Role of Ophthalmology in Emerging Infectious Diseases

It is likely that the field of ophthalmology will continue to play an important role in the identification, control, and treatment of novel pathogens. In this issue of JAMA Ophthalmology, Kontos et al report a case of ocular involvement from the most recent global public health threat, Monkeypox virus. The 21st century has been characterized by numerous emerging infectious diseases that have ophthalmic manifestations including Zika and Ebola, not to mention SARS-CoV-2, which was first identified by an ophthalmologist in Wuhan, China. Soon thereafter, ophthalmologists in that region reported on its eye involvement. Increased connectivity through travel, migration, and international trade likely have contributed to this phenomenon. For example, seasonal influenza circulation in the US can be predicted by commercial flight patterns. Other contributing factors include climate change, urbanization, population growth, and agricultural expansion into remote areas. These changing dynamics have favored the emergence of zoonotic diseases such as Zika, dengue virus, and chikungunya virus through mosquito populations that have adapted to crowded urban environments. Climate change has had numerous impacts, contributing to migration due to pressures from scarce resources and extreme weather events, as well as shifting geographic range of disease. For example, coccidioidomycosis, which can cause conjunctivitis, iritis, chorioretinitis, and endophthalmitis, has become more common as more regions have optimal conditions for fungal spore growth.

COVID-19 has had an unprecedented impact on the provision of eye care worldwide. In-office examination requires close face-to-face contact with patients who are generally older individuals and at higher risk of complications from infectious disease. There is some evidence of increased risk to eye care professionals as well; for example, ophthalmology was identified as a high-risk specialty given the higher proportion of confirmed COVID-19 cases among ophthalmology residents in New York City. Virtualizing ophthalmic services presents numerous challenges with performing even basic testing such as intraocular pressure or slitlamp examination, much less complex ancillary assessments. Delays in routine care including cataract surgery have caused higher backlog and, at least in some series, higher rates of complications with resumption of surgery after a hiatus of elective cases thought to be associated with attenuation of microsurgical skills but potentially also linked to increasing complexity of cases that were previously deferred.

Given the recent pattern of emerging infectious disease, we must learn from this experience, as it is likely not the last time we will face these challenges. Adequate preparation will require a multifaceted approach including collaboration across public health entities, medical specialties, and international partnerships, as well as innovation and technological advancement. Broad and unbiased pathogen surveillance is essential, even for ocular infectious diseases that we think we understand well (eg, conjunctivitis), as there are likely substantial geographic variations. This may be facilitated in the future by next-generation sequencing technology that is not hypothesis driven but rather can identify all infectious pathogens. Artificial intelligence also may play a role. Innovations such as the stereoscopic robotized tele-ophthalmic drone slit lamp device and at-home intraocular pressure monitoring show promise in enabling virtualized services. While our increasing connectivity leads to increased risk of emergent infectious disease, this same connectivity also allows for faster exchange of ideas and sharing of resources between international partners to address these challenges. These innovations, borne out of necessity in ophthalmology, have the potential to have broad impact on the medical community at large.

© 2022 American Medical Association. All rights reserved.