

The COVID-19 pandemic: a brief review to inform Moorfields' response

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General background:

The current global pandemic of COVID-19 began in Wuhan, Peoples' Republic of China, and exploded at incredible pace and scale. In less than three months, the SARS-CoV-2 virus that causes the disease has been identified and sequenced, diagnostic tests have been deployed, the mode of transmission has been studied, and clinical characteristics of the disease now known as COVID-19 have been described.

Current context:

COVID-19 is rapidly spreading throughout the United Kingdom, resulting in unprecedented burdens on our health care facilities. Data from China indicates that healthcare environments are important sources of virus transmission. Moreover, health care workers are at significant excess risks of infection, morbidity, and mortality (1-3).

Purpose:

As a group of UK opinion leaders in ophthalmology, we have reviewed and analysed the currently available information regarding risks of ophthalmology practice in our setting.

Evidence base:

Information is available from published literature, news reports, and reports from consultation with colleagues in the field. Brief summaries are provided below.

Peer-reviewed literature: Data from the clinical experience in China, clearly indicates associations between increased age and increased risk of serious morbidity and mortality (3, 4). The case fatality rate is also increased for those with some comorbidities (cardiovascular disease including hypertension, diabetes mellitus, chronic respiratory disease, and cancer) (4). SARS-CoV-2 is easily transmitted by ill people, but the potential for transmission from asymptomatic people is also evident from the now-infamous *Diamond Princess* cruise ship. Modeling studies suggested that between 15 – 20% of the passengers had asymptomatic infections (5). Further, people who are asymptomatic appear to have viral loads that may be similar to those in symptomatic patients, with similar and substantial transmission potential (6).

Of special concern for ophthalmologists is the possibility that SARS-CoV-2 could be transmitted from ocular tissue contact. However, a study of thirty COVID-19 patients, nine of which had severe disease, only found SARS-CoV-2 genetic material in tears and conjunctival secretions from one patient, who also had conjunctivitis. This implies that the virus does not replicate in conjunctiva and therefore not may be easily transmitted by contact with eye secretions (7).

Anecdotal information: A report in Bloomberg News (8) quoted Chinese physicians who believe that ENT specialists and ophthalmologists were infected at higher rates than other colleagues in the same hospitals. Further news stories described a cluster of three ophthalmologists at Wuhan

Central Hospital, all colleagues in the same department, who all died from the infection (9). This unusual cluster of three deaths is obviously concerning. On the other hand, multiple other factors may have contributed to this outcome and render it spurious.

In contrast to the experience in China, a newspaper report indicated that as of March 19, 2020, only 13 Italian health care workers have died (10), out of a total of 41,035 cases and 3,405 deaths in Italy. Further, conversations with Italian colleagues today indicate that they do not perceive increased risks for ophthalmologists *per se*.

Variation in international professional practices: Some of the largest variations in practice between countries are in the use of personal protective equipment (PPE). Far East countries, who faced the first SARS outbreak, are particularly conservative and ophthalmologists use PPE extensively. This could be interpreted as a best practice that is well-informed by their extensive prior experience. However, we have not found evidence documenting that extensive PPE use improves health outcomes for patients or providers. Nonetheless, anecdotal reports suggest that when PPE use was increased, infection rates were reduced.

Interpretation of evidence:

The most robust conclusion to be drawn from peer-reviewed literature is that increasing age is associated with increased mortality. Additional risks are associated with co-morbidities. Importantly, it is also clear that transmission is greatest in a hospital setting (1-4). Therefore, in our opinion, the most effective mitigation strategy available is drastically reducing the numbers of face-to-face interactions between health care workers and patients. This reduction will likely need to last for a 3 – 4 month period, at the peak of the pandemic (11). Fortunately, reduction is unlikely to have significant negative consequences for the overwhelming majority of ophthalmic patients. In addition, the existing data support age stratification of staff to limit front-line exposures of older health care professionals. The main remaining question is the degree of PPE to employ. The practice of ophthalmology involves close face-to-face proximity between patient and health care professional, with a clear theoretical increased risk. Given that the default mindset in medical practice is to be cautious, a defensive approach has been the natural response of the profession globally, heightened by the anecdotes of ophthalmic deaths. The dilemma we face is reconciling this with constrained resources when the additional benefit conferred by high-level PPE beyond the measures reducing face-to-face interactions and age stratification is unclear. The heightened risk of a hospital setting beyond the increased density of human interaction that we are exposed to in Moorfields is also uncertain given that the evidence on which assessment of this risk is based was in general hospital settings with a high burden of COVID-19 disease.

Agreed and finalized by the authors 11.45am, 20 March 2020 with the intention to review and amend should new evidence become available

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