

# Letters

## RESEARCH LETTER

### Growing Public Health Concern of COVID-19 Chronic Olfactory Dysfunction

As the world enters the second year of the COVID-19 pandemic, chronic (ie, >6 months) olfactory dysfunction (COD) has emerged as one of the symptoms of long-term COVID-19.<sup>1</sup> The loss of olfaction has been associated with decreased general quality of life, impaired food intake, inability to detect harmful gas and smoke, enhanced worries about personal hygiene, diminished social well-being, and the initiation of depressive symptoms.<sup>2,3</sup> To our knowledge, no study on long-term COVID-19 olfactory dysfunction (OD) has measured long-term recovery beyond 6 months. Therefore, the rate and trajectory of recovery for COVID-19 COD is not known. The purpose of this study was to estimate the scale of the public health concern of COVID-19 COD.

**Methods** | The data we used to estimate the number of daily new cases of COVID-19 were publicly available (<https://covidtracking.com/data/national>), and because of this, the institutional review board of Washington University in St. Louis

waived approval and informed consent. The COVID Tracking Project provides national data for positive cases, which include confirmed and probable cases. A *probable case* is one that receives a positive test result via antigen without a positive polymerase chain reaction result or other approved nucleic acid amplification test, one with clinical evidence of COVID-19 infection with no confirmatory laboratory testing performed for SARS-CoV-2, or one with COVID-19 listed on the death certificate with no confirmatory laboratory testing performed for SARS-CoV-2. Positive COVID-19 cases that occurred between January 13, 2020, and March 7, 2021, are included in our estimate of COD.

A recent meta-analysis reported the incidence of acute COVID-19 OD as 52.7% (95% CI, 29.6%-75.2%).<sup>4</sup> A prospective study reported the recovery rate from OD to be 95.3% (95% CI, 92.6%-98.0%).<sup>5</sup> Based on these 2 studies and the number of daily cases, 3 estimates of the cumulative frequency of COVID-19 COD were created (Table). Analyses were conducted using R, version 3.6.3 (R Foundation).

**Results** | During the COVID-19 pandemic, the mean (SD) number of daily cases was 68 468 (68 682). The incidence of COVID-19 peaked on January 8, 2021, with an estimated 295 121 US individuals receiving a diagnosis of confirmed COVID-19.

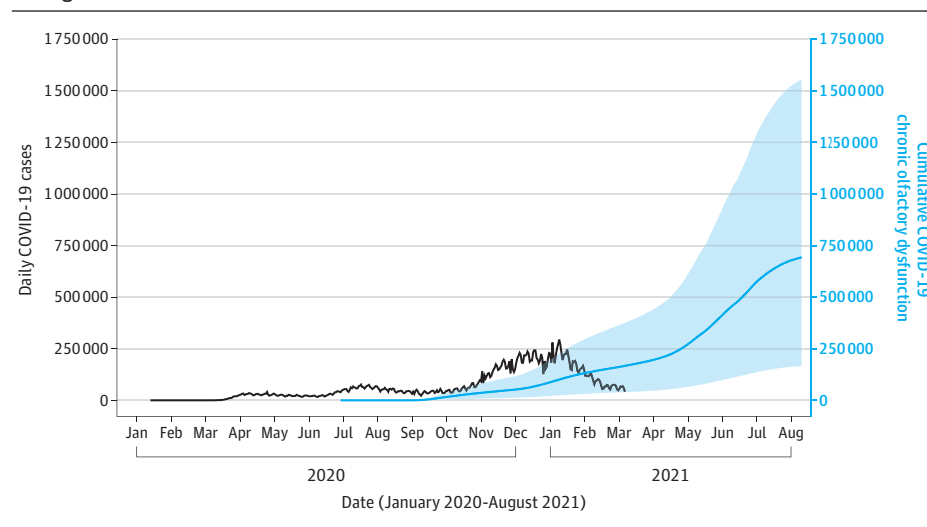
COD due to SARS-CoV-2 emerged in August 2020, 6 months after the pandemic began (Figure). There was a steady increase in the cumulative number of US individuals with COD through April 2021. Starting in May 2021, the analysis predicted a near exponential increase in the slope of the cumulative number of US individuals with COD through August. Based on intermediate estimates, the number of US individuals expected to develop COD by August 2021 was 712 268. Based

Table. Estimate of Cumulative COVID-19 Chronic OD as a Function of Acute Incidence of OD and Rates of Recovery

Estimate of COVID-19 chronic OD	%	
	Incidence of acute OD	Rate of recovery
Low	29.6	98.0
Intermediate	52.7	95.3
High	75.2	92.6

Abbreviation: OD, olfactory dysfunction.

Figure. Incidence of New Daily Cases of COVID-19 and Prevalence of Chronic Olfactory Dysfunction Among Adults With COVID-19 in the US



The incidence of new daily cases is shown in the black line. The estimated prevalence of chronic olfactory dysfunction is shown in blue, with the solid blue line representing the intermediate estimate and the upper and lower range of the ribbon representing the high and low estimates, respectively.

on low estimates for each event, the number of US individuals who are expected to develop COD is 170 238, and based on the highest estimate, the number is 1 600 241.

**Discussion** | This analysis of new daily cases of COVID-19, acute incidence of OD, and rates of recovery suggest that more than 700 000, and possibly as many as 1.6 million, US individuals experience COD because of SARS-CoV-2. To put this number in context, before the COVID-19 pandemic, the National Institute on Deafness and Other Communication Disorders estimated that, among US adults 40 years or older, measurable OD was found in up to 13.3 million adults.<sup>6</sup> Notably, the age-specific prevalence of OD is 4.2% for individuals between age 40 to 49 years and 39.4% for individuals 80 years and older. The addition of 0.7 to 1.6 million new cases of COD represents a 5.3% to 12% relative increase. COVID-19 affects a younger demographic group than other causes of OD. Thus, the life-long burden of OD will be much greater for the COVID-19 cohort than for patients in the older age groups. The true number of COD may be far higher than the results in this article indicate. The main limitation of this study is the inability to obtain the true number of cases, as state-reported positive cases likely underestimate the true number of positive cases. Furthermore, the estimates for the incidence of acute and chronic OD are derived from relatively healthier, ambulatory patients. The incidence of OD may be higher among patients who were hospitalized with SARS-CoV-2. These data suggest an emerging public health concern of OD and the urgent need for research that focuses on treating COVID-19 COD.

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**Concept and design:** Khan.

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