



Public Health  
England

Protecting and improving the nation's health

# **Limiting staff movement and cohorting of residents to reduce the transmission of COVID-19 in care homes**

**A rapid review**

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## Main messages

1. Low-level evidence from 3 COVID-19 outbreaks in North America suggests that restricting staff movement and cohorting of residents could help to reduce the transmission of COVID-19 within care homes.
2. To fully understand the effectiveness of these 2 types of intervention in relation to COVID-19, more high-quality research is needed.
3. Indirect evidence from the management of influenza and other outbreaks in care home settings may help to supplement understanding of effectiveness.

## Background

Many people living in care homes are clinically vulnerable to severe illness from COVID-19 due to age or pre-existing health conditions (1). Data suggests that during the COVID-19 pandemic (and until the 1 May 2020) there had been more than 22,000 deaths of residents of care homes in England and Wales, representing 54% of all excess mortality (2). Although the broader impact on care home residents and workers has not been assessed.

Staff movement between care homes, domiciliary care and even other jobs is common place, which means there are increased opportunities for COVID-19 transmission. A US-based study of roughly 1,000 care home workers reported two thirds having dual- or triple-care giving roles, one in 6 had a second job, and 70% reported feeling obliged to attend work even when unwell (3).

The isolation of individuals who have symptoms of COVID-19 is a main strategy within England to reduce transmission within the general population (4). The practice of separating residents who need to isolate due to having symptoms of COVID-19 may be important in reducing the transmission, and the application of this within care homes warrants consideration. On the one hand, isolation of residents showing symptoms of COVID-19 may reduce further transmission; however, movement of residents, especially those with dementia (either within or between care homes), may lead to increased stress, and increased morbidity and mortality.

## Objective

The purpose of this review is to examine the effectiveness of strategies to i) restrict staff movement and ii) isolate groups of residents showing symptoms of COVID-19 ('cohorting') in reducing the transmission of COVID-19.

## Review questions

1. What is the effectiveness of restricting staff movements for reducing spread of COVID-19 in care homes?
2. What is the effectiveness of cohorting residents for reducing spread of COVID-19 in care homes?

## Summary of methods

A scoping search was completed on 8 May 2020 to identify any existing reviews (systematic or rapid) related to these questions. We searched a number of COVID-19

review repositories and prospective review registers and a summary paper was produced. Two potentially relevant rapid reviews were identified, broadly examining the strategies to reduce the transmission of COVID-19 within care homes (5,6). In addition we identified another relevant 'rapid scan' review produced by The Strategy Unit (7). See [Supplementary evidence from rapid reviews](#) for a summary of these reviews.

A full literature search was then undertaken to look for systematic review and primary studies specifically focused on our 2 questions, published (or available as pre-print) between 1 January 2020 and 13 May 2020. See [Annexe A](#) for details of the methodology, a protocol is available in [Annexe C](#).

## Evidence

The search returned 332 records, after removal of duplicates 272 records were screened by title and abstract and 19 full texts. A PRISMA diagram is provided in [Figure A.1](#).

Five papers, reporting on 3 COVID-19 outbreaks in North America, were identified (8 to 12). One paper reported on an outbreak in long-term care facilities (LTCF) in Ontario, Canada (8). A COVID-19 outbreak database created by the Ontario Ministry of Health was analysed to estimate risk factors in LTCF in Ontario. Ontarians aged over 69 years living in the community were used as the comparator group. The 2 other outbreaks occurred in care homes in Washington, United States, and were investigated by Public Health–Seattle and King County, and the Center for Disease Control (CDC) (9 to 12).

All these studies were observational and have a number of limitations such as lack of randomisation and heterogeneity of participants. Case report studies present additional limitations, including lack of control or comparison groups. In addition, all these studies were rapidly conducted during an outbreak which can result in possible incompleteness of data. Inconsistency of testing across settings is another limitation.

Full details of studies can be found in [Annexe B](#).

## Evidence on restricting staff movement to reduce the spread of COVID-19 in care homes

Three of the identified papers reported on a COVID-19 outbreak in a skilled nursing facility in King County, Washington (9 to 11). A total of 167 confirmed cases of COVID-19 affecting 101 residents, 50 health care personnel and 16 visitors were found to be epidemiologically linked to the facility. Three other facilities with confirmed COVID-19 cases had clear epidemiologic links to the first facility, including 2 facilities which had staff working in the first facility (9,10). A more detailed analysis showed that in one of

these facilities, the index patient was a health care provider which might have contributed to rapid spread in the facility (11).

In the outbreak in Ontario, lagged infections in staff were the strongest predictors of death in residents (8). The results were significant at all lags (0 to 7 days) after adjustment for date and numbers of infected residents. Based on these results, the authors suggested that residents are infected by staff, and not vice versa. One of the authors recommendations, based on their results, was to limit workers to a single facility to prevent movement of COVID-19 between facilities.

Main finding: staff working in more than one facility was identified as one of the factors likely to have contributed to the vulnerability of care homes.

## Evidence on cohorting residents to reduce the spread of COVID-19 in care homes

Investigation of a COVID-19 outbreak in a senior independent and assisted living community in Seattle, Washington, showed that, after 7 days, 4 of the 80 residents and 2 of the 62 staff members were tested positive to COVID-19 (12). Early implementation of stringent isolation (residents isolated in their rooms with no communal meals or activities, no visitors allows and screening of staff members) and less contact with health care providers are some of the possible explanations provided for so few cases compared with other skilled nursing facilities in Washington (9 to 11).

Transmission from asymptomatic and pre-symptomatic residents, who were not recognized as having SARS-CoV-2 infection and therefore not isolated, might also have contributed to rapid spread in some of the LTCF (11). Testing to guide cohorting strategies merit therefore consideration, rather than cohorting based on symptoms only.

Main finding: early implementation of social isolation among residents could help to reduce the transmission of COVID-19 within care homes. Symptom-based screening might not be sufficient and testing to guide cohorting might be a strategy to reduce the spread of COVID-19 in care homes.

## Supplementary evidence from rapid reviews

A rapid review examining how pandemic spreads in care homes can be contained was published by the Centre for Evidence Based Medicine, Oxford on 14 April 2020 (5). The review includes 30 papers, most relating to outbreak management within an influenza outbreak with vaccine available. The review reported the movement of staff as a main

factor in outbreaks and the transmission of communicable disease within larger care home settings – in particular for those working across a number of facilities. We contacted the authors of this rapid review to ask for more details about how they reached this conclusion. The evidence on staff movement was based on a simulation study, a cohort study, and a survey study indicating that care homes expected staff movement to increase during pandemics and that while there is not good evidence that staff movement causes outbreaks, there is some evidence that it may be a risk factor.

A rapid review of strategies for preventing respiratory illness in older adults aged 60 years and above living in long-term care was published as pre-print on 28 March 2020 (6). It is an overview of reviews, prepared in Canada for WHO and includes 6 systematic reviews. One included review (of moderate quality) considered the effectiveness of outbreak control practices for influenza. Authors combined a literature review with Bayesian hierarchical logistic regression modelling. They included 18 studies on social distancing which included 1) isolating and cohorting, 2) no new admissions, 3) ward transfer restrictions, 4) visitor restrictions. They reported that social distancing was not associated with significant changes in influenza attack rates. However, the lack of statistically significant effect of social distancing could have been due to broad definitions as non-pharmaceutical interventions were rarely reported in detail. Furthermore, it was not possible to separate out the effects of the 4 different types of social distancing measures.

This rapid review is currently being updated, is due for publication by 23 May 2020, and will include systematic reviews, guidelines and primary studies.

A 'rapid scan' of the literature produced by The Strategy Unit drew the following conclusions (7):

1. Staffing: the attempt to cover staffing gaps through temporary staff may exacerbate spread, particularly where staff are deployed across multiple sites. Retention is identified as a main issue to address during recovery planning.
2. Isolation and distancing: qualitative studies suggest a concern with the unintended consequences of distancing in a population where anxiety and depression are prevalent. Recovery planning should include procedures for reintroducing visitors safely.

## Limitations

The review of primary studies is limited to evidence drawn from COVID-19. Whilst this is most directly relevant, there are only 5 papers available, reporting on 3 outbreaks. In examining the broader evidence base it was necessary to rely on existing rapid reviews due to time constraints. There would be value in examining this evidence more fully.

## Conclusions

Some direct, but low-level, evidence from COVID-19 outbreaks was identified. However, this evidence did suggest that restriction of staff movement and social distancing among residents could help reduce the spread of COVID-19. This evidence is supported by broader evidence for the effectiveness of these strategies (as described in rapid and systematic reviews), but further high-quality research is needed. The potential adverse impacts of these measures should also be considered.

## Disclaimer

PHE's rapid reviews aim to provide the best available evidence to decision makers in a timely and accessible way, based on published peer-reviewed scientific papers, unpublished reports and papers on preprint servers. Please note that the reviews: i) use accelerated methods and may not be representative of the whole body of evidence publicly available; ii) have undergone an internal, but not independent, peer review; and iii) are only valid as of the date stated on the review.

In the event that this review is shared externally, please note additionally, to the greatest extent possible under any applicable law, that PHE accepts no liability for any claim, loss or damage arising out of, or connected with the use of, this review by the recipient or any third party including that arising or resulting from any reliance placed on, or any conclusions drawn from, the review.



## References

1. Cabinet Office. 'Guidance: Staying alert and safe (social distancing) after 4 July'. Coronavirus (COVID-19): guidance and support 2020:
2. Comas-Herrera A and others. 'England: Estimates of mortality of care home residents linked to the COVID-19 pandemic'. 2020
3. Van Houtven CH and others. 'Essential Long-Term Care Workers Commonly Hold Second Jobs and Double- or Triple-Duty Caregiving Roles'. Pre-print, Accepted
4. Public Health England. 'Guidance: Stay at home: guidance for households with possible coronavirus (COVID-19) infection'. Coronavirus (COVID-19): guidance and support 2020
5. Koshkouei M and others. 'How can pandemic spreads be contained in care homes?'. 2020
6. Rios P and others. 'Preventing respiratory illness in older adults aged 60 years and above living in long-term care: A rapid overview of reviews'. 2020
7. The Strategy Unit (NHS). 'Rapid scan 1: Effects on people in care/nursing homes (and other residential facilities) including approaches to protecting workers and residents'. 2020
8. Fisman D and others. 'Failing our Most Vulnerable: COVID-19 and Long-Term Care Facilities in Ontario'. 2020
9. McMichael TM and others. 'Epidemiology of Covid-19 in a long-term care facility in King County, Washington'. New England Journal of Medicine 2020
10. McMichael TM and others. 'COVID-19 in a long-term care facility—King County, Washington, February 27–March 9, 2020'. MMWR Morb Mortal Wkly Rep 2020: volume 69, issue 12, pages 339-42
11. Kimball A and others. 'Asymptomatic and Presymptomatic SARS-CoV-2 Infections in Residents of a Long-Term Care Skilled Nursing Facility - King County, Washington, March 2020'. MMWR - Morbidity & Mortality Weekly Report 2020: volume 69, issue 13, pages 377-81
12. Roxby AC and others. 'Detection of SARS-CoV-2 Among Residents and Staff Members of an Independent and Assisted Living Community for Older Adults—Seattle, Washington, 2020'. MMWR Morb Mortal Wkly Rep 2020: volume 69, issue 14, pages 416-8

## Annexe A. Methods

This report employed a rapid review approach to address the following research questions:

1. Is restricting staff movement effective for reducing the spread of COVID-19 in care homes?
2. Is cohorting residents effective in reducing the spread of COVID-19 in care homes?

### Notes

Restriction of movement included staff moving between care homes, and moving between care homes and domestic care (that is, caring for people in their own homes), and moving within a care home.

Cohorting refers to the practice of isolating COVID-19 patients from those who are not infected within a care home setting or between care homes.

A preliminary scoping search identified 4 relevant reviews; these were broader reviews related to transmission in care homes.

It was therefore agreed that a literature search would be undertaken to provide the most up to date evidence specific to COVID-19.

## Protocol

A protocol was produced by the project team before the literature search began, specifying the research question and the inclusion and exclusion criteria. The protocol is available in [Annexe C](#). Due to a limited amount of available evidence, we included observational studies without control group.

## Sources searched

1. Medline, Embase, Social Care Online/SocIndex, medRxiv preprints.
2. We also searched a number of existing COVID-19 review repositories plus additional resources such as PROSPERO, TRIP database, NICE Evidence and an Endnote library containing COVID-19 citations.

## Search strategy

Searches were conducted for papers published between 1 January 2020 and 13 May 2020.

Search terms covered main aspects of the research question, including terms related to the intervention. The search strategy for Ovid Medline is presented [below](#).

### Search strategy Ovid Medline

1. (care adj home\*).tw,kw.
2. (nursing adj home\*).tw,kw.
3. ((patient\* or client\* or resident\* or elderly) adj3 home\*).tw,kw.
4. (sheltered hous\* or long term care or residential care\* or long term facilit\*).tw,kw.
5. assisted living.tw,kw.
6. (old age home\* or retirement home).tw,kw.
7. domiciliary care.tw,kw.
8. Home Nursing/
9. Home Care Services/
- 10.exp Nursing Homes/
- 11.Residential Facilities/
- 12.Group Homes/
- 13.Homes for the Aged/
- 14.Hospice Care/
- 15.1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14
- 16.exp coronavirus/
- 17.exp Coronavirus Infections/
- 18.((corona\* or corono\*) adj1 (virus\* or viral\* or virinae\*)).ti,ab,kw.
- 19.(coronavirus\* or coronavir\* or coronavirinae\* or CoV or HCoV\*).ti,ab,kw.
- 20.(2019-nCoV or 2019nCoV or nCoV2019 or nCoV-2019 or COVID-19 or COVID19 or CORVID-19 or CORVID19 or WN-CoV or WNCov or HCoV-19 or HCoV19 or 2019 novel\* or Ncov or n-cov or SARS-CoV-2 or SARSCoV-2 or SARSCoV2 or SARS-CoV2 or SARSCov19 or SARS-Cov19 or SARSCov-19 or SARS-Cov-19 or Ncover or Ncorona\* or Ncorono\* or NcovWuhan\* or NcovHubei\* or NcovChina\* or NcovChinese\* or SARS2 or SARS-2 or SARSCoronavirus2 or SARS-coronavirus-2 or SARSCoronavirus 2 or SARS coronavirus2 or SARSCoronavirus2 or SARS-coronavirus-2 or SARSCoronavirus 2 or SARS coronavirus2).ti,ab,kw.
- 21.(respiratory\* adj2 (symptom\* or disease\* or illness\* or condition\*) adj10 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw.
- 22.((seafood market\* or food market\* or pneumonia\*) adj10 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw.
- 23.((outbreak\* or wildlife\* or pandemic\* or epidemic\*) adj1 (Wuhan\* or Hubei or China\* or Chinese\* or Huanan\*)).ti,ab,kw.
- 24.or/16-23
- 25.15 and 24

**Table A.1. Inclusion and exclusion criteria**

	<b>Included</b>	<b>Excluded</b>
Population	Adults in generic care homes and those being cared for at home	Care homes for people aged less than 60
Issue	1. Staff movement restrictions 2. Cohorting residents	
Comparison	Any comparisons will be included	
Outcomes	COVID-19 infection (incidence) Mortality	
Measurement type	Clinically confirmed cases	
Language	English, French, Spanish and Italian	
Date of publication	1 January 2020 to present	
Study design	Reviews and experimental or observational studies	
Publication type	Published and pre-print	
Setting	All	We may focus on literature from USA and Europe in the first instance depending on how many relevant articles are identified

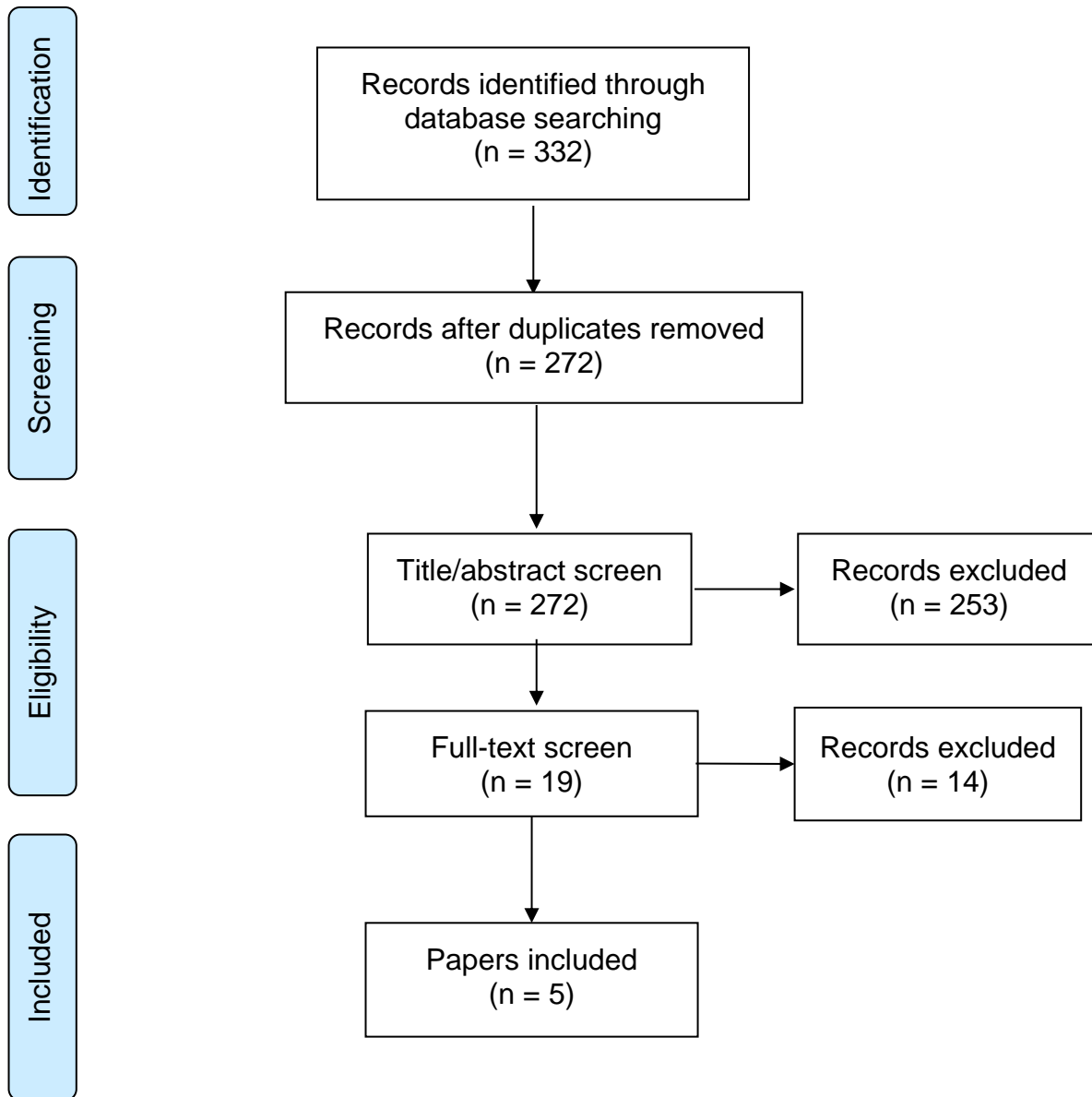
## Screening

Title and abstract screening was done independently by 2 reviewers. In case of disagreement, the study was included for full-text consideration. Full text screening was done by a one reviewer. [Figure A.1](#) illustrates this process.

## Data extraction and quality assessment

Data extraction was done by one reviewer.

Due to the rapid nature of the work, a validated risk of bias tool was not used to assess study quality. However, major sources of bias were noted when reviewing the papers.



**Figure A.1. PRISMA diagram**

Figure A.1. PRISMA diagram alt text

A PRISMA diagram showing the flow of studies through this review.

There were  $n = 332$  records identified via database searching, reduced to  $n = 272$  records after duplicates were removed, leaving  $n = 272$  records screened on title and abstract.

From these,  $n = 253$  records were excluded. This left  $n = 19$  records screened on full text, of which  $n = 14$  were excluded, leaving  $n = 5$  papers that were included in the review.

## Annexe B. Data extraction

Acronyms used: CDC = center for disease and control, CI = confidence interval, LTCF = long term care facility, PPE = personal protective equipment, SNF = skilled nursing facility

Reference	Study design	Methods	Findings
Fisman and others 2020 (8)  PRE-PRINT	Retrospective observational study.  <u>Setting:</u> long-term care facilities (LTCF) in Ontario (Canada).  <u>Objective:</u> to better understand trends and risk factors for COVID-19 death in LTC in Ontario.	A COVID-19 outbreak database created by the Ontario Ministry of Health was analysed for the period 29 March 2020 to 7 April 2020.  Mortality incidence rate ratios for LTCF were calculated with community living Ontarians aged over 69 years used as the comparator group.  Count-based regression methods were used to model temporal trends and identify associations between infection risk in staff and residents, and subsequent LTCF resident death.  <u>Limitations:</u> <ul style="list-style-type: none"> <li>• possible incompleteness of data collected rapidly during an outbreak</li> <li>• inconsistency in testing across Ontario</li> <li>• absence of individual-level data on LTCF infections and deaths</li> </ul>	Confirmed or suspected cases of COVID-19 were identified in 272 of 627 LTCF by 7 April 2020. The incidence rate ratio for COVID-19 death was 13.1 (9.9 to 17.3) relative to community living adults over 69. Incidence rate ratio increased over time and was 87.28 (90% CI: 9.98 to 557.08) by 7 April 2020.  Lagged infections in staff were the strongest predictors of death in residents and were significant at all lags (0 to 7 days) after adjustment for date and numbers of infected residents. The strongest effects were seen with infected staff at a 2 day lag (relative increase in death per infected staff member 20%, 95% CI: 14 to 26%) and a 6 day lag (17%, 95% CI: 11% to 26%). By contrast the association between infection in residents and subsequent resident death was variable, and far weaker than the effect seen for staff, and was statistically significant only at a zero-day lag (increased risk per infected resident 8%, 95% CI: 1% to 15%).  Based on these results, the authors suggested that residents are infected by staff, and not vice versa.  The authors concluded that early identification of risk requires a focus on testing and provision of personal protective equipment to staff, and restructuring the LTCF workforce to prevent movement of COVID-19 between LTC.
McMichael and others, 2020 (9,10)	Case report  <u>Setting:</u> long-term care facility (LTCF) in King County, Washington (US), with approximately 130 facility residents and 170 staff.  <u>Objective:</u> to investigate the cluster of COVID-19-like illness that was occurring in this facility.	On 28 February 2020, a confirmed case of COVID-19 was identified in a skilled nursing facility ("Facility A") in King County, Washington (73-year-old woman).  Public Health—Seattle and King County, aided by the Centers for Disease Control and Prevention, launched a case investigation, contact tracing, quarantine of exposed persons, isolation of confirmed and suspected cases, and on-site enhancement of infection prevention and control.  Facility residents, visitors, and health care personnel with confirmed COVID-19 were interviewed by telephone to collect information on symptoms, severity, coexisting conditions, travel history, and close contacts with known COVID-19.  <u>Limitations:</u> <ul style="list-style-type: none"> <li>• not all residents and staff were interviewed and tested for SARS-CoV-2</li> <li>• case ascertainment and testing ramped up after the outbreak was recognized at Facility A, but there could have been infections and transmission at other facilities in the area earlier</li> </ul>	As of 18 March, a total of 167 confirmed cases of COVID-19 affecting 101 residents (median age 83 years), 50 health care personnel (median age 43.5 years), and 16 visitors (median age 62.5 years) were found to be epidemiologically linked to the facility.  A total of 30 King County facilities with at least one confirmed COVID-19 case, including Facility A, were identified by 18 March. Of the first 8 facilities affected after Facility A, at least 3 had clear epidemiologic links to Facility A: 2 had staff working both at that facility and at Facility A; the third facility had received two patient transfers from Facility A.  Factors identified by this case investigation as likely to have contributed to the vulnerability of these facilities included: <ul style="list-style-type: none"> <li>• staff who had worked while symptomatic</li> <li>• staff who worked in more than one facility</li> <li>• inadequate familiarity with and adherence to PPE recommendations</li> <li>• challenges to implementing proper infection control</li> <li>• practices, including inadequate supplies of PPE and other items (for example, alcohol-based hand sanitiser)</li> <li>• delayed recognition of cases because of a low index of suspicion</li> <li>• limited availability of testing</li> <li>• difficulty identifying persons with COVID-19 on the basis of signs and symptom alone.</li> </ul>

Reference	Study design	Methods	Findings
<p>Kimball and others, 2020 (11)</p>	<p>Case report on the same outbreak as (9,10)</p> <p><u>Setting:</u> long-term care skilled nursing facility (SNF) in King County, Washington (US), with 82 residents.</p> <p><u>Objective:</u> to assess how asymptomatic and presymptomatic residents might contribute to SARS-CoV-2 transmission and to evaluate the utility of symptom screening for identification of COVID-19 in residents.</p>	<p>A COVID-19 outbreak in a long-term care SNF in King County, Washington that was first identified on 28 February 2020. On 1 March, a health care provider at a second long-term care SNF in King County, Washington, had a positive test result for SARS-CoV-2, after working while symptomatic on February 26 and 28. By March 6, seven residents of this second facility were symptomatic and had positive test results for SARS-CoV-2.</p> <p>On 13 March, CDC performed symptom assessments and SARS-CoV-2 testing for 76 (93%) of the 82 residents to evaluate the utility of symptom screening for identification of COVID-19 in SNF residents.</p> <p><u>Limitations:</u> Accurate symptom ascertainment in persons with cognitive impairment and other disabilities is challenging; however, this limitation is estimated to be representative of symptom data collected in most SNFs, and thus, these findings might be generalizable.</p> <p>Because this analysis was conducted among residents of an SNF, it is not known whether findings apply to the general population, including younger persons, those without underlying medical conditions, or similarly aged populations in the general community.</p>	<p>Among the 76 tested residents, 23 (30.3%) had positive test results. And among the 23 residents with positive test results, 10 (43.5%) were symptomatic, and 13 (56.5%) were asymptomatic. Eight symptomatic residents had typical COVID-19 symptoms, and two had only atypical symptoms; the most common atypical symptoms reported were malaise (4 residents) and nausea (3 residents).</p> <p>One week after testing, the 13 residents who had positive test results and were asymptomatic on the date of testing were reassessed; 10 had developed symptoms and were recategorized as presymptomatic. The mean interval from testing to symptom onset in the presymptomatic residents was 3 days. Three residents with positive test results remained asymptomatic.</p> <p>These results indicate a very rapid spread, despite early adoption of infection prevention and control measures. Approximately half of all residents with positive test results did not have any symptoms at the time of testing, suggesting that transmission from asymptomatic and presymptomatic residents, who were not recognized as having SARS-CoV-2 infection and therefore not isolated, might have contributed to further spread.</p> <p>The authors concluded that additional prevention measures merit consideration, including using testing to guide cohorting strategies.</p> <p>The authors also highlighted that the index patient in this outbreak was a health care provider, which might have contributed to rapid spread in the facility.</p>
<p>Roxby and others, 2020 (12)</p>	<p>Case report</p> <p><u>Setting:</u> a senior independent and assisted living community (facility 1) in Seattle, Washington (US), with 80 residents and 62 staff members. It comprises 83 apartments (45 independent living and 38 assisted living) along multiple hallways; and communal dining, library, and activity areas</p> <p><u>Objective:</u> to investigate this outbreak.</p>	<p>During 5 to 9 March 2020, two residents of facility 1 were hospitalized with confirmed COVID-19 infection. On March 6, residents were isolated in their rooms with no communal meals or activities, no visitors were allowed in the facility, and staff member screening and exclusion of symptomatic staff members were implemented. Enhanced hygiene practices were put into effect, including cleaning and disinfection of frequently touched surfaces and additional hand hygiene stations in hallways for workers to use.</p> <p>UW Medicine (the health system linked to the University of Washington), Public Health – Seattle &amp; King County, and CDC conducted an investigation at the facility, including testing (2 rounds, 7 days apart) and surveys of residents and staff members.</p> <p><u>Limitation:</u> Symptom reports by residents and staff members might have been subject to recall bias, given the general anxiety about COVID-19 in response to the identification of the two initial COVID-19 cases.</p>	<p>Among 142 residents and staff members tested during the initial phase, three of 80 residents (3.8%) and two of 62 staff members (3.2%) had positive test results. A fourth resident had positive test results 7 days later.</p> <p>Possible explanations for so few cases of COVID-19 in this residential community compared with those in several Seattle skilled nursing facilities with high morbidity and mortality include more social distancing among residents and less contact with health care providers. In addition, early implementation of stringent isolation and protective measures after identification of two COVID-19 cases might have been effective in minimizing spread of the virus in this type of setting.</p>

# Annexe C. Protocol

## Research questions

1. Is restricting staff movement effective for reducing the spread of COVID-19 in care homes?
2. Is cohorting residents effective in reducing the spread of COVID-19 in care homes?

### Notes

Restriction of movement will include staff moving between care homes, and moving between care homes and domestic care (that is, caring for people in their own homes), and moving within a care home.

Cohorting refers to the practice of isolating COVID-19 positive patients from those who are not infected within a care home setting.

We will start searching for literature related to COVID-19 only. If too few papers are identified, the review could be repeated to focus on literature on influenza.

**Table C.1: Inclusion and Exclusion criteria**

	<b>Included</b>	<b>Excluded</b>
Population	Adults in generic care homes and those being cared for at home	Care homes for people aged less than 60
Issue	<ol style="list-style-type: none"> <li>1. Staff movement restrictions</li> <li>2. Cohorting residents</li> </ol>	
Comparison	Any comparisons will be included	
Outcomes	COVID-19 infection (incidence) Mortality	
Measurement type	Clinically confirmed cases	
Language	English, French, Spanish and Italian	
Date of publication	1 January 2020 to present	
Study design	Reviews and experimental or observational studies which include a comparison group	
Publication type	Published and pre-print	
Setting	All	We may focus on literature from USA and Europe in the first instance depending on how many relevant articles are identified



## Sources of evidence

Medline, Embase, Social Care Online/SocIndex, medRxiv preprints.

We also searched a number of existing COVID-19 review repositories plus additional resources such as PROSPERO, TRIP database, NICE Evidence and an Endnote library containing COVID-19 citations.

### Search terms for OVID Medline

1. (care adj home\*).tw,kw.
2. (nursing adj home\*).tw,kw.
3. ((patient\* or client\* or resident\* or elderly) adj3 home\*).tw,kw.
4. (sheltered hous\* or long term care or residential care\* or long term facilit\*).tw,kw.
5. assisted living.tw,kw.
6. (old age home\* or retirement home).tw,kw.
7. domiciliary care.tw,kw.
8. Home Nursing/
9. Home Care Services/
- 10.exp Nursing Homes/
- 11.Residential Facilities/
- 12.Group Homes/
- 13.Homes for the Aged/
- 14.Hospice Care/
- 15.1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14
- 16.exp coronavirus/
- 17.exp Coronavirus Infections/
- 18.((corona\* or corono\*) adj1 (virus\* or viral\* or virinae\*)).ti,ab,kw.
- 19.(coronavirus\* or coronovirus\* or coronavirinae\* or CoV or HCoV\*).ti,ab,kw.
- 20.(2019-nCoV or 2019nCoV or nCoV2019 or nCoV-2019 or COVID-19 or COVID19 or CORVID-19 or CORVID19 or WN-CoV or WNCov or HCoV-19 or HCoV19 or 2019 novel\* or Ncov or n-cov or SARS-CoV-2 or SARSCoV-2 or SARSCoV2 or SARS-CoV2 or SARSCov19 or SARS-Cov19 or SARSCov-19 or SARS-Cov-19 or Ncover or Ncorona\* or Ncorono\* or NcovWuhan\* or NcovHubei\* or NcovChina\* or NcovChinese\* or SARS2 or SARS-2 or SARScoronavirus2 or SARS-coronavirus-2 or SARScoronavirus 2 or SARS coronavirus2 or SARScoronavirus2 or SARS-coronavirus-2 or SARScoronavirus 2 or SARS coronavirus2).ti,ab,kw.
- 21.(respiratory\* adj2 (symptom\* or disease\* or illness\* or condition\*) adj10 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw.
- 22.((seafood market\* or food market\* or pneumonia\*) adj10 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw.
- 23.((outbreak\* or wildlife\* or pandemic\* or epidemic\*) adj1 (Wuhan\* or Hubei or China\* or Chinese\* or Huanan\*)).ti,ab,kw.
- 24.or/16-23
- 25.15 and 24

## Screening

Screening will be undertaken by one reviewer and checked by a second.

## Data extraction

Summary information for each study will be extracted and reported in tabular form. This will be undertaken by one reviewer and checked by a second.

## Risk of bias assessment

The risk of bias for each included review will be assessed by one reviewer using AMSTAR.

Due to the rapid nature of the work, validated tools will not be used for experimental and observational studies, however major sources of bias will be noted by reviewers.

## Synthesis

A narrative synthesis will be provided.

# About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-leading science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and a distinct delivery organisation with operational autonomy. We provide government, local government, the NHS, Parliament, industry and the public with evidence-based professional, scientific and delivery expertise and support.

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