Clinical Experience of an American Academic Ophthalmology Department During the COVID-19 Pandemic

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Background and Objectives: To describe the experience of a large American academic ophthalmology department from the start of the COVID-19 pandemic to the early recovery phase in Summer 2020. **Methods:** Retrospective review; description of approaches taken by our academic medical center and department regarding supply chain issues, protection of doctors and staff, elimination of nonurgent care, calls for staff and faculty deployment, and reopening. Comparison of surgical and clinic volumes in suburban locations versus the main campus; analysis of volumes compared with pre-pandemic periods. **Results:** At our medical center, screening and precautions (such as the mask policy) continued to evolve from March through August 2020. Ophthalmologists were not allowed to use N95 respirators except in rare circumstances. Surgical and clinic volume dropped at both urban and suburban locations, but surgery rebounded more quickly at suburban surgery centers once elective procedures resumed. Mandates from administration were not always attainable. **Conclusions:** During respiratory pandemics such as COVID-19, medical centers should adopt protective measures that are consistent across inpatient and outpatient sectors and consistent with other institutions. Our department's large presence outside the urban center where the main hospital is located allowed faster return of clinical care overall. In the event of another pandemic, a central budget rather than individual divisional budgets should be used for purchase of protective equipment for health care workers of an academic center. Because outpatient care provides important continuity of care and keeps patients away from emergency departments and hospitals, perhaps outpatient care does not have to be curtailed to the extent it was in Spring-Summer 2020, provided that outpatient health care workers have sufficient staff and equipment and the above measures are in place.

Key words: academic medicine, academic ophthalmology, COVID-19, ophthalmology, outpatient care, pandemic response

On January 4, 2020, the World Health Organization reported a cluster of pneumonia cases in the city of Wuhan, Hubei province, China, following an alert that ophthalmologist Dr Wenliang Li sent to the government on December 30, 2019. Despite these warnings, within 3 months there was a sharp increase in the number of cases of novel coronavirus 2019 disease (COVID-19) in the United States from only 8 cases on February 1, 2020, to 30 cases a month later, to 10 422 cases by March 18, 2020. Approaches to the pandemic varied across the globe,[1-5] from aggressive testing, screening, and masking and social distancing mandates in several Asian countries[1] to lack of mask mandates in 16 of 50 states in the United States as late as August 17, 2020.[2]

Approaches in the United States even varied by jurisdiction. The San Francisco Bay Area's "shelter-in-place" order effective March 16, 2020, may have been among the first and most stringent, more so than "safe at home" or "stay at home"[6] or "healthy at home."[7] From the start, strategies adopted by medical centers in the United States were not as divergent and became more uniform over time. In March and April 2020, leaders of US medical centers stressed conserving personal protective equipment (PPE) for intensive care unit (ICU) and emergency department (ED) workers, developing ways to circumvent supply chain issues, and eliminating nonurgent care and elective procedures so as to limit exposure of patients, staff, and doctors—to "flatten the curve."

In the United States, ophthalmology experienced the largest decrease in outpatient visits of all specialties.[8] Moreover, ophthalmologists may be at an increased risk for becoming infected.[9-11] A recent survey to which 91 New York City residency program directors responded regarding how many of their residents had become infected with COVID-19 found that trainees in anesthesiology, emergency medicine, and ophthalmology were at an increased risk.[12]

METHODS

On March 18, 2020, the day that more than 10 000 cases were confirmed in the United States, the American Academy of Ophthalmology (AAO) issued the following statement: "Due to the COVID-19 pandemic, the [AAO] now finds it essential that all ophthalmologists cease providing any treatment other than urgent

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or emergent care immediately .... All other factors—business, finance, inconvenience, etc.—are remotely secondary. This is an existential crisis."[13] For the first time in its 124-year history, the AAO called for all US ophthalmologists to provide only care that they deemed urgent or emergent. March 18 also marked the date of the first COVID-19 fatality in Maryland.

We describe the experience of a large US academic ophthalmology department with an urban base at the main university hospital and suburban ambulatory surgery centers (ASCs) and satellite offices. We describe the department response to directives regarding PPE use and curtailment of clinical activity; response to supply chain shortages and calls for staff and physician deployment; preparation for reopening; and lessons learned.

RESULTS

The Wilmer Eye Institute, Department of Ophthalmology, Johns Hopkins University School of Medicine, has its base at the main university hospital (The Johns Hopkins Hospital) in the city of Baltimore, Maryland, and has 8 suburban satellite offices, some 50 miles away from the city. Visits to satellites have grown over the years.[14,15] In fiscal year 2019, satellites accounted for 60% of the department's 300 000 outpatient visits.

Clinical operations

On March 5, 2020, the governor of Maryland issued a "Declaration of State of Emergency and Existence of Catastrophic Health Emergency."[16] Starting on March 12, all Johns Hopkins Medicine (JHM) patients had to be screened for travel; through the present day (Spring 2021), the patients are asked to attend appointments alone unless they require a caregiver, and they cannot enter most JHM clinics without an appointment.

Ophthalmology division and satellite chiefs had daily conference calls to discuss updates from Hospital Epidemiology and Infection Control (HEIC). Two days following report of the first confirmed COVID-19 case in Baltimore, the JHM leaders mandated systemwide cancellation and postponement of elective surgical procedures, effective March 18 through April 3, 2020. This cancellation affected 770 cases of Wilmer surgeons. The JHM leaders requested that no new elective cases be scheduled. Schedulers, therefore, rescheduled surgical patients for more than 90 days into the future, which was repeated every 2 weeks through late-May as HEIC and JHM monitored COVID-19 admissions and inpatients, bed and ventilator availability, and positivity rates.

On March 16, 2020, the JHM also mandated that all elective outpatient visits be postponed through early April; the AAO issued its statement a few days later. Ophthalmologists and optometrists were asked to review patient rosters for the upcoming 2 weeks. The default at one large satellite was to cancel all patients unless doctors specified differently. The default at other satellites was to keep all scheduled patients unless otherwise specified. Some doctors cancelled all diabetic eye examinations; others did not. Whereas in some clinics, doctors worked only if they were "on call" to triage and to see urgent/emergent cases for the day, at the author's satellite, ophthalmologists with subspecialty training worked 2 to 3 days a week, seeing patients at 30-minute intervals, and the optometrists worked 1 day a week, seeing patients hourly. Therefore, depending on the size and clinic coverage arrangements, through late June 2020, doctors in the ophthalmology department might work a few days a week to once every few weeks. In other words, patient volume per doctor during the first 3 months of the pandemic varied widely. Patients stayed in examination rooms while dilating. To prevent long checkout lines, the patients were instructed to call the call center for appointments for more than 3 months in the future.

Similar to findings of a recent survey of how private and academic US ophthalmology practices responded to scripted phone calls describing symptoms or requests for ophthalmic care,[17] triage of patients with symptoms of posterior vitreous detachment was an issue. Symptoms are indistinguishable from those of a retinal tear or detachment, which can be complications of posterior vitreous detachment. The retina division chief reported that several divisions/satellites directed such patients to his division at the main campus, which did not happen pre-pandemic. In the published survey, a statistically significant higher proportion of private practices offered to schedule a patient with posterior vitreous detachment symptoms compared with university centers ($P = .01$).[17]

Ophthalmology clinics were encouraged to rotate front desk staff, technicians, and doctors to reduce the number of people in clinic. Department employees without direct patient care responsibilities (eg, the call center whose 40+ agents make appointments for all of Wilmer, centralized surgical scheduling staff, administrative assistants, the chief executive officer, the chief finance officer, and administrators in human resources, finance, philanthropy, and some clinical operations) worked from home starting in March 2020; most still do at the present time (Spring 2021). Despite low clinic volumes in Spring 2020, ophthalmology administrators required all clinics to stay open from 7:30 to 5 PM each day, 5 days a week. Visual field testing for glaucoma was halted for a few weeks until cleaning methods were clarified. The resident clinic at the main hospital housed a negative pressure room where patients with or under investigation for COVID-19 could be examined for urgent/emergent ophthalmic issues.

On March 31, 2020, following involuntary deployment of internal medicine subspecialists such as endocrinologists to inpatient units while hospitalists were deployed to the ICU and ED, the JHM leaders asked other departments to prepare faculty for deployment (Table). Most ophthalmologists were volunteered for positions of patient transport and ED screener; however, no one in the department was deployed.

Table. Deployment Chart of Job Roles and Descriptions

Job Role	Intensivist	Junior Intensivist	ICU Bedside Clinician	Floor Attending	Floor Clinician	General Medicine Consult	Proceduralist	In-house Transport (Lifeline)	ED Provider (Urgent Care)	ED Provider (Screen)	COVID Ambulatory Resource Team—in Person and Virtual
Provider pool	Attendings, fellows	Fellows, senior ICU-advanced practice providers (APP), senior surgical residents, PGY4 anesthesia resident, IM senior residents	Internal medicine residents and interns, ICU/IMC (APP), junior surgical resident, PGY2/3 anesthesia resident, senior residents from disciplines other than noted previously.	Board eligible in medicine, hospitalists, non-ICU attending physicians, non-ICU fellows	Attendings/ fellows, residents, ambulatory APP, inpatient APP	Hospitalists, internal medicine residents, senior APP w/medicine background	Surgical residents, interventional radiology, procedure team, APP	Surgical/medical residents, NP/PA/CRNA/CNM/ CNS, paramedic/ EMT, RN	Attendings/fellow residents, inpatient/ ambulatory with urgent/primary care experience (APP)	Attendings/fellow Residents, ambulatory advanced practice providers (APP), inpatient APP	Attending physicians, nurse practitioner, physician assistant, attending/fellow staff with medicine/urgent care/primary care background
Deployment (COVID and non-COVID)	ICU/IMC	ICU/IMC	ICU/IMC	IMC/floor	Floor	Units caring for non-COVID medicine patients	Hospital-wide	Hospital-wide	Emergency department	Emergency department	Bayview Ambulatory Center
Job description	Provides independent oversight of teams caring for 12-24 patients	Provides critical care with indirect supervision from intensivist. Able to oversee bedside clinician and delegate tasks. Reports to intensivists	Provides medical care to intensive care–level patients with direct or indirect supervision. Reports to junior intensivists or attending	Able to oversee the care of non-ICU level general medical and surgical patients with or without consultation by internal medicine or other specialty services	Provides daily evaluation and management to medical and surgical patients with indirect supervision. Reports to floor attending	Consultative service to provide medical guidance for management of non-ICU medical patients	Consultative service for procedures at request of team(s)	Partners with lifeline/ED/ICU staff in the transport of acute and/or critically ill patients	Owns/partners in outpatient urgent care assessment and management and disposition of non–acute care needs	Screening and initial assessment of ILI patients; disposition to ED or home with f/u	Provides follow-up evaluation and primary care to Covid-positive patients recovering at home; site is ambulatory center with chest radiography and laboratory facilities. Consult services available for additional primary care concerns (eg, urology, ortho, neurology).
Skills	Lead a team of individuals providing care to patients requiring management of advanced oxygen therapy (HFNC); ventilators (ARDS, proning, sedation, and paralytic use); hemodynamic support (vasopressors)	Management of advanced oxygen therapy (HFNC); ventilators (ARDS, proning, sedation, and, paralytic use); hemodynamic support (vasopressors); E&M of patient's hemodynamic, laboratory test results, radiology results, adjusting care plan as indicated; placing orders	Assessment of patients; placing orders; monitoring of hemodynamics, laboratory test results, radiology results; discharge planning; general documentation and reporting	Management of teams caring for non-ICU patients; referrals; discharge planning	Assessment of patients; placing orders; monitoring of hemodynamics, laboratory test results, radiology results; communication with patients/ families; discharge planning	Knowledge base in general medicine sufficient to provide recommendations for general plan of care	Independent operator for central lines, arterial lines; additional procedures (PICC, CT/pigtail placement or removal) TBD	Ability to physically transport patient on stretcher with multiple IV poles/machinery between areas of hospital. Ability to read ECG/Monitoring tracings preferred but not required	Prior practice in assessment, evaluation, management, and disposition with primary care/urgent care patients	Experience with urgent/primary care practice; comfort with urgent care assessment; experience in medicine/urgent/ primary care practice; comfort with urgent care assessment and management of primary care concerns. Independent	Experience in medicine/urgent/primary care practice; comfort with urgent care assessment; and management of primary care concerns. Independent decision making with remote attending consultation

Abbreviations: ARDS, acute respiratory distress syndrome; CART, COVID-19 ambulatory response team; ED, emergency department; E&M, evaluation and management; f/u, follow up; ICU, intensive care unit; ILI, influenza like illness; IMC, intermediate medical care; IV, intravenous; PICC, peripherally inserted central catheter; TBD, to be determined.

Protection and screening at clinics

As a surge of patients with COVID-19 was anticipated and predictably occurred in Spring 2020, the emphasis at the JHM always was to ration PPE. Wearing masks or shields at ambulatory care sites was not recommended until March 31, 2020, when both became recommended for patient-facing clinicians. According to the HEIC, "The purpose of face shields is to protect the face from viral aerosolization and to protect the integrity of the surgical mask which we're expected to reuse." Outpatient faculty and staff were reminded many times not to wear N95 respirators so as to conserve them for ED and ICU workers. Breath shields were placed on slit lamps in clinics in the second half of March 2020; barriers or shields were required for all staff in April. The HEIC recommended "that once the face shield goes on, it's best to keep it on throughout the day" or else it had to be cleaned with sanitizer or soap and water. It was difficult to heed this advice at the slit lamp or when performing indirect ophthalmoscopy. Goggles, while recommended abroad during SARS and COVID-19,[18] were rarely used at our institution; "not having a face shield compromises the [surgical] mask. Thus, the goggle user must change their mask between every patient," per the HEIC. From April 1 through June 30, 2020, a centralized JHM budget covered the cost of masks, disinfectant wipes, slit-lamp shields, and front desk counter barriers. After this budget was terminated, each ophthalmology division/satellite paid these expenses.

Masking requirements for clinicians, staff, and patients changed through the pandemic without announcement or explanation and were not uniform among the 3 populations. Cloth masks purchased by the JHM in March for staff and clinicians were deemed inadequate in early April, when surgical masks became mandated for all clinicians and staff. Face coverings became required of the JHM patients as of April 7, 2020. All types (including neck gaiters, bandanas, scarves, and masks with exhalation valve) were accepted for the patients. According to ambulatory care leaders, "Masks with exhalation valve [are] no worse than bandanas." However, in late August, an email included the statement that valved N95s, gaiters, bandanas, and scarves were deemed "unsuitable face coverings," for which entrance screeners would give a loose-fitting disposable mask.

The screening protocol at the JHM building entrances, mostly staffed by clinic administrators, front desk clinic workers, technicians, and medical assistants on a voluntary basis, also changed through the pandemic. As a result of adoption of universal masking on April 7, 2020, the leaders halted infrared temperature checks at outpatient building entrances. They provided 3 reasons: (1) patients could be using antipyretics, (2) a percentage of patients with COVID-19 had no fever; therefore, temperature checks were not "sensitive" to detect infection, and (3) screeners feared contracting infection from performing temperature checks. Staff had the prerogative to direct patients back to their car if they arrived too early and there was no room availability.

In late April 2020, the JHM Occupational Health Services announced that it had contracted with a vendor to provide a mobile phone–based application to assist the JHM employees with remote monitoring and timely notification for COVID-19 symptoms. Employee uptake was limited because of concerns about privacy and its legitimacy. Beginning Summer 2020, the JHM employees had to complete daily screening questions about COVID-19 when they logged into workstations.

Finances

As the pandemic continued into Spring 2020, some staff including ophthalmic surgical technicians, librarian, and ophthalmic technicians were furloughed a day a week or more, lasting a few weeks to months. For these furloughs, such individuals were encouraged to utilize accumulated "paid time-off", time that nonfaculty accrue each pay period and can combine with vacation time or medical leave. The expectation was that when clinics and surgery centers reopened, vacation or paid time-off would be discouraged to work through an anticipated backlog of patients under new, untested circumstances.

Although no one in the ophthalmology department was laid off during the first 3 months of the pandemic, on April 22, 2020, the president of Johns Hopkins University (JHU) delivered news that furloughs and layoffs throughout the JHU were "regrettably expected to be necessary." The JHU would "suspend retirement contributions to ... retirement accounts ... in this time of unprecedented financial pressures" from July 1, 2020, through June 30, 2021. Base salaries for all employees (including faculty) would be frozen at the previous year levels. Distribution of faculty clinical supplements (incorrectly referred to as "bonuses" perhaps because they are productivity-based) for work performed prior to the pandemic would be suspended. The president and the provost vowed to take a 20% salary reduction for the coming fiscal year July 1, 2020, through June 30, 2021; deans and university officers would take a 10% reduction. The disposition of their salaries in the fiscal year that ended June 2020 was unclear.

All nonessential international and domestic university-sponsored travel was suspended except for time-critical research, clinical care delivery, and/or clinical trials as determined by the dean or his or her designee. Personal travel was strongly discouraged "and may be prohibited for certain employees (e.g., the health care workforce)." The JHU leaders also announced that capital projects of more than $100 000 would be halted except for "projects that address critical safety or systems issues, meet an urgent strategic need," (eg, COVID-19), "or are largely supported by donor and/or sponsored funds." With the same exceptions, a hiring freeze would also be in effect.

As a result of seeing patients with only emergent or urgent status, ophthalmology clinic volume at the main campus, suburban satellite clinics, and the overall

department showed the largest same-month decline in April 2020. Volume dropped by 82% overall compared with 2019, with a 77% drop in ophthalmology clinics at the main campus in Baltimore city and an 85% drop at satellite clinics. May 2020 showed similar declines. The Retina division, the largest subspecialty division, remained the busiest, declining by 65% in clinic volume over prior year to date for the hardest-hit months of April and May 2020, whereas other divisions and satellites decreased by 75% to 95%.

Ophthalmology administrators strongly encouraged doctors to conduct "telemedicine visits" as the Centers for Medicare & Medicaid Services relaxed platform requirements and increased reimbursement for such visits.[19] Telemedicine visits comprised fewer than 2% of all pre-pandemic ophthalmology visits and fewer than 10% from mid-March through end-May.

Reopening of state, the JHM, ASCs, and outpatient clinics

On May 6, 2020, Maryland state announced that schools would be closed for the rest of the academic year although outdoor activities such as tennis and golf could resume. The state allowed resumption of elective procedures and appointments effective May 7 at the discretion of local hospitals and health care providers, provided all of certain measures were in place, including that "licensed healthcare providers shall exercise their independent professional judgment in determining what procedures are appropriate to perform, which appointments should occur, and which patients to see ...," and at least 1 week's supply of PPE for providers, staff, and, as appropriate, patients was in place.[20] However, because COVID-19 statistics had not stabilized over the prior 2-week period at the main hospital, the JHM along with Baltimore City continued the moratorium on elective procedures. This moratorium superseded the decisions of counties where ASCs and satellites are located. Surgery at Hopkins ASCs resumed mid-May and at the main hospital in mid-June. Patients were required to obtain nasopharyngeal polymerase chain reaction testing for SARS-CoV-2 (preferably at the JHM) within 72 hours of surgery or be cancelled.

In the first 2 weeks of reopening ASCs, nursing management mandated 45-minute room turnover time between cases, which reduced case volume by more than 50%. After 2 weeks of observation, turnover time was reduced to 30 minutes and then 10 minutes in September 2020. Within the first few weeks of reopening, ophthalmology surpassed other specialties in JHM ASC volumes. In our department, the ASC volume usually accounts for about 50% to 55% of total surgical volume, which increased to 68% with reopening in June 2020. Compared with the main hospital, surgical volumes at ASCs (all in suburbs) showed a bigger drop during the first months of the pandemic but faster recovery with reopening.

Resumption of nonsurgical outpatient clinical care followed a different timeline. On May 15, the JHM announced that a "COVID Safety Auditor" would be required in all clinics. Responsibilities would include monitoring physical distance and mask and shield usage, traffic flow, answering questions, and screening (as needed). The officer would round 4 times a day, provide a written assessment each time, and be held to maintaining compliance or else "concerns will be escalated to leadership and no longer remain a local issue," wrote one ophthalmology administrator. The following were other guidelines for ophthalmology:

- Target 50% of pre-pandemic clinic volume
- Not allow overbooking or more than 1 patient waiting for each doctor
- Continue to meet the ophthalmology department mandate of offering a few slots for patients requesting same-day availability
- Practice social distancing in the waiting room and the clinic
- Stagger doctors' clinics and work hours if possible; reduce patient and testing volume with physician cooperation
- Minimize handling of paperwork and transactions
- Conduct pre-visit phone interviews by technicians 24 to 48 hours prior to patient arrival

Maryland state allowed all Hopkins outpatient clinics to open on May 27. By late August 2020, when our department was close to 80% of pre-pandemic volume, safety rounds had decreased to twice a day and to once a day by March 2021. Appointments were double-booked in some clinics in September. No cluster of cases occurred in any ophthalmology clinic.

DISCUSSION

COVID-19 has challenged the American health care system and revealed strengths and weaknesses. As ophthalmology is primarily an outpatient specialty, this overview provides insight into ambulatory care at one academic center during the first 6 months of the pandemic. Certain responses could be improved in the future. Without a federal mandate, protective measures should be clearly communicated and consistent across a medical center. Moreover, purchase of supplies and protective equipment for staff and doctors should be centralized and not be purchased at the individual division or satellite level. Our department's large network of satellite offices and ASCs (all in suburban locations) allowed return to approximately 80% of pre-pandemic clinic and surgical volume relatively quickly after reopening. Because care at outpatient clinics keeps patients away from ERs, perhaps outpatient ophthalmic care does not have to be as drastically curtailed if another pandemic occurs. However, this suggestion is predicated on clear communication, consistent policies regarding employees and patients, and sufficient PPE and supplies at outpatient facilities. Cross-training and strategic deployment of employees would lessen financial pressures. Academic center leaders should also examine how to make the work and exposure burden more equitable among fully salaried staff and clinicians.

In contrast to the United States, which continues to lack a federal mask mandate, starting on February 6, 2020, the general public in Taiwan was allowed to purchase 2 surgical masks every 7 days at the cost of NT $5 (US $0.17), the allowances of which increased to 9 surgical masks for adults or 10 masks for children every 14 days in April.[21] Whereas the type of masks deemed appropriate for the JHM staff, doctors, and patients changed with little warning the first 5 months of the pandemic and masks were expected to be reused, Taiwan was able to donate 24 million surgical masks in April 2020 to the United States, Europe, Africa, Australia, and other parts of Asia.[22,23] It is unclear why American medical centers did not adopt a uniform, universal policy. At Mass General Brigham, universal masking was associated with a significantly lower rate of SARS-CoV-2 positivity among health care workers.[24] Surgical masks were required of all Mass General Brigham clinical employees starting March 25, 2020, and of all patients and visitors starting April 6. Mass General Brigham strictly banned "non-hospital–approved face masks."[25] The University of California, San Francisco, adopted universal masking of employees and patients by the end of March 2020, with patients given a surgical mask at building entrances as of March 29, 2020.[26] Perhaps regional supply chain differences can explain why the JHM adopted "suitable" universal masking only in late August 2020. *Through the present day (Spring 2021)*, ophthalmologists and other JHM doctors and staff are actively discouraged from wearing N95s although private practice counterparts wear them and ophthalmologists are at increased risk of contracting SARS-CoV-2.[9-11,12] Directors of 91 New York City residency programs (encompassing 99.2% of the resident physicians) reported reuse or extended mask use by residents during the height of the pandemic when the city was considered the US epicenter; residents in 43 programs, encompassing 60.4% of residents, felt that PPE was suboptimal.[12]

Surgical and procedural specialties such as ophthalmology were disproportionately affected by the pandemic.[27] In April, our department's percent decline in surgery was larger for (suburban) ASCs than for main campus–operating rooms because emergent cases continued at the latter. However, with reopening, satellite clinics and ASCs recovered faster because COVID-19 statistics hampered reopening of the main campus. Thus, a suburban presence allowed our department to attain 80% of pre-pandemic volume by August 2020.

Our department administrators targeted achieving 50% of pre-pandemic volume at the time of reopening and 100% by October. For reopening, they had proposed extended work hours from 7:30 AM to 5:30 PM and Saturday clinics. However, without overtime pay, such plans would require staggered work hours, which is possible only in clinics with many doctors and staff. Even with a smooth reopening, clinician and staff attrition in the presence of a hiring freeze hinders return to pre-pandemic clinic volumes for some divisions/satellites. In the near future, administrators should examine employee functions and effort and cross-train "nonessential" employees in preparation for strategic deployment rather than rely on voluntarism.

Despite pushing by administrators, long-term telemedicine uptake in ophthalmology is unclear. It is not conducive to some conditions and complaints.[17] At times during the pandemic, expectations of non–patient-facing administrators were not in keeping with clinical operations. The leader of one large academic ophthalmology department in New York City stated that he and other senior management went into the hospital in person every day: "If the hospital and department leaders are doing Zoom calls from home, that doesn't engender a lot of confidence .... (W)e managed the hospital and clinics by walking around and being available."[28] Several studies indicate that the relative frequency of various ophthalmic conditions changed during the shutdown. In a retrospective Italian study, "undeferrable urgent visits" significantly increased—diagnoses that included herpetic keratitis, acute angle closure glaucoma, trauma, uveitis, retinal vein occlusion, retinal tear, and endophthalmitis—all of which cause vision loss and could prompt an ED visit.[29] A UK study found an increase in proportion of macula-off retinal detachments compared with the same time period in 2019,[30] implying that COVID-19 induced "additional pressures on eye emergency departments ... due to complications and associated morbidity from delayed presentations."[29]

For Hopkins faculty, particularly in surgical subspecialties such as ophthalmology, the clinical supplements raise compensation to the 25th to 50th percentile of Association of American Medical Colleges compensation for faculty members in the Southeastern region of the United States. After much heated discussion, half-yearly clinical supplements normally distributed in April were distributed to ophthalmology faculty 6 months later—disrupting the compensation stream for some faculty—in October 2020 for work done July through December 2019. The president of JHU announced resumption of retirement fund contributions in March 2021.

CONCLUSIONS

The ASC and satellite presence in suburban locations allowed faster resumption of patient care at our large academic department. Without a federal response, it is imperative that clear communication, universal policies regarding screening and protection, and adequate PPE be offered for workers in both inpatient and outpatient settings. While voluntarism is laudable, strategic deployment of cross-trained employees should be considered in future shutdowns in order to fill essential duties and to preserve jobs when revenue stream from clinical care is reduced. It is not clear whether the work or exposure burden during this pandemic was equitably shared among fully salaried staff, administrators, and clinicians. While ophthalmology administrators were not entrenched in

clinics even in the pre-pandemic era, it was clear that some mandates and proposals during the pandemic (such as extended hours) were not based on real-time clinical operations. At medical centers, centralized provision of PPE and supplies is preferable to decentralized purchase by departments that then pass the responsibility to divisions and satellites. In the event of a future pandemic, with sound policies, sufficient personnel, and protective equipment, continuation of outpatient ophthalmic care would help patients so that they do not develop complications and morbidity from delayed presentations[28,29] and would maintain department solvency.

REFERENCES

1. An BY, Tang S-Y. Lessons from COVID-19 responses in East Asia: institutional infrastructure and enduring policy instruments. *Am Rev Public Adm*. 2020;50(6):790-800.
2. Kim A, Andrew S, Froio J. These are the states requiring people to wear masks when out in public. https://www.cnn.com/2020/06/19/us/states-face-mask-coronavirus-trnd/index.html. Published August 17, 2020. Accessed March 31, 2021.
3. Wang CJ, Ng CY, Brook RH. Response to COVID-19 in Taiwan: big data analytics, new technology, and proactive testing. *JAMA*. 2020;323(14):1341-1342.
4. Paul M, Raymond Z, Aaron K. In coronavirus fight, China gives citizens a color code, with red flags. https://www.nytimes.com/2020/03/01/business/china-coronavirus-surveillance.html. Published March 1, 2020. Accessed March 31, 2021.
5. Paterlini M. "Closing borders is ridiculous": the epidemiologist behind Sweden's controversial coronavirus strategy. https://www.nature.com/articles/d41586-020-01098-x. Published April 21, 2020. Accessed March 31, 2021.
6. Schwiegershausen E. Shelter-in-place and stay-at-home orders: what they mean. *New York Magazine*. https://www.thecut.com/article/what-does-shelter-in-place-mean.html. Published April 22, 2020. Accessed March 31, 2021.
7. Mervosh S, Lu D, Swales V. See which states and cities have told residents to stay at home. *New York Times*. https://www.nytimes.com/interactive/2020/us/coronavirus-stay-at-home-order.html. Published April 20, 2020. Accessed March 31, 2021.
8. Strata Decision Technology. Analysis: ophthalmology lost more patient volume due to COVID-19 than any other specialty. https://eyewire.news/articles/analysis-55-percent-fewer-americans-sought-hospital-care-in-march-april-due-to-covid-19/. Published May 11, 2020. Accessed March 31, 2021.
9. Reviglio VE, Osaba M, Reviglio V, Chiaradia P, Kuo IC, O'Brien TP. COVID-19 and ophthalmology: a new chapter in an old story. *Med Hypothesis Discov Innov Ophthalmol*. 2020;9(2):71-73.
10. Kuo IC, O'Brien TP. COVID-19 and ophthalmology: an underappreciated occupational hazard. *Infect Control Hosp Epidemiol*. 2020;41(10):1207-1208.
11. Kuo IC. A Rashomon moment? Ocular involvement and COVID-19. *Ophthalmology*. 2020;127(7):984-985.
12. Breazzano MP, Shen J, Abdelhakim AH, et al. Resident physician exposure to novel coronavirus (2019-nCoV, SARS-CoV-2) within New York City during exponential phase of COVID-19 pandemic: report of the New York City Residency Program Directors COVID-19 Research Group. *medRxiv*. 2020.04.23:20074310.
13. American Academy of Ophthalmology. Recommendations for urgent and nonurgent patient care. https://www.aao.org/headline/new-recommendations-urgent-nonurgent-patient-care. Published March 18, 2020. Accessed March 31, 2021.
14. Kuo IC. Satellite clinics in academic ophthalmology programs: an exploratory study of successes and challenges. *BMC Ophthalmol*. 2013;13(1):79.
15. Kuo IC, Wright SM. Impact of satellite practices on academic ophthalmology departments. *J Acad Ophthalmol*. 2017;09(1):e7-e12.
16. Hogan Jr LJ. State of Maryland proclamation: declaration of state of emergency and existence of a catastrophic health emergency—COVID-19. https://governor.maryland.gov/wp-content/uploads/2020/03/Proclamation-COVID-19.pdf. Published March 5, 2020. Accessed March 31, 2021.
17. Starr MR, Israilevich R, Zhitnitsky M, et al. Practice patterns and responsiveness to simulated common ocular complaints among US ophthalmology centers during the COVID-19 pandemic. *JAMA Ophthalmol*. 2020;138(9):981-988.
18. Loon SC, Teoh SC, Oon LL, et al. The severe acute respiratory syndrome coronavirus in tears. *Br J Ophthalmol*. 2004;88(7):861-863.
19. Centers for Medicare & Medicaid Services. Medicare telemedicine health care provider fact sheet. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-careprovider-fact-sheet. Published March 17, 2020. Accessed March 31, 2021.
20. Maryland Society of Anesthesiologists. Governor Hogan announces resumption of elective and non-urgent procedures and appointments beginning May 7th at 7:00 am. https://www.msahq.org/2020/05/06/governor-hogan-announces-resumption-of-elective-and-non-urgent-procedures-and-appointments-beginning-may-7th-at-700-am/. Published May 6, 2020. Accessed March 31, 2021.
21. Yi-Fong Su V, Yen YF, Yang KY, et al. Masks and medical care: two keys to Taiwan's success in preventing COVID-19 spread. *Travel Med Infect Dis*. 2020;38:101780.
22. *CORONAVIRUS/Taiwan to donate 7 million more masks to countries worldwide*. *Focus Taiwan: CNA English News*. https://focustaiwan.tw/politics/202005050009. Published May 5, 2020. Accessed March 31, 2021.
23. Chiang CH, Chiang CH, Chiang CH. Maintaining mask stockpiles in the COVID-19 pandemic: Taiwan as a learning model. *Infect Control Hosp Epidemiol*. 2021;42(2):244-245.
24. Wang X, Ferro EG, Zhou G, Hashimoto D, Bhatt DL. Association between universal masking in a health care system and SARS-CoV-2 Positivity among health care workers. *JAMA*. 2020;324(7):703-704.
25. Mass General Brigham. Universal mask policy. https://www.massgeneral.org/assets/MGH/pdf/news/coronavirus/universal-mask-policy.pdf. Published June 24, 2020. Accessed March 31, 2021.
26. University of California, San Francisco. Universal surgical mask policy. https://infectioncontrol.ucsfmedicalcenter.org/sites/g/files/tkssra4681/f/Surgical_Mask_Flyer.pdf. Published March 29, 2020. Accessed March 31, 2021.
27. The Commonwealth Fund. The impact of the COVID-19 pandemic on outpatient visits: a rebound emerges. https://www.commonwealthfund.org/publications/2020/apr/impact-covid-19-outpatient-visits. Published May 19, 2020. Accessed March 31, 2021.
28. Kent C. The COVID chronicles: past, present & future. Review of Ophthalmology. https://www.reviewofophthalmology.com/article/the-covid-chronicles-past-present-and-future. Published April 15, 2021. Accessed September 24, 2021.
29. Posarelli C, Maglionico MN, Covello G, et al. Ophthalmological emergencies and the SARS-CoV-2 outbreak. *PLoS One*. 2020;15(10):e0239796.
30. Poyser A, Deol SS, Osman L, et al. Impact of COVID-19 pandemic and lockdown on retinal detachments. *Eye (Lond)*. 2020;35:2322-2323.