

CADTH RAPID RESPONSE REPORT: REFERENCE LIST

# Masks During Aerosol Generating Dental Procedures: Clinical Effectiveness and Guidelines

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## Research Questions

1. What is the clinical effectiveness of masks for dental clinicians exposed to bioaerosols or infectious agents during dental procedures?
2. What are the evidence-based guidelines regarding the selection of respiratory protection during dental procedures for dental clinicians?

## Key Findings

One non-randomized study was identified regarding the clinical effectiveness of masks for dental clinicians exposed to bioaerosols or infectious agents during dental procedures. No relevant evidence-based guidelines were identified regarding the selection of respiratory protection during dental procedures for dental clinicians.

## Methods

A limited literature search was conducted by an information specialist on key resources including MEDLINE, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were COVID-19, dental procedures, and face masks. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2000 and March 23, 2020. Internet links were provided, where available.

## Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

**Table 1: Selection Criteria**

<b>Population</b>	Any individual performing or requiring aerosol generating dental care (including pediatrics and high-risk individuals [e.g., immunocompromised, > 60 years of age])
<b>Intervention</b>	Q1: N95 masks Q2: Masks (surgical or N95 masks)
<b>Comparator</b>	Q1: Surgical Masks (Levels 1, 2 or 3) Q2: Not applicable

<b>Outcomes</b>	Q1: Clinical effectiveness (transmission of infection [to dental clinician from patient], adverse events) Q2: Recommendations regarding the selection of masks during dental procedures for dental clinicians.
<b>Study Designs</b>	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, evidence-based guidelines

## Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, and systematic reviews are presented first, followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

One non-randomized study<sup>1</sup> was identified regarding the clinical effectiveness of masks for dental clinicians exposed to bioaerosols or infectious agents during dental procedures. No relevant health technology assessments, systematic reviews, or randomized controlled trials were identified. In addition, no relevant evidence-based guidelines were identified regarding the selection of respiratory protection during dental procedures for dental clinicians.

Additional references of potential interest are provided in the appendix.

### Health Technology Assessments

No literature identified.

### Systematic Reviews and Meta-analyses

No literature identified.

### Randomized Controlled Trials

No literature identified.

### Non-Randomized Studies

1. Liu MH, Chen CT, Chuang LC, Lin WM, Wan GH. Removal efficiency of central vacuum system and protective masks to suspended particles from dental treatment. *PLoS ONE*. 2019;14(11):e0225644.  
[PubMed: PM31770413](#)

### Guidelines and Recommendations

No literature identified.

## Appendix — Further Information

### Previous CADTH Reports

2. Respiratory precautions for protection from bioaerosols or infectious agents: a review of the clinical effectiveness and guidelines. (*CADTH Rapid response report: summary with critical appraisal*). Ottawa (ON): CADTH; 2014: <https://www.cadth.ca/respiratory-precautions-protection-bioaerosols-or-infectious-agents-review-clinical-effectiveness>. Accessed 2020 Mar 23.
3. Wear compliance and donning/doffing of respiratory protection for bioaerosols or infectious agents: a review of the effectiveness, safety, and guidelines. (*CADTH Rapid response report: summary with critical appraisal*). Ottawa (ON): CADTH; 2014. <https://www.cadth.ca/wear-compliance-and-donningdoffing-respiratory-protection-bioaerosols-or-infectious-agents-review>. Accessed 2020 Mar 23.
4. Aerosol-generating procedures and risk of transmission of acute respiratory infections: a systematic review. (*CADTH Health technology assessment*). Ottawa (ON): CADTH; 2013: <https://www.cadth.ca/aerosol-generating-procedures-and-risk-of-transmission-acute-respiratory-infections-systematic-review>. Accessed 2020 Mar 23.
5. Physical interventions to interrupt or reduce the spread of respiratory viruses — resource use implications: a systematic review. (*CADTH Health technology assessment*). Ottawa (ON): CADTH; 2011: <https://www.cadth.ca/physical-interventions-interrupt-or-reduce-spread-respiratory-viruses-resource-use-implications-0>. Accessed 2020 Mar 23.
6. Use of N99 respirator masks during a pandemic: clinical effectiveness. (*CADTH Health technology inquiry service: health technology assessment*). Ottawa (ON): CADTH; 2009: <https://www.cadth.ca/use-n99-respirator-masks-during-pandemic-clinical-effectiveness-0>. Accessed 2020 Mar 23.

### Health Technology Assessments – Alternative Population

7. Killingley B, Greatorex J, Cauchemez S, et al. Virus shedding and environmental deposition of novel A (H1N1) pandemic influenza virus: interim findings. *Health Technol Assess*. 2010 Oct;14(46):237-354. <https://www.journalslibrary.nihr.ac.uk/hta/hta14460-04/#/abstract>. Accessed 2020 Mar 23  
[PubMed: PM20923613](#)

### Systematic Reviews and Meta-Analyses – Alternative Population

8. Bin-Reza F, Lopez Chavarrias V, Nicoll A, Chamberland ME. The use of masks and respirators to prevent transmission of influenza: a systematic review of the scientific evidence. *Influenza Other Respir Viruses*. 2012 Jul;6(4):257-267. [PubMed: PM22188875](#)

### Randomized Controlled Trials – Alternative Population

9. Loeb M, Dafoe N, Mahony J, et al. Surgical mask vs N95 respirator for preventing influenza among health care workers: a randomized trial. *JAMA*. 2009 Nov

4;302(17):1865-1871.

[PubMed: PM19797474](#)

## Non-Randomized Studies – No Comparator

10. Zhou SS, Lukula S, Chiossone C, Nims RW, Suchmann DB, Ijaz MK. Assessment of a respiratory face mask for capturing air pollutants and pathogens including human influenza and rhinoviruses. *J Thorac Dis.* 2018 Mar;10(3):2059-2069.

[PubMed: PM29707364](#)

### *Alternative Mask*

11. Oberg T, Brosseau LM. Surgical mask filter and fit performance. *Am J Infect Control.* 2008 May;36(4):276-282.

[PubMed: PM18455048](#)

12. Checchi L, Montevecchi M, Moreschi A, Graziosi F, Taddei P, Violante FS. Efficacy of three face masks in preventing inhalation of airborne contaminants in dental practice. *J Am Dent Assoc.* 2005 Jul;136(7):877-882.

[PubMed: PM16060468](#)

## Clinical Practice Guidelines

### *Dental-Specific Aerosol Generating Medical Procedures*

13. When to use a surgical face mask or FFP3 respirator. London (GB): Public Health England; 2020:  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/874411/When\\_to\\_use\\_face\\_mask\\_or\\_FFP3.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/874411/When_to_use_face_mask_or_FFP3.pdf). Accessed 2020 Mar 23.
14. Interim infection prevention and control recommendations for patients with suspected or confirmed coronavirus disease 2019 (COVID-19) in healthcare settings. Atlanta (GA): Centers for Disease Control and Prevention; 2020:  
<https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html> Accessed 2020 Mar 23.  
*See: Respirator or Facemask*
15. COVID-19: Guidance for infection prevention and control in healthcare settings. London (GB): UK Government; 2020:  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/874316/Infection\\_prevention\\_and\\_control\\_guidance\\_for\\_pandemic\\_coronavirus.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/874316/Infection_prevention_and_control_guidance_for_pandemic_coronavirus.pdf). Accessed 2020 Mar 23.  
*See: 6.5 Aerosol-generating procedures (AGPs), page 28*
16. Infection prevention and control for clinical office practice. Toronto (ON): Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee; 2015: <https://www.publichealthontario.ca/-/media/documents/bp-clinical-office-practice.pdf?la=en>. Accessed 2020 Mar 23.  
*See: N95 Masks, page 23*
17. Pandemic influenza: guidance for dental practices. London (GB): UK Government, Department of Health; 2008:  
[http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_087736?Icds](http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_087736?Icds)

[ervice=GET\\_FILE&dID=172010&Rendition=Web](#). Accessed 2020 Mar 23.  
See: *Appendix 2, page 18*

## General Aerosol Generating Medical Procedures

18. Advice on the use of masks in the community, during home care and in healthcare settings in the context of the novel coronavirus (COVID-19) outbreak. Geneva (CH): WHO; 2020: [https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-\(2019-ncov\)-outbreak](https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak). Accessed 2020 Mar 23.
19. Contact and droplet precautions. Edmonton (AB): Alberta Health Services; 2019: <https://www.albertahealthservices.ca/assets/healthinfo/ipc/hi-ipc-contact-and-droplet-precautions-info.pdf>. Accessed 2020 Mar 23.  
See: *pages 2 to 3*
20. Infection prevention and control for coronavirus disease (COVID-19): Interim guidance for acute healthcare settings. Ottawa (ON): Public Health Agency of Canada; 2020: <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/interim-guidance-acute-healthcare-settings.html>. Accessed 2020 Mar 23.  
See: *11. Aerosol-generating medical procedures*
21. Coronavirus Disease 2019 (COVID-19): Infection prevention and control requirements for aerosol-generating medical procedures. Toronto (ON): Public Health Ontario; 2020: <https://www.publichealthontario.ca/-/media/documents/ncov/ipac/ipac-aerosol-generating-procedures.pdf?la=en>. Accessed 2020 Mar 23.  
See: *Personal Protective Equipment, page 2*
22. Prince Edward Island guidelines for the management and control of COVID-19. Charlottetown (PE): Prince Edward Island Health and Wellness; 2020: [https://www.princeedwardisland.ca/sites/default/files/publications/20200305\\_pei\\_guideline\\_covid-19.pdf](https://www.princeedwardisland.ca/sites/default/files/publications/20200305_pei_guideline_covid-19.pdf). Accessed 2020 Mar 23.
23. Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19). Geneva (CH): World Health Organization; 2020: [https://apps.who.int/iris/bitstream/handle/10665/331498/WHO-2019-nCoV-IPC\\_PPE\\_use-2020.2-eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/331498/WHO-2019-nCoV-IPC_PPE_use-2020.2-eng.pdf). Accessed 2020 Mar 23.
24. Alberta's response to the 2009 H1N1 influenza pandemic. Calgary (AB): Health Quality Council of Alberta; 2010: [https://hqca.ca/wp-content/uploads/2018/05/H1N1\\_OfficialReport\\_December\\_2010.pdf](https://hqca.ca/wp-content/uploads/2018/05/H1N1_OfficialReport_December_2010.pdf). Accessed 2020 Mar 23.  
See: *3.5.3 Use of Personal Protective Equipment including N95 Masks, page 49*

## Review Articles

25. Meng L, Hua F, Bian Z. Coronavirus disease 2019 (COVID-19): emerging and future challenges for dental and oral medicine. *J Dent Res*. 2020;22034520914246.  
[PubMed: PM32162995](#)
26. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. *Int J Oral Sci*. 2020;12(1):9.  
[PubMed: PM32127517](#)

27. Petti S. Tuberculosis: Occupational risk among dental healthcare workers and risk for infection among dental patients. A meta-narrative review. *J Dent.* 2016;49:1-8.  
[PubMed: PM27106547](#)
28. Bennett AM, Fulford MR, Walker JT, Bradshaw DJ, Martin MV, Marsh PD. Microbial aerosols in general dental practice. *Br Dent J.* 2000;189(12):664-667.  
[PubMed: PM11191178](#)

## Additional References

29. Appropriate mask for the COVID-19 pandemic. Saskatoon (SK): College of Dental Surgeons of Saskatchewan; 2020:  
[https://saskdentists.com/images/pdf/temp\\_files/Alerts\\_Memos/Mask\\_Levels\\_Guide\\_to\\_Face\\_Mask\\_Selection\\_Use.pdf](https://saskdentists.com/images/pdf/temp_files/Alerts_Memos/Mask_Levels_Guide_to_Face_Mask_Selection_Use.pdf). Accessed 2020 Mar 23.
30. COVID-19 - Clinical recommendations for use of PPE (mask vs respirator). Winnipeg (MB): Shared Health Manitoba; 2020:  
<https://sharedhealthmb.ca/files/covid-19-mask-vs-respirator-poster.pdf> Accessed 2020 Mar 23.