

# Patient Questions Surrounding Posterior Nasal Nerve Ablation for Chronic Rhinitis

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## Abstract

**Objective.** In-office ablation of the posterior nasal nerve (PNN) has emerged as an effective treatment option for chronic rhinitis patients. This study explored questions patients commonly search online regarding this therapy and the quality of content available.

**Study Design.** A retrospective analysis of online search criteria and sources was performed with subsequent analysis of results.

**Setting.** Search and data acquisition was in September of 2023.

**Methods.** Most common search terms related to cryotherapy and radiofrequency neurolysis of the PNN were identified with associated People Also Ask (PAA) questions. Questions were categorized and organized into subtopics and sources evaluated using readability and quality metrics.

**Results.** A total of 255 unique PAA questions and 175 unique websites were identified. The most common subtopics were related to facts about chronic rhinitis (26.7%) and rhinitis treatment options (25.1%). Nearly a quarter (24.3%) of websites were from commercial sources. Quality metrics indicate difficult-to-read and low-quality materials.

**Conclusion.** Existing online resources need improvement to provide patients material that is easier to read. Physicians counseling patients should be aware of these areas for adequate shared decision making.

## Keywords

chronic rhinitis, cryotherapy, Google Trends, patient education, posterior nasal nerve ablation, radiofrequency neurolysis

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In-office ablation of the posterior nasal nerve (PNN) has emerged as an effective treatment option for patients with refractory chronic rhinitis.

Radiofrequency neurolysis and cryotherapy of the PNN are the most frequently used methods.<sup>1,2</sup> As these procedures become more commonplace, physician knowledge of the pathophysiology, treatment options, and what patients wish to know becomes critical to shared decision-making process. Neubauer et al found that most chronic rhinosinusitis patients sought information about sinus surgery prior to consulting a physician, and many of these patients utilized the Internet for their education.<sup>3</sup> This is likely also the case for rhinitis patients considering treatment. Studies have found more than two-thirds of adults seek information about health-related topics online.<sup>4</sup> The purpose of this study is to explore the most common questions searched online regarding PNN ablation, and the quality of available related content.

## Methods

The most common search terms related to PNN ablation were identified via Google Trends. The terms “Clarifix,” “Clarifix Procedure,” “Neuromark,” “Neuromark Procedure,” “Rhinaer,” “Rhinaer Procedure,” and “Rhinitis Procedure” were used as umbrella terms to

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derive People Also Ask (PAA) questions. These are additional questions that Google automatically populates on the the web page based on the original search query, typically with the most related question listed closer to the top. Generally, these questions can be considered a proxy for the most popular related questions patients search online regarding the original search query as obtained through Google Trends.<sup>5</sup> Questions were extracted with their associated website using a freely available program (SEO Minion) as previously described in September of 2023 in a single session.<sup>6</sup> Questions were only obtained in 1 session, thus any trends after this collection period were not recorded or analyzed. Questions were categorized into fact-, policy-, or value-based according to Rothwell's content classification via 2 independent reviewers (R.K.S. and S.E.R.).<sup>7</sup> "Fact" questions ask whether something is true and to what extent. "Value" questions ask for evaluation of an idea, object, or event. "Policy" questions ask whether a certain course of action should be taken to solve a problem. Websites were categorized as either academic, government, commercial, or private practice. Sources were considered academic if they had an affiliated educational institution or educational purpose, government if they had an associated ".gov" or related uniform resource locator, private practice if associated with a nonacademic medical practice, and commercial if industry sponsored or containing other financial interests. Interrater reliability was calculated using Cohen's  $\kappa$  and questions were organized into subtopics. Sources were evaluated for readability using the Flesch Reading Ease (FRE) score and Flesch-Kincaid Grade Level (FKGL). FRE scores are reported from 0 to 100, with 100 identifying material that is easy to read. FKGL estimates the US grade level required to read materials. Quality was assessed with the *Journal of the American Medical Association* (JAMA) benchmark criteria, which is reported on a 0 to 4 scale, with a single point given each for authorship, attribution, disclosure, and currency. Scores of  $\geq 3$  indicate high-quality material. The Patient Education Materials Assessment Tool (PEMAT) understandability score, designed by the governmental Agency for Healthcare Research and Quality, was assessed. PEMAT scores are reported as percentages, with higher scores indicating better understandability of materials. No harm or adverse effects were encountered during this study. This study was Institutional Review Board exempt.

## Results

A total of 255 unique PAA questions and 175 unique websites were identified related to in-office PNN ablation using the terms detailed above. Questions were primarily fact-based (73.7%), followed by value-based (20.0%) and policy-based (6.3%), with examples for each seen in **Figure 1**. Interrater reliability was substantial,  $\kappa = 0.75$ . The most common subtopics were related to facts about chronic rhinitis (26.7%) and rhinitis treatment options (25.1%), followed by rhinitis causes (8.2%) and technical details about the procedures (7.84%) (**Figure 2**). Websites answering PAA questions were mostly from academic (35.7%) followed by private practice (31.8%) commercial (24.3%), and government (8.2%) sources (**Figure 3**). Mean FRE was 41.7 (SD = 15.6), indicating difficult-to-read materials, and FKGL scores found the average reading level to be around the 11th grade (SD = 2.96). Mean JAMA criteria scores were 1.8 (SD = 1.4), indicating low-quality materials on average.

When stratifying by material source type, government sources had favorable ratings in 3 categories, with higher mean readability (59.2), PEMAT understandability (81.7%), and a lower grade level (8.3) (**Figure 4A-C**). Academic sources received the highest JAMA benchmark scores (2.5) (**Figure 4D**).

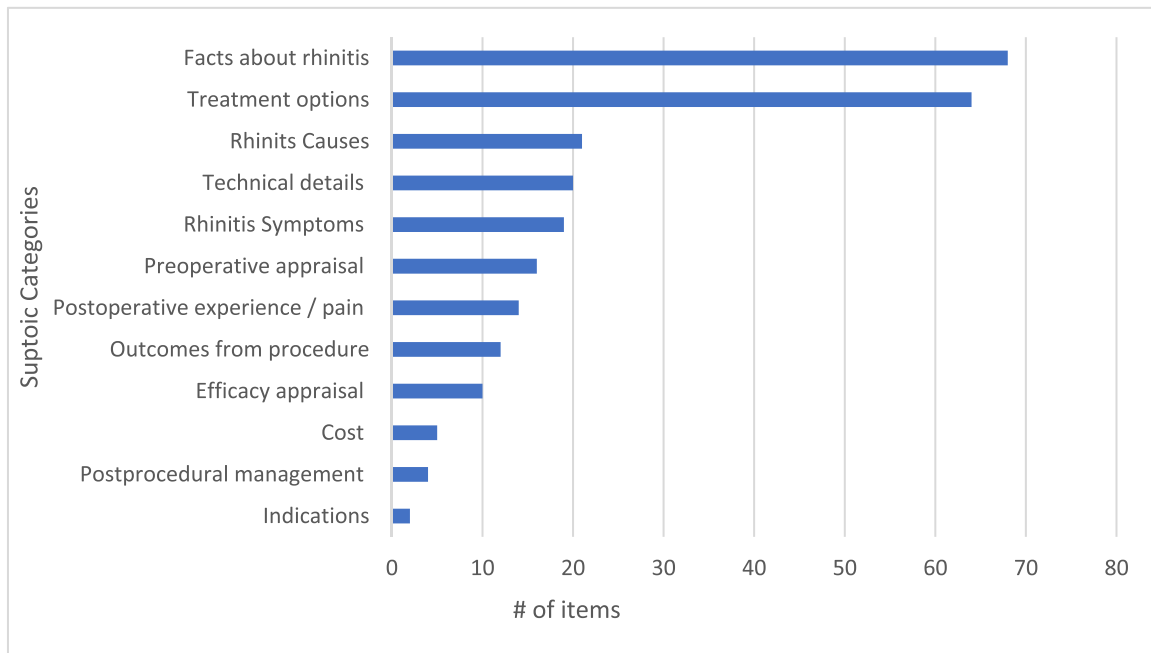
## Discussion

Shared decision making is crucial for ensuring effective care of patients with chronic rhinitis. Given the time constraints of clinical encounters, an understanding of the questions patients have may help to guide conversations. The present study provides insight into the questions that individuals ask related to in-office PNN ablation and reviews commonly accessed online educational materials.

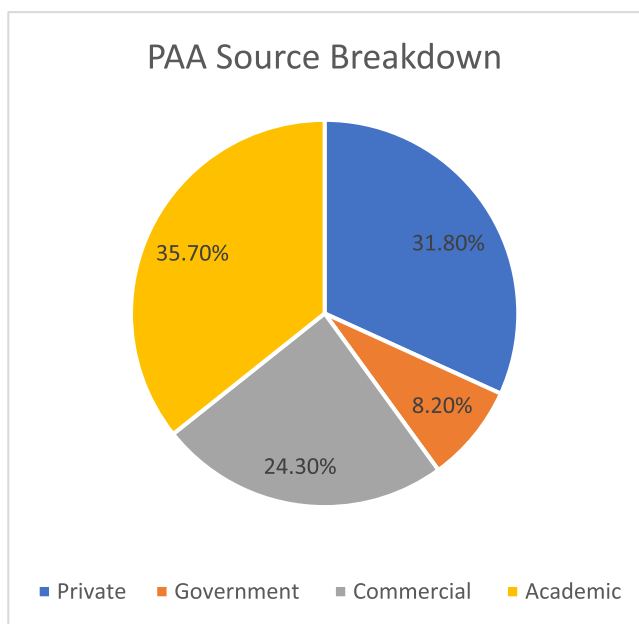
The variety of questions associated with PNN ablation searches were grouped into thematic categories. Commonly searched topics included information about the rhinitis diagnosis and overviews of treatment options. It is reasonable to assume that individuals will likely weigh the risks and benefits of different options, particularly patients with chronic disease.<sup>3</sup> However, it is important to note that many questions focused on learning more about rhinitis and may suggest that more education about the disease is necessary to allow patients to make informed decisions. Context about the disease process can ultimately impact the patient-physician relationship as well as patients' choice of treatment. Given many over-the-counter treatments, patients

Rothwell Classification	People Also Ask (PAA) Question
Fact	"What are the new treatments for chronic rhinitis?"
Value	"What is the best nasal spray for chronic rhinitis?"
Policy	"When does chronic rhinitis need surgery?"

**Figure 1.** Examples of representative People Also Ask questions classified by Rothwell's classification system.



**Figure 2.** People Also Ask question subtopics.



**Figure 3.** People Also Ask (PAA) source breakdown.

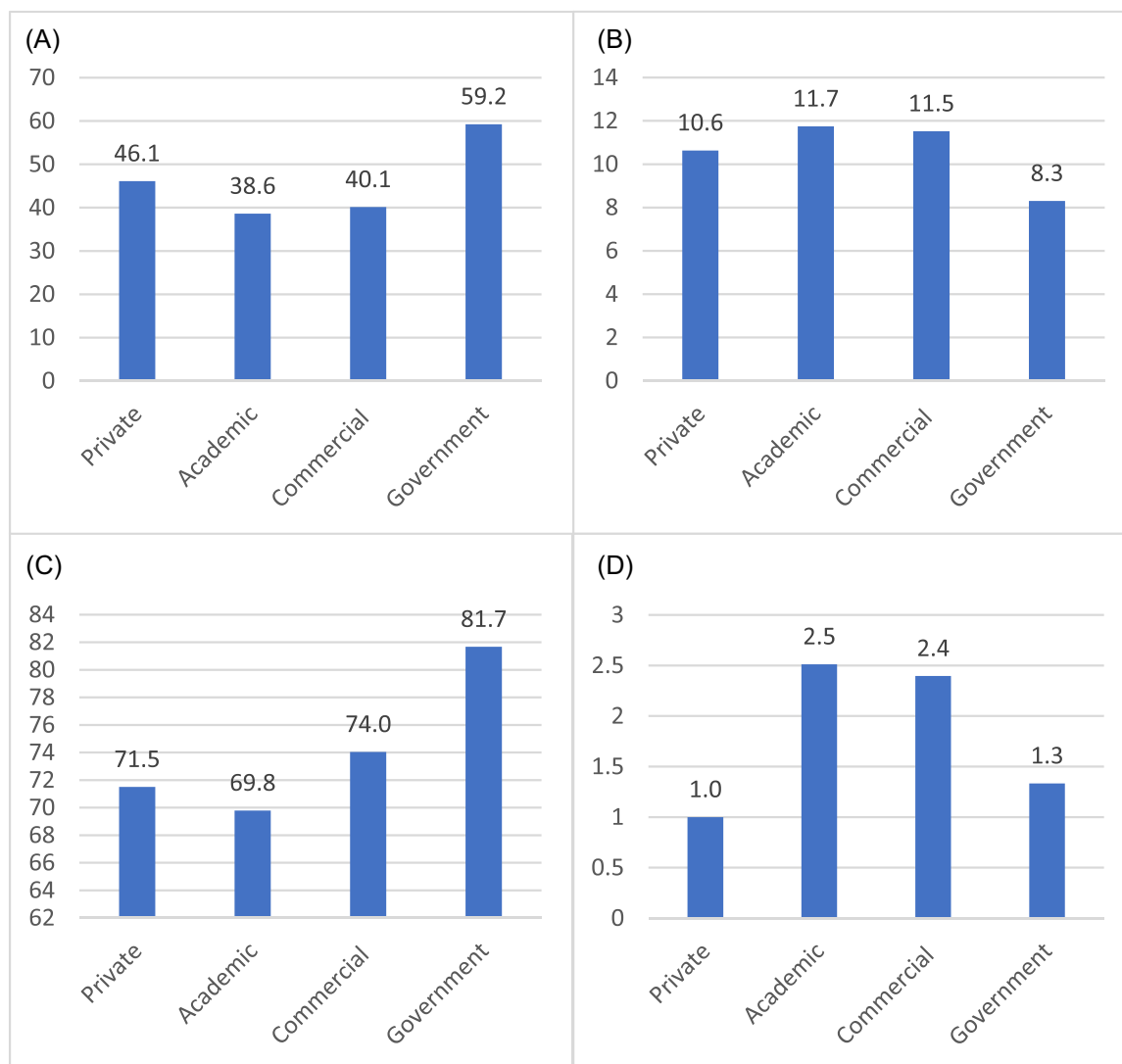
with rhinitis may attempt to self-diagnose and self-treat without adequate physician guidance and proper counseling about their disease.<sup>8</sup>

Review of the sources associated with PAA questions found that related patient education materials are written at well above the recommended sixth-grade reading level and tend to have poor quality, signifying that while many may look online for information, they are likely not receiving appropriately curated content.<sup>9</sup> Furthermore, patients tend to receive information from unreliable sources, and nearly a quarter of patients access information from commercial

websites. Both the American Academy of Otolaryngology–Head and Neck Surgery and the American Rhinologic Society recently released position statements supporting PNN ablation and answering some of the PAA topics noted here.<sup>10,11</sup> Government sources were found to have the highest quality material in most metrics but made up only about 8% of websites. Academic sources, while the most accurate and unbiased in content, had material that was some of the hardest to read and understand. Most PAA-associated websites were academic or private practice based and were well above the recommended grade levels and scored lower on reading ease and understandability scores. Similar conclusions can be made about commercial sources. Not only is it important to understand what patients are searching online, but also which sources to refer them to for unbiased, accurate, and easy-to-understand material for further education. Based on our findings, it is worthwhile to leverage the credibility of these entities to provide or create similar educational content directed toward patients, perhaps in the form of a database of patient educational material.

As the use of these devices increases, physicians and academic departments will be able to use our results to guide discussions and understand what patients are inquiring about on the internet. Additionally, they may be directed to sources with the best information quality.

There are limitations to this study. Though PAA questions identify common searches, it is not possible to interpret the true motivation of the question and whether these questions are asked exclusively by a chronic rhinitis patient. Furthermore, JAMA criteria scores may be skewed due to a lack of transparency rather than improper information, so results should be interpreted carefully.<sup>6</sup> This paper serves to characterize the general online search trends and content related to PNN ablation,



**Figure 4.** Outcomes stratified by resource type. (A) Reading ease. (B) Grade level. (C) PEMAT. (D) JAMA score. JAMA, *Journal of the American Medical Association*; PEMAT, Patient Education Materials Assessment Tool.

but further work is necessary to characterize patient attitudes toward this novel treatment approach.

## Conclusion

Individuals asking questions related to PNN ablation tend to seek general information about rhinitis and the associated treatment options. Physicians should be aware of these areas of interest to better inform patients, and existing online resources have substantial opportunity to improve readability and quality.

## Author Contributions

**Daniel Gorelik**, conceptualization, methodology, writing—original draft, data curation, formal analysis, writing—review and editing; **Samuel E. Razmi**, methodology, data curation, formal analysis, investigation, writing—original draft, writing—review and editing; **Robert Kenneth Sims IV**, data curation, investigation, writing—original draft; **Aatin K. Dhanda**, formal

analysis, investigation, writing—original draft, writing—review and editing; **Masayoshi Takashima**, supervision, writing—review and editing; **Ella S. Brissett**, writing—review and editing; **Nicholas R. Rowan**, writing—review and editing; **Michael T. Yim**, writing—review and editing; **Najm Khan**, writing—review and editing; **Meha G. Fox**, writing—supervision, review, and editing; **Omar G. Ahmed**, writing—original draft, supervision, project administration, writing—review and editing.

## Disclosures

**Competing interests:** Omar G. Ahmed serves as a consultant for Aerin Medical (Sunnyvale, CA, USA) and Medtronic (Dublin, Ireland). Masayoshi Takashima is a consultant for Aerin Medical, Medtronic, Acclarent, and LivaNova. Nicholas R. Rowan is supported by the Johns Hopkins University Claude D. Pepper Older Americans Independence Center funded by the National Institute on Aging of the National Institutes of Health (P30AG021334).

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