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Indoor setting-specific transmission risk analysis for Covid-19 in Amsterdam, Netherlands

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Background: Indoor transmission plays an important role in Covid-19 transmission. Understanding which indoor settings have higher infection risks will help effective pandemic control. Setting-specific indoor transmission risks of Covid-19 have been studied in limited types of public indoor settings, but the assessment results from different studies are not compatible with each other.

Methods: Contact tracing data was collected by Geneeskundige en Gezondheidsdienst (GGD) Amsterdam from June 2020 till December 2021. We identified transmission clusters from data which consists of one index case and secondary cases caused by one index case's visit. Data augmentation was conducted for missing information in order to reconstruct transmission chains. Bayesian inference was applied to assess transmission risks in different settings and heterogeneity across different settings.

Results: We estimated setting-specific R to be 0.108 (95% CI: 0.013-0.298) in horeca, 0.082 (95% CI: 0.016-0.179) in workplaces, 0.073 (95% CI: 0.010-0.196) in sports clubs, 0.132 (95% CI: 0.024-0.283) in primary schools, 0.285 (95% CI: 0.107-0.420) in secondary schools, and 0.069 (95% CI: 0.006-0.240) in cultural events. We estimated that around 15% of index cases infected 80% of secondary cases in secondary schools, while less than 10% of index cases infected 80% of secondary cases in most indoor settings.

Conclusion: Covid-19 transmitted more efficiently in primary schools, secondary schools, sports club, and horeca. Further research on how indoor settings' factors (e.g. human density, duration time, and space size) affect indoor transmission risks can be conducted.