



# AEROSOLS IN DENTISTRY

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# Content

- Basic information
- Infectious aerosols in dental office
- Aerosol in dental environment
- Current information about aerosols and COVID-19



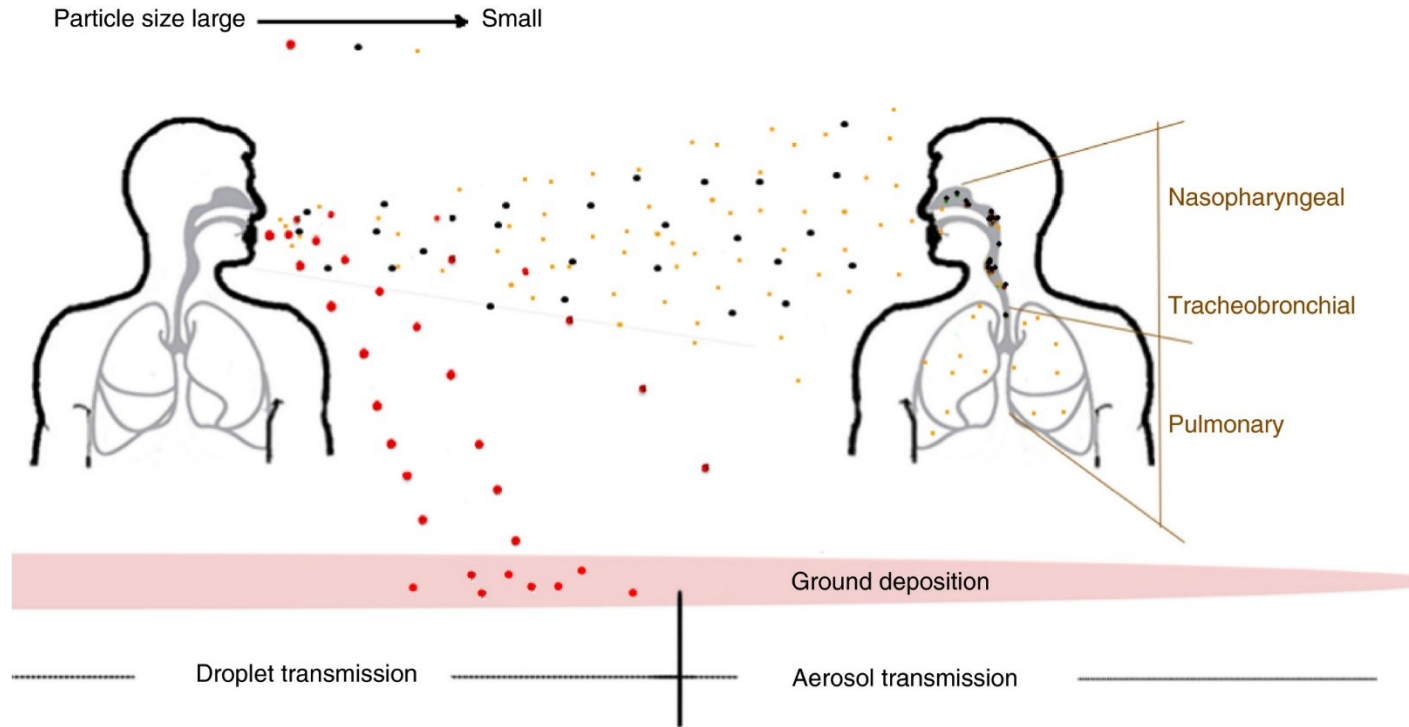
# DEFINITION



- **Aerosols** = liquid or solid particles suspended in the air by humans, animals, instruments, or machines.
- **Bio-aerosols** = aerosols consisting of particles of any kind of organism.



# DEFINITION



- Aerosol - particles less than 5  $\mu\text{m}$  in diameter
- Splatter - particles larger than 5  $\mu\text{m}$  in diameter

# SIZE COMPARISON

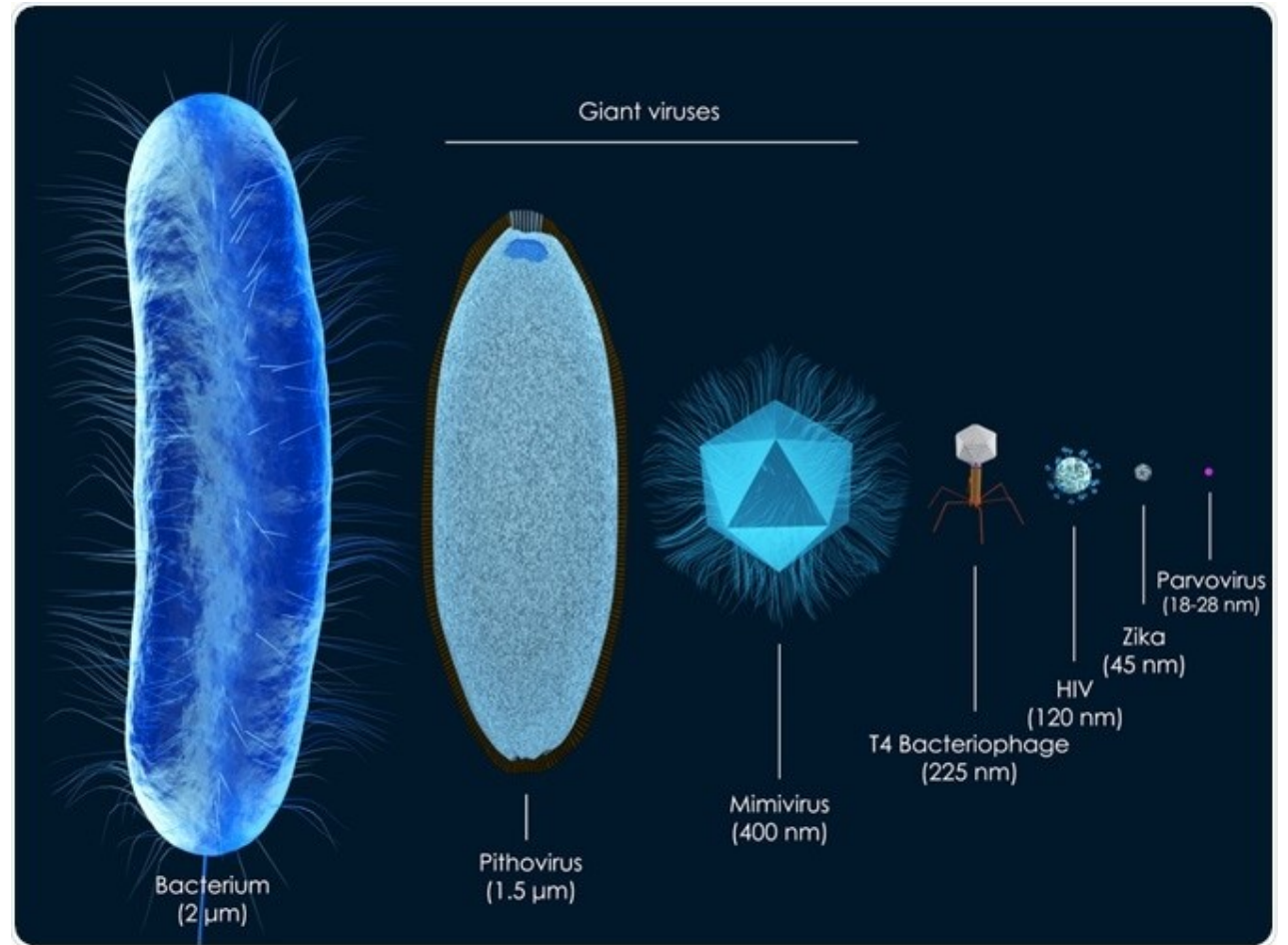
Aerosol particles:  $< 5 \mu\text{m}$

Mycobacterium tuberculosis:  $2 \mu\text{m}$

Staphylococcus epidermidis:  $1,5 \mu\text{m}$

Coronaviridae:  $100-150 \text{ nm}$

Influenza viruses:  $80-120 \text{ nm}$



# DISEASES KNOWN TO BE SPREAD BY DROPLETS OR AEROSOLS



Tuberculosis, Influenza, Legionnaires' Disease, Severe Acute Respiratory Syndrome, Measles, Pneumonic Plague, diseases caused by herpetic viruses (Varicella Zoster Virus) and rhinovirus.



# INFECTIOUS AEROSOLS IN DENTAL OFFICE

Complete overview micro-organisms identified in the dental setting.

## Bacteria N = 19

### Gram negative

*Acinetobacter wolffii*

*Legionella* spp.

*Pseudomonas aureus*

*Staphylococcus aureus*

### Gram positive

*Staphylococcus capitis*

*Staphylococcus lentus*

*Staphylococcus xylosus*

*Staphylococcus chromogenes*

*Staphylococcus haemolyticus*

*Staphylococcus epidermidis*

*Staphylococcus fominis*

*Micrococcus luteus*

*Micrococcus* spp.

*Micrococcus lylae*

*Bacillus pumilus*

*Diphtheroids*

*Corynebacteria*

*Bacillus* spp.

*Actinomycetes*

## Viruses N = 0

None reported

## Parasites N = 0

None reported

## Fungi N = 23

*Alternaria alternata*

*Alternaria brassicicola*

*Alternaria citri*

*Arthrinium phaesospermum*

*Aspergillus*

*Aspergillus flavus*

*Aspergillus fumigatus*

*Aspergillus niger*

*Botrytis* spp

*Cladosporium cladosporiodias*

*Cladosporium cucumerinum*

*Cladosporium ramotenellum*

*Cladosporium sphaerospermum*

*Cladosporium* spp

*Cladosporium spongiosum*

*Geotrichum* spp

*Monocillim indicum*

*Monodictys glauca*

*Pencillium* spp

*Penicillium chrysogenum*

*Stemphylium* spp

*Stemphylium* spp

*Ulocladium alternariae*



# INFECTIOUS AEROSOLS IN DENTAL OFFICE

**To minimise the likelihood of airborne disease transmission via droplets or aerosols, the dental team adopts the following (SARS, 2004):**

- 1.Reduction of droplet/aerosol generation
- 2.Use of rubber dam isolation
- 3.Use of pre-procedure mouthwash ( 0.12% chlorhexidine mouth rinse or povidone iodine)
- 4.Dilution and efficient removal of contaminated ambient air (High volume evacuation, ventilation)
- 5.Disinfect air/aerosol generated (Ultraviolet germicidal irradiation etc.)
- 6.Adoption of contact precautions (Thorough hand washing, Personal protective equipment )





# COVID-19: Guidance for Dental Settings

## CDC: Summary of Recent Changes

- In areas with moderate to substantial community transmission, during patient encounters with patients not suspected of SARS-CoV-2 infection, CDC recommends that dental healthcare personnel (DHCP):
  - Wear eye protection in addition to their facemask to ensure the eyes, nose, and mouth are all protected from exposure to respiratory secretions during patient care encounters, including those where splashes and sprays are not anticipated.
  - Use an N95 respirator or a respirator that offers an equivalent or higher level of protection during aerosol generating procedures.
- Added language that protective eyewear (e.g., safety glasses, trauma glasses) with gaps between glasses and the face likely do not protect eyes from all splashes and sprays.



# COVID-19: RELEVANT INFORMATION

WHO

<https://www.who.int>

CDC

<https://www.cdc.gov/coronavirus/2019-ncov/index.html>

Science

[https://www.sciencemag.org/collections/coronavirus?intcmp=sci\\_cov](https://www.sciencemag.org/collections/coronavirus?intcmp=sci_cov)

Actual information from Ministry of Health of the Czech Republic

[https://onemocneni-aktualne.mzcr.cz/covid-19?utm\\_source=general&utm\\_medium=widget&utm\\_campaign=covid-19](https://onemocneni-aktualne.mzcr.cz/covid-19?utm_source=general&utm_medium=widget&utm_campaign=covid-19)



# Conclusion

## Aerosols in dental offices



- To date (October 28) there are no relevant studies in COVID-19 and aerosol
- The current guidelines are extrapolated from influenza and previous outbreaks of SARS-1 and on expert opinion
- At this moment there are few researching groups around the world which focused on aerosol in dental offices (one in Czech Republic)