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# COVID-19 Anosmia Reporting Tool: Initial Findings

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## Abstract

There is accumulating anecdotal evidence that anosmia and dysgeusia are associated with the COVID-19 pandemic. To investigate their relationship to SARS-CoV2 infection, the American Academy of Otolaryngology–Head and Neck Surgery developed the COVID-19 Anosmia Reporting Tool for Clinicians for the basis of this pilot study. This tool allows health care providers to confidentially submit cases of anosmia and dysgeusia related to COVID-19. We analyzed the first 237 entries, which revealed that anosmia was noted in 73% of patients prior to COVID-19 diagnosis and was the initial symptom in 26.6%. Some improvement was noted in 27% of patients, with a mean time to improvement of 7.2 days in this group (85% of this group improved within 10 days). Our findings suggest that anomia can be a presenting symptom of COVID-19, consistent with other emerging international reports. Anosmia may be critical in timely identification of individuals infected with SARS-CoV2 who may be unwittingly transmitting the virus.

## Keywords

coronavirus, COVID-19, anosmia, dysgeusia, smell, taste

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Anosmia (loss of sense of smell) and dysgeusia (alteration of sense of taste) have been reported in association with the COVID-19 pandemic. Dysgeusia may be related to alteration in the perception of taste due to loss of the sense of olfaction. There have been published and nonpublished anecdotal reports of anosmia related to COVID-19 emanating from around the world, including South Korea, Germany, Italy, United Kingdom, Iran, and the United States. In South Korea, the Daegu City Council's informal phone survey found 15.3% of 3191 confirmed SARS-CoV-2 cases had anosmia or dysgeusia.[1] Hendrick Streeck, a German virologist, reported a loss of smell and taste in over two-thirds of 100 people interviewed with mild symptoms from COVID-19.[2] Massimo Galli, an Italian infectious disease specialist at the University of Milan, noted that anosmia and dysgeusia seem to be observed in patients with even modest symptoms or limited severity; however, these appear to present later in the course of infection.[3] A non–peer-reviewed Iranian study[4] of 10,069 patients with anosmia or hyposmia (unknown COVID-19 status) noted sudden symptom onset in 76.2%.

In an effort to establish a platform allowing health care providers of all specialties worldwide to submit data to confidentially report on anosmia symptoms related to COVID-19, the American Academy of Otolaryngology–Head and Neck Surgery (AAO-HNS) established the COVID-19 Anosmia Reporting Tool for Clinicians (see Supplemental Material, available online).[5] The survey was developed by expert panelists and stakeholders from the AAO-HNS Infectious Disease Committee and Patient Safety and Quality Improvement Committee. After multiple iterations, consensus was reached, satisfying adequate face validity. The content of the tool, especially the data elements, was based on review of multiple COVID-19 reports related to anosmia. As this is a pilot study conducted in an expedited manner to address the rapidly changing situation, additional validation will be forthcoming. Data collection is hosted on a platform similarly used for the AAO-HNS Patient Safety Event Reporting Tool,[6] with digital safeguards built to ensure anonymity. No identifiable data about the user were solicited. The computer's internet protocol address was not captured from the submitting provider to preserve the confidentiality of the report/reporter. If identifiable information was inadvertently provided by the reporter in the free-text entry boxes, this information was immediately discarded. This preliminary analysis is based on data collected from the opening of the survey on March 25, 2020, to April 3, 2020. Descriptive statistics were used to describe submissions to the database.

In 10 days of data accrual, 240 entries were made. Three were removed due to clinical inconsistencies, and thus 237 entries were analyzed. While otolaryngologists contributed

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**Table 1.** Demographics (N = 237).

| | |
|---|---|
| Age, y | |
| Mean ± SD | 39.6 ± 14.6 |
| Median | 36 |
| Range | 2-89 |
| Sex, male:female, No. (%) | 108:129 (46:54) |
| Patient location, No. (%) | |
| United States | 158 (67) |
| Mexico | 11 (5) |
| Italy | 9 (4) |
| UK | 7 (3) |
| Other | 52 (22) |

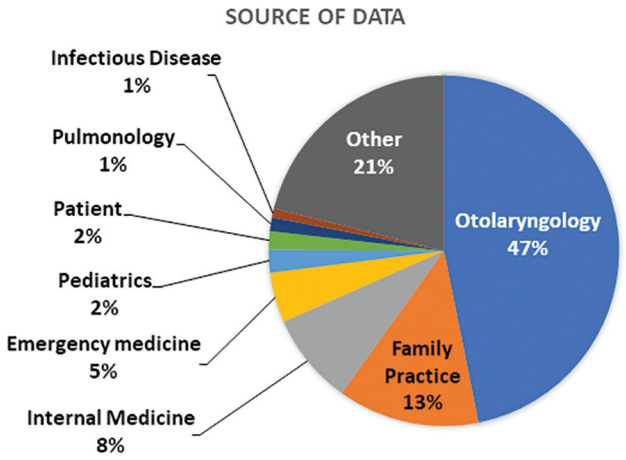


**Figure 1.** Sources of data.

47% of entries, the majority came from a variety of other specialists (**Figure 1**). Demographics are shown in **Table 1**. An age distribution histogram is found in Supplemental Figure S1 (available online). Over one-third of the cases were of health care workers.

One of the most relevant findings is the timing of anosmia in relationship to diagnosis and the presence—or absence—of other symptoms (**Table 2**). Anosmia was noted in 73% prior to diagnosis. Anosmia contributed to recommending testing in 40%. More critically, anosmia was the initial symptom in more than a quarter of patients. The remainder demonstrated more common symptoms of COVID-19, with myalgias and sore throat highly noted as free-text entries in the ''other'' category. Some improvement in anosmia was noted in 27% of patients, with a mean time to improvement of 7.2 days in this group (85% of this group improved within 10 days). These data are subject to significant interpretation, as many entries were submitted before long-term follow-up was achieved.

Although the exact pathophysiology of how SARS-CoV-2 could produce olfactory dysfunction has not been firmly established, direct extension through the nasal mucosa (via angiotensin-converting enzyme 2 receptor on the basal layer

**Table 2.** Timing of Anosmia.[a]

| | No. (%) or Mean ± SD |
|---|---|
| Anosmia onset | |
| Before diagnosis | 172 (73) |
| Anosmia contributed to testing for COVID-19 | 94 (40) |
| After diagnosis | 65 (27) |
| Symptoms before anosmia | |
| None | 64 (27) |
| Fever | 90 (38) |
| Chills | 63 (27) |
| Malaise | 93 (39) |
| Cough | 98 (41) |
| Headache | 88 (37) |
| Nasal congestion | 60 (25) |
| Rhinorrhea | 42 (18) |
| Gastrointestinal distress | 24 (10) |
| Other | 28 (13) |
| Resolution of anosmia | |
| Complete resolution | 30 (13) |
| Partial resolution | 32 (14) |
| None, not yet | 175 (74) |
| Time to improvement, d | 7.2 ± 3.1 |

of the nasal epithelium) and extension to the olfactory bulb are potential hypotheses. Postviral olfactory dysfunction is a common cause of olfactory dysfunction and is thought to be caused by neuroepithelial dysfunction.[7,8] Deems et al[7] reported that 26% of patients had anosmia as a result of an upper respiratory infection or cold, with a preponderance of females (63%) being affected. More recently, Fornazieri et al[9] reported a 13% incidence of postviral loss of smell.

Although coronaviruses are a known etiology for postviral olfactory dysfunction,[10] there is only 1 case report of SARS-CoV producing anosmia.[11] SARS-CoV-2 appears to differ in this regard, as the mounting anecdotal evidence caused ENT UK and the AAO-HNS to announce the potential association.[12,13] For the current COVID-19 pandemic, scientific data are emerging. A European multicenter study released recently had 417 patients with COVID-19 with mild to moderate symptoms (mean age, 36.9 years; 63% female, n = 263).[14] Olfactory dysfunction was reported in 11.8% of cases before any other symptom.

Currently, neither the World Health Organization nor the Centers for Disease Control and Prevention recognizes anosmia as a screening symptom. As we continue to treat this pandemic, it is vital to identify additional symptoms outside the classic triad of fever, cough, and dyspnea in an effort to promote timely identification of infected individuals who may unknowingly transmit the virus. Characteristic symptoms inclusive of anosmia can be utilized to direct early and widespread testing to mitigate this disease.

With this survey, some caveats should be considered. Entries are provider initiated and limited by the awareness

of the tool. Because of limitations to testing availability, diagnosis of some patients is presumed and not confirmed. By the nature of the capture strategy, analysis has been made of a subset of patients with COVID-19 only: those who have anosmia. It is difficult to determine the prevalence of this symptom among all patients with COVID-19.

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## Author Contributions

**Rachel Kaye**, substantial contributions to the conception or design of the work, analysis, and interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved; **C. W. David Chang**, substantial contributions to the conception or design of the work, analysis, and interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved; **Ken Kazahaya**, substantial contributions to the conception or design of the work, analysis, and interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved; **Jean Brereton**, substantial contributions to the conception or design of the work, acquisition of data for the work; and revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved; **James C. Denneny III**, substantial contributions to the conception or design of the work, analysis, and interpretation of data for the work; drafting the work or revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

## Disclosures

**Competing interests:** C. W. David Chang, cochair of the Patient Safety Quality Improvement Committee, American Academy of Otolaryngology–Head and Neck Surgery Foundation; Ken Kazahaya, chair of the Infectious Disease Committee, American Academy of Otolaryngology–Head and Neck Surgery Foundation; Jean Brereton, staff at American Academy of Otolaryngology–Head and Neck Surgery; James C. Denneny III, executive vice president, American Academy of Otolaryngology–Head and Neck Surgery.

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## Supplemental Material

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

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