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## Brief Report

## Assessing health care worker perceptions of face coverings during the COVID-19 pandemic

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## Key Words:

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The Coronavirus Disease 2019 pandemic created a significant disruption in the personal protective equipment (PPE) supply chain while simultaneously creating unprecedented demand for their use. Hospitals pursued different PPE strategies based on local factors, PPE availability, and interpretation of the evolving data on the epidemiology of the disease. After instituting universal face coverings, we sought to assess the comfort and tolerability, along with the advantages and disadvantages for face masks and face shields through a survey of employees at an academic medical center.

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By August 5, 2020, the United States approached 4.9 million confirmed cases of Coronavirus Disease 2019 (COVID-19) with more than 160,000 deaths.<sup>1</sup> The pandemic created a significant disruption in the personal protective equipment (PPE) supply chain that forced a reassessment of infection prevention practices.<sup>2</sup> Different PPE strategies emerged as hospitals assessed PPE supplies in the context of local disease prevalence, and interpreted the emerging data on disease transmission.

Face shields are reusable and offer more facial protection compared to face masks.<sup>3–5</sup> Universal use of face masks and face shields has been advised to control the spread of COVID-19.<sup>6</sup> On March 18, 2020, our hospital began providing all clinical and nonclinical employees with face shields for protection to be worn at all times. They were industrial-grade shields mainly from UTM (North Branch, NJ), SAS Safety Corp (Long Beach, CA), and several other suppliers. On April 20, 2020 surgical masks were also required for all patient care. We aim to assess and compare the comfort and tolerability of face masks and face shields for employees and determine the advantages and disadvantages of both at an academic medical center.

## METHODS

Employees at the hospital were asked to participate in a brief, voluntary, electronic survey, which was approved by the Institutional Review Board. The survey had 29 questions across 6 domains

(demographics and COVID-19 status, use, comfort, safety, communication, and device comparison). All employees were eligible to complete the survey, which was distributed through an internal electronic newsletter on 3 occasions over a 3-week period.

The analysis focuses on differences in workers' perceptions between face masks and face shields. Differences in proportions were compared using a  $\chi^2$  test, Fisher exact test, or 1-way ANOVA when appropriate. All tests of significance were 2-tailed with an alpha of 0.05. All statistical analyses were performed using R 3.6.1 (R Foundation for Statistical Computing, Vienna, Austria).

## RESULTS

During June 19–July 13, 2020, 1,109 electronic survey responses were collected. Approximately half of the respondents provide direct patient care (568, 51.2%). Among them, the highest percentage of responses (180, 32%) came from nursing personnel (nurses, nursing assistants, and medical assistants), followed by physicians and medical students (77, 14%). Nearly one-third (168, 29%) cared for laboratory-confirmed COVID-19 patients, while 24 reported a history of COVID-19 infection.

Among respondents providing direct patient care (ie, clinical workers), 88% (497) wear face coverings more than 4 hours per day in comparison to 50% (271) of nonclinical workers ( $P < .001$ ). Of these, 95% (471) wear both face mask and face shields, while only 1% (5) wear face masks only and 4% (21) wear face shields. Outside of the workplace, 93% (498) reported wear face coverings (face mask 85%, face shields 2%, both 13%). Among employees wearing glasses, 33%

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Conflicts of interest: None to report.

**Table 1.**  
Employees' electronic survey responses at the University of Iowa Hospitals & Clinics

Section	Question	All workers (n = 1,109)			Clinical workers (n = 568)			Nonclinical workers (n = 528)		
		Face mask	Face shield	P	Face mask	Face shield	P	Face mask	Face shield	P
Comfort	Comfortable to wear (% agree)	32.7	23.5	<.001	33.3	15.6	<.001	32.0	32.3	.981
	Easy to breathe (% agree)	20.3	69.9	<.001	24.0	67.0	<.001	16.3	73.1	<.001
	Easy to remove (% agree)	87.2	77.3	<.001	87.2	73.8	<.001	87.2	81.3	.015
	Easy to see (% agree)	50.1	27.5	<.001	54.2	17.9	<.001	45.6	38.1	.02
	Feels claustrophobic (% agree)	33.3	28.3	.015	32.0	32.3	.983	34.7	23.9	<.001
	Feels too warm (% agree)	67.6	46.4	<.001	66.5	52.9	<.001	68.8	39.3	<.001
	Interferes with work (% agree)	28.1	50.4	<.001	31.1	61.1	<.001	24.8	38.8	<.001
	Lightweight (% agree)	91.6	33.0	<.001	93.5	20.9	<.001	89.6	46.2	<.001
	Minimal adjustment after putting it on (% agree)	52.1	43.8	<.001	52.9	34.1	<.001	51.2	54.4	.34
	Skin irritation or itching (% agree)	46.2	31.5	<.001	56.2	40.2	<.001	35.1	22.0	<.001
Communication	Can hear others (% agree)	61.6	25.3	<.001	58.4	13.3	<.001	65.1	38.3	<.001
	Others can hear me clearly (% agree)	17.1	16.2	.596	19.9	10.9	<.001	14.1	21.9	.002
Safety	Feels protective (% agree)	69.9	70.6	.762	71.5	65.7	.049	68.2	76.0	.008
	Protects others (% agree)	87.1	78.5	<.001	86.3	74.1	<.001	88.0	83.2	.038
	Change or disinfect after each use (% yes)	37.0	59.5	<.001	39.1	64.4	<.001	34.7	54.2	<.001
	Touching face in 4-hour period (% more than 5 times)	40.0	25.6	<.001	38.4	28.1	<.001	41.8	22.8	<.001

(179/548) reported that face masks interfere with their work compared to 26% (147/548) for face shields ( $P = .034$ ).

Clinical workers found face masks significantly more comfortable than face shields (32.7% vs 23.5%), though there was no difference for nonclinical workers. Both groups reported that breathing is easier with face shields (69.9% vs 20.3%). Both groups also felt that face masks were easier to remove (87.2% vs 77.3%) and provided better visual clarity (50.1% vs 27.5%) than face shields. Nonclinical workers felt more claustrophobic while wearing face masks compared to face shields (34.7% vs 23.9%) but the difference was not significant for clinical workers. Both groups reported feeling too warm more commonly while wearing face masks compared to face shields (67.6% vs 46.4%). Face masks were better in terms of less work interference (28.1% vs 50.4%) and were much lighter than face shields (91.6% vs 33.0%) for both groups. Device-related skin irritation or itching was attributed to face masks more than face shields in both groups (46.2% vs 31.5%).

Regarding communication, both clinical and nonclinical employees found hearing others easier while wearing face masks in comparison to face shields (61.6% vs 25.3%). Clinical workers feel that others can hear them more clearly while wearing face masks rather than face shields (19.9% vs 10.9%) and nonclinical workers reported that face shields were better (21.9% vs 14.1%); however, both devices were felt to be limiting in that regard. By a small but statistically significant margin, clinical workers found masks to feel more protective (71.5% vs 65.7%), while nonclinical workers felt face shields were more protective than face masks (76.0% vs 68.2%). Respondents, in general, reported that face masks were more likely to protect others when compared to face shields (87.1% vs 78.5%). Both clinical and nonclinical workers reported that they change or disinfect their face shield after each use more than for face masks (59.5% vs 37.0%). They also reported that they touched their face in a 4-hour time period more often with face masks when compared to face shields (40.0% vs 25.6%).

When respondents were asked which face covering they prefer, clinical workers preferred face masks (35.7%) over face shields (25%), as compared to nonclinical workers who preferred face shields (39.2%) to neither face mask nor face shield (25.4%;  $P < .001$ ) (Table 1).

## DISCUSSION

The COVID-19 pandemic continues to challenge health care executives, health care personnel, and policy makers. It strained the

capacity of hospitals and created shortages of PPE.<sup>7</sup> Nonetheless, employee wellbeing and safety remained a top priority.<sup>8</sup>

In this study, we evaluated employee perceptions of face masks and face shields regarding their comfort and acceptability. While face shields were reported to be better for breathing, cleanability, and prevention of face touching, face masks were found to be lighter and easier to wear especially among workers providing patient care. A combination of face masks and prescription glasses produced significant work interference, which was not true for face shields.

## CONCLUSIONS

Overall, face shields were found to be less comfortable to wear despite it being easier to breathe while wearing them. That is one of the reasons why clinical workers preferred to wear face masks rather than face shields. The degree of comfort might be related to the fact we issued industrial-grade shields to workers providing patient care, which are far heavier. In response, we are evaluating lighter models to improve comfort and tolerability. Re-assessment of PPE and worker perceptions will need to be performed as products evolve and transmission dynamics are better understood.

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