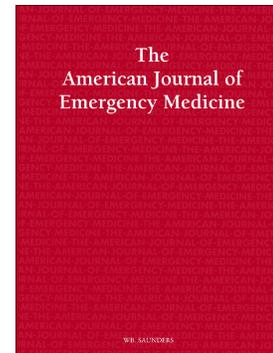


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Trends in emergency ophthalmic care during COVID-19: A comparative analysis

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TRENDS IN EMERGENCY OPHTHALMIC CARE DURING COVID-19: A COMPARATIVE ANALYSIS

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The COVID-19 pandemic has had a significant impact on the delivery of medical care in the United States. On March 18, 2020, the American Academy of Ophthalmology released a statement calling for ophthalmologists in the United States to discontinue any non-urgent care due to the pandemic.[1] At the same time, emergency

departments (ED) across the U.S. witnessed a marked decrease in patient visits for conditions unrelated to COVID-19.[2] However, the particular effect of the COVID-19 pandemic on the presentation of ophthalmic emergencies has not been specifically studied. In this manuscript, we report trends in patient demographics and diagnoses to an ophthalmology ED during the COVID-19 pandemic compared to the same time period in the prior year.

This study was approved by the *** Institutional Review Board, adhered to the tenets of the Declaration of Helsinki, and was performed in accordance with the Health Insurance Portability and Accountability Act of 1996. A retrospective review of the medical records of all patients who presented to the ** ED from March 4, 2020 through May 17, 2020 and March 4, 2019 through May 17, 2019 was performed. The study period was designed to represent the dates during which outpatient clinics were closed due to COVID-19 (March 18, 2020 through May 3, 2020) while capturing a two week 'buffer' period before and after the closure to account for differences not completely temporally related to the shut down. Demographic and encounter data were collected. Demographic data included date of visit, age, sex, ethnicity, primary language, and zip code. Zip codes were used to estimate median household income using data from 2018 American Community Survey 5-Year Estimates.[3] Encounter data included insurance payer, diagnosis, and follow-up course. Student's t-test and Pearson chi square analysis were used for comparative analysis. All statistical analyses were conducted using StataIC 15.1 (StataCorp LLC, College Station, Texas, USA). A p -value <0.05 was considered statistically significant.

A total of 10,490 patients presented to the eye ED during the study period. The age, sex, ethnicity, and primary language are reported in Table 1. There was a 16.8% decrease in patient volume comparing 2020 (n=6,127) to 2019 (n=4,363). There was no significant age difference between the cohorts (p=.096). The proportion of females presenting was significantly lower in 2020 (n=2,121, 48.6%) compared to 2019 (n=3,175, 51.8%; p=.001). Additionally, there were significantly fewer Hispanic patients in 2020 (n=2,545, 59.4%) compared to 2019 (n=3,702, 61.3%; p=.049). Furthermore, a lower proportion of non-English speakers presented to the ED during 2020 (n=1654, 38.1%) compared to 2019 (n=2,589, 42.5%; p<.001). The mean household income was significantly higher in 2020 (\$72,753) compared to 2019 (\$39,040; p<.001). There was no statistically significant difference in insurance payers (p=.228) between cohorts.

Trauma as a percentage of presenting diagnoses was higher in 2020 (16.2%) compared to 2019 (12.8%; p<.001). Overall, the proportion of retina diagnoses, including posterior vitreous detachment, epiretinal membrane, and retinal detachment, in each cohort was also higher in 2020 (16.8%) compared to 2019 (14.8%; p=.005). However, there was a significant drop in the percentage of anterior segment diagnoses in 2020 (39.0%) compared to 2019 (42%; p=.002). A summary of proportion differences for all diagnoses can be found in Figure 1. Lastly, a lower proportion of patients completed follow up during the recommended time frame by the physician in 2020 compared to 2019 (30.2% vs 38.5%; p<.001) (Figure 2).

EDs across the world saw a drop in utilization during the early months of 2020.[4,5] In the US, CDC data reported a 42% decrease in overall ED utilization, with females demonstrating a steeper decline in ED visits and Hispanic and Black patients

reporting increased avoidance of urgent or emergent care.[2,6] Decreased access to medical services for racial minorities and women during the COVID-19 pandemic has been previously documented in other specialties.[7,8] Our study identifies similar trends within ophthalmology with disproportionate percentages of women, Hispanics, and low-income individuals presenting to the eye ED across time periods. The reasons for these findings are likely multifactorial and may include lack of access to care in lower income communities, distrust in the medical establishment, and more conservative behavior during the pandemic.

Clinically, the pandemic significantly impacted the presenting diagnoses to our ED. The proportion of trauma and retina diagnoses increased while anterior segment diagnoses decreased. The increase in the proportion of trauma diagnoses and retinal diagnoses may be due to the acute and potentially blinding nature of these conditions. These findings are supported by a prior study examining emergent ophthalmic surgery during the COVID-19 pandemic, which also demonstrated a significant increase in the proportion of retinal detachment repairs and trauma-related surgical cases during COVID-19.[9] Furthermore, the proportion of patients completing follow-up was lower during the COVID-19 pandemic. The reasons behind the decrease may be related to patient hesitation to return to a medical center during the pandemic after an initial ED visit.[10] Decreased follow-up may also be explained by peak unemployment levels at the start of the lockdown period (14.8% in April 2020) and subsequent loss of insurance coverage, with women and ethnic minorities being most affected.[11] Finally, our study showed that patient income was dramatically higher in 2020 compared to 2019. Several studies have demonstrated the disproportionate effect of the COVID-19 pandemic on

lower-income individuals, with lower-income individuals more likely to have been economically impacted by the pandemic and therefore have limited access to care.

[12,13,14]

This study is limited by the retrospective nature of chart reviews. Income data was extrapolated from aggregated data rather than individual household income reported by the patient. Nevertheless, the present work offers important insights into the demographic and clinical makeup of patients presenting to our ED.

In conclusion, the present study highlights a demographic shift in the population of patients presenting to our ophthalmology ED during the COVID-19 pandemic. Further studies should be performed to understand the social and economic barriers faced by women, Hispanic, and lower-income individuals, especially as trickle-down effects of the COVID-19 pandemic continue to emerge.

Legends:

Table 1. Study Population Demographics During 2020 COVID-19 Shut-down Period Compared to Same Time Period in 2019.

Figure 1. Diagnosis as a Proportion During 2020 COVID-19 Shut-down Period Compared to Same Time Period in 2019.

Figure 2. Follow-Up Course During 2020 COVID-19 Shut-down Period Compared to Same Time Period in 2019.

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	2020 (n=4363) ^a	2019 (n=6127) ^b	Overall (n=10490)
Age (mean years)	51.0	50.4	50.7
Sex			
Female	2121 (48.6%)	3175 (51.8%)	5296 (50.5%)
Male	2242 (51.4%)	2952 (48.1%)	5194 (49.5%)
Ethnicity			
Hispanic	2545 (59.4%)	3702 (61.3%)	6247 (59.6%)
Non-Hispanic	1739 (40.6%)	2334 (38.7%)	4073 (38.9%)
Language			
English	2689 (61.9%)	3508 (57.5%)	6197 (59.1%)
Non-English	1654 (38.1%)	2589 (42.5%)	4243 (40.4%)

- a. Includes all patients who presented to the Bascom Palmer Eye Emergency Department from March 4, 2020 – May 17, 2020.
- b. Includes all patients who presented to the Bascom Palmer Eye Emergency Department from March 4, 2019 – May 17, 2019.