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No Time for Tears

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The potential for transmission of the 2019 novel coronavirus (SARS-CoV-2) through ocular fluid is a concern for ophthalmologists. In this issue, Seah et al,¹ (see page 977) from the National Health Care Group Eye Institute in Singapore, report that they were unable to detect SARS-CoV-2 in the tears of 17 patients diagnosed with COVID-19. They conclude the risk of transmission of SARS-CoV-2 through tears likely is low. Although the results are reassuring, risks to ophthalmologists remain because a few caveats must be considered. None of the study participants had conjunctivitis on presentation. One patient sampled developed conjunctival injection and chemosis on day 17 of hospitalization. In addition, most of the samples were obtained during the second and third weeks of symptoms, when viral load is known to have decreased precipitously.^{2,3} In a separate study that evaluated conjunctival swabs of 30 patients with COVID-19 pneumonia in China, only 1 patient demonstrated conjunctivitis, and those swabs showed positive results for SARS-CoV-2 by reverse-transcriptase polymerase chain reaction analysis.⁴ Of note, those conjunctival samples were collected early in the disease course. Finally, the diagnostic sensitivity for ocular samples such as tears and conjunctival swabs generally is lower than for other tissue types, given the limited sample volume. Therefore, negative results may reflect insufficient tissue sampling. Regardless, the viral load in noninflamed ocular tissues likely is low, and it is unclear if the viral RNA fragments detected by reverse-transcriptase polymerase chain reaction analysis represent viable viral particles capable of infection.

The healthcare sector represents 11% of all jobs in the United States economy.⁵ Our greatest professional exposure risk remains via airborne respiratory droplet transmission. Transmission of SARS-CoV-2 within the healthcare environment occurs.^{6,7} Viral loads of SARS-CoV-2 are high in the nose and throat of asymptomatic and symptomatic patients.² Notable is the higher viral load in the nasal cavity than that of the throat, suggesting the high potential for transmission in the setting of close face-to-face contacts, such as slit-lamp examinations and other diagnostic ophthalmic imaging methods. Furthermore, SARS-CoV-2 remains viable in aerosols for at least 3 hours.⁸ Therefore, avoidance of talking during slit-lamp examination and minimizing time spent in close proximity to patients is important.

Per current American Academy of Ophthalmology guidelines,⁹ only patients requiring urgent or emergent ophthalmology care should be examined in person. Patients who seek treatment from an ophthalmologist and

screen positive for signs, symptoms, or both of COVID-19 should forgo an eye examination for prompt SARS-CoV-2 screening. Patients with conjunctivitis seeking treatment from ophthalmology departments should be considered contagious, and SARS-CoV-2 precautions should be taken.

For COVID-19 asymptomatic patients requiring an ophthalmic assessment for an emergent vision loss issue, the following precautions should be considered strongly.

- Any instrument or surface the patient contacts should be disinfected before and after the patient examination. The SARS-CoV-2 virus is very stable on stainless steel and plastic surfaces, lasting several days.⁸ Surface disinfection with 1 minute of exposure time of 0.1% sodium hypochlorite or 70% ethanol significantly reduces virus infectivity on surfaces.¹⁰
- Intraocular pressure should be checked with a disposable device. Tonometry using forced air should be avoided because this technique generates micro-aerosol droplets.¹¹ Multiuse tonometry devices should be cleaned per prior published guidelines.¹²

With any transmissible respiratory process, a series of ambulatory best practice patterns can be considered.

- Obtain most previsit information as well as postvisit discussion of assessment and plan remotely (e.g., via telephone or video). Consider screening visual acuity remotely.¹³
- Clinical examinations should be focused on only what is required to make a critical diagnosis.
- Imaging should be obtained only if results could change management.
- Social distancing in waiting rooms should be enforced.
- Patients should wear masks.
- Slit-lamp shields between the examiner and patient may be installed.
- The ophthalmologist should consider an N95 mask and eye protection while at the slit lamp. Data-driven guidelines specific to physicians requiring close face-to-face contact are lacking. To help preserve supply, Centers for Disease Control and Prevention guidelines limiting N95 mask reuse should be reviewed as recommendations are updated.

Unprecedented times require unprecedented protocols and actions. As we honor our medical colleagues modifying their protocols and caring for inpatients, we also reflect on this time as ophthalmologists. Together, we will continue to

use the best evidence available to create practices that maximize the safety we can provide for our patients, our trainees, our staff, and ourselves.

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