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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

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

Outcomes	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.
Study Designs	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 study¹ 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](https://pubmed.ncbi.nlm.nih.gov/31770413/)

BACKGROUND: High levels of **suspended particulate matters (PMs) and bioaerosols are created by dental procedures. The present study aimed to evaluate the size and concentration of PMs produced by drilling and grinding teeth, and to assess the efficiency of central vacuum system and protective masks for the removal of PMs.** **METHODS:** A total of 20 extracted permanent teeth were collected. A novel experimental system and particle counter were used to evaluate the PMs produced by dental procedures and the **PM removal efficiency of a central vacuum system and surgical/N95 masks.** **RESULTS:** The number concentration of total PMs produced by drilling and grinding teeth was significantly higher than the indoor background concentration. The average aerodynamic diameter of particle was generally less than 1 µm. The average number concentration of

ultrafine particles was 2.1×10^{11} particles/m³ during tooth drilling and grinding. The efficiency of the central vacuum system was 35.74% for PM_{≥0.5} and 35.41% for PM₁₀. For PM_{≥0.5}, the ratios of inside and outside masks were 0.8-1.34 without vacuum and 1.18-1.36 with vacuum. **No difference was found with the use of surgical/N95 masks during dental therapy, with or without vacuum use.**

CONCLUSIONS: High levels of PMs were found during tooth drilling and grinding procedures, especially among PM₁. **The PM removal efficiency of a central vacuum system and surgical/N95 masks were limited.**

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](#)

BACKGROUND: The relative importance of different routes of influenza transmission, including the role of bioaerosols, and ability of masks and/or hand hygiene to prevent transmission, remains poorly understood. Current evidence suggests that infectious virus is not typically released from adults after 5 days of illness, however, little is known about the extent to which virus is deposited by infected individuals into the environment and whether deposited virus has the ability to infect new hosts. Further information about the deposition of viable influenza virus in the immediate vicinity of patients with pandemic influenza is fundamental to our understanding of the routes and mechanisms of transmission. **OBJECTIVES:** To collect data on patients infected with pandemic H1N1 2009 (swine flu). Primary objectives were to correlate the amount of virus detected in a patient's nose with that recovered from his/her immediate environment,

and with symptom duration and severity. Secondary objectives were to describe virus shedding and duration according to major patient characteristics: adults versus children, and those with mild illness (community patients) versus those with more severe disease (hospitalised patients). **METHODS:** Adults and children, both in hospital and from the community, who had symptoms of pandemic H1N1 infection, were enrolled and visited every day during follow-up for a maximum of 12 days. Symptom data was collected and samples were taken, including nose swabs and swabs from surfaces and objects around patients. Samples of air were obtained using validated sampling equipment. The samples were tested for the presence of pandemic H1N1 virus, using polymerase chain reaction (PCR) to detect virus genome and an immunofluorescence technique to detect viable virus. **RESULTS:** Forty-three subjects were followed up, and 19 of them were subsequently proven to be infected with pandemic H1N1 virus. The median duration of virus shedding from the 19 infected cases was 6 days when detection was performed by PCR, and 3 days when detection was performed by a culture technique. Over 30% of cases remained potentially infectious for at least 5 days. Only 0.5% of all community and none of the hospital swabs taken revealed virus on surfaces. Five subjects had samples of the air around them collected and virus was detected by PCR from four; some of the air particles in which virus was detected were small enough to be inhaled and deposited deep in the lungs. **LIMITATION:** Small number of subjects recruited. **CONCLUSIONS:** The finding that over 30% of infected individuals have infectious virus in their noses for 5 days or more has infection control implications. The data suggest that contact transmission of pandemic influenza via fomites may be less important than previously thought, but transmission via bioaerosols at short range may be possible, meaning that high-level personal protective equipment may be needed by health-care workers when attending patients with pandemic influenza. Further work is being undertaken to consolidate these findings, as they have important potential implications for the protection of health-care workers and the formulation of advice to households, nationally and internationally.

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](#)

There are limited data on the use of masks and respirators to reduce transmission of influenza. A systematic review was undertaken to help inform pandemic influenza guidance in the United Kingdom. The initial review was performed in November 2009 and updated in June 2010 and January 2011. Inclusion criteria included randomised controlled trials and quasi-experimental and observational studies of humans published in English with an outcome of laboratory-confirmed or clinically-diagnosed influenza and other viral respiratory infections. There were 17 eligible studies. Six of eight randomised controlled trials found no significant differences between control and intervention groups (masks with or without hand hygiene; N95/P2 respirators). One household trial found that mask wearing coupled with hand sanitiser use reduced secondary transmission of upper respiratory infection/influenza-like illness/laboratory-confirmed influenza compared with education; hand sanitiser alone resulted in no reduction. One hospital-based trial found a lower rate of clinical respiratory illness associated with non-fit-tested N95 respirator use compared with medical masks. Eight

of nine retrospective observational studies found that mask and/or respirator use was independently associated with a reduced risk of severe acute respiratory syndrome (SARS). Findings, however, may not be applicable to influenza and many studies were suboptimal. None of the studies established a conclusive relationship between mask/respirator use and protection against influenza infection. Some evidence suggests that mask use is best undertaken as part of a package of personal protection especially hand hygiene. The effectiveness of masks and respirators is likely linked to early, consistent and correct usage.

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](#)

CONTEXT: Data about the effectiveness of the surgical mask compared with the N95 respirator for protecting health care workers against influenza are sparse. Given the likelihood that N95 respirators will be in short supply during a pandemic and not available in many countries, knowing the effectiveness of the surgical mask is of public health importance. **OBJECTIVE:** To compare the surgical mask with the N95 respirator in protecting health care workers against influenza. **DESIGN, SETTING, AND PARTICIPANTS:** Noninferiority randomized controlled trial of 446 nurses in emergency departments, medical units, and pediatric units in 8 tertiary care Ontario hospitals. **INTERVENTION:** Assignment to either a fit-tested N95 respirator or a surgical mask when providing care to patients with febrile respiratory illness during the 2008-2009 influenza season. **MAIN OUTCOME MEASURES:** The primary outcome was laboratory-confirmed influenza measured by polymerase chain reaction or a 4-fold rise in hemagglutinin titers. Effectiveness of the surgical mask was assessed as noninferiority of the surgical mask compared with the N95 respirator. The criterion for noninferiority was met if the lower limit of the 95% confidence interval (CI) for the reduction in incidence (N95 respirator minus surgical group) was greater than -9%. **RESULTS:** Between September 23, 2008, and December 8, 2008, 478 nurses were assessed for eligibility and 446 nurses were enrolled and randomly assigned the intervention; 225 were allocated to receive surgical masks and 221 to N95 respirators. Influenza infection occurred in 50 nurses (23.6%) in the surgical mask group and in 48 (22.9%) in the N95 respirator group (absolute risk difference, -0.73%; 95% CI, -8.8% to 7.3%; $P = .86$), the lower confidence limit being inside the noninferiority limit of -9%. **CONCLUSION:** Among nurses in Ontario tertiary care hospitals, use of a surgical mask compared with an N95 respirator resulted in noninferior rates of laboratory-confirmed influenza. **TRIAL REGISTRATION:** clinicaltrials.gov Identifier: NCT00756574

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](#)

Background: Prevention of infection with airborne pathogens and exposure to airborne particulates and aerosols (environmental pollutants and allergens) can be facilitated

through use of disposable face masks. The effectiveness of such masks for excluding pathogens and pollutants is dependent on the intrinsic ability of the masks to resist penetration by airborne contaminants. This study evaluated the relative contributions of a mask, valve, and Micro Ventilator on aerosol filtration efficiency of a new N95 respiratory face mask. Methods: The test mask was challenged, using standardized methods, with influenza A and rhinovirus type 14, bacteriophage PH1Chi174, Staphylococcus aureus (S. aureus), and model pollutants. The statistical significance of results obtained for different challenge microbial agents and for different mask configurations (masks with operational or nonoperational ventilation fans and masks with sealed Smart Valves) was assessed. Results: The results demonstrate >99.7% efficiency of each test mask configuration for exclusion of influenza A virus, rhinovirus 14, and S. aureus and >99.3% efficiency for paraffin oil and sodium chloride (surrogates for PM_{2.5}). Statistically significant differences in effectiveness of the different mask configurations were not identified. The efficiencies of the masks for excluding smaller-size (i.e., rhinovirus and bacteriophage PH1Chi174) vs. larger-size microbial agents (influenza virus, S. aureus) were not significantly different. Conclusions: The masks, with or without features intended for enhancing comfort, provide protection against both small- and large-size pathogens. Importantly, the mask appears to be highly efficient for filtration of pathogens, including influenza and rhinoviruses, as well as the fine particulates (PM_{2.5}) present in aerosols that represent a greater challenge for many types of dental and surgical masks. This renders this individual-use N95 respiratory mask an improvement over the former types of masks for protection against a variety of environmental contaminants including PM_{2.5} and pathogens such as influenza and rhinoviruses.

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](#)

BACKGROUND: Surgical masks have been used since the early 1900s to minimize infection of surgical wounds from wearer-generated bacteria. There is ongoing debate, however, whether surgical masks can meet the expectations of respiratory protection devices. The goal of this study was to evaluate the filter performance and facial fit of a sample of surgical masks. METHODS: Filter penetration was measured for at least 3 replicates of 9 surgical masks using monodisperse latex sphere aerosols (0.895, 2.0, and 3.1 microm) at 6 L/min and 0.075-microm sodium chloride particles at 84 L/min. Facial fit was measured on 20 subjects for the 5 masks with lowest particle penetration, using both qualitative and quantitative fit tests. RESULTS: Masks typically used in dental settings collected particles with significantly lower efficiency than those typically used in hospital settings. All subjects failed the unassisted qualitative fit test on the first exercise (normal breathing). Eighteen subjects failed the assisted qualitative fit tests; 60% failed on the first exercise. Quantitative fit factors ranged from 2.5 to 9.6. CONCLUSION: None of these surgical masks exhibited adequate filter performance and facial fit characteristics to be considered respiratory protection devices.

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](#)

BACKGROUND: Up-to-date studies are needed on the protection provided by face masks used by dentists. We assessed the relative filtering efficacy of two currently used surgical face masks (one a molded mask, the other a tie-on mask) and a certified personal particulate respirator, all made by a single manufacturer. **METHODS:** The authors sprayed bicarbonate particulate against a porcelain surface (representing the patient's mouth) and collected it via a mannequin head (representing the dentist's head) placed 40 centimeters away and a tube with two airflow rates (0.5 cubic meters per hour and 9 m³/hour). They calculated the dry residue weight. They performed three separate runs for each mask and three runs with no mask at the two airflow rates with and without aerosol. **RESULTS:** With no mask (control), the authors recorded significant weight gains at both airflow rates with and without vaporization. With vaporization, the three masks were associated with different dry residue weights ($P < .03$ with the Kruskal-Wallis test at both flow rates), the respirator providing the lowest amount. The respirator provided an efficiency of 94 to 96 percent, compared with 90 to 92 percent and 85 to 86 percent for the molded and tie-on surgical masks, respectively. **CONCLUSIONS:** These data provide independent evidence that a certified personal that a certified personal respirator can be more effective than high quality surgical masks in dental settings. **CLINICAL IMPLICATIONS:** Dentists should be aware that a certified particulate respirator can provide them with superior filtering protection.

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. 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. 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?IdcService=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. 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-IPCPE_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. 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](#)

The epidemic of coronavirus disease 2019 (COVID-19), originating in Wuhan, China, has become a major public health challenge for not only China but also countries around the world. The World Health Organization announced that the outbreaks of the novel coronavirus have constituted a public health emergency of international concern. As of February 26, 2020, COVID-19 has been recognized in 34 countries, with a total of 80,239 laboratory-confirmed cases and 2,700 deaths. Infection control measures are necessary to prevent the virus from further spreading and to help control the epidemic situation. Due to the characteristics of dental settings, the risk of cross infection can be high between patients and dental practitioners. For dental practices and hospitals in areas that are (potentially) affected with COVID-19, strict and effective infection control protocols are urgently needed. This article, based on our experience and relevant guidelines and research, introduces essential knowledge about COVID-19 and nosocomial infection in dental settings and provides recommended management protocols for dental practitioners and students in (potentially) affected areas.

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](#)

A novel beta-coronavirus (2019-nCoV) caused severe and even fatal pneumonia explored in a seafood market of Wuhan city, Hubei province, China, and rapidly spread to other provinces of China and other countries. The 2019-nCoV was different from SARS-CoV, but shared the same host receptor the human angiotensin-converting enzyme 2 (ACE2). The natural host of 2019-nCoV may be the bat *Rhinolophus affinis* as 2019-nCoV showed 96.2% of whole-genome identity to BatCoV RaTG13. The person-to-person transmission routes of 2019-nCoV included direct transmission, such as cough, sneeze, droplet inhalation transmission, and contact transmission, such as the contact with oral, nasal, and eye mucous membranes. 2019-nCoV can also be transmitted through the saliva, and the fetal-oral routes may also be a potential person-to-person transmission route. The participants in dental practice expose to tremendous risk of 2019-nCoV infection due to the face-to-face communication and the exposure to saliva, blood, and other body fluids, and the handling of sharp instruments. Dental professionals play great roles in preventing the transmission of 2019-nCoV. Here we recommend the infection control measures during dental practice to block the person-to-person transmission routes in dental clinics and hospitals.

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](#)

OBJECTIVES: Tuberculosis transmission among healthcare workers (HCWs) and patients is due to the level of *Mycobacterium tuberculosis* (MT) circulation in the community and in the healthcare settings where HCWs are active. In contrast, most papers about dentistry report that dental HCWs (DHCWs) and patients are at relatively

high risk, mainly based on tuberculosis case series that occurred in the 80's-90's. This meta-narrative review was designed to evaluate the tuberculosis risk in dentistry accounting for the historical-geographical contexts. DATA: All available studies reporting data on MT infection (active/latent tuberculosis, tuberculin skin test) among patients and DHCWs. SOURCES: PubMed, Scopus, GOOGLE Scholar. KEYWORDS: MT/tuberculosis and dentistry/dentist/dental/dent*. RESULTS: 238 of the 351 titles were excluded because did not concern dental healthcare providing, 94 papers were excluded because they did not provide original data. Thirteen studies on occupational risk, nine on transmission to patients remained. Some, often non-confirmed, cases of MT infection among patients were reported in specific historical-geographical contexts where MT was endemic. The risk of active pulmonary tuberculosis transmission from infected DHCWs to patients is minimal today, provided that the basic infection control guidelines are applied. The development of active tuberculosis among DHCWs is occasional and is associable to MT circulation rather than dental healthcare providing. CLINICAL SIGNIFICANCE: Tuberculosis transmission in dental healthcare settings was due to the lack of basic infection control measures, while the risk is acceptable (i.e., similar to the general population) nowadays. Therefore, tuberculosis transmission can be safely prevented wearing gloves and surgical mask and providing regular air changes in the operative and non-operative dental healthcare settings. Precautionary Principle-based measures are implementable when patients with active pulmonary tuberculosis are routinely treated.

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](#)

OBJECTIVE: To measure the concentration of microbial aerosols in general dental practices and to use this information to carry out quantitative microbiological risk assessments. METHODOLOGY: Microbial air sampling was carried out continuously during 12 treatment sessions in 6 general dental practices in the South West of England. RESULTS: The microbial aerosol concentration in treatment rooms was generally less than 10(3) colony forming units per cubic metre of air (cfu x m⁻³). However, in 6 out of the 12 visits, at least one peak concentration with much higher numbers of bacteria was detected. The peak concentrations were associated with increased recoveries of presumptive oral streptococci suggesting these aerosols originated from the mouths of patients. These aerosol peaks dissipated within 30 minutes and no dissemination into waiting areas was detected. The peak concentrations were associated with mechanical scaling procedures (47% of procedures giving rise to a peak) and to a lesser extent by cavity preparation (11%). No aerosolised blood was detected. CONCLUSIONS: The data have been used to generate a framework for quantifying risk of exposure of staff to aerosolised microbial pathogens in general dental practice. For example, dentists and their assistants may have a slightly higher risk of exposure to *Mycobacterium tuberculosis* than the general public. The **use of face seal masks** that have been shown to protect against aerosolised micro-organisms may reduce this exposure.

Additional References

29. Appropriate mask for the COVID-19 pandemic. Saskatoon (SK): College of Dental Surgeons of Saskatchewan; 2020:
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