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A comparison of the epidemiology of coronavirus disease (COVID-19) outbreaks occurring in the first and second waves in care homes in Northern Ireland

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To the Editor

The Coronavirus disease 2019 (COVID-19) global pandemic had a devastating impact on older people living in care homes.\textsuperscript{1-3} COVID-19 poses a significant risk to care home residents who have poor underlying health and are more vulnerable to infection.\textsuperscript{4-6} There is a need to understand the epidemiology of COVID-19 outbreaks in care homes to aid disease prevention.\textsuperscript{7} The aim of this study is to describe and compare the epidemiology of COVID-19 outbreaks occurring in the first and second waves in care homes in Northern Ireland (NI), using routinely available data.

Variables considered in the study were chosen to reflect markers of outbreak severity, i.e. mortality, duration of outbreak, symptomatology at outbreak notification, outbreak by setting and care home size. For the purpose of this study, the first and second wave of COVID-19 care home outbreaks were determined as 1\textsuperscript{st} March – 31\textsuperscript{st} July 2020 (153 days), and 1\textsuperscript{st} August to 24\textsuperscript{th} December 2020 (146 days), respectively. Information on care home outbreaks was collected by the Health Protection (HP) duty room at notification and at the closure of the outbreak. Deaths attributed to COVID-19 in care homes were determined from Northern Ireland Statistics and Research Agency (NISRA). The study identified outbreaks in care home facility if at least two or more cases in a facility, which were confirmed by positive laboratory results for SARS-CoV2 within a 14-day period among either residents or staff in the care home.

Data showed that there were 110 laboratory confirmed outbreaks in the first wave compared with 314 outbreaks in the second wave. A chart showing care home outbreak waves together with background community incidence is presented in Figure 1. The average duration of care home outbreaks in first wave and second wave was 64.7 and 35 days, respectively. The average duration of care home outbreaks in both waves was 44.1 days. The average number of deaths per day in the second wave was 1.53 (224/146) versus an average of 2.28 (349/153) deaths per day in the first wave. Since testing of asymptomatic persons did effectively not occur in first wave, there were no outbreaks during this wave that were reported as ‘asymptomatic’. In second wave, 170 outbreaks were ‘asymptomatic’ at the time of notification; 79 (46.5\%) of these progressed to symptomatic outbreaks whilst 91 (53.5\%) remained ‘asymptomatic’ throughout their duration. In first wave, six (5.5\%) outbreaks involved staff only, whereas 142 (45.4\%) of the outbreaks in second wave involved staff only at notification. In NI, there is approximately a 50:50 split between residential and nursing
settings. However, the proportions of total outbreaks occurring in each of these settings was 30% residential and 70% nursing during the first wave; this figure was similar in the second wave (i.e. 26% residential and 74% nursing). In the first wave, a total of 207 (91.6%), 130 (74.3%), and 42 (52.5%) care homes, with sizes of 30, 31-50, and more than 51 persons respectively, did not register an outbreak. In the second wave, a total of 146 (64.6%), 72 (41.1%), and 12 (15%) care homes, with sizes of 30, 31-50, and more than 51 persons respectively, did not register an outbreak.

In this study, the time period of each wave was approximately the same, yet a significantly larger number of outbreaks were recorded in the second wave. This may be due to ascertainment bias in that some genuine outbreaks of COVID-19 in the first wave may have remained ‘suspected’ as specimens were not sent for testing. On the other hand, the increase in testing capacity in the second wave may have resulted in some scenarios being labelled as ‘outbreaks’ when, in fact, the positive laboratory results were related to the detection of non-viable viral genome and not active infections. The reduction in deaths and the average outbreak duration observed between first and second waves is encouraging. Outbreaks involving staff in second wave (45%), compared with 6% in first wave, may reflect the implementation of the staff and residents screening policy. While some results may not represent infectiousness, the precautionary approach to the care home population may have helped identify and appropriately manage and care for those at genuine risk of transmission to others.

In both waves, the proportion of total care homes reporting outbreaks was substantially skewed towards nursing homes. Interestingly, the split was approximately similar in both waves. It is noteworthy that the finding remains constant despite external variables operating across both waves. Additionally, more care homes reported experiencing multiple outbreaks in the second wave. It’s uncertain how much this is related to the expansion in testing and/or whether there were individual care home-specific explanations (such as staff shortages or high levels of frailty). Finally, evaluating the relationship between care home size and outbreaks suggest that as care home size increases, the setting is more likely to record at least one outbreak.

The study was observational descriptive in design, and it was not possible to control for externalities which may have had influence on the care home sector during the time periods studied. In conclusion, improvements were seen in the measurements of those variables that
were selected as markers of outbreak severity. Although these may have occurred independently of health service input, they coincide temporally with a range of interventions that have been applied throughout the course of both waves. The composite activity of all of the interventions together were important in interrupting the chain of transmission at multiple levels.

**Compliance with Ethical Standards:** This is a report on the results of an outbreak investigation, which was conducted as part of public health practice to manage the outbreak, as well as supporting the wider public health surveillance, and assisting to inform policy decisions regarding SARS-CoV2 testing in care homes. As such, the work did not require Research Ethics Committee approval. This is in keeping with the UK Health Research Authority's guidance.

**Funding:** This study was carried out as part of our routine work

**Conflict of Interest:** None to declare

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References


Figure 1: Chart showing care home outbreak waves together with background community incidence

**Testing policy:** Testing in care homes was initially offered to all residents in care home settings who met the case definition criteria agreed at 4 Nations level and was endorsed by Department of Health for local implementation. As new clinical evidence emerged in relation to atypical presentation it became clear that clinical picture in vulnerable and older populations did not meet the case definition as established initially.
through the 4 UK Nations and WHO. To avoid testing delays, the testing guidance was amended for care homes in response to the change in definitions advising care homes to treat all residents with atypical symptoms as probable COVID-19 positive in facilities and manage these situations as potential COVID-19 outbreaks where a COVID-19 diagnosis had been confirmed and to avoid further delays in cohorting these residents while awaiting testing. The revised case definition was expanded to alert clinicians and care homes to the need for a higher index of suspicion being warranted about possible atypical COVID-19 presentations particularly in care home facilities. Findings from a local study also highlighted that only testing for symptomatic residents and staff may not identify all residents and staff with SARS-COV2 and supported the change to the Northern Ireland policy for testing all residents and staff for COVID-19 in care homes with new outbreaks regardless of symptoms.4

On 24th April, whole home testing was introduced for care homes with new outbreaks notification to the PHA Health Protection duty room. In early May, whole home testing was applied retrospectively to all open outbreaks notified prior to 24th April and not closed on or before 7th May. Also as precautionary approach, the local testing policy in care homes was revised again to introduce a programme of testing in all COVID-19 free care homes. The programme came into effect on Monday 3rd August.