

M U N I
M E D

AEROSOLS IN DENTISTRY

Veronika Chuchmová

394229@mail.muni.cz

Department of Public Health, Faculty of Medicine, Masaryk University

Content

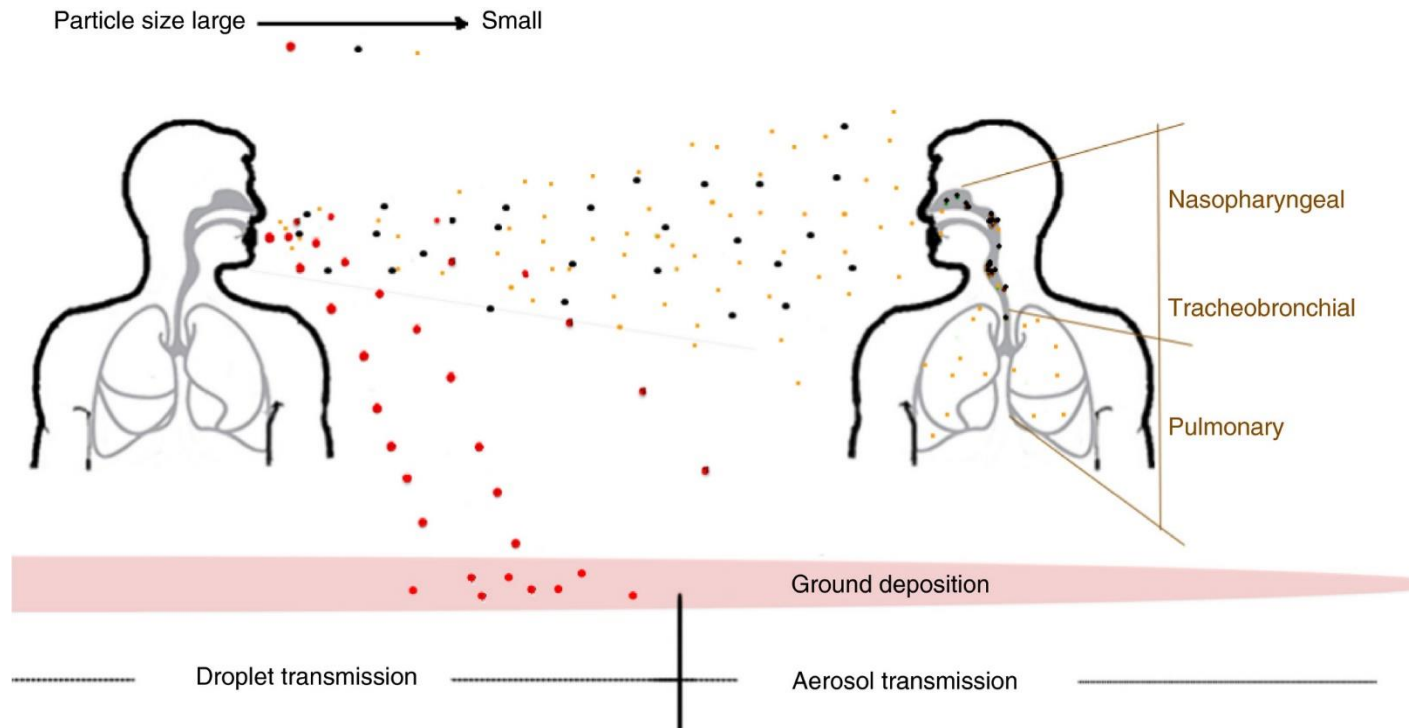
- Basic information
- Infectious aerosols in dental office
- Methodology of aerosol sampling in dental environment
- Current information about aerosols and COVID-19

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

SIZE COMPARISON

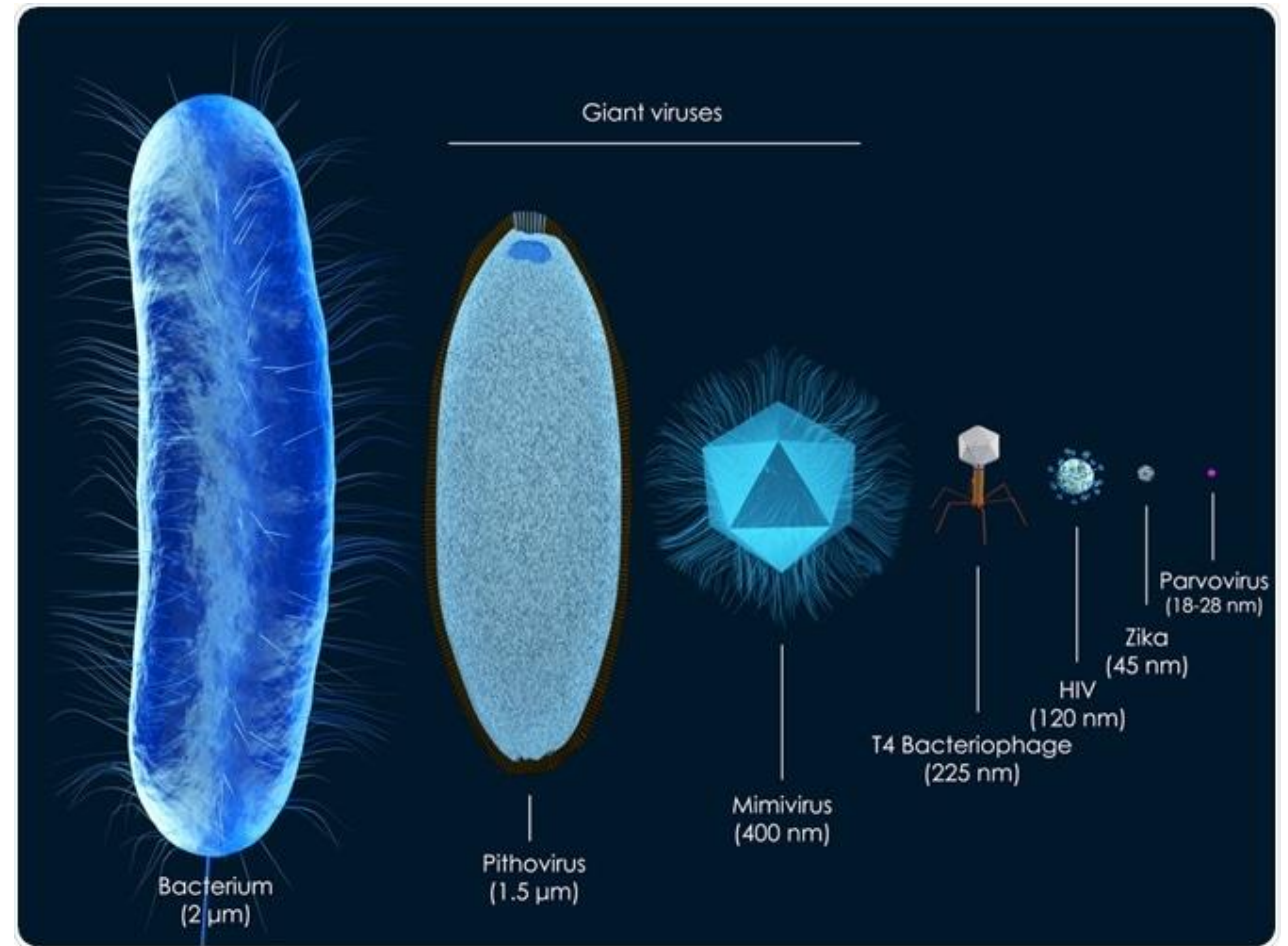
Aerosol particles: $< 5 \mu\text{m}$

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

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

Coronaviridae: 100-150 nm

Influenza viruses: 80-120 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

Aspergillus flavus

Cladosporium cucumerinum

Geotrichum spp

Stemphylium spp

Alternaria brassicicola

Aspergillus fumigatus

Cladosporium ramotenellum

Monocillim indicum

Stemphylium spp

Alternaria citri

Aspergillus niger

Cladosporium sphaerospermum

Monodictys glauca

Ulocladium alternariae

Arthrinium phaesospermum

Botrytis spp

Cladosporium spp

Penicillium spp

Aspergillus

Cladosporium cladosporiodias

Cladosporium spongiosum

Penicillium chrysogenum

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

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

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