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Original Research

Use of prophylactic antivirals and care home characteristics associated with influenza in care homes with confirmed outbreaks

A. Shah [a,*], A.D. Harries [b,c], P. Cleary [d], M. McGivern [e], S. Ghebrehewet [a]

[a] Public Health England (PHE), North West Health Protection Team (Cheshire &Merseyside), UK
[b] International Union Against Tuberculosis and Lung Disease, Paris, France
[c] London School of Hygiene and Tropical Medicine, London, UK
[d] Public Health England Field Service North West, UK
[e] Public Health England North West Health Protection Team (Cumbria & Lancashire), UK

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ABSTRACT

Objectives: To assess the association of antiviral prophylaxis and care home characteristics with the spread and severity of influenza-like illness in care homes with influenza outbreaks in North West England in the 2017/2018 influenza season.
Study design: This is a retrospective observational study.
Methods: Routinely collected outbreak surveillance data reported to Public Health England were extracted from health protection electronic records. Data included use of antiviral prophylaxis, influenza-like illness or confirmed influenza, hospital admissions and deaths. Care home characteristics were obtained from the Care Quality Commission website. Single variable analysis and multivariable logistic regression were used to examine associations between care home characteristics, antiviral prophylaxis and influenza-related outcomes.
Results: In the 109 homes, there were 3498 residents; of whom, 855 (24%) developed an influenza-like illness. Antiviral prophylaxis was given to residents of 67 of the 109 care homes with outbreaks (61%). A significantly higher attack rate was observed among residents of homes given antiviral prophylaxis (27%) than among residents of homes not given antivirals (20%) ($P < 0.001$). Significantly more deaths occurred in homes for people with learning disabilities and homes that received antiviral prophylaxis ($P < 0.001$).
Conclusions: In homes given antiviral prophylaxis, there were a higher number of residents with influenza-like illness and deaths. To improve our understanding of the impact of antiviral prophylaxis use in real life, enhanced and timely data collection is needed for identification of temporal associations between exposure and administration of antiviral prophylaxis. Consideration needs also to be given to ensure people with learning disabilities are protected through the seasonal influenza vaccine and timely antiviral prophylaxis when appropriate.

* *Corresponding author.*
E-mail address: Anjila.Shah@phe.gov.uk (A. Shah).
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Introduction

Influenza is an acute respiratory illness, caused by influenza A, B and C viruses, that in temperate regions usually shows a marked seasonal increase in the winter months, known as the influenza season. The timing of the influenza season varies from year to year and by region. In the UK, seasons generally run from October/November to March/April.

Influenza and other respiratory infections are a major cause of morbidity and mortality among the elderly,[1] with a recent modelling study suggesting that influenza-associated respiratory mortality is much higher than previously reported, especially in people aged 75 years or older.[2] Underlying chronic health conditions are more common in the elderly and increase the risk of severe influenza outcomes.[3] Many elderly people live in care homes where respiratory infections, especially influenza, can spread rapidly resulting in high attack rates owing to close contact between residents and carers.[4,5] In nearly 300 documented outbreaks of influenza-like illness (ILI) in elderly care facilities in Australia and England, the attack rate occurred in nearly 20% of the residents, with the median duration of outbreaks being 9 days.[6,7] Outbreaks of influenza in institutional settings may have serious consequences for individuals and place additional strain on healthcare services.

In addition to standard infection prevention and control measures, further influenza-specific public health measures are routinely implemented to prevent and control the spread of infection. The use of licenced seasonal vaccines, updated annually for changes in strain epidemiology, is one of the most effective preventive measures. However, in the 2017/18 influenza season, the vaccine had low efficacy against the predominant influenza A H3N2 strain.[8,9] The targeted use of antiviral neuraminidase inhibitors (principally oseltamivir) for treatment or prophylaxis is also recommended for people in high-risk groups. Antiviral prophylaxis is recommended for outbreaks in closed settings, such as healthcare settings and care homes, where influenza can spread quickly to other residents and care providers.

There is evidence that antivirals can reduce the risk of death in patients hospitalized with influenza,[10–12] and data from observational studies and clinical trials suggest that antivirals may reduce mortality, hospital admissions, other influenza-related adverse outcomes and duration of outbreaks.[7,13–15] However, other studies have shown no effect of antiviral prophylaxis in reducing the transmission of influenza in care home settings.[6,16] A Cochrane Review found that treatment with antivirals can reduce the duration of influenza and frequency of symptoms in healthy adults and children by about one day and prophylactic use can reduce the risk of developing symptomatic influenza.[17] The review, however, did not find a significant effect on hospitalizations or reduction in the complications of influenza. A limitation of the review is that the majority of the evidence considered was based on otherwise healthy patients in the outpatient setting, who are likely to have had milder illness.[18]

Assessing the effectiveness of prophylactic antivirals has been challenging as it is not easy to verify exposure with certainty, and this has allowed different interpretations of the reported data. In the UK, evidence-based guidelines from the National Institute for Health and Care Excellence (NICE) and Public Health England (PHE) recommend antivirals for the treatment or prophylaxis of residents of care homes with influenza outbreaks, as appropriate.[19,20] These recommendations stipulate that to be effective, prophylactic antivirals need to be started within 36 h for zanamivir or 48 h for oseltamivir from the time of onset of the most recent case.

The challenges that local public health professionals continue to face each year regarding the coordination, organization and implementation of antiviral interventions in a timely way should not be underestimated. There are other factors that may also be important in the transmission of influenza within care homes. These include, managerial leadership, outbreak planning and care home characteristics such as numbers needing care for dementia and care home capacity, but one study reported that the importance of these factors was inconsistent.[21] This study was therefore carried out to understand the association of prophylactic antivirals and characteristics of care homes with the frequency of ILI, hospital admissions and deaths due to ILI in care homes with confirmed outbreaks of influenza in the North West (NW) of England.

Methods

Study design

This was a retrospective observational study using routinely collected data from the 2017/18 influenza season.

General setting

PHE is an executive agency of the Department of Health and Social Care with eight local PHE centres and an integrated region and centre for London. Local health protection teams (HPTs) are based in each centre.

This study was undertaken by the PHE NW HPT (Cheshire & Merseyside and Cumbria & Lancashire). The Cheshire & Merseyside team covers nine local authority areas with a population of just less than 2.5 million; of which, 19% are aged 65 years and older.[22] The Cumbria & Lancashire team covers 20 local authority areas with a population of just more than 1.98 million; of which, 20% are aged 65 years and older.[22]

In 2016, Cheshire & Merseyside and Cumbria & Lancashire had 535 care homes and 728 care homes registered with the Care Quality Commission (CQC), respectively.[23] Care homes are long-term care facilities, which may provide nursing or residential care or a combination of both and also care for patients with special needs such as dementia.

Management of influenza outbreaks

ILI is defined as an acute respiratory illness with a measured temperature of $\geq$38 °C and cough, with onset within the past 10 days.[24] An outbreak of ILI is defined as two or more cases of ILI in residents in the same care home or with epidemiological links to the care home, arising within 48 h. Two or more cases of laboratory-confirmed influenza with epidemiological links

to the care home would constitute a confirmed outbreak.[25] After notification, a risk assessment is undertaken by a consultant in Health Protection to assess the nature, severity and extent of the outbreak, and the information is recorded on the electronic PHE case management system (HPZone). Based on this assessment, an outbreak of influenza or ILI may or may not be declared.

When an outbreak of ILI in a care home is declared, the local PHE HPT recommends a series of actions to manage and control the outbreak. This includes confirming the diagnosis by nasopharyngeal swabs (for up to five cases in a new outbreak), advising on infection control measures including the closure of the home or wing to admissions (as appropriate) and if most likely to be influenza, advising on antivirals for treatment of cases and prophylaxis of all the asymptomatic residents who may have been exposed, regardless of their vaccination status. Prophylactic antivirals should be given within 36 or 48 h of exposure depending on the antiviral used. The usual antiviral is oseltamivir, which is given for 10 days as prophylaxis or 5 days as treatment. At the end of an outbreak, a PHE Acute Respiratory Illness reporting form is completed, which captures information on the final number of cases, hospital admissions and deaths thought to be related to the influenza outbreak. This information is submitted for national flu surveillance and uploaded to the HPZone.

Patient population

All residents in CQC-registered care homes that had a confirmed influenza outbreak in the Cheshire & Merseyside and Cumbria & Lancashire areas during the 2017/2018 influenza season (December 19, 2017, to May 9, 2018) were included in the study.

Data variables, sources of data and data collection

Data variables included the following: homes with a confirmed influenza outbreak, administration of prophylactic antivirals, type of influenza, care home ownership (private, voluntary or local authority), number of residents in each home, type of care provision (nursing, residential or other), dementia status of those in homes including homes for residents with learning disabilities and overall CQC rating (score of 1 = inadequate, 2 = requires improvement, 3 = good and 4 = outstanding), number of residents with ILI and number of hospital admissions or deaths due to an influenza-related illness.

Table 1 – Characteristics of care homes with confirmed influenza outbreaks where residents were and were not given antivirals in the North West of England during the 2017–2018 influenza season.

Characteristics	Care homes where residents were given antivirals	Care homes where residents were not given antivirals	P-value
	n (%)	n (%)	
Total	67	42	
Type of influenza in the homes			
Type A	39 (58)	29 (69)	0.26[a]
Type B	25 (37)	13 (31)	0.50[a]
Type A and B	3 (5)	0 (0)	0.57[a]
Care home ownership			
Local authority	2 (3)	4 (10)	0.15[a]
Private	63 (94)	36 (85)	0.16[a]
Voluntary	2 (3)	2 (5)	0.63[a]
Resident numbers in each home			
<20	11 (16)	11 (26)	0.65[b]
20–50	50 (75)	26 (62)	
≥51	6 (9)	5 (12)	
Type of care homes			
Nursing	22 (33)	11 (26)	0.46[a]
Residential	38 (59.5)	29 (69)	0.20[a]
Both	6 (6)	2 (5)	0.42[a]
Hospice	1 (1.5)	0 (0)	0.74[a]
Dementia status of residents in homes			
Homes with residents with dementia	43 (64)	27 (64)	0.99[a]
Homes with residents with no dementia	24 (36)	12 (29)	0.44[a]
Homes with residents with LD	0 (0)	3 (7)	0.13[a]
Overall CQC score			
1	1 (1.5)	1 (2)	0.24[b]
2	15 (22.5)	12 (29)	
3	49 (73)	28 (67)	
4	1 (1.5)	0 (0)	
Not inspected	1 (1.5)	1 (2)	

CQC = Care Quality Commission; LD = learning disability.
[a] The Mantel-Haenszel chi-squared test was used for statistical analysis.
[b] The Mantel-Haenszel chi-squared test for trend was used for statistical analysis.

Table 2 – Influenza-like illness, hospital admissions and deaths in residents of care homes with a confirmed influenza outbreak where residents were and were not given antivirals in the North West of England during the 2017–2018 influenza season.

Characteristics	Care homes where residents were given antivirals	Care homes where residents were not given antivirals	P-value
	n (%)	n (%)	
Number of residents	2200	1298	
Identified with influenza-like illness	594 (27.0)	261 (20.1)	<0.001
Hospital admission due to influenza-related illness	120 (5.5)	70 (5.4)	0.94
Death due to influenza-related illness	10 (0.45)	10 (0.77)	0.23

The Mantel-Haenszel chi-squared test was used for statistical analysis.

Data sources included HPZone for homes with confirmed influenza outbreaks and the CQC website for care home quality scores.[23]

Analysis and statistics

Data were analyzed using OpenEpi (version 3.03)[26] and R version 3.5.0.[27] Care homes where antivirals were used were compared with care homes where antivirals were not used in terms of care home characteristics, influenza type and the number of residents with ILIs, hospital admissions and deaths using the Mantel-Haenszel chi-squared test and chi-squared test for trend. Attack rates for ILI, hospital admissions and deaths were stratified by care home characteristics and presented with relative risk with 95% confidence intervals. Multivariable Poisson regression models (with robust standard errors) were fitted to the data to estimate adjusted associations between care home characteristics and each of the three outcomes. Levels of significance were set at 5% ($P < 0.05$).

Results

During the 2017–2018 influenza season, 109 care homes had a laboratory-confirmed outbreak of influenza. Of those, sixty-eight (62.4%) had an outbreak caused by influenza A, 38 (34.9%) had an outbreak caused by influenza B and three had an outbreak owing to both influenza A and B. In 67 (61.5%) affected care homes, eligible residents were given prophylactic antivirals.

The characteristics of care homes where residents were given or not given prophylactic antivirals are shown in Table 1. There were no significant differences between the two groups of care homes. For both groups, influenza A predominated, the majority of homes were privately owned, there were more residential homes compared with nursing homes, almost two-thirds had residents with dementia and about three-quarters had a CQC score of 3 (good).

Of 3498 residents in the 109 care homes, 2200 (62.8%) were in homes where prophylactic antivirals were given. The number and proportions of residents from care homes that did and did not get antiviral prophylaxis who developed ILI, who were admitted to hospital or who died are shown in Table 2. A significantly higher attack rate was observed among residents of homes who were given antiviral prophylaxis (27%) than among residents of homes who were not given antivirals (20%). Just more than 5% of residents were admitted to the hospital, and 0.6% died, with no significant differences between the two groups.

Characteristics associated with ILI in residents from homes with a confirmed influenza outbreak are shown in Table 3. The unadjusted analysis showed a significantly lower risk of ILI among residents from voluntary compared with those from privately owned care homes, from homes that were either nursing or nursing combined with residential and from homes with >50 residents. There was a significantly higher risk of ILI among residents from small care homes with <20 residents and from homes that had residents with learning disabilities. Adjusted analysis showed a significantly lower risk of ILI among residents from homes with >50 residents and a significantly higher risk among those from homes with <20 residents, homes having residents with learning difficulties and homes where antiviral prophylaxis was given (Table 4).

Characteristics associated with admission to the hospital in residents from homes with a confirmed influenza outbreak are shown in Table 5. The unadjusted analysis showed a significantly lower risk of hospital admission among residents from nursing homes and a significantly higher risk among those from homes with <20 residents. Adjusted analysis showed no significant associations.

Characteristics associated with death due to ILI in residents from homes with a confirmed influenza outbreak are shown in Table 6. The unadjusted analysis showed a significantly higher risk of death among residents from voluntary owned care homes and homes that had residents with learning disabilities. The adjusted analysis showed a positive association between learning disabilities, care homes where residents were given antiviral prophylaxis and death (Table 7).

Discussion

This study was undertaken in the NW of England and attempted to assess associations between prophylactic antivirals and care home characteristics with the spread and severity of influenza in care home outbreaks. In this study, there were no significant differences in characteristics of care homes where residents were given antiviral prophylaxis compared with homes where residents were not given antiviral prophylaxis.

Table 3 – Care home characteristics associated with influenza-like illness among residents of care homes with a confirmed influenza outbreak in the North West of England during the 2017–2018 influenza season: unadjusted relative risks.

Characteristics	Number of residents	Number of residents with ILI	Unadjusted RR (95% CI)	P-value
	n	n (%)		
Total	3498	855 (24.4)		
Care home ownership				
Local authority	139	31 (22.3)	0.90 (0.7–1.2)	0.50
Private	3273	812 (24.8)	1.00	
Voluntary	86	12 (14.0)	0.56 (0.3–0.9)	0.02
Resident numbers in each home				
<20	353	136 (38.5)	1.51 (1.3–1.7)	<0.001
20–50	2416	618 (25.6)	1.00	
≥51	729	101 (13.9)	0.54 (0.4–0.9)	0.02
Type of care				
Nursing	1236	285 (23.1)	0.87 (0.8–0.9)	0.03
Residential	1916	509 (26.6)	1.00	
Both	339	60 (17.7)	0.67 (0.5–0.8)	<0.001
Other	7	1 (14.3)	0.54 (0.1–3.3)	0.46
Dementia status of residents in homes				
Homes with patients with dementia	2339	546 (23.3)	1.00	
Homes with residents with no dementia	1121	280 (25.0)	1.07 (0.9–1.2)	0.29
Homes with residents with LD	38	29 (76.3)	3.27 (2.7–4.0)	<0.001
Overall CQC score				
1[a]	84	10 (11.9)	0.47 (0.3–0.8)	<0.01
2	763	177 (23.2)	0.92 (0.8–1.1)	0.24
3	2533	641 (25.3)	1.00	
4[a]	60	6 (10.0)	0.40 (0.2–0.8)	<0.01
Not inspected	58	21 (36.2)	–	–

ILI = influenza-like illness; CQC = Care Quality Commission; LD = learning disability; RR = relative risk; CI = confidence interval.
[a] There was only one home with each of these CQC scores.

Table 4 – Care home characteristics associated with influenza-like illness among residents of care homes with a confirmed influenza outbreak in the North West of England during the 2017–2018 influenza season: adjusted relative risks.

Characteristics	Adjusted RR (95% CI)	P-value
Care homes where residents were given antiviral prophylaxis	1.51 (1.2–1.7)	< 0.001
Care homes with less than 20 residents	1.44 (1.1–1.7)	< 0.001
Care home with more than 50 residents	0.58 (0.4–0.7)	< 0.001
Homes with patients with dementia	0.96 (0.8–1.1)	0.66
Homes with residents with LD	2.76 (1.7–4.2)	< 0.001

ILI = influenza-like illness; LD = learning disability; RR = relative risk (using Poisson regression); CI = confidence interval.

Our study, paradoxically, found that care homes where residents received antiviral prophylaxis had a significantly higher attack rate of ILI compared with homes where residents received no prophylaxis. Although these findings were unexpected, similar findings have been reported previously.[6]

These findings, however, should be interpreted with caution as there are several plausible explanations. The criteria from the NICE advise that antivirals need to be started within 36–48 h since exposure to the last case.[19] In practice, this timeline is challenging to be met, and it is likely to have been missed in a number of these outbreaks, resulting in reducing effectiveness at preventing spread of influenza. Information on coverage of prophylaxis for eligible residents was lacking, and cases that developed ILI may or may not have received prophylaxis. In addition, larger outbreaks, where more people were affected, may have been much more likely to be recommended prophylactic antivirals than outbreaks reporting smaller number of cases. As reported in other studies,[28] there may have been delayed reporting where a large number of cases had already occurred. The lack of information on the exact timing of antiviral administration in relation to the date of onset of ILI has also compounded the interpretation of our findings. In addition, outbreaks only identified through laboratory reports from hospitalized cases may have received follow-up only towards the end of an outbreak when antivirals were not indicated, and the shortened period of heightened awareness may have reduced the total number of cases recognized in the home. The number of cases with influenza could have been overestimated as only 3–5 cases are typically tested to confirm an outbreak. Therefore, some of the cases with ILI symptoms may have had other viral/bacterial infections rather than influenza[29,30] and would not benefit from antivirals. Finally, this was an observational study using

Table 5 – Care home characteristics associated with admission to the hospital for influenza-like illness among residents of care homes with a confirmed influenza outbreak in the North West of England during the 2017–2018 influenza season: unadjusted relative risks.

Characteristics	Number of residents	Number of residents admitted to the hospital with ILI	Unadjusted RR (95% CI)	P-value
	n	n (%)		
Total	3498	190 (5.4)		
Care home ownership				
Local authority	139	6 (4.3)	0.79 (0.4–1.7)	0.56
Private	3273	179 (5.5)	1.00	
Voluntary	86	5 (5.8)	1.06 (0.5–2.5)	0.89
Resident numbers in each home				
<20	353	31 (8.8)	1.61 (1.1–2.3)	0.02
20–50	2416	132 (5.5)	1.00	
≥51	729	27 (3.7)	0.68 (0.5–1.0)	0.06
Type of care				
Nursing	1236	54 (4.4)	0.72 (0.5–0.9)	0.04
Residential	1916	117 (6.1)	1.00	
Both	339	18 (5.3)	0.87 (0.5–1.4)	0.57
Other	7	1 (14.3)	2.3 (0.4–14.5)	0.37
Dementia status of residents in homes				
Homes with patients with dementia	2339	130 (5.6)	1.00	
Homes with residents with no dementia	1121	56 (5.0)	0.90 (0.7–1.2)	0.49
Homes with residents with LD	38	4 (10.5)	1.89 (0.7–4.9)	0.19
Overall CQC score				
1	84	3 (3.6)	0.66 (0.2–2.0)	0.45
2	763	40 (5.2)	0.96 (0.7–1.4)	0.83
3	2533	138 (5.4)	1.00	
4	60	1 (1.7)	0.31 (0.1–2.2)	0.20
Not inspected	58	8 (13.8)	–	–

ILI = influenza-like illness; CQC = Care Quality Commission; LD = learning disability; RR = relative risk; CI = confidence interval.

secondary data, and homes were not randomly allocated to treatment or no treatment. Thus, bias and confounding may have influenced the results.

In this study, there were no significant differences in hospital admissions for influenza-related illness between care homes where residents were given antivirals compared with care homes where residents were not given antivirals, and this is also consistent with findings from previous studies.[6,16,31]

This study identified homes specifically catering for people with learning disabilities to be associated with an increased risk of ILI and death. In the Confidential Inquiry into the Deaths of People with Learning Disability, respiratory problems were found to be a major cause of death, and the report recommended that people with learning disabilities should always be included in seasonal influenza vaccination programmes.[32] Despite this advice, a Mencap survey in 2015 found a lack of awareness among primary care givers about people with learning disabilities being at high risk of influenza,[33] and it is possible that low uptake rates for influenza vaccination contributed to the findings. There are no recently published studies on this specific issue. The annual flu letter from the Chief Medical Officer regarding the national flu immunization programme includes people with learning disabilities as one of the high-risk groups that require flu vaccination. Given the long list of high-risk groups needing protection with the flu vaccine, learning disability may not receive the attention it requires. Local areas should be reminded of the need to raise awareness about better protection in homes specifically catering for people with learning disabilities.

There was an association between homes with large number of residents and lower rates of ILI in our study. Although we cannot attribute to cause and effect in our retrospective study, other studies have found that influenza attack rates decrease in proportion to the size of the institution.[34] One of the possible reasons is that in large care homes, uninfected sections can potentially be closed off and isolated from sections with infected residents.

The strengths of this study were the large sample size, the likely generalizability of the findings to England and the conduct and reporting of the study according to STROBE Guidance.[35] However, there were a number of limitations related to the observational nature of the study using routinely collected data, which were not possible to validate. Importantly, and as mentioned earlier, there was no random allocation in the study of homes to treatment or no treatment, and the results may have been affected by bias and confounding. There were missing data for key variables and a lack of important information that included timing and completeness of prescribing and administration of antiviral prophylaxis, whether cases of ILI occurred before or after initiation of antivirals, vaccination status and the thoroughness of infection control measures.

Despite the limitations, there are some important considerations for moving forward. This study cannot answer the question about effectiveness and benefits of antiviral

Table 6 – Care home characteristics associated with death due to influenza-like illness among residents of care homes with a confirmed influenza outbreak in the North West of England during the 2017–2018 influenza season: unadjusted relative risks.

Characteristics	Number of residents	Number of residents who died owing to ILI	Unadjusted RR (95% CI)	P-value
	n	n (%)		
Total	3498	20 (0.57)		
Care home ownership				
Local authority	139	0 (0)	0.67 (0.1–11.1)	0.78
Private	3273	17 (0.52)	1.00	
Voluntary	86	3 (3.49)	6.7 (2.1–22.5)	<0.01
Resident numbers in each home				
<20	353	5 (1.42)	2.28 (0.8–6.2)	0.09
20–50	2416	15 (0.62)	1.00	
≥51	729	0 (0)	0.11 (0.0–1.8)	0.06
Type of care				
Nursing	1236	6 (0.49)	0.66 (0.3–1.7)	0.40
Residential	1916	14 (0.73)	1.00	
Both	339	0 (0)	0.19 (0.0–3.2)	0.20
Other	7	0 (0)	8.26 (0.5–127)	0.08
Dementia status of residents in homes				
Homes with patients with dementia	2339	8 (0.34)	1.00	
Homes with residents with no dementia	1121	8 (0.72)	2.09 (0.8–5.5)	0.13
Homes with residents with LD	38	4 (10.5)	30.1(9.7–97.8)	<0.001
Overall CQC score				
1	84	0 (0)	1.10 (0.1–18.4)	0.95
2	763	6 (0.79)	1.53 (0.6–4.0)	0.38
3	2533	13 (0.51)	1.00	
4	60	0 (0)	1.54 (0.1–25.6)	0.76
Not inspected	58	1 (1.7)	–	–

ILI = influenza-like illness; CQC = Care Quality Commission; LD = learning disability; RR = relative risk; CI = confidence interval.

Table 7 – Care home characteristics associated with deaths due to influenza-like illness in residents of care homes with a confirmed influenza outbreak in the North West of England during the 2017–2018 influenza season: adjusted relative risks.

Characteristics	Adjusted RR (95% CI)	P-value
Care homes where residents were given antiviral prophylaxis	1.46 (1.2–1.7)	< 0.001
Homes with patients with dementia	0.93 (0.8–1.1.0)	0.37
Homes with residents with LD	3.96 (2.6–5.9)	< 0.001

LD = learning disability; RR = relative risk (using Poisson regression); CI = confidence interval.

prophylaxis in care home influenza outbreaks. However, it does identify the need for better and more complete reporting of data to monitor public health interventions in care homes. This will at a minimum require a restructuring of forms for collecting data and raising awareness about the importance of data collection with front-line staff. More detailed data may also be required to fully understand patterns of spread within an outbreak. Finally, more attention needs to be paid to homes that cater for persons with learning disabilities to ensure that they all receive the seasonal influenza vaccine and antiviral prophylaxis as appropriate.

Conclusions

This study conducted in the NW of England (2017/2018 influenza season) found no difference in baseline characteristics of care homes where residents were given antiviral prophylaxis compared with homes where residents were not given antiviral prophylaxis. Care homes where residents were given antiviral prophylaxis had a higher number of residents who developed an ILI and deaths compared with homes where residents received no prophylaxis. This is likely due to quality of data on the temporal associations between exposure to influenza and the appropriate administration of prophylaxis. Homes that catered for people with learning disabilities had more cases of ILI and influenza-related deaths.

Author statements

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Ethical approval

No ethical approval was required as the data used in the study were collected for Public Health surveillance under the Health Protection Legislation (England) Guidance 2010.

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Competing interests

None declared.

Author contributions

A.D.H., S.G. and P.C. were involved in project design, data analysis and interpretation, first and subsequent drafting of the article and final approval of the manuscript. A.S. and M.M. were involved in project design, data collection, data analysis and interpretation, first and subsequent drafting of the article and final approval of the manuscript.

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