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Risk assessment of outpatient dermatology practice in the setting of the COVID-19 pandemic

To the Editor: Severe acute respiratory syndrome coronavirus 2 has had a mortality rate of 2.2% in China and 7.2% in Italy. Mortality and severity of infection are associated with older age and comorbidities.[1] Infectivity is estimated at 2% to 3.58% of exposures. Health care workers, representing up to 20% of those infected, are at elevated risk. The high rates of infectivity and mortality raise questions on how outpatient clinics can reduce risk. We created a model to assess the weekly risk of exposure in a dermatology practice.

In the United States, testing is limited in many places to patients who are highly symptomatic. The largest study to date, which mainly focused on testing symptomatic individuals from Wuhan, reported 81% to have mild disease and 19% to have severe illness.[1] Additionally, many may be completely asymptomatic. In New York on April 27, 2020, the reported number of positive cases was 298,004. The same day, a seroprevalence study showed a positivity rate of 14.9% in the state of 19.45 million people, roughly translating to 2,898,050 infections. These studies suggest that current reporting may be capturing only 10% to 20% of all infections. There are surmounting data that the number of infections is far greater than reported.

To help dermatologists better grasp the impact of COVID-19, we created 2 models: a dermatologist practicing in Chicago (city population of 2,700,000) and one practicing in a metropolitan area of 100,000. The model assumes each physician sees 145 patients per week, which is the national average.[2] The model displays a range that assumes the ratio of symptomatic-to-asymptomatic infections is 1:4 or 1:9, which are based on data from Wuhan and New York, respectively. The range also uses current data that the sensitivity of the polymerase chain reaction test may be as low as 70% or as high as 95%.[3] The number of asymptomatic or mildly symptomatic patients in a population and the number of these patients a dermatologist is likely to encounter in a given week are shown for Chicago (Table I) and a metropolitan area of 100,000 (Table II). When there are 4425 average daily new positive cases in Chicago and 165 in the smaller metropolitan area, a conservative estimate would suggest that a dermatologist could expect to encounter 1 mildly symptomatic or asymptomatic patient with COVID per week.

Table I. Expected exposure rates in the city of Chicago

Number of positive cases	Number of undiagnosed, mild, or minimally symptomatic cases, range	Patient exposure, weekly, range
100	421-1286	0.02-0.071
500	2105-6429	0.11-0.35
1000	4211-12,857	0.23-0.69
4425	**18,632-56,893**	**1.00-2.25**
5000	21,053-64,286	1.13-3.45
10,000	42,105-128,571	2.26-6.90
50,000	210,526-642,587	11.31-34.52
100,000	421,053-1,285,714	22.61-69.05

Bold represents when the threshold when a dermatologist can anticipate to encounter at least one active COVID patient per week.

Table II. Expected exposure rates in a metropolitan area of 100,000 people

Number of positive cases	Number of undiagnosed, mild, or minimally symptomatic cases, range	Patient exposure, weekly, range
10	42-129	0.06-0.19
50	211-643	0.31-0.93
100	421-1286	0.61-1.86
165	**695-2121**	**1.00-1.08**
500	2105-6429	3.05-9.32
1000	4211-12,857	6.11-18.64
5000	21,053-64,286	30.53-93.21
10,000	42,105-128,571	61.05-186.43

Bold represents when the threshold when a dermatologist can anticipate to encounter at least one active COVID patient per week.

The virus is transmitted through airborne aerosols, including speaking, which can travel for at least 6 feet.[3] Furthermore, viral loads are similar in both symptomatic and asymptomatic individuals.[4] Surgical masks can decrease transmission by 75%,[5] and N95 masks are even more protective. However, depending on the type and fit of PPE, dermatologists and their staff could be exposed to the virus if a patient with COVID is seen.

If in-person clinic volumes return to prequarantine levels and if new infections continue in the community, exposure to COVID-positive patients is inevitable. However, there are steps we can take to mitigate the risk. Screening patients for symptoms and recent close contacts with COVID is essential. Universal PPE for dermatologists and their staff, ideally N95 masks, is also needed.

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Application of hydrogel patches to the upper margins of N95 respirators as a novel antifog measure for goggles: A prospective, self-controlled study

To the Editor: During the COVID-19 pandemic, proper use of personal protective equipment has played an important role in protecting frontline health care workers from infection.[1] Because of temperature differences between the inner and outer surfaces of goggles, moist, warm exhaled air escaping from respirators can condense into tiny water droplets on the inner surface. This obscures visibility and impairs workflow. In our previous research, we showed the effectiveness of hydrogel patches in reducing facial pressure injuries caused by N95 respirators.[2] Thereafter, we conducted a prospective, self-controlled study to evaluate the efficacy of hydrogel patches as an antifog measure.

This study was approved by the Medical Ethics Committee of Huazhong University of Science and Technology (no. [2020]0131-1). Twenty health care workers aged 25 to 55 years took part in 2 separate experiments, conducted at a temperature of 64.4°F to 77°F. In both experiments, the right, inner side of the goggles was treated with an antifog agent, and the left side remained untreated. In the first experiment, participants wore only goggles and an N95 respirator. The left, untreated side was the control. In the second experiment, participants wore goggles and hydrogel patches, which were placed in a "W" shape under the upper edges of the N95 respirator (Fig 1). Before starting, the respirator seal was checked for air leaks (Supplemental Materials; available via Mendeley at https://doi.org/10.17632/rbrw7zvp6y.2).[3] At hourly intervals, participants and a clinician scored the fogging observed on each side of the goggles by using the Subject Self-Assessment Fogging Score (SSAFS) and Clinician Assessment Fogging Score (CAFS), respectively (Supplemental Materials; available via Mendeley at https://doi.org/10.17632/rbrw7zvp6y.2). Statistical analysis was performed with SPSS 26.0 (IBM, Armonk, NY) using a paired-sample *t* test ($P < .05$).

A total of 19 participants (14 [73.7%] female) were included. At 1 hour, the mean score for goggles with hydrogel patches was lower than control individuals (SSAFS: 3.29 ± 2.80 vs 5.35 ± 2.47; $P < .01$; CAFS: 1.91 ± 1.35 vs 4.35 ± 2.06; $P < .001$). Hydrogel patches plus antifog agent resulted in lower scores than just antifog agent (SSAFS: 1.82 ± 1.88 vs 2.41 ± 2.81; $P < .05$; CAFS: 0.91 ± 0.71 vs 1.62 ± 0.78; $P < .01$). This difference persisted at 2, 3, and 4 hours. There was no statistically significant difference between hydrogel and antifog agent scores at 1, 3, and 4 hours, except at 2 hours by the SSAFS (Fig 2). Twelve (63.2%) participants without hydrogel patches reported mild air leaks from the N95 respirator versus only 3 (15.8%) with hydrogel patches. Participants did not report skin irritation with hydrogel patches. The main reasons reported by participants for reluctance to use antifog agents were difficulty in even application, long drying times, and concerns about viral contamination of goggles during processing.

This study suggests that hydrogel patches are a useful adjunct to respirators; they enable a tighter fit of the respirators, are well tolerated, and prevent facial pressure injuries. The efficacy of these patches