et al[171]	2019	Retrospective observational	Total thyroidectomy	21% prescribed nonopioid	48	7.5			35.0	
Tharakan et al[171]	2019	Retrospective observational	Hemithyroidectomy	21% prescribed nonopioid	20	10.0			25.0	
Wu et al[170]	2019	Prospective observational	Thyroidectomy	Intraoperative remifentanil	412	23.0			33.0	
Wu et al[170]	2019	Prospective observational	Thyroidectomy	No intraoperative remifentanil	87	19.0			30.0	
Thyroidectomy					**645**	**21.3**	**0.0**		**30.8**	**67.0**
Ngyuen et al[b]	2019	RCT: ibuprofen first line; acetaminophen / hydrocodone for rescue cohort	Parathyroidectomy	Mean 5334-mg ibuprofen	9	3.35		10.0		13.4
Ngyuen et al[b]	2019	RCT: acetaminophen / hydrocodone first-line cohort	Parathyroidectomy	Mean 2616-mg ibuprofen	11	16.35		18.5		34.9
Tharakan et al[171]	2019	Retrospective observational	Parathyroidectomy	21% prescribed nonopioid	21	0.0			25.0	
Thiels et al[164]	2018	Prospective observational	Parathyroidectomy	Not described	108	0.0		0.0	0.0	0.0

(continued)

Appendix E. (continued)

Author[a]	Year	Design	Procedure type	Nonopioid analgesia	No. of patients	Opioid consumption, MME				
						Mean	Median	SD	75th percentile	85th percentile
Parathyroidectomy					**129**	**0.0**			**4.1**	
Dang et al[165]	2020	Prospective observational	Parotidectomy	79% used acetaminophen / hydrocodone	37	43.0		53.0		96.0
Parotidectomy					37	43.0				96.0
Badash et al[174]	2020	Retrospective observational	ESS	NSAIDs not used; mix of opioid / acetaminophen and opioid alone	21	23.0		23.6		46.6
Hallway et al[147]	2019	Prospective observational	ESS	Acetaminophen + ibuprofen first line; rescue opioids	19		0.0		8.0	
Newberry et al[173]	2020	Prospective observational	Limited ESS	Opioid / acetaminophen in 94.1%	23	33.5		46.8		80.3
Newberry et al[173]	2020	Prospective observational	ESS	Opioid / acetaminophen in 94.1%	44	67.9		102.3		170.2
Ngyuen et al[b]	2019	RCT: ibuprofen first line; acetaminophen / hydrocodone for rescue cohort	ESS	Mean 3342-mg ibuprofen	11	9.1		18.5		27.6
Ngyuen et al[b]	2019	RCT: acetaminophen / hydrocodone first-line cohort	ESS	Mean 5292-mg ibuprofen	14	22.85		22.5		45.4
Riley et al[172]	2019	Prospective observational	ESS	Not described	15	4.5		16.1		20.6
ESS					**128**	**41.8**	**0.0**		**8.0**	**103.1**
Badash et al[174]	2020	Retrospective observational	ESS + septoplasty	NSAIDs not used; mix of opioid / acetaminophen and opioid alone	109	24.3		23.6		47.9
Newberry et al[173]	2020	Prospective observational	Limited ESS + septoplasty / turbinate reduction	Opioid / acetaminophen in 94.1%	38	98.7		69.7		168.4
Newberry et al[173]	2020	Prospective observational	ESS + septoplasty / turbinate reduction	Opioid / acetaminophen in 94.1%	46	114.2		125.1		239.3
Riley et al[172]	2019	Prospective observational	ESS + septoplasty	Not described	13	15.0		57.6		72.6
ESS and septoplasty					**206**	**57.5**				**114.4**
Newberry et al[173]	2020	Prospective observational	Septoplasty	Opioid / acetaminophen in 94.1%	16	81.8		99.9		181.7
Newberry et al[173]	2020	Prospective observational	Septoplasty + turbinate reduction	Opioid / acetaminophen in 94.1%	179	88.8		100.7		189.5
Riley et al[172]	2019	Prospective observational	Septoplasty + turbinate reduction	Not described	14	13.5		42.1		55.6
Sclafani et al[153]	2019	Prospective observational	Septoplasty alone	Acetaminophen / opioid (various)	14	28.7		34.1		62.8
Septoplasty + turbinate reduction					**223**	**79.8**				**172.6**
Newberry et al[173]	2020	Prospective observational	Turbinate reduction	Opioid / acetaminophen in 94.1%	18	66.7		89.7		89.7

(continued)

Appendix E. (continued)

Author[a]	Year	Design	Procedure type	Nonopioid analgesia	No. of patients	Opioid consumption, MME				
						Mean	Median	SD	75th percentile	85th percentile
Turbinate reduction alone					**18**	**66.7**				**89.7**
Ngyuen et al[b]	2019	RCT: ibuprofen first line; acetaminophen / hydrocodone for rescue cohort	Septoplasty / septorhinoplasty	Mean 6600-mg ibuprofen	8	23.15		27.0		50.2
Ngyuen et al[b]	2019	RCT: acetaminophen / hydrocodone first-line cohort	Septoplasty / septorhinoplasty	Mean 3150-mg ibuprofen	4	41.25		40.5		81.8
Rock et al[182]	2019	Retrospective observational	Septoplasty or rhinoplasty	Not described	64	100.6		109.0		209.6
Sclafani et al[153]	2019	Prospective observational	Rhinoplasty ± septoplasty	Acetaminophen / opioid (various)	22	32.0		30.2		62.2
Rhinoplasty ± septoplasty					**86**	**83.1**				**171.9**
Ngombu et al[177]	2020	Retrospective observational	Otologic surgery	67% acetaminophen / hydrocodone, 33% oxycodone	61	45.2		46.3		91.5
Ngyuen et al[b]	2019	RCT: ibuprofen first line; acetaminophen / hydrocodone for rescue cohort	Otologic surgery	Mean 5880-mg ibuprofen	5	24		31.0		55.0
Ngyuen et al[b]	2019	RCT: acetaminophen / hydrocodone first-line cohort	Otologic surgery	Mean 2850-mg ibuprofen	4	46.25		34.5		80.8
Qian et al[176]	2019	Prospective observational	Otologic surgery	78.6% acetaminophen / hydrocodone, addition nonopioids use by 23.4%	70	47.3	50.0	42.9		90.2
Otology					**131**	**46.3**	**50.0**			**90.8**
Ngyuen et al[b]	2019	RCT: ibuprofen first line; acetaminophen / hydrocodone for rescue cohort	MSDL	Mean 900-mg ibuprofen	4	0		0.0		0.0
Ngyuen et al[b]	2019	RCT: acetaminophen / hydrocodone first-line cohort	MSDL	Mean 2700-mg ibuprofen	6	40		25.5		65.5
Taliercio et al[178]	2017	Prospective observational	Microlaryngoscopy	All instructed to take acetaminophen ± ibuprofen	50	—[c]		0		
Laryngology					**60**	**4.0**		**6.6**		
Yazdani et al[184]	2016	RCT	Mandibular fracture surgery	Amantadine (NMDA antagonist) group	30.0	121.7		100.6		241.4
Yazdani et al[184]	2016	RCT	Mandibular fracture surgery	Placebo group	30.0	106.0		135.4		231.8
Mandibular fracture					**60.0**	**113.8**		**118.0**		
Pruitt et al[179]	2019	Prospective observational	T+A (pediatric)	Not described	66.0	85.0			178.8	
Adolescent tonsillectomy					**66.0**	**85.0**			**178.8**	
Pruitt et al[179]	2019	Prospective observational	Sinus surgery (pediatric)	Not described	19	25.0			72.5	
Adolescent ESS					**19**	**25.0**			**72.5**	
Pruitt et al[179]	2019	Prospective observational	Septoplasty (pediatric)	Not described	22	47.5			92.5	92.5

(continued)

Appendix E. (continued)

Author[a]	Year	Design	Procedure type	Nonopioid analgesia	No. of patients	Opioid consumption, MME				
						Mean	Median	SD	75th percentile	85th percentile
Adolescent septoplasty					**22**	**47.5**			**92.5**	**92.5**
Kain et al[183]	2006	Prospective observational	T+A, low anxiety (5-12 y)	65.8-mg/kg mean acetaminophen, 1-mg/kg codeine Q3 PRN	197	1.04[d]		0.4		1.4
Kain et al[183]	2006	Prospective observational	T+A, high anxiety (5-12 y)	81.4-mg/kg mean acetaminophen, 1-mg/kg codeine Q3 PRN	44	1.16[d]		0.4		1.6
Salonen et al[185]	2002	Prospective observational	T+A, ≤10 y	Median 23 ketoprofen doses (3-5 mg/kg) + 8 acetaminophen doses (15-20 mg/kg)	44	0[d]		0.0		0.0
Pediatric tonsillectomy (age <12 y)					**285**	**0.9**[d]		**4.3**		**1.2**
Bhananker et al[181]	2006	RCT	BMT (pediatric)	Preoperative acetaminophen group	52	0.00				0.00
Bhananker et al[181]	2006	RCT	BMT (pediatric)	Preoperative 2% lidocaine otic drops group	72	0.00				0.00
Pappas et al[180]	2003	RCT	BMT (pediatric)	Acetaminophen only group	30	0.10		0.08		0.18
Pappas et al[180]	2003	RCT	BMT (pediatric)	Acetaminophen / codeine group	30	0.10		0.09		0.19
Pappas et al[180]	2003	RCT	BMT (pediatric)	Butorphanol group	30	0.09		0.11		0.20
Pappas et al[180]	2003	RCT	BMT (pediatric)	Ketorolac group	30	0.08		0.10		0.18
BMT					**244**	**0.05**				**0.09**

Abbreviations: BMT, bilateral myringotomy with tubes; ESS, endoscopic sinus surgery; MME, morphine milligram equivalent; MSDL, micro suspension direct laryngoscopy; NSAIDs, nonsteroidal anti-inflammatory drugs; PRN, as needed; Q3, every 3 hours; RCT, randomized controlled trial; T+A, tonsillectomy and adenoidectomy.

[a]Bold row indicates total for the studies immediately above (eg, "Adult tonsillectomy").

[b]Procedure specific data from the Ngyuen et al not included in primary manuscript but provided by the authors upon request.

[c]Not available; 20% required any opioid.

[d]Values are in mg/kg.

Acknowledgments

We gratefully acknowledge the support of Lara Handler, MSLS, for her assistance with the literature searches and Jackie Cole, from the AAO-HNSF, for her assistance with the guideline's graphic designs.

Disclaimer

This guideline is not intended as the sole source of guidance in prescribing opioids and/or analgesics for common otolaryngologic procedures. Rather, it is designed to assist clinicians by providing an evidence-based framework for decision-making strategies. The guideline is not intended to replace clinical judgment or establish a protocol for management for all individuals with pain after otolaryngologic surgery and may not provide the only appropriate approach to managing postoperative pain. As medical knowledge expands and technology advances, clinical indicators and guidelines are promoted as conditional and provisional proposals of what is recommended under specific conditions but are not absolute. Guidelines are not mandates. They do not and should not purport to be a legal standard of care. The responsible physician, in light of all circumstances presented by the individual patient, must determine the appropriate treatment. Adherence to these guidelines will not ensure successful patient outcomes in every situation. The AAO-HNSF emphasizes that these clinical guidelines should not be deemed to include all proper treatment decisions or methods of care or to exclude other treatment decisions or methods of care reasonably directed to obtaining the same results.

Author Contributions

Samantha Anne, writer, chair; **James ''Whit'' Mims**, writer, assistant chair; **David E. Tunkel**, writer, methodologist; **Richard M. Rosenfeld**, writer, methodologist; **David S. Boisoneau**, writer; **Michael J. Brenner**, writer; **John D. Cramer**, writer; **David Dickerson**, writer; **Sandra A. Finestone**, writer; **Adam J. Folbe**, writer; **Deepa J. Galaiya**, writer; **Anna H. Messner**, writer; **Allison Paisley**, writer; **Ahmad R. Sedaghat**, writer; **Kerstin M. Stenson**, writer; **Angela K. Sturm**, writer; **Erin M. Lambie**, writer, AAO-HNSF staff liaison; **Nui Dhepyasuwan**, writer, AAO-HNSF staff liaison; **Taskin M. Monjur**, writer, AAO-HNSF staff liaison.

Disclosures

Competing interests: James ''Whit'' Mims—AstraZeneca consultant, Teva stock; Anna H. Messner—UpToDate royalties; Kerstin M. Stenson—UpToDate royalties, Rakuten medical consulting fees; David Dickerson—Abbott Laboratories consulting fee, Fresenius Kabi consulting fee, Vertos medical consulting fee, SPR Therapeutics consulting fee; Adam J. Folbe—Quintree Medical owner, Authentic 4D shareholder; Erin M. Lambie—AAO-HNSF salaried employee; Nui Dhepyasuwan—AAO-HNSF salaried employee; Taskin M. Monjur—AAO-HNSF salaried employee.

Sponsorship: AAO-HNSF.

Funding source: AAO-HNSF.

References

1. Lyden J, Binswanger IA. The United States opioid epidemic. *Semin Perinatol*. 2019;43(3):123-131.
2. Madras BK. The President's Commission on Combating Drug Addiction and the Opioid Crisis: origins and recommendations. *Clin Pharmacol Ther*. 2018;103(6):943-945.
3. Centers for Disease Control and Prevention. Opioid basics: understanding the epidemic. Published 2020. Accessed July 22, 2020. https://www.cdc.gov/drugoverdose/epidemic/index.html
4. Wilkerson RG, Kim HK, Windsor TA, Mareiniss DP. The opioid epidemic in the United States. *Emerg Med Clin North Am*. 2016;34(2):e1-e23.
5. Cramer JD, Wisler B, Gouveia ACJ. Opioid stewardship in otolaryngology: state of the art review. *Otolaryngol Head Neck Surg*. 2018;158(5):817-827.
6. Svider PF, Arianpour K, Guo E, et al. Opioid prescribing patterns among otolaryngologists: crucial insights among the medicare population. *Laryngoscope*. 2018;128(7):1576-1581.
7. Khalid SI, Kelly R, Khalid R, et al. The opioid prescribing practices of surgeons: a comprehensive review of the 2015 claims to Medicare Part D. *Surgery Open Science*. 2020;2(2):96-100.
8. Lawal OD, Gold J, Murthy A, et al. Rate and risk factors associated with prolonged opioid use after surgery: a systematic review and meta-analysis. *JAMA Netw Open*. 2020;3(6): e207367.
9. Alam A, Gomes T, Zheng H, Mamdani MM, Juurlink DN, Bell CM. Long-term analgesic use after low-risk surgery: a retrospective cohort study. *Arch Intern Med*. 2012;172(5):425-430.
10. Center for Behavioral Health Statistics and Quality. Results from the 2014 National Survey on Drug Use and Health. Published 2014. Accessed December 8, 2019. https://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs2014/NSDUH-DetTabs2014.pdf
11. Boyd CJ, Esteban McCabe S, Teter CJ. Medical and nonmedical use of prescription pain medication by youth in a Detroit-area public school district. *Drug Alcohol Depend*. 2006;81(1):37-45.
12. Han B, Compton WM, Blanco C, Crane E, Lee J, Jones CM. Prescription opioid use, misuse, and use disorders in US adults: 2015 National Survey on Drug Use and Health. *Ann Intern Med*. 2017;167(5):293-301.
13. Inciardi JA, Surratt HL, Lugo Y, Cicero TJ. The diversion of prescription opioid analgesics. *Law Enforc Exec Forum*. 2007;7(7): 127-141.
14. American Psychiatric Associaiton. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. American Psychiatric Publishing; 2013.
15. American Society of Anesthesiologists Task Force on Acute Pain Management. Practice guidelines for acute pain management in the perioperative setting: an updated report by the American Society of Anesthesiologists Task Force on Acute Pain Management. *Anesthesiology*. 2012;116(2):248-273.
16. 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.
17. Rosenfeld RM, Shiffman RN, Robertson P. Clinical practice guideline development manual, third edition: a quality-driven approach for translating evidence into action. *Otolaryngol Head Neck Surg*. 2013;148(1):S1-S55.

18. Dowell D, Haegerich TM, Chou R. CDC guideline for prescribing opioids for chronic pain United States, 2016. *JAMA*. 2016; 315(15):1624-1645.
19. Reinhart M, Scarpati LM, Kirson NY, Patton C, Shak N, Erensen JG. The economic burden of abuse of prescription opioids: a systematic literature review from 2012 to 2017. *Appl Health Econ Health Policy*. 2018;16(5):609-632.
20. Kaplovitch E, Gomes T, Camacho X, Dhalla IA, Mamdani MM, Juurlink DN. Sex differences in dose escalation and overdose death during chronic opioid therapy: a population-based cohort study. *PLoS One*. 2015;10(8):e0134550.
21. Washington State Agency Medical Directors' Group. AMDG 2015 interagency guideline on prescribing opioids for pain. Published 2015. Accessed November 14, 2019. http://www.agencymeddirectors.wa.gov/guidelines.asp
22. Centers for Disease Control and Prevention. *2019 Annual Surveillance Report of Drug-Related Risks and Outcomes United States*. US Department of Health and Human Services; 2019.
23. Centers for Disease Control and Prevention. *2018 Annual Surveillance Report of Drug-Related Risks and Outcomes United States*. US Department of Health and Human Services; 2018.
24. Lipari RN, Hughes A. *The CBHSQ Report: How People Obtain the Prescription Pain Relievers They Misuse*. Substance Abuse and Mental Health Services Administration; 2017.
25. Brat GA, Agniel D, Beam A, et al. Postsurgical prescriptions for opioid naive patients and association with overdose and misuse: retrospective cohort study. *BMJ*. 2018;360:j5790.
26. Brummett CM, Waljee JF, Goesling J, et al. New persistent opioid use after minor and major surgical procedures in US adults. *JAMA Surg*. 2017;152(6):e170504.
27. Shah A, Hayes CJ, Martin BC. Characteristics of initial prescription episodes and likelihood of long-term opioid use—United States, 2006-2015. *Morb Mortal Wkly Rep*. 2017;66(10):265-269.
28. Centers for Disease Control and Prevention. *Wide-Ranging Online Data for Epidemiologic Research (WONDER)*. US Department of Health and Human Services; 2020.
29. Centers for Disease Control and Prevention. *Multiple Cause of Death 1999-2017*. US Department of Health and Human Services; 2018.
30. Kuehn BM. FDA: no codeine after tonsillectomy for children. *JAMA*. 2013;309(11):1100.
31. US Food and Drug Administration. FDA drug safety communication. Published 2014. Accessed November 14, 2019. https://www.fda.gov/media/85072/download
32. US Food and Drug Administration. *Joint Meeting of the Drug Safety and Risk Management (DSaRM) Advisory Committee and Anesthetic and Analgesic Drug Products Advisory Committee (AADPAC)*. US Food and Drug Administration; 2019.
33. Birnbaum HG, White AG, Schiller M, Waldman T, Cleveland JM, Roland CL. Societal costs of prescription opioid abuse, dependence, and misuse in the United States. *Pain Med*. 2011; 12(4):657-667.
34. Oderda GM, Lake J, Rüdell K, Roland CL, Masters ET. Economic burden of prescription opioid misuse and abuse: a systematic review. *J Pain Palliat Care Pharmacother*. 2015;29(4): 388-400.
35. Substance Abuse and Mental Health Services Administration. *The DAWN Report: Highlights of the 2011 Drug Abuse Warning Network (DAWN) Findings on Drug-Related Emergency Department Visits*. US Department of Health and Human Services; 2013.
36. Florence CS, Zhou C, Luo F, Xu L. The economic burden of prescription opioid overdose, abuse, and dependence in the United States, 2013. *Med Care*. 2016;54(10):901-906.
37. Altarum. Economic toll of opioid crisis in US exceeded $1 trillion since 2001. Published 2018. Accessed August 5, 2020. https://altarum.org/news/economic-toll-opioid-crisis-us-exceeded-1-trillion-2001
38. Kirson NY, Scarpati LM, Enloe CJ, Dincer AP, Birnbaum HG, Mayne TJ. The economic burden of opioid abuse: updated findings. *J Manag Care Spec Pharm*. 2017;23(4):427-445.
39. Baser O, Xie L, Mardekian J, Schaaf D, Wang L, Joshi AV. Prevalence of diagnosed opioid abuse and its economic burden in the Veterans Health Administration. *Pain Pract*. 2014;14(5): 437-445.
40. Meyer R, Patel AM, Rattana SK, Quock TP, Mody SH. Prescription opioid abuse: a literature review of the clinical and economic burden in the United States. *Popul Health Manag*. 2014; 17(6):372-387.
41. Inocencio TJ, Carroll NV, Read EJ, Holdford DA. The economic burden of opioid-related poisoning in the United States. *Pain Med*. 2013;14(10):1534-1547.
42. Pruitt L, Casazza G, Newberry C, et al. Opioid prescribing and use in ambulatory otolaryngology. *Laryngoscope*. 2020;130(8): 1913-1921.
43. Hill M, McMahon M, Stucke R, Barth R Jr. Wide variation and excessive dosage of opioid prescriptions for common general surgical procedures. *Ann Surg*. 2017;265(4):709-714.
44. Substance Abuse and Mental Health Services Administration. *Key Substance Use and Mental Health Indicators in the United States: Results From the 2016 National Survey on Drug Use and Health*. US Department of Health and Human Services;2017.
45. Oxford Centre for Evidence-Based Medicine Work Group. The Oxford levels of evidence 2. Published 2011. Accessed November 7, 2018. https://www.cebm.net/index.aspx?o=5653
46. American Academy of Pediatrics. Classifying recommendations for clinical practice guidelines. *Pediatrics*. 2004;114(3):874-877.
47. Shiffman RN, Michel G, Rosenfeld RM, Davidson C. Building better guidelines with BRIDGE-Wiz: development and evaluation of a software assistant to promote clarity, transparency, and implementability. *J Am Med Inform Assoc*. 2012;19(1):94-101.
48. Shiffman RN, Dixon J, Brandt C, et al. The GuideLine Implementability Appraisal (GLIA): development of an instrument to identify obstacles to guideline implementation. *BMC Med Inform Decis Mak*. 2005;5:23.
49. Eddy D. *A Manual for Assessing Health Practices and Designing Practice Policies: The Explicit Approach*. American College of Physicians; 1992.
50. Choudhry NK, Stelfox HT, Detsky AS. Relationships between authors of clinical practice guidelines and the pharmaceutical industry. *JAMA*. 2002;287(5):612-617.

51. Detsky AS. Sources of bias for authors of clinical practice guidelines. *CMAJ*. 2006;175(9):1033-1035.
52. Barry MJ, Edgman-Levitan S. Shared decision making—pinnacle of patient-centered care. *N Engl J Med*. 2012;366(9): 780-781.
53. Jawaid M, Mushtaq A, Mukhtar S, Khan Z. Preoperative anxiety before elective surgery. *Neurosciences (Riyadh)*. 2007;12(2): 145-148.
54. Stamenkovic DM, Rancic NK, Latas MB, et al. Preoperative anxiety and implications on postoperative recovery: what can we do to change our history? *Minerva Anestesiol*. 2018;84(11): 1307-1317.
55. Anderson EA. Preoperative preparation for cardiac surgery facilitates recovery, reduces psychological distress, and reduces the incidence of acute postoperative hypertension. *J Consult Clin Psychol*. 1987;55(4):513-520.
56. Butler GS, Hurley CA, Buchanan KL, Smith-VanHorne J. Prehospital education: effectiveness with total hip replacement surgery patients. *Patient Educ Couns*. 1996;29(2):189-197.
57. Crowe J, Henderson J. Pre-arthroplasty rehabilitation is effective in reducing hospital stay. *Can J Occup Ther*. 2003;70(2):88-96.
58. Doering S, Katzlberger F, Rumpold G, et al. Videotape preparation of patients before hip replacement surgery reduces stress. *Psychosom Med*. 2000;62(3):365-373.
59. Stanek JJ, Renslow MA, Kalliainen LK. The effect of an educational program on opioid prescription patterns in hand surgery: a quality improvement program. *J Hand Surg Am*. 2015;40(2): 341-346.
60. Egbert LD, Battit GE, Welch CE, Bartlett MK. Reduction of postoperative pain by encouragement and instruction of patients: a study of doctor-patient rapport. *N Engl J Med*. 1964;270:825-827.
61. Langer EJ, Janis IL, Wolfer JA. Reduction of psychological stress in surgical patients. *J Exp Soc Psychol*. 1975;11(2):155-165.
62. Alter TH, Ilyas AM. A prospective randomized study analyzing preoperative opioid counseling in pain management after carpal tunnel release surgery. *J Hand Surg Am*. 2017;42(10):810-815.
63. Arthur HM, Daniels C, McKelvie R, Hirsh J, Rush B. Effect of a preoperative intervention on preoperative and postoperative outcomes in low-risk patients awaiting elective coronary artery bypass graft surgery: a randomized, controlled trial. *Ann Intern Med*. 2000;133(4):253-262.
64. Wilson JF. Behavioral preparation for surgery: benefit or harm? *J Behav Med*. 1981;4(1):79-102.
65. Wittekindt D, Wittekindt C, Schneider G, Meissner W, Guntinas-Lichius O. Postoperative pain assessment after septorhinoplasty. *Eur Arch Otorhinolaryngol*. 2012;269(6):1613-1621.
66. Gerbershagen HJ, Aduckathil S, van Wijck AJ, Peelen LM, Kalkman CJ, Meissner W. Pain intensity on the first day after surgery: a prospective cohort study comparing 179 surgical procedures. *Anesthesiology*. 2013;118(4):934-944.
67. Locketz GD, Brant JD, Adappa ND, et al. Postoperative opioid use in sinonasal surgery. *Otolaryngol Head Neck Surg*. 2019; 160(3):402-408.
68. Patel S, Zuliani G, Kridel R. Opioid prescription patterns after rhinoplasty. *JAMA Facial Plast Surg*. 2019;21(3):263-264.
69. Meints SM, Cortes A, Morais CA, Edwards RR. Racial and ethnic differences in the experience and treatment of noncancer pain. *Pain Manag*. 2019;9(3):317-334.
70. Sadhasivam S, Chidambaran V, Ngamprasertwong P, et al. Race and unequal burden of perioperative pain and opioid related adverse effects in children. *Pediatrics*. 2012;129(5):832-838.
71. Ip HY, Abrishami A, Peng PW, Wong J, Chung F. Predictors of postoperative pain and analgesic consumption: a qualitative systematic review. *Anesthesiology*. 2009;111(3):657-677.
72. Bhashyam AR, Heng M, Harris MB, Vrahas MS, Weaver MJ. Self-reported marijuana use is associated with increased use of prescription opioids following traumatic musculoskeletal injury. *J Bone Joint Surg Am*. 2018;100(24):2095-2102.
73. Khanwalkar AR, Shen J, Kern RC, et al. Utilization of a novel interactive mobile health platform to evaluate functional outcomes and pain following septoplasty and functional endoscopic sinus surgery. *Int Forum Allergy Rhinol*. 2019;9(4):345-351.
74. Kent ML, Hurley RW, Oderda GM, et al. American Society for Enhanced Recovery and Perioperative Quality Initiative–4 joint consensus statement on persistent postoperative opioid use: definition, incidence, risk factors, and health care system initiatives. *Anesth Analg*. 2019;129(2):543-552.
75. Chou R, Fanciullo GJ, Fine PG, et al. Clinical guidelines for the use of chronic opioid therapy in chronic noncancer pain. *J Pain*. 2009;10(2):113-130.
76. Katz NP, Adams EH, Benneyan JC, et al. Foundations of opioid risk management. *Clin J Pain*. 2007;23(2):103-118.
77. Klimas J, Gorfinkel L, Fairbairn N, et al. Strategies to identify patient risks of prescription opioid addiction when initiating opioids for pain: a systematic review. *JAMA Netw Open*. 2019; 2(5):e193365.
78. Lawrence R, Mogford D, Colvin L. Systematic review to determine which validated measurement tools can be used to assess risk of problematic analgesic use in patients with chronic pain. *Br J Anaesth*. 2017;119(6):1092-1109.
79. Cheatle MD, Compton PA, Dhingra L, Wasser TE, O'Brien CP. Development of the revised opioid risk tool to predict opioid use disorder in patients with chronic nonmalignant pain. *J Pain*. 2019;20(7):842-851.
80. Jones T, Lookatch S, Moore T. Validation of a new risk assessment tool: the Brief Risk Questionnaire. *J Opioid Manag*. 2015; 11(2):171-183.
81. Chaudhary MA, Bhulani N, de Jager EC, et al. Development and validation of a bedside risk assessment for sustained prescription opioid use after surgery. *JAMA Netw Open*. 2019;2(7):e196673.
82. Karhade AV, Chaudhary MA, Bono CM, Kang JD, Schwab JH, Schoenfeld AJ. Validating the Stopping Opioids after Surgery (SOS) score for sustained postoperative prescription opioid use in spine surgical patients. *Spine J*. 2019;19(10):1666-1671.
83. Bevilacqua L, Goldman D. Genes and addictions. *Clin Pharmacol Ther*. 2009;85(4):359-361.
84. Sordo L, Barrio G, Bravo MJ, et al. Mortality risk during and after opioid substitution treatment: systematic review and meta-analysis of cohort studies. *BMJ*. 2017;357:j1550.
85. Elwyn G, Frosch D, Thomson R, et al. Shared decision making: a model for clinical practice. *J Gen Intern Med*. 2012;27(10): 1361-1367.

86. Stacey D, Bennett CL, Barry MJ, et al. Decision aids for people facing health treatment or screening decisions. *Cochrane Database Syst Rev*. 2011(10):CD001431.
87. Raynes-Greenow CH, Nassar N, Torvaldsen S, Trevena L, Roberts CL. Assisting informed decision making for labour analgesia: a randomised controlled trial of a decision aid for labour analgesia versus a pamphlet. *BMC Pregnancy Childbirth*. 2010;10:15.
88. ERAS Society USA. Accessed October 30, 2020. https://erasusa.org/
89. Clark BS, Swanson M, Widjaja W, et al. ERAS for head and neck tissue transfer reduces opioid usage, peak pain scores, and blood utilization. *Laryngoscope*. Published online June 9, 2020. doi:10.1002/lary.28768
90. Smith TW Jr, Wang X, Singer MA, Godellas CV, Vaince FT. Enhanced recovery after surgery: a clinical review of implementation across multiple surgical subspecialties. *Am J Surg*. 2020;219(3):530-534.
91. Jandali DB, Vaughan D, Eggerstedt M, et al. Enhanced recovery after surgery in head and neck surgery: reduced opioid use and length of stay. *Laryngoscope*. 2020;130(5):1227-1232.
92. Ansari A, Rizk D, Whinney C. The Society of Hospital Medicine's (SHM's) multimodal pain strategies guide for postoperative pain management. Published 2017. Accessed January 7, 2020. https://www.hospitalmedicine.org/globalassets/clinical-topics/clinical-pdf/ctr-17-0004-multi-model-pain-project-pdf-version-m1.pdf
93. Du E, Farzal Z, Stephenson E, et al. Multimodal analgesia protocol after head and neck surgery: effect on opioid use and pain control. *Otolaryngol Head Neck Surg*. 2019;161(3):424-430.
94. Graff V, Grosh T. *Multimodal Analgesia and Alternatives to Opioids for Postoperative Analgesia*. Anesthesia Patient Safety Foundation; 2018.
95. Jandali DB, Vaughan D, Eggerstedt M, et al. Enhanced recovery after surgery in head and neck surgery: reduced opioid use and length of stay. *Laryngoscope*. 2020;130(5):1227-1232.
96. Polomano RC, Fillman M, Giordano NA, Vallerand AH, Nicely KL, Jungquist CR. Multimodal analgesia for acute postoperative and trauma-related pain. *Am J Nurs*. 2017;117(3)(suppl 1):S12-S26.
97. Svider PF, Nguyen B, Yuhan B, Zuliani G, Eloy JA, Folbe AJ. Perioperative analgesia for patients undergoing endoscopic sinus surgery: an evidence-based review. *Int Forum Allergy Rhinol*. 2018;8(7):837-849.
98. Wick EC, Grant MC, Wu CL. Postoperative multimodal analgesia pain management with nonopioid analgesics and techniques: a review. *JAMA Surg*. 2017;152(7):691-697.
99. Jin F, Chung F. Multimodal analgesia for postoperative pain control. *J Clin Anesth*. 2001;13(7):524-539.
100. Elvir-Lazo OL, White PF. The role of multimodal analgesia in pain management after ambulatory surgery. *Curr Opin Anaesthesiol*. 2010;23(6):697-703.
101. Rawal N. Current issues in postoperative pain management. *Eur J Anaesthesiol*. 2016;33(3):160-171.
102. US Food and Drug Administration. FDA warns about serious breathing problems with seizure and nerve pain medicines gabapentin (Neurontin, Gralise, Horizant) and pregabalin (Lyrica, Lyrica CR). Published 2019. Accessed April 6, 2020. https://www.fda.gov/drugs/drug-safety-and-availability/fda-warns-about-serious-breathing-problems-seizure-and-nerve-pain-medicines-gabapentin-neurontin
103. Enhanced Recovery After Surgery Society. List of guidelines. Accessed April 16, 2020. https://erassociety.org/guidelines/list-of-guidelines/
104. Townsend M, Liou T, Kallogjeri D, et al. Effect of perioperative gabapentin use on postsurgical pain in patients undergoing head and neck mucosal surgery: a randomized clinical trial. *JAMA Otolaryngol Head Neck Surg*. 2018;144(11):959-966.
105. Sanders JG, Cameron C, Dawes PJD. Gabapentin in the management of pain following tonsillectomy: a randomized double-blind placebo-controlled trial. *Otolaryngol Head Neck Surg*. 2017;157(5):781-790.
106. Sanders JG, Dawes PJ. Gabapentin for perioperative analgesia in otorhinolaryngology–head and neck surgery: systematic review. *Otolaryngol Head Neck Surg*. 2016;155(6):893-903.
107. Mayhew D, Sahgal N, Khirwadkar R, Hunter JM, Banerjee A. Analgesic efficacy of bilateral superficial cervical plexus block for thyroid surgery: meta-analysis and systematic review. *Br J Anaesth*. 2018;120(2):241-251.
108. Wu M, Chen K, Chen IF, et al. The efficacy of acupuncture in post-operative pain management: a systematic review and meta-analysis. *PloS One*. 2016;11(3):e0150367.
109. Barra M, Remák E, Liu DD, Xie L, Abraham L, Sadosky AB. A cost-consequence analysis of parecoxib and opioids vs opioids alone for postoperative pain: Chinese perspective. *Clinicoecon Outcomes Res*. 2019;11:169-177.
110. Maiese BA, Pham AT, Shah MV, Eaddy MT, Lunacsek OE, Wan GJ. Hospitalization costs for patients undergoing orthopedic surgery treated with intravenous acetaminophen (IV-APAP) plus other IV analgesics or IV opioid monotherapy for postoperative pain. *Adv Ther*. 2017;34(2):421-435.
111. Memtsoudis SG, Poeran J, Zubizarreta N, et al. Association of multimodal pain management strategies with perioperative outcomes and resource utilization: a population-based study. *Anesthesiology*. 2018;128(5):891-902.
112. Nassif GJ, Miller TE. Evolving the management of acute perioperative pain towards opioid free protocols: a narrative review. *Curr Med Res Opin*. 2019;35(12):2129-2136.
113. Aminoshariae A, Kulild JC, Donaldson M, Hersh EV. Evidence-based recommendations for analgesic efficacy to treat pain of endodontic origin. *JADA*. 2016;147(10):826-839.
114. Wu CL, King AB, Geiger TM, et al. American Society for Enhanced Recovery and Perioperative Quality Initiative joint consensus statement on perioperative opioid minimization in opioid-naive patients. *Anesth Analg*. 2019;129(2):567-577.
115. Vittinghoff M, Lonnqvist PA, Mossetti V, et al. Postoperative pain management in children: guidance from the Pain Committee of the European Society for Paediatric Anaesthesiology (ESPA Pain Management Ladder Initiative). *Paediatr Anaesth*. 2018;28(6):493-506.
116. Pitchon DN, Dayan AC, Schwenk ES, Baratta JL, Viscusi ER. Updates on multimodal analgesia for orthopedic surgery. *Anesthesiol Clin*. 2018;36(3):361-373.
117. American Academy of Pediatrics Committee on Psychosocial Aspects of Child and Family Health, Task Force on Pain in

Infants Children and Adolescents. The assessment and management of acute pain in infants, children, and adolescents. *Pediatrics*. 2001;108(3):793-797.
118. Hegmann K, Weiss M, Bowden K, et al. ACOEM practice guidelines: opioids for treatment of acute, subacute, chronic, and postoperative pain. *J Occup Environ Med*. 2014;56(12): e143-e159.
119. American Society of Anesthesiologists. Practice guidelines for acute pain management in the perioperative setting: an updated report by the American Society of Anesthesiologists Task Force on Acute Pain Management. *Anesthesiology*. 2012; 116(2):248-273.
120. Boric K, Dosenovic S, Kadic AJ, et al. Interventions for postoperative pain in children: an overview of systematic reviews. *Pediatr Anesth*. 2017;27(9):893-904.
121. Joshi GP, Bonnet F, Kehlet H, et al. Evidence-based postoperative pain management after laparoscopic colorectal surgery. *Colorectal Disease*. 2013;15(2):146-155.
122. Joshi GP, Rawal N, Kehlet H. Evidence-based management of pain after inguinal hernia repair in adults. *Anesth Analg*. 2011; 112(5).
123. Kelley B, Shauver M, Chung K. Management of acute postoperative pain in hand surgery: a systematic review. *J Hand Surg Am*. 2015;40(8):1610-1619, 1619.e1611.
124. Macfater H, Xia WS, Srinivasa S, et al. Evidence-based management of postoperative pain in adults undergoing laparoscopic sleeve gastrectomy. *World J Surg*. 2019;43(6):1571-1580.
125. Mitchell A, van Zanten SV, Inglis K, Porter G. A randomized controlled trial comparing acetaminophen plus ibuprofen versus acetaminophen plus codeine plus caffeine after outpatient general surgery. *J Am Coll Surg*. 2008;206(3):472-479.
126. Moir MS, Bair E, Shinnick P, Messner A. Acetaminophen versus acetaminophen with codeine after pediatric tonsillectomy. *Laryngoscope*. 2000;110(11):1824-1827.
127. Moore PA, Ziegler KM, Lipman RD, Aminoshariae A, Carrasco-Labra A, Mariotti A. Benefits and harms associated with analgesic medications used in the management of acute dental pain: an overview of systematic reviews. *J Am Dent Assoc*. 2018;149(4):256-265.e3.
128. Saco M, Golda N. Postoperative pain management in dermatologic surgery: a systematic review. *Dermatol Clin*. 2019;37(3): 341-348.
129. Sammour T, Barazanchi AWH, Hill AG. Evidence-based management of pain after excisional haemorrhoidectomy surgery: a PROSPECT review update. *World J Surg*. 2017;41(2):603-614.
130. Secrist ES, Freedman KB, Ciccotti MG, Mazur DW, Hammoud S. Pain management after outpatient anterior cruciate ligament reconstruction: a systematic review of randomized controlled trials. *Am J Sports Med*. 2016;44(9):2435-2447.
131. Uhlmann RA, Reinhart HA, Postevka E, Snyder SK, Romero Arenas M. A review of postoperative pain management for thyroid and parathyroid surgery. *J Surg Res*. 2019;241:107-111.
132. Wang J, Liu GT, Mayo HG, Joshi GP. Pain management for elective foot and ankle surgery: a systematic review of randomized controlled trials. *J Foot Ankle Surg*. 2015;54(4):625-635.
133. Ghanem CI, Perez MJ, Manautou JE, Mottino AD. Acetaminophen from liver to brain: new insights into drug pharmacological action and toxicity. *Pharmacol Res*. 2016;109:119-131.
134. Goldman RD. Acetaminophen in children: an old drug with new warnings. *Can Fam Physician*. 2013;59(10):1065-1066, e1449-1050.
135. Irvine J, Afrose A, Islam N. Formulation and delivery strategies of ibuprofen: challenges and opportunities. *Drug Dev Ind Pharm*. 2018;44(2):173-183.
136. Derry C, Derry S, Moore RA, McQuay HJ. Single dose oral naproxen and naproxen sodium for acute postoperative pain in adults. *Cochrane Database Syst Rev*. 2009(1):CD004234.
137. Derry S, Moore RA. Single dose oral celecoxib for acute postoperative pain in adults. *Cochrane Database Syst Rev*. 2013(10):CD004233.
138. Silverstein FE, Faich G, Goldstein JL, et al. Gastrointestinal toxicity with celecoxib vs nonsteroidal anti-inflammatory drugs for osteoarthritis and rheumatoid arthritis: the CLASS study. A randomized controlled trial: Celecoxib Long-term Arthritis Safety Study. *JAMA*. 2000;284(10):1247-1255.
139. Yeomans ND, Graham DY, Husni ME, et al. Randomised clinical trial: gastrointestinal events in arthritis patients treated with celecoxib, ibuprofen or naproxen in the PRECISION trial. *Aliment Pharmacol Ther*. 2018;47(11):1453-1463.
140. Bombardier C, Laine L, Reicin A, et al; VIGOR Study Group. Comparison of upper gastrointestinal toxicity of rofecoxib and naproxen in patients with rheumatoid arthritis. *N Engl J Med*. 2000;343(21):1520-1528.
141. Bresalier RS, Sandler RS, Quan H, et al. Cardiovascular events associated with rofecoxib in a colorectal adenoma chemoprevention trial. *N Engl J Med*. 2005;352(11):1092-1102.
142. LaMattina J. Surprise! Arthritis drug Celebrex shown as safe as ibuprofen and naproxen. *Forbes*. Published 2016. Accessed March 2, 2020. https://www.forbes.com/sites/johnlamattina/2016/11/14/surprise-arthritis-drug-celebrex-shown-as-safe-as-ibuprofen-and-naproxen/#106679207a0c
143. Nissen SE, Yeomans ND, Solomon DH, et al. Cardiovascular safety of celecoxib, naproxen, or ibuprofen for arthritis. *N Engl J Med*. 2016;375(26):2519-2529.
144. US Food and Drug Administration. CDER statement: FDA approves labeling supplement for Celebrex (celecoxib). Published 2018. Accessed March 2, 2020. https://www.fda.gov/drugs/drug-safety-and-availability/cder-statement-fda-approves-labeling-supplement-celebrex-celecoxib
145. Derry S, Moore RA. Single dose oral celecoxib for acute postoperative pain in adults. *Cochrane Database Syst Rev*. 2012(3): CD004233.
146. Elia N, Lysakowski C, Tramer M. Does multimodal analgesia with acetaminophen, nonsteroidal antiinflammatory drugs, or selective cyclooxygenase-2 inhibitors and patient-controlled analgesia morphine offer advantages over morphine alone? Meta-analyses of randomized trials. *Anesthesiology*. 2005; 103(6):1296-1304.
147. Hallway A, Vu J, Lee J, et al. Patient satisfaction and pain control using an opioid-sparing postoperative pathway. *J Am Coll Surg*. 2019;229(3):316-322.

148. Maund E, McDaid C, Rice S, Wright K, Jenkins B, Woolacott N. Paracetamol and selective and non-selective non-steroidal anti-inflammatory drugs for the reduction in morphine-related side-effects after major surgery: a systematic review. *Br J Anaesth*. 2011;106(3):292-297.
149. Sada A, Ubl DS, Thiels CA, et al. Optimizing opioid-prescribing practices after parathyroidectomy. *J Surg Res*. 2019;245:107-114.
150. Sethi RKV, Miller AL, Bartholomew RA, et al. Opioid prescription patterns and use among patients undergoing endoscopic sinus surgery. *Laryngoscope*. 2019;129(5):1046-1052.
151. Shindo M, Lim J, Leon E, Moneta L, Li R, Quintanilla-Dieck L. Opioid prescribing practice and needs in thyroid and parathyroid surgery. *JAMA Otolaryngol Head Neck Surg*. 2018; 144(12):1098-1103.
152. Nguyen KK, Liu YF, Chang C, et al. A randomized single-blinded trial of ibuprofen- versus opioid-based primary analgesic therapy in outpatient otolaryngology surgery. *Otolaryngol Head Neck Surg*. 2019;160(5):839-846.
153. Sclafani AP, Kim M, Kjaer K, Kacker A, Tabaee A. Postoperative pain and analgesic requirements after septoplasty and rhinoplasty. *Laryngoscope*. 2019;129(9):2020-2025.
154. Ndon S, Spock T, Torabi SJ, Manes RP. Patterns in pain and opiate use after endoscopic sinus surgery. *Otolaryngol Head Neck Surg*. 2020;162(6):969-978.
155. Moore RA, Derry S, Aldington D, Wiffen PJ. Single dose oral analgesics for acute postoperative pain in adults-an overview of Cochrane reviews. *Cochrane Database Syst Rev*. 2015;(9): CD008659.
156. Ong CK, Seymour RA, Lirk P, Merry AF. Combining paracetamol (acetaminophen) with nonsteroidal antiinflammatory drugs: a qualitative systematic review of analgesic efficacy for acute postoperative pain. *Anesth Analg*. 2010;110(4):1170-1179.
157. Flory DA, Fankhauser RA, McShane MA. Postoperative pain control in total joint arthroplasty: a prospective, randomized study of a fixed-dose, around-the-clock, oral regimen. *Orthopedics*. 2001;24(3):243-246.
158. Hobson A, Wiffen PJ, Conlon JA. As required versus fixed schedule analgesic administration for postoperative pain in children. *Cochrane Database Syst Rev*. 2015(2):CD011404.
159. Sutters KA, Miaskowski C, Holdridge-Zeuner D, et al. A randomized clinical trial of the efficacy of scheduled dosing of acetaminophen and hydrocodone for the management of postoperative pain in children after tonsillectomy. *Clin J Pain*. 2010;26(2):95-103.
160. Sun EC, Darnall BD, Baker LC, Mackey S. Incidence of and risk factors for chronic opioid use among opioid-naive patients in the postoperative period. *JAMA Intern Med*. 2016;176(9): 1286-1293.
161. Steyaert A, Lavand'homme P. Postoperative opioids: let us take responsibility for the possible consequences. *Eur J Anaesthesiol*. 2013;30(2):50-52.
162. Howard R, Fry B, Gunaseelan V, et al. Association of opioid prescribing with opioid consumption after surgery in Michigan. *JAMA Surg*. 2019;154(1):e184234.
163. Bicket MC, Long JJ, Pronovost PJ, Alexander GC, Wu CL. Prescription opioid analgesics commonly unused after surgery: a systematic review. *JAMA Surg*. 2017;152(11):1066-1071.
164. Thiels CA, Ubl DS, Yost KJ, et al. Results of a prospective, multicenter initiative aimed at developing opioid-prescribing guidelines after surgery. *Ann Surg*. 2018;268(3):457-468.
165. Dang S, Duffy A, Li JC, et al. Postoperative opioid-prescribing practices in otolaryngology: a multiphasic study. *Laryngoscope*. 2020;130(3):659-665.
166. Tolska HK, Takala A, Blomgren K, Hamunen K, Kontinen V. Topical ropivacaine in prevention of post-tonsillectomy pain in adults. *Anesth Analg*. 2017;124(5):1459-1466.
167. Choo S, Nogan S, Matrka L. Postoperative opioid prescribing and consumption patterns after tonsillectomy. *Otolaryngol Head Neck Surg*. 2019;161(6):960-966.
168. Ng TT, Diamantaras D, Priestley J, Redman J, De Silva N, Mahanta V. Is celecoxib a useful adjunct in the treatment of post-tonsillectomy pain in the adult population? A randomised, double-blind, placebo-controlled study. *J Laryngol Otol*. 2017; 131(S1):S18-S28.
169. van Daele DJ, Bodeker KL, Trask DK. Celecoxib versus placebo in tonsillectomy: a prospective, randomized, double-blind placebo-controlled trial. *Ann Otol Rhinol Laryngol*. 2016; 125(10):785-800.
170. Wu JX, Assel M, Vickers A, et al. Impact of intraoperative remifentanil on postoperative pain and opioid use in thyroid surgery. *J Surg Oncol*. 2019;120(8):1456-1461.
171. Tharakan T, Jiang S, Fastenberg J, et al. Postoperative pain control and opioid usage patterns among patients undergoing thyroidectomy and parathyroidectomy. *Otolaryngol Head Neck Surg*. 2019;160(3):394-401.
172. Riley CA, Kim M, Sclafani AP, et al. Opioid analgesic use and patient-reported pain outcomes after rhinologic surgery. *Int Forum Allergy Rhinol*. 2019;9(4):339-344.
173. Newberry CI, Casazza GC, Pruitt LC, Meier JD, Skarda DE, Alt JA. Prescription patterns and opioid usage in sinonasal surgery. *Int Forum Allergy Rhinol*. 2020;10(3):381-387.
174. Badash I, Lui CG, Hur K, Acevedo JR, Ference EH, Wrobel BB. Quantifying the use of opioids in the immediate postoperative period after endoscopic sinus surgery. *Laryngoscope*. 2020;130(5):1122-1127.
175. Aynehchi BB, Cerrati EW, Rosenberg DB. The efficacy of oral celecoxib for acute postoperative pain in face-lift surgery. *JAMA Facial Plast Surg*. 2014;16(5):306-309.
176. Qian ZJ, Alyono JC, Woods OD, Ali N, Blevins NH. A prospective evaluation of postoperative opioid use in otologic surgery. *Otol Neurotol*. 2019;40(9):1194-1198.
177. Ngombu S, Hooks A, Rock AN, et al. Comparison of opioid prescription patterns and consumption following otologic surgery. *Otol Neurotol*. 2020;41(2):229-234.
178. Taliercio S, Sanders B, Achlatis S, Fang Y, Branski R, Amin M. Factors associated with the use of postoperative analgesics in patients undergoing direct microlaryngoscopy. *Ann Otol Rhinol Laryngol*. 2017;126(5):375-381.
179. Pruitt LCC, Swords DS, Russell KW, Rollins MD, Skarda DE. Prescription vs consumption: opioid overprescription to

children after common surgical procedures. *J Pediatr Surg*. 2019;54(11):2195-2199.
180. Pappas AL, Fluder EM, Creech S, Hotaling A, Park A. Postoperative analgesia in children undergoing myringotomy and placement equalization tubes in ambulatory surgery. *Anesth Analg*. 2003;96(6):1621-1624.
181. Bhananker SM, Azavedo L, MacCormick J, Splinter W. Topical lidocaine and oral acetaminophen provide similar analgesia for myringotomy and tube placement in children. *Can J Anaesth*. 2006;53(11):1111-1116.
182. Rock AN, Cheresnick C, Akakpo K, Zmistowski B, Nogan S. Postoperative opioid prescriptions and corresponding opioid consumption after septoplasty or rhinoplasty. *Otolaryngol Head Neck Surg*. 2018;159(1):P74.
183. Kain ZN, Mayes LC, Caldwell-Andrews AA, Karas DE, McClain BC. Preoperative anxiety, postoperative pain, and behavioral recovery in young children undergoing surgery. *Pediatrics*. 2006;118(2):651-658.
184. Yazdani J, Aghamohamadi D, Amani M, Mesgarzadeh AH, Maghbooli Asl D, Pourlak T. Effect of preoperative oral amantadine on acute and chronic postoperative pain after mandibular fracture surgery. *Anesth Pain Med*. 2016;6(3):e35900.
185. Salonen A, Kokki H, Nuutinen J. The effect of ketoprofen on recovery after tonsillectomy in children: a 3-week follow-up study. *Int J Pediatr Otorhinolaryngol*. 2002;62(2):143-150.
186. National Center for Injury Prevention and Control. CDC compilation of benzodiazepines, muscle relaxants, stimulants, zolpidem, and opioid analgesics with oral morphine milligram equivalent conversion factors, 2017 version. Centers for Disease Control and Prevention; 2017.
187. Howard R, Waljee J, Brummett C, Englesbe M, Lee J. Reduction in opioid prescribing through evidence-based prescribing guidelines. *JAMA Surg*. 2018;153(3):285-287.
188. Hill MV, Stucke RS, McMahon ML, Beeman JL, Barth RJ, Jr. An educational intervention decreases opioid prescribing after general surgical operations. *Ann Surg*. 2018;267(3):468-472.
189. Lanzillotta JA, Clark A, Starbuck E, Kean EB, Kalarchian M. The impact of patient characteristics and postoperative opioid exposure on prolonged postoperative opioid use: an integrative review. *Pain Manag Nurs*. 2018;19(5):535-548.
190. Lovecchio F, Premkumar A, Stepan JG, Albert TJ. Fighting back: institutional strategies to combat the opioid epidemic: a systematic review. *HSS J*. 2019;15(1):66-71.
191. Bailey L, Sun J, Courtney M, Murphy P. Improving postoperative tonsillectomy pain management in children—a double blinded randomised control trial of a patient analgesia information sheet. *Int J Pediatr Otorhinolaryngol*. 2015;79(5):732-739.
192. Peisker A, Meissner W, Raschke GF, et al. Quality of postoperative pain management after maxillofacial fracture repair. *J Craniofac Surg*. 2018;29(3):720-725.
193. Feinberg AE, Chesney TR, Srikandarajah S, Acuna SA, McLeod RS; Best Practice in Surgery Group. Opioid use after discharge in postoperative patients: a systematic review. *Ann Surg*. 2018;267(6):1056-1062.
194. Voepel-Lewis T, Wagner D, Tait AR. Leftover prescription opioids after minor procedures: an unwitting source for accidental overdose in children. *JAMA Pediatr*. 2015;169(5):497-498.
195. Cicero TJ, Kurtz SP, Surratt HL, et al. Multiple determinants of specific modes of prescription opioid diversion. *J Drug Issues*. 2011;41(2):283-304.
196. Bartels K, Mayes LM, Dingmann C, Bullard KJ, Hopfer CJ, Binswanger IA. Opioid use and storage patterns by patients after hospital discharge following surgery. *PLoS One*. 2016;11(1):e0147972.
197. Howard R, Alameddine M, Klueh M, et al. Spillover effect of evidence-based postoperative opioid prescribing. *J Am Coll Surg*. 2018;227(3):374-381.
198. Chua KP, Harbaugh CM, Brummett CM, et al. Association of perioperative opioid prescriptions with risk of complications after tonsillectomy in children. *JAMA Otolaryngol Head Neck Surg*. 2019;145(10):911-918.
199. Horton JD, Munawar S, Corrigan C, White D, Cina RA. Inconsistent and excessive opioid prescribing after common pediatric surgical operations. *J Pediatr Surg*. 2019;54(7):1427-1431.
200. Patel S, Sturm A, Bobian M, Svider PF, Zuliani G, Kridel R. Opioid use by patients after rhinoplasty. *JAMA Facial Plast Surg*. 2018;20(1):24-30.
201. US Food and Drug Administration. Where and how to dispose of unused medicines. Accessed December 12, 2019. https://www.fda.gov/consumers/consumer-updates/where-and-how-dispose-unused-medicines
202. Lawrence AE, Carsel AJ, Leonhart KL, et al. Effect of drug disposal bag provision on proper disposal of unused opioids by families of pediatric surgical patients: a randomized clinical trial. *JAMA Pediatr*. 2019;173(8):e191695.
203. National Institute for Drug Abuse. *Preventing Opioid Use Disorder in Older Adolescents and Young Adults (Ages 16-30): Expert Panel Planning Meeting*. National Institutes of Health; 2018.
204. National Institute for Drug Abuse. *HEAL Preventing Opioid Use Disorder in Older Adolescents and Young Adults (Ages 16-30) FOA Technical Assistance Webinar*. National Institutes of Health; 2019.
205. Kolodny A, Courtwright DT, Hwang CS, et al. The prescription opioid and heroin crisis: a public health approach to an epidemic of addiction. *Annu Rev Public Health*. 2015;36:559-574.
206. Fortuna RJ, Robbins BW, Caiola E, Joynt M, Halterman JS. Prescribing of controlled medications to adolescents and young adults in the United States. *Pediatrics*. 2010;126(6):1108-1116.
207. Compton WM, Jones CM, Baldwin GT. Relationship between nonmedical prescription-opioid use and heroin use. *N Engl J Med*. 2016;374(2):154-163.
208. Lankenau SE, Teti M, Silva K, Jackson Bloom J, Harocopos A, Treese M. Initiation into prescription opioid misuse amongst young injection drug users. *Int J Drug Policy*. 2012;23(1):37-44.
209. McCabe SE, West BT, Boyd CJ. Leftover prescription opioids and nonmedical use among high school seniors: a multi-cohort national study. *J Adolesc Health*. 2013;52(4):480-485.
210. Boyd C, Shew M, Penn J, et al. Postoperative opioid use and pain management following otologic and neurotologic surgery. *Ann Otol Rhinol Laryngol*. 2020;129(2):175-180.

211. Garren BR, Lawrence MB, McNaull PP, et al. Opioid-prescribing patterns, storage, handling, and disposal in postoperative pediatric urology patients. *J Pediatr Urol*. 2019;15(3):260.e1-260.e7.
212. Kattail D, Hsu A, Yaster M, et al. Attitudes and self-reported practices of orthopedic providers regarding prescription opioid use. *J Opioid Manag*. 2019;15(3):213-228.
213. de la Cruz M, Reddy A, Balankari V, et al. The impact of an educational program on patient practices for safe use, storage, and disposal of opioids at a comprehensive cancer center. *Oncologist*. 2017;22(1):115-121.
214. Licensing and Regulatory Affairs. Michigan opioid laws. Published 2019. Accessed February 15, 2019. https://www.michigan.gov/documents/lara/LARA_DHHS_Opioid_Laws_FAQ_05-02-2018_622175_7.pdf
215. Gollwitzer PM. Implementation intentions: strong effects of simple plans. *Am Psychol*. 1999;54(7):493-502.
216. Lopez J, Warner N, Arpey C, et al. Opioid prescribing for acute postoperative pain after cutaneous surgery. *J Am Acad Dermatol*. 2019;80(3):743-748.
217. Ericsson E, Brattwall M, Lundeberg S. Swedish guidelines for the treatment of pain in tonsil surgery in pediatric patients up to 18 years. *Int J Pediatr Otorhinolaryngol*. 2015;79(4):443-450.
218. Magdalena ML, Caragol L, Sole A, Rodrigo JP. Comparison of two analgesic protocols for post-tonsillectomy pain control in outpatient adults. *Acta Otorrinolaringol Esp*. 2014;65(2):102-108.
219. Raikundalia MD, Cheng TZ, Truong T, et al. Factors associated with opioid use after endoscopic sinus surgery. *Laryngoscope*. 2019;129(8):1751-1755.
220. Lou I, Chennell TB, Schaefer SC, et al. Optimizing outpatient pain management after thyroid and parathyroid surgery: a two-institution experience. *Ann Surg Oncol*. 2017;24(7):1951-1957.
221. Militsakh O, Lydiatt W, Lydiatt D, et al. Development of multimodal analgesia pathways in outpatient thyroid and parathyroid surgery and association with postoperative opioid prescription patterns. *JAMA Otolaryngol Head Neck Surg*. 2018;144(11):1023-1029.
222. Friedrichsdorf SJ, Postier AC, Foster LP, et al. Tramadol versus codeine/acetaminophen after pediatric tonsillectomy: a prospective, double-blinded, randomized controlled trial. *J Opioid Manag*. 2015;11(4):283-294.
223. Salonen A, Kokki H, Nuutinen J. Recovery after tonsillectomy in adults: a three-week follow-up study. *Laryngoscope*. 2002;112(1):94-98.
224. Vons KM, Bijker JB, Verwijs EW, Majoor MH, de Graaff JC. Postoperative pain during the first week after adenoidectomy and guillotine adenotonsillectomy in children. *Paediatr Anaesth*. 2014;24(5):476-482.
225. Walrave Y, Maschi C, Bailleux S, et al. Pain after tonsillectomy: effectiveness of current guidelines? *Eur Arch Otorhinolaryngol*. 2018;275(1):281-286.
226. Luk LJ, Mosen D, MacArthur CJ, Grosz AH. Implementation of a pediatric posttonsillectomy pain protocol in a large group practice. *Otolaryngol Head Neck Surg*. 2016;154(4):720-724.
227. American College of Surgeons. Surgical patient education program: safe and effective pain control after surgery. Published 2018. Accessed May 7, 2020. https://www.facs.org/education/patient-education/safe-pain-control
228. Polomano RC, Galloway KT, Kent ML, et al. Psychometric testing of the Defense and Veterans Pain Rating Scale (DVPRS): a new pain scale for military population. *Pain Med*. 2016;17(8):1505-1519.
229. Defense and Veterans Center for Integrative Pain Management. Defense and Veterans Pain Rating Scale (DVPRS). Accessed September 1, 2020. https://www.dvcipm.org/clinical-resources/defense-veterans-pain-rating-scale-dvprs/
230. Yazdani J, Khorshidi-Khiavi R, Nezafati S, et al. Comparison of analgesic effects of intravenous and intranasal ketorolac in patients with mandibular fracture: a randomized clinical trial. *J Clin Exp Dent*. 2019;11(9):e768-e775.