Associations between measures of social distancing and SARS-CoV-2 seropositivity: a nationwide population-based study in the Netherlands

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ABSTRACT

Importance: Assessment of the impact of social distancing measures on SARS-CoV-2 infection is vital for informing public health policy and effectively control the COVID-19 pandemic.

Objective: To determine key social distancing-related risk factors associated with SARS-CoV-2 infection.

Design: Cross-sectional seroepidemiological study.

Setting: Nationwide population-based study in the Netherlands after the first epidemic wave in June 2020.

Participants: 6,813 randomly-selected participants from the Dutch population aged 1-90 years.

Exposure: SARS-CoV-2 infection assessed by seropositivity.

Main outcomes and Measures: SARS-CoV-2-specific serum IgG antibodies to Spike-S1 antigen were measured using a validated immunoassay and a cutoff for seropositivity was determined via mixture modelling. Seroprevalence was estimated controlling for the survey design, standardized to the Dutch population, and adjusted for test performance characteristics (94.3% sensitivity and 99.9% specificity). Risk factors associated with seropositivity were determined via random-effects multivariable logistic regression.

Results: Overall seroprevalence in the general population was estimated at 4.5% (95%CI 3.8-5.2), was highest in young adults in their early twenties (up to 9%) and lowest in children ≤12 years of age (<2%). Social distancing-related risk factors independently associated with SARS-CoV-2 seropositivity included non-household close contacts with proportionately more persons aged ≥10 years (adjusted odds ratio (aOR): 1.36 (95% confidence interval (CI) 1.04-1.78)) as compared to no contacts; attending indoor meetings with >20 persons (aOR: 1.46 (95% CI 1.12-1.89)); being an nursing home worker (aOR: 3.72 (95% CI 1.90-7.27)); increasing household size (2-person: aOR: 1.64 (95% CI 1.02-2.63), and ≥3-person: aOR: 1.79 (95% CI 1.09-2.95)); and age, where the adjusted odds were very low in primary-school aged children, but over 2.5 times higher in persons aged 18-30 and ≥50 years when compared to 12-years-olds. Non-household close contact with children aged <10 years and working with children was not associated with seropositivity.

Conclusions and Relevance: These data underscore the importance of social distancing measures to reduce SARS-CoV-2 transmission, and suggest that particularly young adults play a substantial role in viral spread. Furthermore, our results indicate both a lower risk of infection in primary school-aged children as well as reduced risk of transmission to those in close contact with them.