



# COVID Smell Tracker: A research-based mobile application to study smell loss in subjects with COVID-19

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## ABSTRACT

**INTRODUCTION:** Up to 60% of people infected with SARS-CoV-2 report anosmia or ageusia during their disease course. "COVID Smell Tracker" is a smart phone application (app) developed to elucidate the onset, duration and extent of anosmia and ageusia through questionnaires.

**METHODS:** "COVID Smell Tracker" is publicly available on smart phone devices (www.covidsmelltracker.org). Users complete surveys around demographics, medical history, COVID status and symptomatology. Deidentified responses were collated and analyzed using descriptive statistics.

**RESULTS:** Of the 266 users included, the majority were located in Europe (43%) and North America (33%). Male, Caucasian users were most common (54.9% and 61.7% respectively), followed by Indian (10.5%) and Latino (9.4%). The majority of users reported no COVID testing (63%). 164 users reported COVID-related symptoms, and 57% of them reported olfactory dysfunction. Users whom were younger age ( $p = 0.0003$ ) and with type A and B blood types ( $p = 0.021$ ) experienced smell loss at higher frequencies. Dysgeusia was associated with 28-34% of patients with concomitant smell loss, versus 6%-9% in users without. Smell loss was described as "sudden" (63%), occurring on average 3 days following the onset of any other symptom. Of those that reported resolution of their smell loss, 50% resolved in 1 week, with 75% resolution reported within 1 month.

**CONCLUSION:** The results herein correlate with other established COVID-related studies, despite relying on purely volunteered data from participants from around the world. This is the first study to suggest an association of age and blood type with smell loss. Mobile app offers a novel method for safe, remote and granular insight into those suffering from infectious diseases like COVID-19.

## OBJECTIVE

**SPECIFIC AIM:** The ultimate objective of this study is to uncover more about the epidemiology and prognosis of those suffering to allow physicians to appropriately manage COVID-related smell and taste issues by using novel, questionnaire-based mobile application.

## EXPERIMENTAL DESIGN

- Prospectively collected data from the corresponding author's mobile application (COVID Smell Tracker) was analyzed over an 8-month period from May in 2020 to February 2021.
- Data was exported and user data were grouped by demographics, COVID symptoms, medical history, and treatment history. Subjective symptom scoring was recorded as a twenty-two item Sinonasal Outcomes Test (SNOT-22).
- Deidentified responses were collated and analyzed using descriptive statistics.



**COVID SMELL TRACKER**  
An app-based research study

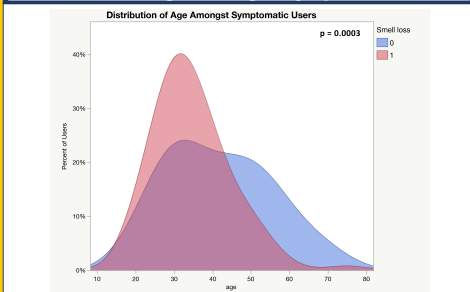
## User Demographics

Table 1: Distribution of Users		
	N	%
Total users	266	100.0%
Mean age (SD)	39.5 (11.4)	
Gender		
Male	146	54.9%
Female	120	45.1%
Race		
White	164	61.7%
Asian Indian	28	10.5%
Latino	25	9.4%
Asian	23	8.6%
Black	16	6.0%
Native American/Hispanic	10	3.8%
Location		
Europe	99	43.0%
North America	75	32.6%
Asia	36	15.7%
South America	12	5.2%
Africa	7	3.0%
Australia	1	0.4%
Not shared	36	
App Statistics		
Average number of reports per user	1.0	
Average follow up time	16 days	
Maximum follow up time	205 days	
Conversion rate	74.7%	

## Anosmia Resolution

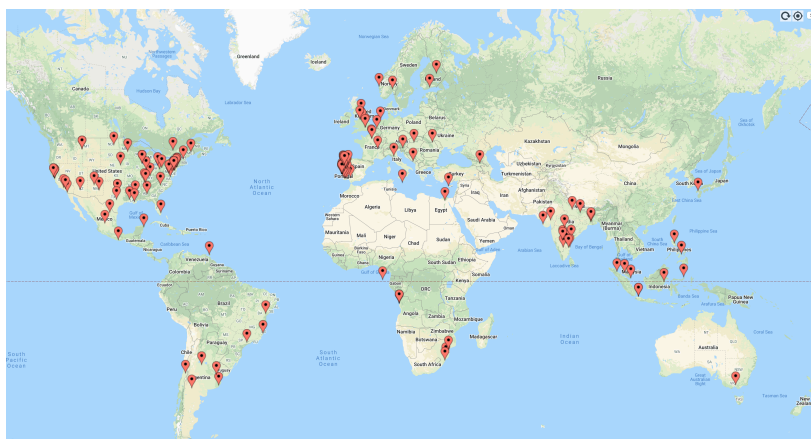
Table 2: Small Loss Resolution Characteristics		
	N	%
Small loss characteristics		
Total small loss	94	100.0%
Occurred suddenly	59	62.8%
Occurred gradually	35	37.2%
Average onset of small loss after 1st symptom (SD)	3 days (6.7)	
Timing of resolution		
Total reported	29	30.9%
1 week	14	48.3%
2 weeks	6	20.7%
3 weeks	1	3.4%
1 month	1	3.4%
1-4 months	4	13.8%
Over 6 months	3	10.3%

## Distribution of Age Amongst Symptomatic Users



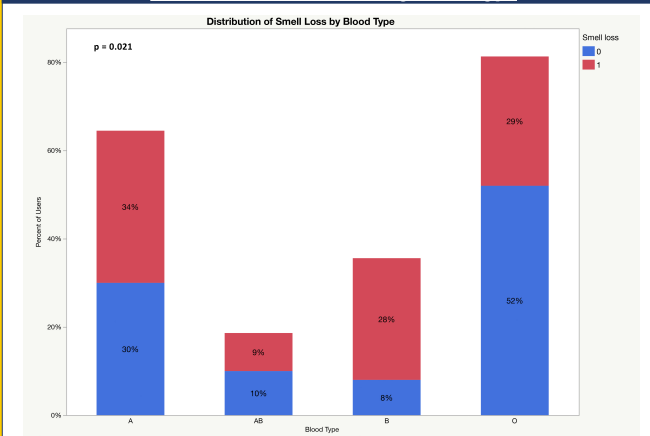
**FIGURE 2:** The average user was 39.5 years of age, 54.9% male and 45.1% female. Younger users (34.6 years vs 41.7 years) experienced higher rates of smell loss amongst all symptomatic users.

## User Map



**FIGURE 1, TABLE 1, and TABLE 2:** Subjective data was captured from users from all across the world. The majority of users were from Europe (43%), followed by North America (32.6%), Asia (15.7%), South America (5.2%), and Australia (0.4%). The average user was 39.5 years of age, 54.9% male and 45.1% female. By race, the majority of users identified as Caucasian (61.7%), followed by Asian Indians (10.5%), and Latinos (9.4%). The remainder of the demographic data can be visualized in Table 1. Table 2 shows that 48.3% patients reported smell resolution at one week, 20% reporting resolution at two weeks, and approximately 25% of patients that resolved beyond one month.

## Distribution of Smell Loss by Blood Type



**FIGURE 3:** Type O and Type A blood were the most prevalent blood types. Those with A, B or AB blood type experienced higher rates of smell loss amongst all symptomatic users. Specifically, blood type B was over 2.5 times more likely, versus blood type O which almost half as likely.

## SUMMARY

- The data generated within Figure 1 and Table 1 encompasses users from every inhabited continent, marking this as one of the first studies to incorporate a global patient pool.
- The incidence of smell loss amongst symptomatic users was measured at 57% and occurred on average within 3 days of symptom onset.
- Table 2 indicated that almost half of patients reported smell resolution at one week, and additional 20% reporting resolution at two weeks. However, there were approximately 25% of patients that resolved beyond one month and even over 6 months.
- Figure 2 and Figure 3 did indicate that smell loss may disproportionately affect younger people and those with particular blood types.
  - Figure 2 shows that younger users (34.6 years vs 41.7 years) experienced higher rates of smell loss amongst all symptomatic users.
  - Figure 3 shows blood type B was over 2.5 times more likely to have concomitant smell loss, versus blood type O which almost half as likely.

## CONCLUSION

- COVID Smell Tracker may be used in parallel with other, validated clinical assessments to track disease incidence, risk factors, infection trends and outcomes on a global scale.
- This app can provide additional longitudinal information to the epidemiological community by collecting data on a remote platform.
- Data from the present analysis suggest there may be a correlation between age, blood type and the experience of smell loss from COVID-19.
- Future age-matched multivariate studies should be conducted to investigate this relationship further.

## REFERENCES

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