Examining the Impact of School Closures on COVID-19 Infections in Europe and their Effects on Different Age Cohorts

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Abstract

Objectives: This paper analyzes the trends of COVID-19 cases in different age groups in selected European countries, assessing to what extent school closures helped reduce case numbers, how school closures affected case numbers in different age groups, and how COVID-19 spread between age groups.

Study Design: A longitudinal study was conducted to observe changes in COVID-19 cases during school closures.

Methods: A Generalized Additive Model is performed to compare trends from twelve European countries across five age groups. Then, Transfer Entropy calculations are used to evaluate the impact of younger cohorts on older cohorts.

Results: The findings demonstrate a decreasing non-linear effect of school closure on the total COVID-19 case number across all countries studied. However, the analysis of age groups only reveals a consistent downward trend in infections in the 0 to 4 pre-school age group, while the school-going age groups 5 to 14 exhibit a significant increase in cases. Age groups 15 to 24 show a surge immediately after closure, followed by a decline. Transfer Entropy calculations highlight asymmetry in age group influences, indicating that changes in COVID-19 cases in certain age groups predict changes in other age groups but not vice versa.

Conclusions: These findings contribute to a better understanding of COVID-19 dynamics in European countries and provide insights for public health strategies and interventions.

Keywords: COVID-19, School Closures, Intergenerational Transmission.

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