

In brief

Ocular transmission

26 August 2021

Background

- Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is transmitted person-to-person through close contact, mainly through respiratory droplets.¹ According to the [World Health Organization](#) infection may occur where respiratory droplets containing virus reach the mouth, nose or eyes of a susceptible person.²
- There is some evidence of SARS-CoV-2 detection in [ocular swab samples](#) however the [prevalence is low](#) (0-17%).³⁻⁶ [Evidence is limited and conflicting](#) about whether SARS-CoV-2 can spread through the mucous membranes of the eye.⁷

Ocular transmission

- While [ocular transmission](#) has been proposed as a transmission route for SARS-CoV-2, via the nasolacrimal duct into the respiratory tract, there is no evidence of definite ocular transmission of SARS-CoV-2.⁷⁻⁹
- SARS-CoV-2 can cause ocular symptoms, in particular conjunctivitis, however prevalence is low (between 0-35%).^{3-5, 7, 8} There is a [potential but unconfirmed risk of transmission](#) from conjunctiva.^{9, 10}

Eye protection

- Proper [personal protective equipment \(PPE\)](#) and effective infection control measures in clinical settings are recommended when treating patients with suspected SARS-CoV-2.⁹
- Use of [eye protection](#) and [face shields](#) has been associated with fewer infections and is recommended in addition to face masks.^{1, 11, 12} However, there is [no specific standard for eye protection](#) against SARS-CoV-2.¹³
- Eye protection provides a [physical barrier from droplet spray](#) and can prevent people touching their eyes between hand washing.¹²
- The Clinical Excellence Commission in NSW recommends that eye protection should be worn when [providing direct care](#) for patients with suspected SARS-CoV-2 or close contacts.^{12, 14, 15}
- The US Occupational Safety and Health Administration (OSHA) recommends [goggles as primary eye protection](#) as they form a complete seal around the eyes. Face shields have decreased efficacy with small aerosolised particles and are recommended as secondary protection to use in combination with goggles.¹⁶ Eye protection should be worn in combination with other personal protective equipment and face shields are [not recommended as a substitute for face masks](#).^{17, 18} Most other recommendations do not generally distinguish between the primary and secondary types of eye protection.
- The World Health Organization, Australian National COVID-19 Clinical Evidence Taskforce and Australian Commission on Safety and Quality in Health Care recommend that healthcare workers

wear goggles or face shields to avoid contamination of mucous membranes, especially when performing [aerosol-generating procedures](#), [procedures generating splashes or sprays of blood and body substances](#), or [collecting laboratory specimens](#).^{15, 19-22} The World Health Organization and US Centers for Disease Control and Prevention recommend that goggles and face shields should [cover the front and sides of the face](#) and [extend below the chin](#).²² [Gaps to the sides and underneath of face shields](#) may allow virus droplets to infect mucous membranes, including the eyes.²³

- Advice on safety glasses is conflicting. [Ottawa Public Health guidelines](#) suggest safety glasses do not provide the same level of protection from splashes, sprays and droplets as goggles or face shields and are not generally recommended for infection control purposes.²⁴ However the [European Union standards for personal eye protection](#) state that goggles and safety glasses provided similar protection for the eyes.¹⁸
- The Victorian Department of Health and Human Services published a fact sheet on use of eye protection for healthcare workers. It is advised that if [closely fitted wraparound goggles or safety glasses](#) are used, they should meet Australian standards ([AS/NZS 1337.1:2010](#)).^{12, 25}

Cleaning and disinfecting

- [Reusable eye protection must be cleaned and disinfected](#) between uses according to the manufacturer's instructions. Single use eye protection may be worn for an extended period unless moist, wet or contaminated, and must be disposed of after use.¹⁴ The Victorian Department of Health and Human Services states reusable face shields are preferred over single-use and require a process for appropriate decontamination and storage between uses.¹²
- The [Australian Infection Control Expert Group](#) provides guidance on cleaning and disinfection of protective eyewear in health and residential care facilities, including by individual healthcare workers and mass disinfection of protective eyewear.²⁶

Limitations

There are differences in how the types of eye protection are defined and no clear consensus on cleaning processes.

To inform this brief, PubMed and Google searches were conducted using terms related to ((ocular OR eye) AND (transmission) AND (protection) AND (COVID-19 or SARS-CoV-2)) on 22 June 2021. Search results were limited to systematic reviews. The Critical Intelligence Unit have published an evidence check on [Extended use or reuse of personal protective equipment](#) and maintains a living evidence table on [COVID-19 transmission](#).^{27, 28}

References

1. Chu DK, Akl EA, Duda S, et al. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. *Lancet*. 2020 Jun 27;395(10242):1973-87. DOI: 10.1016/s0140-6736(20)31142-9
2. World Health Organisation. Transmission of SARS-CoV-2: implications for infection prevention precautions [Internet]. Switzerland: WHO; 2020. [cited 28 June 2021]. Available from: <https://apps.who.int/iris/handle/10665/333114>.
3. Cheong KX. Systematic Review of Ocular Involvement of SARS-CoV-2 in Coronavirus Disease 2019. *Curr Ophthalmol Rep*. 2020 Sep 26:1-10. DOI: 10.1007/s40135-020-00257-7
4. Cao K, Kline B, Han Y, et al. Current Evidence of 2019 Novel Coronavirus Disease (COVID-19) Ocular Transmission: A Systematic Review and Meta-Analysis. *Biomed Res Int*. 2020;2020:7605453. DOI: 10.1155/2020/7605453

5. Jin YP, Trope GE, El-Defrawy S, et al. Ophthalmology-focused publications and findings on COVID-19: A systematic review. *Eur J Ophthalmol*. 2021 Feb 8;1120672121992949. DOI: 10.1177/1120672121992949
6. Ho D, Low R, Tong L, et al. COVID-19 and the Ocular Surface: A Review of Transmission and Manifestations. *Ocul Immunol Inflamm*. 2020 Jul 3;28(5):726-34. DOI: 10.1080/09273948.2020.1772313
7. Aiello F, Gallo Afflitto G, Mancino R, et al. Coronavirus disease 2019 (SARS-CoV-2) and colonization of ocular tissues and secretions: a systematic review. *Eye (Lond)*. 2020 Jul;34(7):1206-11. DOI: 10.1038/s41433-020-0926-9
8. Siedlecki J, Brantl V, Schworm B, et al. COVID-19: Ophthalmological Aspects of the SARS-CoV 2 Global Pandemic. *Klin Monbl Augenheilkd*. 2020 May;237(5):675-80. DOI: 10.1055/a-1164-9381
9. Ling XC, Kang EY, Lin JY, et al. Ocular manifestation, comorbidities, and detection of severe acute respiratory syndrome-coronavirus 2 from conjunctiva in coronavirus disease 2019: A systematic review and meta-analysis. *Taiwan J Ophthalmol*. 2020 Jul-Sep;10(3):153-66. DOI: 10.4103/tjo.tjo_53_20
10. Inomata T, Kitazawa K, Kuno T, et al. Clinical and Prodromal Ocular Symptoms in Coronavirus Disease: A Systematic Review and Meta-Analysis. *Invest Ophthalmol Vis Sci*. 2020 Aug 3;61(10):29. DOI: 10.1167/iovs.61.10.29
11. Almazroa A, Alamri S, Alabdulkader B, et al. Ocular transmission and manifestation for coronavirus disease: a systematic review. *Int Health*. 2021 May 27. DOI: 10.1093/inthealth/ihab028
12. Victorian Department of Health and Human Services. Personal protective equipment (PPE) - coronavirus (COVID-19) [Internet]. Australia: Victorian DHHS; 2021. [cited 5 July 2021]. Available from: <https://www.dhhs.vic.gov.au/personal-protective-equipment-ppe-covid-19>.
13. Optometry Australia. The role of eye protection during COVID-19 [Internet]. Australia: Optometry Australia; 2021. [cited 5 July 2021]. Available from: <https://www.optometry.org.au/practice-professional-support/coronavirus-covid-19-what-optometrists-need-to-know/covid-19-clinical-advice/the-role-of-eye-protection-during-covid-19/>.
14. Clinical Excellence Commission. COVID-19 infection prevention and control manual: For acute and non-acute healthcare settings [Internet]. Australia: CEC; 2021. [cited 5 July 2021]. Available from: https://www.cec.health.nsw.gov.au/data/assets/pdf_file/0003/661593/COVID-19-IPAC-manual-version-1.4-Final-July-2021.pdf.
15. SA Health Department for Health and Wellbeing. COVID-19 Personal Protective Equipment (PPE) Decision Matrix [Internet]. Australia: SA Health; 2021. [cited 5 July 2021]. Available from: https://www.sahealth.sa.gov.au/wps/wcm/connect/952a07a8-a676-4e53-9603-67c44f2162c3/20210624_111COVID+Ops_Protocol_COVID+19+PPE+Decision+Matrix_Infection+Control+%282c51be8e-dbee-4fd0-8e62-4dd57e1ff9f9%29+%281%29.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-952a07a8-a676-4e53-9603-67c44f2162c3-nFIPMgW.
16. American Academy of Ophthalmology. Safety of goggles vs. face shields in the COVID-19 era [Internet]. USA, 2020. [cited 5 July 2021]. Available from: <https://www.aao.org/Assets/7231d8d7-0332-406b-b5b6-681558dd35d3/637215419697630000/goggles-vs-faceshields-pdf?inline=1>.
17. Centers for Disease Control and Prevention. Guidance for wearing masks [Internet]. USA, 2021. [cited 5 July 2021]. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover-guidance.html>.
18. Swiss National COVID-19 Science Taskforce. Policy Brief: The use of face shields as personal protective equipment during the SARS-CoV-2 pandemic [Internet]. Switzerland, 2021. [cited 5 July 2021]. Available from: <https://sciencetaskforce.ch/en/policy-brief/the-use-of-face-shields-as-personal-protective-equipment-during-the-sars-cov-2-pandemic/>.

19. World Health Organization. Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected [Internet]. Switzerland: WHO; 2020. [cited 28 June 2021]. Available from <https://www.who.int/publications/i/item/10665-331495>.
20. National COVID-19 Clinical Evidence Taskforce. Australian guidelines for SARS-CoV-2 infection prevention and control of COVID-19 in healthcare workers [Internet]. Australia: National COVID-19 Clinical Evidence Taskforce; 2021. [cited 5 July 2021]. Available from: <https://app.magicapp.org/#/guideline/ERWdzj/section/LqXbqj>.
21. Australian Commission on Safety and Quality in Health Care. Infection prevention and control COVID-19 [Internet]. Australia: ACSQHC; 2020. [cited 5 July 2021]. Available from: https://www.safetyandquality.gov.au/sites/default/files/2020-04/infection_prevention_and_control_covid-19_personal_protective_equipment.pdf.
22. Centers for Disease Control and Prevention. Guidance for dental settings: Interim infection prevention and control guidance for dental settings during the coronavirus disease 2019 (COVID-19) pandemic [Internet]. USA: CDC; 2020. [cited 5 July 2021]. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html>.
23. Australian Department of Health. Face shields: A quick guide [Internet]. Australia: Department of Health; 2020. [cited 5 July 2021]. Available from: <https://www.health.gov.au/sites/default/files/documents/2020/07/coronavirus-covid-19-face-shields-a-quick-guide.pdf>.
24. Ottawa Public Health. COVID-19 protective eyewear guidance [Internet]. Canada, 2020. [cited 5 July 2021]. Available from: https://www.ottawapublichealth.ca/en/professionals-and-partners/resources/Documents/COVID-19-Eye-Protection-Guideline_EN.pdf.
25. Standards Australia. Standards Catalogue: AS/NZS 1337.1-2010 [Internet]. Australia, 2010. [cited 5 July 2021]. Available from: <https://www.standards.org.au/standards-catalogue/sa-snz/publicsafety/sf-006/as-slash-nzs--1337-dot-1-2010>.
26. Infection Control Expert Group. ICEG guidelines on cleaning and disinfection of protective eyewear in health and residential care facilities [Internet]. Australia: Department of Health; 2021. [cited 5 July 2021]. Available from: <https://www.health.gov.au/resources/publications/iceg-guidelines-on-cleaning-and-disinfection-of-protective-eyewear-in-health-and-residential-care-facilities>.
27. Agency for Clinical Innovation. Extended use or reuse of personal protective equipment [Internet]. NSW Health, Australia, 2020. [cited 5 July 2021]. Available from: https://aci.health.nsw.gov.au/_data/assets/pdf_file/0005/591107/Evidence-Check-Extended-use-or-reuse-of-personal-protective-equipment.pdf.
28. Agency for Clinical Innovation. Living evidence: COVID-19 transmission [Internet]. NSW Health, Australia, 2021. [cited 5 July 2021]. Available from: <https://aci.health.nsw.gov.au/covid-19/critical-intelligence-unit/covid-19-transmission-flowchart>.

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