Onsite schooling and SARS-CoV-2 epidemiology: analysis of four countries

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Introduction

- School closures and remote learning were adopted to reduce the transmission of SARS-CoV-2.
- There is growing evidence of the negative impacts of school closures and remote learning on child development.[1,2]
- Some studies showed that while infections occur in school, they do not drive community transmission,[3,4] and that secondary attack rates were low when index cases were school children.[5]
- This ecological analysis describes the epidemiology of SARS-CoV-2 cases and COVID-19 related hospitalisation and mortality in the context of returning to onsite schooling during the Delta and Omicron BA.1/2 periods in six countries.

Methods

Setting and time period

- Countries: Australia (New South Wales), Denmark, Finland and United Kingdom (England and Scotland).
- Time period: Two weeks before and six weeks after onsite school reopening during Delta and Omicron BA.1/2 periods.

Data sources

- Demographic and COVID-19 surveillance data from government websites, subject to availability.
- School closures/holidays from the UNESCO COVID-19 Education Response portal. Partially open denotes a combination of onsite and online learning.
- Stringency levels of public health and social measures (PHSM) from the Oxford COVID-19 Government Response Tracker (OxCGRT).

Data analysis

- Age group-specific case, hospitalisation and mortality incidence rates were calculated with a 7-day moving average per 100,000 population or as 7-day incidence rates per 100,000 population, depending on data availability. Denominators are the population for the specific age group.

Results

Observations

- There was no clear trend between onsite learning and changes in SARS-CoV-2 cases, COVID-19 hospitalisations and deaths in both child and adult age groups in all settings.
- The upward trajectory of cases, hospitalisations and deaths mostly started when schools were not open for onsite learning, before peaking shortly after school reopening in most age groups.
- Some exceptions to this general observation were seen for case incidence during the Omicron BA.1/2 period, including increases in:
  - New South Wales – All school-age children & community (Figure 1b)
  - Scotland – Children 0-19 years (Figure 5a)

References

1. Hammerstein S, et al. Effects of COVID-19-related school closures on student achievement: a systematic review. Front Psychol. 2021;12:746289.
2. Hawrilenko M, et al. The association between school closures and child mental health during COVID-19. JAMA Netw Open. 2021;4(9):e2124092.
3. Falk A, et al. COVID-19 cases and transmission in 17 K-12 schools – Wood County, Wisconsin, August 31 – November 29 2020. Morb Mortal Wkly Rep. 2021;70(4):136-40.
4. Zimmerman KO, et al. Incidence and secondary transmission of SARS-CoV-2 infections in schools. Pediatrics. 2021;147(4).
5. Ryan K, et al. SARS-CoV-2 infections and public health responses in schools and early childhood education and care centres in Victoria, Australia: an observational study. Lancet Reg Health West Pac. 2022;19:100369.

Results (continued)

Australia

New South Wales

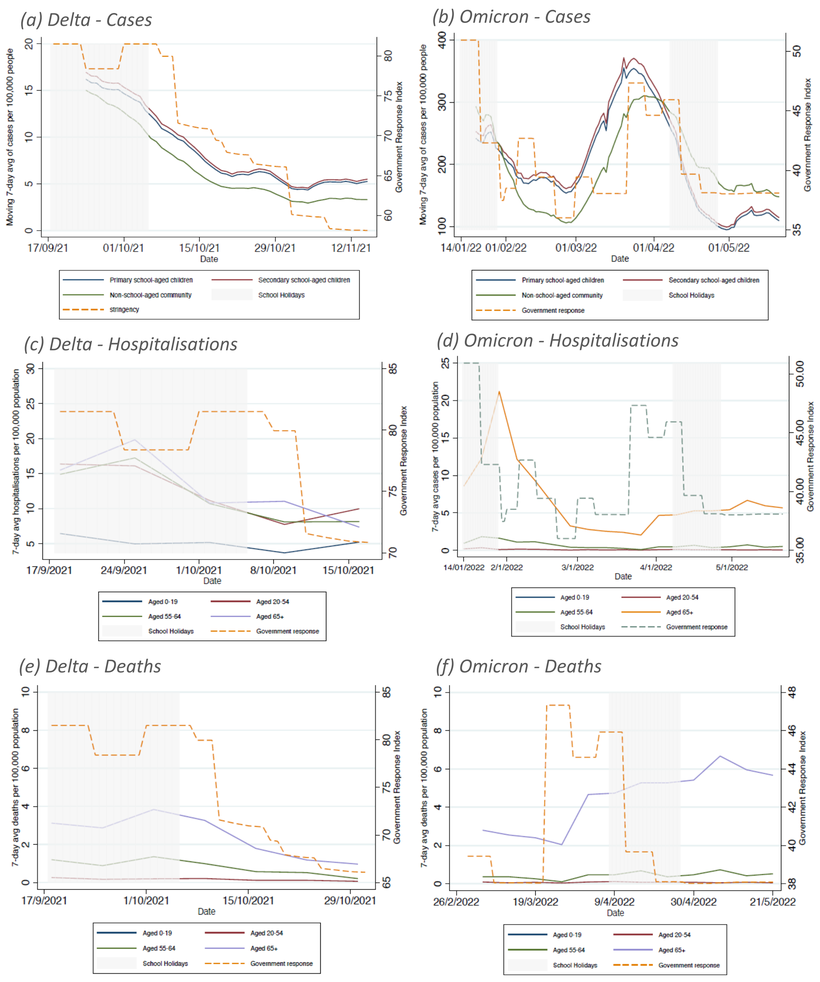

Figure 1. (a,b) Moving seven-day average of SARS-CoV-2 cases, (c,d) seven-day average of COVID-19 hospitalisations, (e,f) seven-day average of COVID-19 deaths in New South Wales, and stringency of PHSM during Delta and Omicron BA.1/2.

Denmark

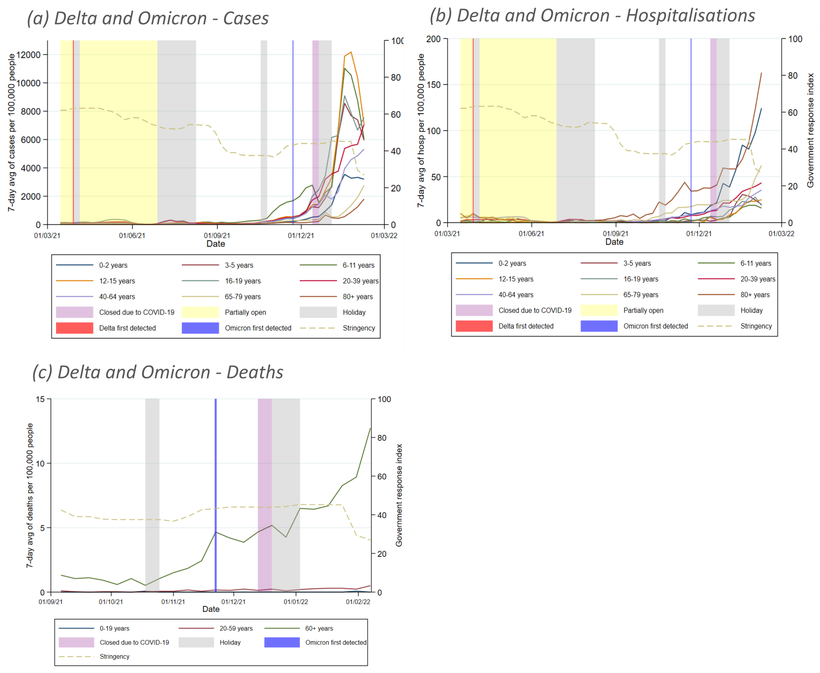

Figure 2. Seven-day average of (a) SARS-CoV-2 cases, (b) COVID-19 hospitalisations and (c) COVID-19 deaths in Denmark, and stringency of PHSM during Delta and Omicron BA.1. Note that data for deaths were only available from a shorter time period.

Finland

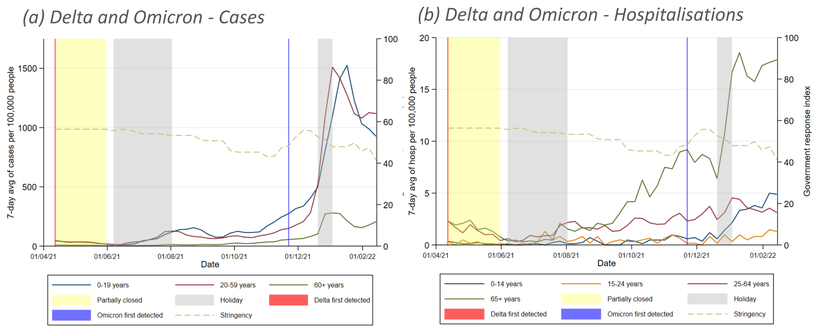

Figure 3. Seven-day average of (a) SARS-CoV-2 cases and (b) COVID-19 hospitalisations in Finland, and stringency of PHSM during Delta and Omicron BA.1. Note that data on deaths are not available.

Results (continued)

United Kingdom

England

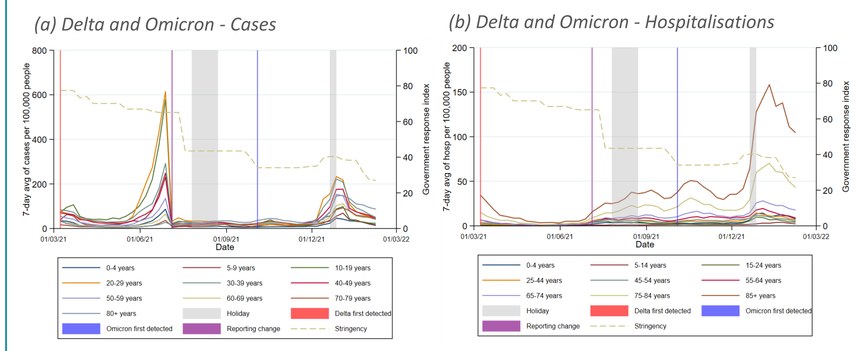

Figure 4. Seven-day average of (a) SARS-CoV-2 cases and (b) COVID-19 hospitalisations in England, and stringency of PHSM during Delta and Omicron BA.1. Reduced reporting took effect on 5 July 2021 (Pillars 1 and 2 to Pillar 1 only). Note that data on deaths are not available.

Scotland

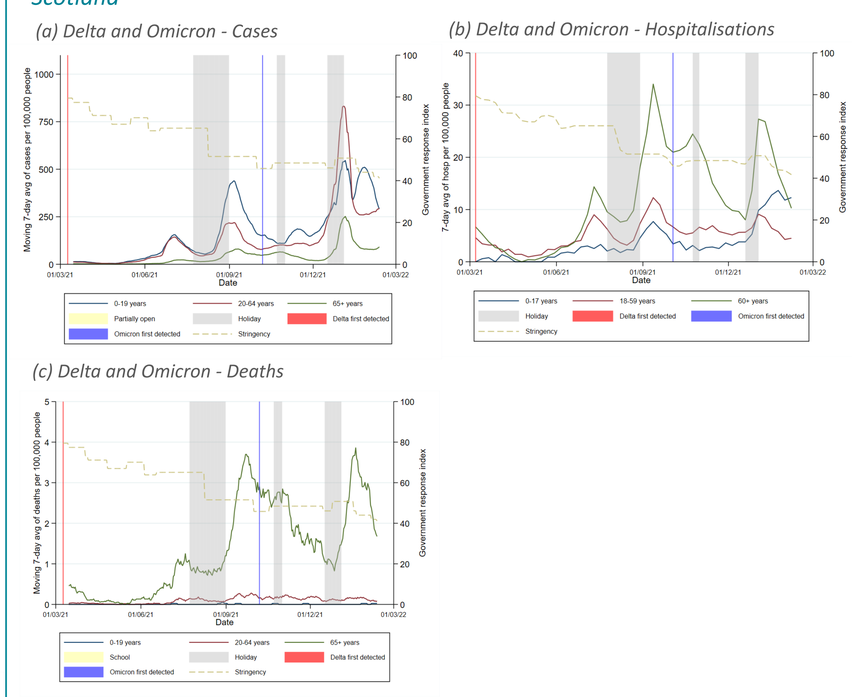

Figure 5. (a) Moving seven-day average of SARS-CoV-2 cases, (b) seven-day average of COVID-19 hospitalisations and (c) moving seven-day average of COVID-19 deaths in Scotland, and stringency of PHSM during Delta and Omicron BA.1.

Discussion

- No consistent patterns were seen across countries which coincided with return to onsite learning after remote learning or school holidays.
- Waves of COVID-19 outcomes seem to reflect the emergence of new variants or subvariants, rather than being caused by school reopening.
- While transmission occurs in schools, it may not drive community transmission.
- Several other factors may have contributed to the observed changes in waves of COVID-19 outcomes, such as changes in PHSM, vaccination coverage and waning immunity, new variants, immune escape and changes to testing requirements and mandates.
- Limitations:
  - Causal inference cannot be drawn due to population-level observations.
  - Different testing rates and hospital admission and coding criteria within and between countries were not accounted for.
- Given the growing evidence of the negative impacts of school closures and remote learning on children and adolescents, there needs to be strong evidence and justification if school closures were to be adopted again for COVID-19 or future pandemics.

More information

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