Aerogenic transmission of SARS-CoV-2

- Multiple parties, including the Ministry of Health, Welfare and Sport, asked the RIVM for advice about aerogenic transmission of SARS-CoV-2 over a longer distance than 1,5 meters and possible implications for ventilation inside buildings.
- Aerosols are formed during speech, coughing and sneezing. However, at this moment there is not enough evidence that aerogenic transmission plays a relevant role in the spreading of SARS-CoV-2.
- Based on the current insights, alterations to ventilation systems are not necessary. Current guidelines for ventilation can be used.
- There will be a separate advice on the role of aerosols in singing and sports.

Aerogenic transmission of SARS-CoV-2

Research questions & methods:

Can SARS-CoV-2 be transmitted through aerosols? If so, are there any additional measures necessary for ventilation systems? To answer these questions, relevant literature was searched through databases like PubMed and Embase. Only studies regarding SARS-CoV-2 were included. Literature specifically on singing, exercise and fecal-oral transmission was not included.

Results

Aerosols are formed during speech, coughing and sneezing (Asadi et al., 2020). Under laboratory circumstances it has been shown that SARS-CoV-2 can survive in aerosols for several hours (Fears et al., 2020; Van Doremalen et al., 2020). However, an R_0 of 2-4 does not indicate aerogenic transmission. Different studies within hospitals have found virus RNA in air samples (Liu et al., 2020; Ong et al., 2020; Santarpia et al., 2020). In contrast, two other studies did not find RNA in air samples, even when taken close to a patient's chin (Cheng et al., 2020; Faridi et al., 2020). In some occasions outside the hospital aerogenic transmission is named as a possible transmission route (Brurberg, 2020; Lu et al., 2020; Wang et al., 2020). However, in these studies other transmission routes cannot be excluded. There are no studies that have measured the presence of virus in the air in public spaces, such as schools and supermarkets. Research on the outbreak aboard the Diamond Princess cruise ship showed that transmission took place via direct contact and contaminated surfaces, and not through the air-conditioning system (Xu et al., 2020).

Conclusion

Different studies based on epidemiologic, virologic and modelling research do not show aerogenic transmission as a main route for the spread of SARS-CoV-2. At this moment, there is not enough evidence that aerogenic transmission plays a relevant role in the spread of SARS-CoV-2 over longer distances. Based on the current insights, alterations to ventilation systems are not necessary. Current guidelines for ventilation can be used. The background document about this subject is published on the RIVM website.

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