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Clinical Practice Guideline: Nosebleed (Epistaxis) Executive Summary

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Abstract

Objective. Nosebleed, also known as epistaxis, is a common problem that occurs at some point in at least 60% of people in the United States. While the great majority of nosebleeds are limited in severity and duration, about 6% of people who experience nosebleeds will seek medical attention. For the purposes of this guideline, we define the target patient with a nosebleed as a patient with bleeding from the nostril, nasal cavity, or nasopharynx that is sufficient to warrant medical advice or care. This includes bleeding that is severe, persistent, and/or recurrent, as well as bleeding that impacts a patient's quality of life. Interventions for nosebleeds range from self-treatment and home remedies to more intensive procedural interventions in medical offices, emergency departments, hospitals, and operating rooms. Epistaxis has been estimated to account for 0.5% of all emergency department visits and up to one-third of all otolaryngology-related emergency department encounters. Inpatient hospitalization for aggressive treatment of severe nosebleeds has been reported in 0.2% of patients with nosebleeds.

Purpose. The primary purpose of this multidisciplinary guideline is to identify quality improvement opportunities in the management of nosebleeds and to create clear and actionable recommendations to implement these opportunities in clinical practice. Specific goals of this guideline are to promote best practices, reduce unjustified variations in care of patients with nosebleeds, improve health outcomes, and minimize the potential harms of nosebleeds or interventions to treat nosebleeds.

The target patient for the guideline is any individual aged $\geq$3 years with a nosebleed or history of nosebleed who needs medical treatment or seeks medical advice. The target audience of this guideline is clinicians who evaluate and treat patients with nosebleed. This includes primary care providers such as family medicine physicians, internists, pediatricians, physician assistants, and nurse practitioners. It also includes specialists such as emergency medicine providers, otolaryngologists, interventional radiologists/neuroradiologists and neurointerventionalists, hematologists, and cardiologists. The setting for this guideline includes any site of evaluation and treatment for a patient with nosebleed, including ambulatory medical sites, the emergency department, the inpatient hospital, and even remote outpatient encounters with phone calls and telemedicine. Outcomes to be considered for patients with nosebleed include control of acute bleeding, prevention of recurrent episodes of nasal bleeding, complications of treatment modalities, and accuracy of diagnostic measures.

This guideline addresses the diagnosis, treatment, and prevention of nosebleed. It will focus on nosebleeds that commonly present to clinicians with phone calls, office visits, and emergency room encounters. This guideline discusses first-line treatments such as nasal compression, application of vasoconstrictors, nasal packing, and nasal cautery. It also addresses more complex epistaxis management, which includes the use of endoscopic arterial ligation and interventional radiology procedures. Management options for 2

special groups of patients, patients with hemorrhagic telangiectasia syndrome (HHT) and patients taking medications that inhibit coagulation and/or platelet function, are included in this guideline.

This guideline is intended to focus on evidence-based quality improvement opportunities judged most important by the working group. It is not intended to be a comprehensive, general guide for managing patients with nosebleed. In this context, the purpose is to define useful actions for clinicians, generalists, and specialists from a variety of disciplines to improve quality of care. Conversely, the statements in this guideline are not intended to limit or restrict care provided by clinicians based upon their experience and assessment of individual patients.

Action Statements. The guideline development group made *recommendations* for the following key action statements: (1) At the time of initial contact, the clinician should distinguish the nosebleed patient who requires prompt management from the patient who does not. (2) The clinician should treat active bleeding for patients in need of prompt management with firm sustained compression to the lower third of the nose, with or without the assistance of the patient or caregiver, for 5 minutes or longer. (3a) For patients in whom bleeding precludes identification of a bleeding site despite nasal compression, the clinician should treat ongoing active bleeding with nasal packing. (3b) The clinician should use resorbable packing for patients with a suspected bleeding disorder or for patients who are using anticoagulation or antiplatelet medications. (4) The clinician should educate the patient who undergoes nasal packing about the type of packing placed, timing of and plan for removal of packing (if not resorbable), postprocedure care, and any signs or symptoms that would warrant prompt reassessment. (5) The clinician should document factors that increase the frequency or severity of bleeding for any patient with a nosebleed, including personal or family history of bleeding disorders, use of anticoagulant or antiplatelet medications, or intranasal drug use. (6) The clinician should perform anterior rhinoscopy to identify a source of bleeding after removal of any blood clot (if present) for patients with nosebleeds. (7a) The clinician should perform, or should refer to a clinician who can perform, nasal endoscopy to identify the site of bleeding and guide further management in patients with recurrent nasal bleeding, despite prior treatment with packing or cautery, or with recurrent unilateral nasal bleeding. (8) The clinician should treat patients with an identified site of bleeding with an appropriate intervention, which may include 1 or more of the following: topical vasoconstrictors, nasal cautery, and moisturizing or lubricating agents. (9) When nasal cautery is chosen for treatment, the clinician should anesthetize the bleeding site and restrict application of cautery only to the active or suspected site(s) of bleeding. (10) The clinician should evaluate, or refer to a clinician who can evaluate, candidacy for surgical arterial ligation or endovascular embolization for patients with persistent or recurrent bleeding not controlled by packing or nasal cauterization. (11) In the absence of life-threatening bleeding, the clinician should initiate first-line treatments prior to transfusion, reversal of anticoagulation, or withdrawal of anticoagulation/antiplatelet medications for patients using these medications. (12) The clinician should assess, or refer to a specialist who can assess, the presence of nasal telangiectasias and/or oral mucosal telangiectasias in patients who have a history of recurrent bilateral nosebleeds or a family history of recurrent nosebleeds to diagnose hereditary hemorrhagic telangiectasia syndrome (HHT). (13) The clinician should educate patients with nosebleeds and their caregivers about preventive measures for nosebleeds, home treatment for nosebleeds, and indications to seek additional medical care. (14) The clinician or designee should document the outcome of intervention within 30 days or document transition of care in patients who had a nosebleed treated with nonresorbable packing, surgery, or arterial ligation/embolization.

The policy level for the following recommendation about examination of the nasal cavity and nasopharynx using nasal endoscopy was an *option:* (7b) The clinician may perform, or may refer to a clinician who can perform, nasal endoscopy to examine the nasal cavity and nasopharynx in patients with epistaxis that is difficult to control or when there is concern for unrecognized pathology contributing to epistaxis.

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Nosebleed, also known as epistaxis, is a common problem that occurs at some point in at least 60% of people in the United States.[1] While the great majority of nosebleeds are limited in severity and duration, about 6% of people who experience nosebleeds will seek medical attention.[2] For the purposes of this guideline, we define the target patient with a nosebleed as *a patient with bleeding from the nostril, nasal cavity, or nasopharynx that is sufficient to warrant medical advice or care. This includes bleeding that is severe, persistent, and/or recurrent, as well as bleeding that impacts a patient's quality of life (QOL)*.

Interventions for nosebleeds range from self-treatment and home remedies to more intensive procedural interventions in medical offices, emergency departments, hospitals, and operating rooms. Epistaxis has been estimated to account for 0.5% of all emergency department visits and up to one-third of all otolaryngology-related emergency department encounters.[1,3,4] Inpatient hospitalization for aggressive treatment of severe nosebleeds has been reported in 6% of patients treated for nosebleeds in emergency departments.[4]

The comprehensive management of nosebleeds was recently addressed in 2 sets of publications: a series of guidelines on aspects of epistaxis management in France and an ''audit'' of epistaxis management from the United Kingdom. These 2 sets of publications addressed the initial evaluation of patients with nosebleeds, the use of packing and cautery as initial treatments, the care of nosebleeds in patients who are taking medication that impairs clotting, the use of surgical and endovascular procedures for refractory epistaxis, and the management of nosebleeds in patients with comorbid conditions such as hypertension or hereditary hemorrhagic telangiectasia syndrome (HHT).[5-12] This multidisciplinary clinical practice guideline has been developed using the guideline development process of the American Academy of Otolaryngology–Head and Neck Surgery Foundation (AAO-HNSF) to create evidence-based recommendations to improve quality and reduce variations in the care of patients with nosebleeds.[13]

Guideline Scope and Purpose

The purpose of this multidisciplinary guideline is to identify quality improvement opportunities in the management of nosebleeds and to create clear and actionable recommendations to implement these opportunities in clinical practice. Expert consensus to fill evidence gaps, when used, is explicitly stated and supported with a detailed evidence profile for transparency. Specific goals of this guideline are to promote best practices, reduce unjustified variations in care of patients with nosebleeds, improve health outcomes, and minimize the potential harms of nosebleeds and/or interventions to treat nosebleeds.

The target patient for the guideline is any individual aged $\geq$3 years with a nosebleed or history of nosebleed. Children aged $<$3 years are excluded, as the guideline development group (GDG) felt that very young, otherwise healthy children rarely required evaluation for nosebleeds. The group also recognized that literature informing treatment of nosebleeds in infants and toddlers was scant. In addition, while bleeding from the nose may occur secondary to a variety of systemic diseases and head and neck disorders, this guideline does not apply to patients who have a diagnosed bleeding disorder, tumors of the nose or nasopharynx, vascular malformations of the head and neck, a history of recent facial trauma, or have undergone nasal and/or sinus surgery in the past 30 days. The management of nosebleeds in such excluded patients centers on treatment of these causative factors, and the recommendations within this guideline may not consistently apply in such cases. Patients with intranasal telangiectasias associated with HHT are not excluded, as the GDG noted opportunity for improved care of these patients with specific recommendations based on studies of HHT patients with epistaxis.

The target audience of this guideline is clinicians who evaluate and treat patients with nosebleed. This includes primary care providers such as family medicine physicians, internists, physician assistants, nurse practitioners, and pediatricians. It also includes specialists such as emergency medicine providers, otolaryngologists, interventional radiologists and neurointerventionalists, hematologists, and cardiologists. A plain-language summary accompanies this clinical practice guideline (CPG) for the use of patients and nonclinicians. The setting for this guideline includes any site of evaluation and treatment for a patient with nosebleed, including ambulatory medical sites, the emergency department, the inpatient hospital, and even outpatient remote encounters with phone calls and telemedicine (**Table 1**). Outcomes to be considered for patients with epistaxis include control of acute bleeding, prevention of recurrent episodes of nasal bleeding, complications of treatment modalities, and accuracy of diagnostic measures. Other considerations are cost, time, and efficiency of diagnostic and treatment measures in patients with nosebleed.

This guideline addresses the diagnosis, treatment, and prevention of nosebleed. It will focus on nosebleeds that commonly present to clinicians with phone calls, office visits, and emergency room encounters. This guideline discusses first-line treatments such as nasal compression, application of vasoconstrictors, and nasal packing. It also addresses more complex epistaxis management, which includes the use of endoscopic arterial ligation and interventional radiology procedures. Management options for 2 special groups of patients, patients with HHT and patients taking medications that inhibit coagulation and/or platelet function, are included in this guideline.

Table 1. Applying the Nosebleed Clinical Practice Guideline: Target Patient and Practice Settings.

Target Patient	Exclusions	Practice Settings/Encounter Type
• Age ≥3 years • Nosebleed that is severe, persistent, or recurrent or affects quality of life	• Age <3 years • Nasal or nasopharyngeal tumor • Vascular malformation of the head and neck • Diagnosed bleeding disorder • Recent facial trauma • Recent sinus and/or nasal surgery	• Outpatient office or clinic • Emergency department • Hospital (wards, radiology suites, operating rooms) • Phone call encounters • Emails/texts • Telemedicine

This guideline is intended to focus on evidence-based quality improvement opportunities judged most important by the working group. It is not intended to be a comprehensive, general guide for managing patients with nosebleed. In this context, the purpose is to define useful actions for clinicians, generalists, and specialists from a variety of disciplines, to improve quality of care. Conversely, the statements in this guideline are not intended to limit or restrict care provided by clinicians based upon their experience and assessment of individual patients.

Health Care Burden

Epidemiology

As noted previously, nearly 60% of the population experience a nosebleed at least once. One-tenth of these patients eventually seek medical advice/intervention and 0.16% will need hospitalization.[14] Many people with nosebleed experience recurrent minor bleeding episodes and may not present for medical attention and instead may use home treatments or simply observe without need for intervention. One survey has shown that nearly one-third of households have ≥1 household members who experience these minor recurrent nosebleeds.[15]

A recent study based on data from the Nationwide Emergency Department Sample (NEDS) from 2009 to 2011 identified 1.2 million emergency department visits for epistaxis in the United States, thus comprising 0.32% of all emergency department encounters.[16] The mean age of patients treated for epistaxis in the emergency department was 53.4 years, and 52.7% were male. In the audit of epistaxis cases managed in the United Kingdom during November 2016, 13.9% of patients treated for epistaxis presented again for treatment within 30 days.[17] These investigators also found a 30-day all-cause mortality rate of 3.4% in these patients.

Nosebleeds seem to affect the population in a bimodal age distribution, with more nosebleeds seen in children and the elderly.[18] A review of the National Hospital Ambulatory Medical Care Survey from 1992 to 2001 demonstrated this bimodal age distribution of patients presenting to emergency departments for treatment of epistaxis, with peak frequency of bleeding in children <10 years of age and in adults between ages 70 and 79 years.[4] A review of Medicare claims data showed an increase in emergency department visits for epistaxis with advanced age, with patients aged 66 to 75 years 1.36 times more likely, patients aged 76 to 85 years 2.37 times more likely, and patients aged >85 years 3.24 times more likely to present to the emergency room than patients <65 years old.[1] Although some studies report a higher incidence of nosebleeds in male patients,[4,19] other studies have not demonstrated any sex preponderance.[20]

Nosebleeds are very common in childhood, with 3 out of 4 children experiencing at least 1 episode of epistaxis according to 1 recent report.[5] Nosebleeds in otherwise healthy children most often are limited bleeds from the anterior nasal septum and can be caused or aggravated by digital trauma, crusting from nasal inflammation, or nasal foreign bodies. Persistent or recurrent nasal bleeding in adolescent males, particularly unilateral nosebleed in the presence of nasal obstruction, could suggest the diagnosis of juvenile nasopharyngeal angiofibroma, an uncommon histologically benign but locally invasive vascular tumor.[21] A recent study of emergency department databases in 4 states showed that children who presented with epistaxis had a mean age of 7.5 years and 57.4% were male.[22] Procedures to control epistaxis were required in 6.9% of these children, with 93.5% of these procedures coded as simple anterior epistaxis control (limited cautery and/or packing).[22]

About 5% to 10% of nosebleeds are from posterior sites on the lateral nasal wall or nasal septum not visible by anterior rhinoscopy, known as *posterior epistaxis*. Posterior epistaxis is more common in older patients and often more difficult to control.[2] One series demonstrated that posterior epistaxis accounted for 5% of all nosebleed patients treated in the emergency department or admitted to the hospital.[23]

While epistaxis is usually spontaneous without obvious cause, some nosebleeds can be associated with systemic hematologic, hepatic, renal, genetic, or cardiovascular diseases. Forty-five percent of patients hospitalized for epistaxis had systemic illnesses that likely contributed to the nosebleeds.[24] In the study of epistaxis patients using NEDS, 15% of patients were on long-term anticoagulation, 33% had a history of hypertension, and 0.9% had an underlying coagulation disorder.[16] The often-assumed causal relationship between epistaxis and hypertension is not well established.[18] A recent systematic review of the association of

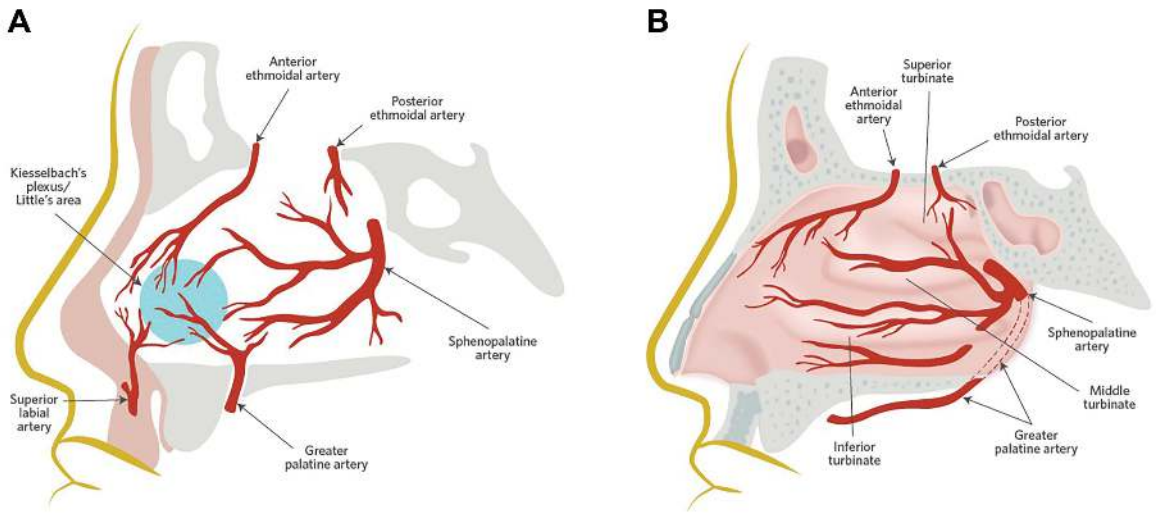

Figure 1. Epistaxis illustration: Vascular supply of the (A) nasal septum and (B) lateral nasal wall.

hypertension with epistaxis showed an association of hypertension with epistaxis (odds ratio [OR], 1.532; 95% confidence interval [CI], 1.181-1.986), but no study supported any causal relationship.[25] These authors noted the prevalence of hypertension in patients with epistaxis has been reported to be between 24% and 64%. An accompanying commentary provides additional information about available studies of the relationship between hypertension and nosebleed.[26]

Nosebleeds are also a recognized problem for patients with known inherited bleeding disorders such as von Willebrand disease or hemophilia,[27] as well as for patients with abnormal nasal vasculature such as that seen in HHT syndrome.[28] Nosebleeds are common in patients taking anticoagulants and medications that impair platelet function. New-generation anticoagulants appear to increase the risk of nosebleed, and algorithms for treating these nosebleeds and indications for discontinuing such medications in these patients are being developed.[6,12,29] The increasing use of such medications, with observations of associated nosebleeds, was one of the key concerns of the GDG.

Interventions for Nosebleed

Most nosebleeds originate from the nasal septum, although the lateral nasal wall has a rich vascular supply as well (**Figure 1**).

Initial (''first-line'') treatment can include combinations of direct nasal compression, application of topical agents including vasoconstrictors, cautery of the bleeding site with chemicals or electrocautery, or packing with a variety of resorbable and nonresorbable materials.[18,30,31] In the aforementioned review of nosebleeds using NEDS, 19.7% of emergency room visits for epistaxis involved treatment with nasal packing. Fifty-two percent of these patients who required packing also had nasal cautery, 41% had anterior packing alone, and 7% had anterior and posterior nasal packing performed.[16] While the use of topical vasoconstriction and anterior nasal packing is accepted and used widely, questions remain about the types of topical agents, the method of packing, the specific packing materials employed, the duration of packing, and the aftercare for patients with nasal packing. Hemostatic aids such as antifibrinolytic agents and hemostatic packing materials provide additional options for control of nasal bleeding.

A small fraction of patients with nosebleeds refractory to initial local measures will require intensive management, usually with either surgical ligation/cautery of feeder arteries or the use of endovascular embolization procedures.[32] Success of surgical ligation and embolization procedures for acute control of nasal bleeding is >90%. A recent report of a care pathway for patients with severe epistaxis at a tertiary care center advocated for early sphenopalatine artery ligation to improve outcomes and reduce costs.[33] A review of the National Inpatient Sample database from 2008 to 2013 found 1813 cases treated with such procedures, with 57.1% undergoing surgical ligation and 42.9% treated with endovascular embolization. Use of interventional radiology procedures increased over the 5 years of review, although surgical ligation appeared to have fewer airway complications, lower hospital charges, and slightly shorter length of hospital stay. This clinical practice guideline will provide recommendations, as evidence allows, to assist with selection of the most appropriate pathways for initial and rescue treatment of nosebleed.

Cost and Variations in Care

While most patients with nosebleeds may not seek medical care, a small percentage will have bleeding requiring presentation to the emergency department with possible admission for additional consultation and control. Sethi et al[16] reported 132 emergency department visits for epistaxis per 100,000 population yearly. In this sample, 95.5% of epistaxis patients were discharged home from the emergency department. The mean charge for these patients was estimated to be $1146.21 per visit, but the cost increased when

nasal packing was used ($1473.29 for packed patients vs $1048.22 for patients who were not packed).[16] A study from Canada reviewed costs when initial emergency department epistaxis management failed and found repeat nasal packing could drive the cost up to $4046.74 CAD ($3035 USD based on April 2018 exchange rates).[34]

Charges and costs dramatically increase for patients who require inpatient admission for epistaxis management. Goljo et al[35] noted an average length of stay of 2.24 days with a mean cost of $6925 per admission. They also noted that the presence of renal disease increased costs by $1272 per patient, with some of this increase due to hemodialysis that was required for 16.8% of their admitted patients. Costs were also increased in patients with a history of alcohol abuse and/or sinonasal disease. Costs were even higher in patients of Asian/Pacific Islander descent, top income quartile, or with private payer insurance. When actual hospital charges are considered, as opposed to the patient costs previously noted, the numbers are even more striking. Villwock and Goyal[36] compared costs associated with early or delayed intervention for admitted epistaxis patients and studied costs of surgical ligation in the operating room (endoscopic sphenopalatine ligation) vs angiography with embolization. Early intervention appeared to reduce total cost of hospitalization. They also noted a $30,000 increase in charges for those undergoing embolization ($58,967) as compared to surgical ligation ($28,611).[36] Brinjikji et al[37] expressed additional concerns about the cost of tertiary care for nosebleeds, as they documented a trend to more frequent use of embolization, from 2.8% of admitted nosebleed patients in 2003 to 10.7% in 2010.

These cost analyses indicate variations in care of nosebleed patients, not all of which are readily explained. Male sex (OR, 1.14; 95% CI, 1.10-1.17) and the setting of long-term anticoagulation (OR, 1.21; 95% CI, 1.10-1.33) independently increased the likelihood of treatment with nasal packing. Packing also seemed to occur more often in the Midwest (OR, 1.85; 95% CI, 1.24-2.30) and South (OR 1.62; 95% CI, 1.12-1.34) when compared with the West and more frequently occurred in nontrauma hospitals (OR, 1.56; 95% CI, 1.19-2.05). The authors postulated that increased packing rates could indicate reduced availability of otolaryngologic services.[16] Patients admitted on a weekday were more likely to receive early intervention for nosebleed than those admitted on a weekend (OR, 1.86; 95% CI, 1.34-2.58).[36] In addition, admission to an urban hospital more often resulted in embolization or surgical ligation, likely due to increased availability of specialty services, but an increase in the likelihood of embolization specifically was not seen.

Quality of Life

Nosebleeds are troublesome and adversely affect the QOL of patients and their families. The Parental Stress Index Short Form (PSISF) is a validated test of stress with 3 subscales.[38] The stress on parents of pediatric patients with epistaxis was evaluated using the PSISF, which showed that nearly a one-third of the children and 44% of their parents reported high stress scores.[39]

Few, if any, studies measure either baseline QOL or QOL changes with treatment in nosebleed patients, aside from several studies of patients with HHT. These studies of adults with epistaxis and HHT have shown severity-dependent effects on QOL and impairment on psychosocial QOL measures.[40,41] Merlo et al[41] surveyed 604 patients with HHT using a validated survey, the Epistaxis Severity Score (ESS), and evaluated their health-related QOL. The authors found 27.6% patients had mild (ESS <4), 47.2% had moderate (≥ 4 ESS <7), and 25.2% reported severe epistaxis (ESS ≥ 7). The patients with severe epistaxis had lower scores on the Mental and Physical Component Summaries of health-related QOL when compared to those with mild epistaxis. Similarly, in the study by Loaec et al,[40] 115 patients were interviewed, and the authors found that frequent episodes of epistaxis and abundant bleeding decreased psychosocial QOL measures. In addition, these patients expressed ''desire to withdraw'' and ''felt different'' compared to others.

Methods

General Methods

In developing this evidence-based clinical practice guideline, the methods outlined in the third edition of the AAO-HNSF Guideline Development Manual were followed explicitly.[13]

Literature Search

An information specialist conducted several literature searches from November 2017 through March 2018, using a validated filter strategy, to identify CPGs, systematic reviews, randomized controlled trials, and related clinical studies.

The following databases were searched for relevant studies: MEDLINE (OvidSP 1946 to February Week 2, 2018), Embase (OvidSP 1974 to February 16, 2018), CINAHL (EBSCO all years to February 19, 2018), and BIOSIS Previews (all years to February 17, 2018). All searches were conducted on February 17, 2018, except CINAHL, which was searched on February 19, 2018. The databases were searched using both controlled vocabulary words and synonymous free text words for the topic of interest (epistaxis or nosebleed). The search strategies were adjusted for the syntax appropriate for each database/platform. The search was not limited to clinical study design and English language. The full strategy is shown in the Appendix in the online version of the article. Alternatively, the authors may be contacted directly for search strategy details. These search terms were used to capture all evidence on the population, incorporating all relevant treatments and outcomes. In certain instances, targeted searches for lower-level evidence were performed by the GDG members to address gaps from the systematic searches identified in writing the guideline from April 2018 through October 2018.

The English-language search identified 5 CPGs, 30 systematic reviews, 35 randomized controlled trials, and 238 related studies published through March 2018. Clinical practice guidelines were included if they met quality criteria of (a) an explicit scope and purpose, (b) multidisciplinary stakeholder involvement, (c) systematic literature review, (d) explicit system for ranking evidence, and (e) explicit system for linking evidence to recommendations. Systematic reviews were emphasized and included if they met quality criteria of (a) clear objective and methodology, (b) explicit search strategy, and (c) valid data extraction methods. Randomized controlled trials were included if they met quality criteria as follows: (a) trials involved study randomization, (b) trials were described as double-blind, and (c) trials denoted a clear description of withdrawals and dropouts of study participants. Other studies were included if they were deemed pertinent to the epistaxis topic. After removing duplicates, irrelevant references, and non-English-language articles, we retained 5 clinical practice guidelines, 17 systematic reviews, and 16 randomized controlled trials that met inclusion criteria. An additional 203 related studies were identified that were related to the key action statements. The recommendations in this clinical practice guideline are based on systematic reviews identified by a professional information specialist using an explicit search strategy. Additional background evidence included randomized controlled trials and observational studies, as needed, to supplement the systematic reviews or to fill knowledge gaps when a review was not available.

The AAO-HNSF assembled the GDG representing the medical disciplines of nursing, family medicine, emergency medicine, otolaryngology–head and neck surgery, pediatrics, rhinology, radiology, internal medicine, and hematology. The GDG also included a consumer/patient representative. The GDG had 3 conference calls and 2 in-person meetings, during which they defined the scope and objectives of the guideline, reviewed comments from the expert panel review for each key action statement, identified other quality improvement opportunities, reviewed the literature search results, and drafted/revised the document.

Key action statements were developed using an explicit and transparent a priori protocol for creating actionable statements based on supporting evidence and the associated balance of benefit and harm. Electronic decision support (BRIDGE-Wiz; Yale Center for Medical Informatics, New Haven, Connecticut) software was used to facilitate creating actionable recommendations and evidence profiles.[42]

AAO-HNSF staff used the Guideline Implementability Appraisal (GLIA) to appraise adherence to methodologic standards, to improve clarity of recommendations, and to predict potential obstacles to implementation.[43] The GDG received summary appraisals and modified an advanced draft of the guideline based on the appraisal. The final draft of the clinical practice guideline was revised based on comments received during multidisciplinary peer review, open public comment, and journal editorial peer review. A scheduled review process will occur at 5 years from publication or sooner if new compelling evidence warrants earlier consideration.

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 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 *quality of evidence* and the *balance of benefit and harm* that is anticipated when the statement is followed. The definitions for evidence-based statements are listed in **Table 2**[44] and **Table 3**.[45]

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 might be expected with a ''recommendation.''''Options'' offer the most opportunity for practice variability.[46] Clinicians should always act and decide in a way that they believe 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 a team of experienced clinicians and methodologists addressing the scientific evidence for a particular topic.[45] Making recommendations about health practices involves value judgments on the desirability of various outcomes associated with management options. Values applied by the guideline panel sought to minimize harm and diminish unnecessary and inappropriate therapy. A major goal of the panel 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 American Academy of Otolaryngology–Head and Neck Surgery Foundation (AAO-HNSF). Potential conflicts of interest for all panel members in the past 2 years were disclosed, compiled, and distributed before the first conference call. After review and discussion of these disclosures,[47] 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 and professional experiences, how a participant earns a living, and the participant's previously established ''stake'' in an issue.[48] Conflicts were again delineated at the start of the in-person meetings and at the start of each teleconference meeting, with the same

Table 2. Aggregate Grades of Evidence by Question Type.[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[b]	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, or 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			

Abbreviations: NA, not applicable; OCEBM, Oxford Centre for Evidence-Based Medicine.
[a]Adapted from Oxford Centre for Evidence-Based Medicine Work Group.[44]
[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.

Table 3. Guideline Definitions for Evidence-Based Statements.

Statement	Definition	Implied Obligation
Strong recommendation	A strong recommendation means the benefits of the recommended approach clearly exceed the harms (or that the harms clearly exceed the benefits in the case of a strong negative recommendation) and that the quality of the supporting evidence is excellent (grade A or B).[a] In some clearly identified circumstances, strong recommendations may be made 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 the benefits exceed the harms (or that the harms exceed the benefits in the case of a negative recommendation), but the quality of evidence is not as strong (grade B or C).[a] In some clearly identified circumstances, recommendations may be made 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 that exists is suspect (grade D)[a] or that well-done studies (grade A, B, or C)[a] show little clear advantage to one approach vs 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 American Academy of Pediatrics classification scheme.[45]

caveats followed. All conflicts are disclosed at the end of this document.

Guideline Key Action Statements

Each evidence-based statement is organized in a similar fashion: an evidence-based key action statement in bold, followed by the strength of the recommendation in italics. Each key action statement is followed by the ''action statement profile'' with quality improvement opportunities, aggregate evidence quality, level of confidence in the evidence, benefit-harm assessment, and statement of costs. In addition, there is an explicit statement of any value judgments, the role of patient preferences, clarification of any intentional vagueness by the panel, exclusions to the statement, any differences of opinion, and a repeat statement of the strength of the recommendation. Several paragraphs subsequently discuss the evidence base supporting the statement. An overview of each evidence-based statement in this guideline can be found in **Table 4**.

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.[49] For an action statement where the evidence base demonstrates clear benefit, clinicians should provide patients with clear and comprehensible information on the benefits to facilitate patient understanding and shared decision making, which in turn leads to better patient adherence and outcomes.[49] For statements where evidence is weaker or benefits are less certain, the practice of shared decision making is extremely useful, wherein the management decision is made by a collaborative effort between the clinician and an informed patient.[49] Factors related to patient preference include (but are not limited to) absolute benefits (numbers needed to treat), potential adverse effects (number needed to harm), cost of drugs or procedures, frequency and duration of treatment, and certain less tangible factors such as religious and/or cultural beliefs or personal levels of desire for intervention.

Key Action Statements

STATEMENT 1. PROMPT MANAGEMENT: At the time of initial contact, the clinician should distinguish the nosebleed patient who requires prompt management from the patient who does not. *Recommendation based on observational studies and a preponderance of benefit over harm.*

Action Statement Profile: 1

- Quality improvement opportunity: To identify those patients who need immediate diagnosis and treatment (National Quality Strategy: Patient safety)
- Level of confidence in evidence: Medium, as available evidence only addresses nosebleed patients who actually seek and receive medical intervention
- Aggregate evidence quality: Grade C, based on observational studies on the effectiveness of interventions
- Benefits: Prevention of morbidity and in rare cases mortality; increased likelihood of timely treatment; more efficient allocation of resources to patients in greatest need of treatment; reduction of patient and family stress; avoidance of unnecessary interventions in patients who are not actively bleeding
- Risk, harm, cost: Delayed treatment of patients who may actually need intervention, overtreatment of patients who are not actively bleeding, increased patient anxiety. No costs are associated with this recommendation.
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: None
- Intentional vagueness: The actual appropriate timing for ''prompt'' management is not specified, as it may vary with different clinical situations; assessment of bleeding severity may occur during telephone/electronic communications or during face-to-face patient encounter.
- Role of patient preferences: None
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 2. NASAL COMPRESSION: The clinician should treat active bleeding for patients in need of prompt management with firm sustained compression to the lower third of the nose, with or without the assistance of the patient or caregiver, for 5 minutes or longer. *Recommendation based on observational studies and a preponderance of benefit over harm.*

Action Statement Profile: 2

- Quality improvement opportunity: To promote effective treatment for nosebleed patients (National Quality Strategy Domain: Patient and family engagement, clinical processes/effectiveness)
- Level of confidence in evidence: Medium
- Aggregate evidence quality: Grade C, observational studies and control group of 1 randomized controlled trial
- Benefits: Use of the simplest method to stop nosebleeds, reduce morbidity, protect airway, reduce need for blood products, improve patient satisfaction, allow for further assessment and management
- Risk, harm, cost: May delay more definitive management if needed; patient discomfort
- Benefit-harm assessment: Preponderance of benefit over harm

Table 4. Summary of Evidence-Based Statements.

Statement	Action	Strength
1: Prompt management	At the time of initial contact, the clinician should distinguish the nosebleed patient who requires prompt management from the patient who does not.	Recommendation
2: Nasal compression	The clinician should treat active bleeding for patients in need of prompt management with firm sustained compression to the lower third of the nose, with or without the assistance of the patient or caregiver, for 5 minutes or longer.	Recommendation
3a: Nasal packing	For patients in whom bleeding precludes identification of a bleeding site despite nasal compression, the clinician should treat ongoing active bleeding with nasal packing.	Recommendation
3b: Nasal packing in patients with suspected increased bleeding risk	The clinician should use resorbable packing for patients with a suspected bleeding disorder or for patients who are using anticoagulation or antiplatelet medications.	Recommendation
4: Nasal packing education	The clinician should educate the patient who undergoes nasal packing about the type of packing placed, timing of and plan for removal of packing (if not resorbable), postprocedure care, and any signs or symptoms that would warrant prompt reassessment.	Recommendation
5: Risk factors	The clinician should document factors that increase the frequency or severity of bleeding for any patient with a nosebleed, including personal or family history of bleeding disorders, use of anticoagulant or antiplatelet medications, or intranasal drug use.	Recommendation
6: Anterior rhinoscopy to identify location of bleeding	The clinician should perform anterior rhinoscopy to identify a source of bleeding after removal of any blood clot (if present) for patients with nosebleeds.	Recommendation
7a: Examination using nasal endoscopy	The clinician should perform, or should refer to a clinician who can perform, nasal endoscopy to identify the site of bleeding and guide further management in patients with recurrent nasal bleeding, despite prior treatment with packing or cautery, or with recurrent unilateral nasal bleeding.	Recommendation
7b: Examination of nasal cavity and nasopharynx using nasal endoscopy	The clinician may perform, or may refer to a clinician who can perform, nasal endoscopy to examine the nasal cavity and nasopharynx in patients with epistaxis that is difficult to control or when there is concern for unrecognized pathology contributing to epistaxis.	Option
8: Appropriate interventions for identified bleeding site	The clinician should treat patients with an identified site of bleeding with an appropriate intervention, which may include 1 or more of the following: topical vasoconstrictors, nasal cautery, and moisturizing or lubricating agents.	Recommendation
9: Nasal cautery	When nasal cautery is chosen for treatment, the clinician should anesthetize the bleeding site and restrict application of cautery only to the active or suspected site(s) of bleeding.	Recommendation
10: Ligation and/or embolization for persistent nosebleeds	The clinician should evaluate, or refer to a clinician who can evaluate, candidacy for surgical arterial ligation or endovascular embolization for patients with persistent or recurrent bleeding not controlled by packing or nasal cauterization.	Recommendation
11: Management of patients using anticoagulation and antiplatelet medications	In the absence of life-threatening bleeding, the clinician should initiate first-line treatments prior to transfusion, reversal of anticoagulation, or withdrawal of anticoagulation/antiplatelet medications for patients using these medications.	Recommendation
12: HHT identification	The clinician should assess, or refer to a specialist who can assess, the presence of nasal telangiectasias and/or oral mucosal telangiectasias in patients who have a history of recurrent bilateral nosebleeds or a family history of recurrent nosebleeds to diagnose hereditary hemorrhagic telangiectasia syndrome (HHT).	Recommendation
13: Patient education and prevention	The clinician should educate patients with nosebleeds and their caregivers about preventive measures for nosebleeds, home treatment for nosebleeds, and indications to seek additional medical care.	Recommendation
14: Nosebleed outcomes	The clinician or designee should document the outcome of intervention within 30 days or document transition of care in patients who had a nosebleed treated with nonresorbable packing, surgery, or arterial ligation/embolization.	Recommendation

- Value judgments: The GDG felt the least invasive, most readily available, and lowest-cost management method should be used first in patients with nosebleeds.
- Intentional vagueness: Patients or caregivers may choose to perform sustained digital compression under the direction of the clinician if willing and able. A nose clip is an alternative to digital compression if available and tolerated by the patient. The precise duration of compression is not stated, although the GDG felt a minimum of 5 minutes was necessary to control bleeding. We agreed that longer periods of compression and repeated compression may be helpful for persistent bleeding. Vasoconstrictors can be applied by clinician or patient in conjunction with compression.
- Role of patient preferences: None
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 3A. NASAL PACKING: For patients in whom bleeding precludes identification of a bleeding site despite nasal compression, the clinician should treat ongoing active bleeding with nasal packing. *Recommendation based on observational studies and a preponderance of benefit over harm.*

Action Statement Profile: 3a

- Quality improvement opportunity: Promote effective treatment for nosebleed patients (National Quality Strategy Domains: Patient and family engagement, clinical processes/effectiveness)
- Level of confidence in evidence: Medium
- Aggregate evidence quality: Grade C, based on observational studies and 2 randomized controlled trials
- Benefits: Effective and prompt control of nasal bleeding, reduce morbidity, protect airway, reduce need for blood products, allow for additional assessment and management to control bleeding
- Risk, harm, cost: Failure to control bleeding, delay in care, can make subsequent examination more difficult, patient discomfort, mucosal damage from packing insertion/removal, damage to intranasal structures, possible infection, possible antibiotic exposure, adverse respiratory effects of nasal obstruction, cost of packing materials and procedure
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: None
- Intentional vagueness: The duration of packing is not specified, but the GDG felt long durations of packing should be avoided.
- Role of patient preferences: Small to moderate, as some may decline packing and instead elect to try more or less aggressive treatments
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 3B. NASAL PACKING IN PATIENTS WITH SUSPECTED INCREASED BLEEDING RISK: The clinician should use resorbable packing for patients with a suspected bleeding disorder or for patients who are using anticoagulation or antiplatelet medications. *Recommendation based on observational studies and 2 randomized controlled trials, as well as a preponderance of benefit over harm.*

Action Statement Profile: 3b

- Quality improvement opportunity: Promote effective treatment for nosebleed patients, increase the likelihood that resorbable nasal packing will be available and used in settings where these patients are treated (National Quality Strategy Domains: Patient and family engagement, clinical processes/effectiveness)
- Level of confidence in evidence: Medium
- Aggregate evidence quality: Grade C, based on observational studies and 2 randomized controlled trials
- Benefits: Reduce likelihood of additional bleeding when nonresorbable packing is removed, reduce morbidity, protect airway, reduce need for blood products, allow for proper further assessment and management, reduce the need for future visits, improve patient comfort as compared to nonresorbable packing
- Risk, harm, cost: Scarring, failure to control the bleed, can make subsequent exam more difficult, patient discomfort, cost for resorbable packing materials, possible infection, possible antibiotic exposure, adverse respiratory effects of nasal obstruction, delay of care if resorbable packing not available
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: The GDG felt resorbable packing is underused in these patients.
- Intentional vagueness: The specific type of resorbable packing is not addressed as there are a variety of materials, with limited evidence to support use of any 1 specific material. Experience and local availability may dictate the specific type of packing material used.
- Role of patient preferences: None
- Exclusions: Patients who take ''low-dose'' daily aspirin and do not take other antiplatelet and/or anticoagulation medications

- Policy level: Recommendation
- Differences of opinion: The use of the term resorbable vs other terms (absorbable, dissolvable, degradable) was debated by the GDG, as multiple terms are used in the literature. The vote was 0 for degradable, 1 for absorbable, 10 for resorbable, and 8 for dissolvable. One panel member was recused from these statements regarding nasal packing, as this member was concerned about potential conflict of interest with a role as a US Food and Drug Administration (FDA) patient representative.

STATEMENT 4. NASAL PACKING EDUCATION: The clinician should educate the patient who undergoes nasal packing about the type of packing placed, timing of and plan for removal of packing (if not resorbable), post-procedure care, and any signs or symptoms that would warrant prompt reassessment. *Recommendation based on observational studies and 1 systematic review with a preponderance of benefit over harm.*

Action Statement Profile: 4

- Quality improvement opportunity: To improve patient education regarding care after nasal packing (National Quality Strategy Domains: Patient safety, person- and family-centered care, health and well-being of communities)
- Aggregate evidence quality: Grade C, based on observational studies and 1 systematic review
- Level of confidence in evidence: Medium
- Benefits: Reduce complications of packing, prompt recognition of complications, avoid prolonged packing duration, decrease patient anxiety, improve patient satisfaction, allow shared decision making regarding the decision to use prophylactic systemic antibiotics, improve timing of appropriate follow-up
- Risk, harm, cost: Time for education, increase patient anxiety regarding potential complications
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: Although evidence regarding education specifically about nasal packing is not available, the GDG made this recommendation based on indirect evidence regarding the benefits of education about medical interventions in general; the GDG expressed concern that plans for removal of packing may not be clear for some patients, leading to prolonged packing duration and perhaps complications.
- Intentional vagueness: None
- Role of patient preferences: None
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 5. RISK FACTORS: The clinician should document factors that increase the frequency or severity of bleeding for any patient with a nosebleed, including personal or family history of bleeding disorders, use of anticoagulant or antiplatelet medications, or intranasal drug use. *Recommendation based on observational studies and a preponderance of benefit over harm.*

Action Statement Profile: 5

- Quality improvement opportunity: To improve awareness of factors that modify management of nosebleeds (National Quality Strategy Domains: Patient safety, effective communication and care coordination)
- Level of confidence in evidence: Medium
- Aggregate evidence quality: Grade C, based on observational studies
- Benefits: Adapt treatment to comorbid conditions and history, avoid delay in diagnosis, early identification of contributing causes of bleeding, reduce costs for patients with associated conditions
- Risk, harm, cost: Unnecessary diagnostic procedures, potential delay in initiating first-line treatments for nosebleed while identifying and managing risk factors
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: None
- Intentional vagueness: The bleeding disorders or medications that can increase risk of nosebleed are not specified, as there are many such disorders and medications.
- Role of patient preferences: None
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 6. ANTERIOR RHINOSCOPY TO IDENTIFY LOCATION OF BLEEDING: The clinician should perform anterior rhinoscopy to identify a source of bleeding after removal of any blood clot (if present) for patients with nosebleeds. *Recommendation based on observational studies with a preponderance of benefit over harm.*

Action Statement Profile: 6

- Quality improvement opportunity: To educate clinicians regarding the importance of anterior rhinoscopy in diagnosis and treatment and to show optimal techniques to perform anterior rhinoscopy (National Quality Strategy Domains: Patient safety, prevention and treatment of leading causes of morbidity and mortality)

- Aggregate evidence quality: Grade C, based on observational studies
- Level of confidence in evidence: Medium
- Benefits: Identify a bleeding site that could expedite and focus treatment; instruct that removal of clot, when present, can assist with hemostasis and identification of the bleeding site; diagnose other causes of nosebleeds such as tumor, differentiate anterior from posterior nosebleeds, determine laterality of the bleeding
- Risk, harm, cost: Potential trauma to the nose, patient discomfort, cause bleeding with clot removal or manipulation
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: None
- Intentional vagueness: None
- Role of patient preferences: None
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 7A. EXAMINATION USING NASAL ENDOSCOPY: The clinician should perform, or should refer to a clinician who can perform, nasal endoscopy to identify the site of bleeding and guide further management in patients with recurrent nasal bleeding, despite prior treatment with packing or cautery, or in patients with recurrent unilateral nasal bleeding. *Recommendation based on observational studies and a preponderance of benefit over harm.*

Action Statement Profile: 7a

- Quality improvement opportunity: Improve utilization of nasal endoscopy to facilitate complete and accurate diagnosis, evaluate patients at risk for a posterior bleeding site or additional associated sinonasal pathology, and identify foreign bodies (National Quality Strategy Domains: Patient safety, prevention and treatment of leading causes of morbidity and mortality)
- Level of confidence in evidence: Medium
- Aggregate evidence quality: Grade C, based on observational studies
- Benefits: Improve localization of bleeding sites, improve identification of patients with posterior bleeding, improve identification of patients with nasal and nasopharyngeal pathology including tumors, reduce time required to control bleeding, reduce unnecessary interventions, use video- or photodocumentation to improve care and communications with patients/care team
- Risk, harm, cost: Procedural discomfort, cost of the procedure, lack of availability, risks of topical medications (anesthetics and decongestants), nasal bleeding risk from endoscopy
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: None
- Intentional vagueness: None
- Role of patient preferences: Moderate because of alternative options, cost, and potential for discomfort
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 7B. EXAMINATION OF NASAL CAVITY AND NASOPHARYNX USING NASAL ENDOSCOPY: The clinician may perform, or may refer to a clinician who can perform, nasal endoscopy to examine the nasal cavity and nasopharynx in patients with epistaxis that is difficult to control or when there is concern for unrecognized pathology contributing to epistaxis. *Option based on observational studies with a balance of benefits and harms.*

Action Statement Profile: 7b

- Quality improvement opportunity: Improve utilization of nasal endoscopy to ensure complete diagnosis, especially for patients at risk for a posterior bleeding site or additional associated pathology; identify foreign bodies (National Quality Strategy Domains: Patient safety, prevention and treatment of leading causes of morbidity and mortality)
- Level of confidence in evidence: Medium
- Aggregate evidence quality: Grade C, based on observational studies
- Benefits: Improve localization of bleeding sites, improve identification of patients with posterior bleeds, improve identification of patients with nasal and nasopharyngeal pathology including tumors, reduce time required to control bleeding, reduce unnecessary intervention
- Risk, harm, cost: Procedural discomfort, cost of the procedure, lack of availability, risks of topical medications (anesthetics and decongestants), nasal bleeding risk from endoscopy
- Benefit-harm assessment: Balance of benefits and harms
- Value judgments: None
- Intentional vagueness: The term *unrecognized pathology* was used, as multiple conditions could warrant nasal endoscopy for further evaluation in a patient with nosebleed.
- Role of patient preferences: Large
- Exclusions: None
- Policy level: Option
- Differences of opinion: None

STATEMENT 8. APPROPRIATE INTERVENTIONS FOR IDENTIFIED BLEEDING SITE: The clinician should treat patients with an identified site of bleeding with an appropriate intervention, which may include 1 or more of the following: topical vasoconstrictors, nasal cautery, and moisturizing or lubricating agents. *Recommendation based on randomized controlled trials and a systematic review with a preponderance of benefit over harm.*

Action Statement Profile: 8

- Quality improvement opportunity: To initiate appropriate treatment interventions when a bleeding site is identified; to reduce risk of recurrent nasal bleeding (National Quality Strategy Domains: Patient safety, prevention and treatment of leading causes of morbidity and mortality)
- Level of confidence in evidence: Medium
- Aggregate evidence quality: Grade B, based on randomized controlled trials and a systematic review
- Benefits: Provide effective treatment, encourage shared decision making, prevent recurrent bleeding, improve management by using effective therapies and avoiding harm associated with unproven or ineffective therapies
- Risk, harm, cost: Specific adverse effects based on the treatments used—possible injury from cautery, side effects of vasoconstrictors; cost of treatments; some initial treatments may fail; patient discomfort from treatment
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: None
- Intentional vagueness: A preferred treatment option is not specified, since there is little evidence comparing these options. In fact, combinations of several methods are often used. We also do not specify the order of interventions. Moisturizing and lubricating agents would not likely be used for an active bleed, but such agents would be used after bleeding is stopped with cautery and/or vasoconstrictors.
- Role of patient preferences: Large
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 9. NASAL CAUTERY: When nasal cautery is chosen for treatment, the clinician should anesthetize the bleeding site and restrict application of cautery only to the active or suspected site(s) of bleeding. *Recommendation based on observational studies with a preponderance of benefit over harm.*

Action Statement Profile: 9

- Quality improvement opportunity: To limit the application of nasal cauterization to the site of bleeding to reduce damage to additional tissue, to reduce complications related to nasal cautery, to improve patient comfort during cautery (National Quality Strategy Domains: Patient safety, prevention and treatment of leading causes of morbidity and mortality)
- Level of confidence in evidence: Medium
- Aggregate evidence quality: Grade C, based on observational studies and indirect evidence from randomized controlled trials comparing types of cautery and a systematic review
- Benefits: Reduce complications, improve control of pain during the procedure, improve patient satisfaction, avoid injury to healthy tissue, avoid scarring
- Risk, harm, cost: Possible reaction to the anesthetic medication, delay in treatment if anesthetics not readily available, cost of medication, inadequate control of bleeding, need for additional treatment, some severe nosebleeds and posterior bleeding sites may prove difficult to anesthetize
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: The GDG was concerned that topical anesthetics are perhaps underused before nasal cautery. The GDG also noted that cautery may be used in a manner not specifically directed to the specific site of bleeding.
- Intentional vagueness: Choice of anesthetic agent and the method of delivery (topical vs injected) were not specified. The method of nasal cautery was also not specified.
- Role of patient preferences: Moderate for the use of an anesthetic; none for limiting the application of cautery to the identified bleeding site
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 10. LIGATION AND/OR EMBOLIZATION FOR PERSISTENT NOSEBLEEDS: The clinician should evaluate, or refer to a clinician who can evaluate, candidacy for surgical arterial ligation or endovascular embolization for patients with persistent or recurrent bleeding not controlled by packing or nasal cauterization. *Recommendation based on observational and case-controlled studies, with a preponderance of benefit over harm.*

Action Statement Profile: 10

- Quality improvement opportunity: To promote the appropriate use and awareness of these methods vs other less invasive use of control to allow more timely intervention in patients with severe or uncontrolled epistaxis (National Quality Strategy Domain: Clinical care)
- Level of confidence in evidence: High

- Aggregate evidence quality: Grade C, based on observational studies and case-controlled studies
- Benefits: Improve access to effective treatment options, raise awareness of effective treatment options, provide effective and timely control of bleeding, reduce length of stay and overall cost for the patient, allow opportunity for shared decision making about methods more invasive than cautery to control nosebleed
- Risk, harm, cost: Complications of the procedures, risks of anesthesia, inappropriate patient selection, cost of the procedures
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: There may be inappropriate use (both underutilization or overutilization) and/or timing of these procedures
- Intentional vagueness: The GDG did not specify a preferred surgical procedure or preference for surgery vs endovascular embolization as selection would depend on clinical factors and expertise available.
- Role of patient preferences: Large
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 11. MANAGEMENT OF PATIENTS USING ANTICOAGULATION AND ANTIPLATELET MEDICATIONS: In the absence of life-threatening bleeding, the clinician should initiate first-line treatments prior to transfusion, reversal of anticoagulation, or withdrawal of anticoagulation/antiplatelet medications for patients using these medications. *Recommendation based on observational studies and expert opinion with a preponderance of benefit over harm.*

Action Statement Profile: 11

- Quality improvement opportunity: To discourage overuse of reversal agents, withholding of medications, and/or administration of blood products, clotting factors, or specific antidotes, prior to attempting first-line interventions for patients with nosebleeds (National Quality Strategy Domains: Efficient use of health care resources and patient safety)
- Aggregate evidence quality: Grade C, based on observational studies and expert opinions
- Level of confidence in evidence: High
- Benefits: Control nosebleeds without increasing thrombotic risk associated with withholding medications, reduce blood product exposure, decrease cost associated with unnecessary administration of blood products (such as platelets, plasma, and clotting factors) and other agents
- Risk, harm, cost: Persistence or recurrence of nosebleeds, delay in treatment
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: The GDG felt that clinicians are willing to risk prolonging the time to resolution of nasal bleeding to avoid the increased risk of thrombotic events or the risks associated with blood products.
- Intentional vagueness: The term *life-threatening* was used to both allow for some clinician flexibility and encourage judicious restraint regarding when to withhold medications, reverse medications, or administer blood products, clotting factors, or specific antidotes.
- Role of patient preferences: Moderate
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 12. HEREDITARY HEMORRHAGIC TELANGIECTASIAS (HHT) IDENTIFICATION: The clinician should assess, or refer to a specialist who can assess, the presence of nasal telangiectasias and/or oral mucosal telangiectasias in patients who have a history of recurrent bilateral nosebleeds or a family history of recurrent nosebleeds to diagnose hereditary hemorrhagic telangiectasia syndrome (HHT). *Recommendation based on systematic reviews of observational studies, randomized trials, and cross-sectional studies with a preponderance of benefit over harm.*

Action Statement Profile: 12

- Quality improvement opportunity: To identify patients with HHT and refer them to the appropriate specialist for assessment and management of associated conditions (National Quality Strategy Domains: Patient safety, prevention and treatment of leading causes of morbidity and mortality)
- Aggregate evidence quality: Grade B, based on systematic reviews of observational studies, randomized trials, and cross-sectional studies
- Level of confidence in evidence: High
- Benefits: Allow earlier diagnosis of HHT, increase use of resorbable packing for HHT patients, avoid inappropriate management of nasal bleeding
- Risk, harm, cost: Patient anxiety regarding possible incorrect diagnosis, cost of overreferral
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: The GDG felt HHT is perhaps underdiagnosed or diagnosed after delays and felt clinicians are often unfamiliar with the criteria for diagnosing HHT.
- Intentional vagueness: None
- Role of patient preferences: None
- Exclusions: None

- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 13. PATIENT EDUCATION AND PREVENTION: The clinician should educate patients with nosebleeds and their caregivers about preventive measures for nosebleeds, home treatment for nosebleeds, and indications to seek additional medical care. *Recommendation based on systematic reviews with a preponderance of benefit over harm.*

Action Statement Profile: 13

- Quality improvement opportunity: To educate patients and caregivers regarding home control for nosebleeds, preventive measures for nosebleeds, and when to seek medical care (National Quality Strategy Domains: Patient safety, person- and family-centered care, prevention and treatment of leading causes of morbidity and mortality)
- Aggregate evidence quality: Grade B, based on systematic reviews that suggest benefit on patient anxiety and comfort for other conditions
- Level of confidence in evidence: Medium
- Benefits: Reduce patient anxiety, foster patient empowerment, reduce nosebleed recurrence, reduce medical utilization, prevent use of improper or ineffective treatments
- Risk, harm, cost: Time to educate patients and caregivers, cost of educational materials
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: None
- Intentional vagueness: Method and content of the education is not specified because there are no studies that specifically address education about nosebleeds.
- Role of patient preferences: None
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

STATEMENT 14. NOSEBLEED OUTCOMES: The clinician or designee should document the outcome of intervention within 30 days or document transition of care, in patients who had a nosebleed treated with nonresorbable packing, surgery, or arterial ligation/embolization. *Recommendation based on observational studies with a preponderance of benefit over harm.*

- Quality improvement opportunity: To encourage clinicians to systematically obtain follow-up data for patients treated for nosebleeds. Potential for clinicians to assess interventions and improve outcomes. (National Quality Strategy Domains: Patient safety, person and family centered care, effective communication and care coordination)
- Aggregate evidence quality: Grade C, based on observational studies and large-scale audit that document up to 50% relapse rate
- Level of confidence in evidence: Medium
- Benefits: Improve patient outcomes by identifying patients who need additional care, evaluate the effectiveness of our interventions, assess patient satisfaction
- Risk, harm, cost: Administrative burden, both cost and time, of obtaining follow-up data
- Benefit-harm assessment: Preponderance of benefit over harm
- Value judgments: The GDG felt that follow-up of treated nosebleed patients varied widely. The group also perceived lack of knowledge by individual clinicians as well as in the literature about the effectiveness of interventions for nosebleeds as well as the rebleed rates for treated patients.
- Intentional vagueness: The 30-day outcome suggestion is a broad range that may not be applicable to all patients. The group was also intentionally vague about specifying the method to determine and document outcomes, leaving this up to the discretion of the clinician.
- Role of patient preferences: None
- Exclusions: None
- Policy level: Recommendation
- Differences of opinion: None

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Disclaimer

This clinical practice guideline is not intended as an exhaustive source of guidance for managing patients with epistaxis. 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 all individuals with this condition and may not provide the only appropriate approach to diagnosing and managing this program of care. 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. These do not and should not purport to be a legal standard of care. The responsible physician, with consideration 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 American Academy of Otolaryngology–Head and Neck Surgery Foundation 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.

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Supplemental Material

Additional supporting information is available in the online version of the article.

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