UK Health Security Agency

Interventions to reduce COVID-19 transmission in adult social care settings

A rapid review

Contents

Main messages

1. The purpose of this review was to identify and examine evidence on the effectiveness of interventions to reduce coronavirus (COVID-19) transmission in adult social care settings. The review includes 14 studies (including one preprint): 4 interventional studies (of which 3 were before and after studies) and 10 observational studies (search up to 8 July 2021).
2. All included studies were conducted in long-term care facilities (no evidence on domiciliary care identified). Of the 14 studies, 11 were from the early stage of the pandemic (before summer 2020). None of the studies identified were conducted in a population that had been vaccinated.
3. There was evidence from interventional and observational studies that strategies based on facility-wide testing and isolation of identified cases was likely to reduce COVID-19 transmission in care home settings.
4. There was evidence from observational studies that staffing policies such as cohorting staff to infected or to non-infected residents, not employing agency staff and having statutory sick pay were associated with lower risk of COVID-19 transmission.
5. The evidence on personal protection equipment (PPE) was limited to observational studies. The results on PPE use were conflicting, and the findings on PPE training and auditing and PPE supply were mixed, with some studies reporting no association and others suggesting a decrease in transmission. Other factors are likely to have impacted the results.
6. There was some evidence from observational studies that limiting the use of shared space, restricting group activities, and hand sanitiser availability were associated with small or non-significant association with COVID-19 rates. Results on resident cohorting were mixed. Results on cleaning practices were conflicting.
7. The evidence on the effectiveness of infection and prevention control (IPC) measures remains limited, partly due to study designs and factors not accounted for in the studies are likely to have impacted the results. There is a need for higher quality studies.

Background

Adult social care (ASC) services, which provide support to adults with physical and learning disabilities or physical and mental illness, have been severely affected by the COVID-19 pandemic. The World Health Organization (WHO) has estimated that in some countries more than 40% of COVID-19 related deaths in the first wave occurred in care homes, with incidence rates ranging up to 70% amongst residents in high-income countries such as the UK and US (1). ASC workers were also particularly affected: in 2020, those working in social care occupations in England and Wales were at higher risk of COVID-19-related deaths compared to other professional occupations, and almost 3 in 4 of the deaths in social care occupations were in care workers and home carers (2).

As a result, Infection Prevention Control (IPC) measures were implemented in ASC settings, including hand washing and enhanced cleaning, use of Personal Protection Equipment (PPE), testing and isolation of cases, and staffing policies such as cohorting. In England, a range of guidance to support the ASC sector on responding to the COVID-19 pandemic was made available (3,4), including specific guidance on testing for ASC settings (5), general guidance on IPC measures in health and care settings (6) and PPE guidance for community and social care settings (7).

Vaccines have now been widely rolled out in care homes. As of 24 August 2021, 94% of residents and 81% of staff in older adult care homes had received both doses of COVID-19 vaccine (8), and from November 2021 it will be mandatory for all care home workers in England to be fully vaccinated (9). The situation is different in other ASC settings, especially for domiciliary care where only 68% of staff has been fully vaccinated (8). Whilst evidence suggests that vaccines are effective in reducing infection and severe disease in older adults (10), there is some emerging evidence that waning of vaccine effectiveness may be greater in adults older than 65 years old and in those in a clinical risk group compared to heathy adults (11). New cases and clusters are still happening in these settings, so there is still a need to review and promote IPC measures that are effective in mitigating COVID-19 transmission.

Transmission modes are important considerations when deciding on which IPC measures to implement to break the chain of infection. COVID-19 is transmitted through respiratory particles that contain the SARS-CoV-2 virus and close contact transmission is widely accepted as being the main mode of COVID-19 transmission (12,13). Whilst some risk of transmission via fomite has been acknowledged, especially at the start of the pandemic, the risk is now thought to be low compared to direct and airborne transmission (14). There is evidence that SARS-CoV-2 RNA can be detected on surfaces, but there is limited evidence that viable (infectious) virus can be detected on surfaces in real-world settings as well as limited epidemiological evidence of fomite transmission (13,15,16). On the other hand, the risk associated with airborne transmission was initially underestimated but it is now recognised that it can occur (17,18); despite limited evidence that viable (infectious) virus can be detected in real-world settings (19,20), there is evidence from epidemiological investigations that long-distance airborne

transmission (beyond 2 metres) is possible, especially in poorly ventilated indoor settings (20,21).

Appropriate IPC measures can also depend on the setting. For instance, the level of recommended PPE is different in community settings (considered lower risk) than in healthcare settings (considered higher risk). However, most of the evidence on PPE effectiveness comes from healthcare settings. Overall, the evidence suggests that PPE use such as masks, eye protection, gloves and gowns decreased infection risk in healthcare workers (22 to 24). When comparing different types of masks and respirators, the evidence suggests that N95 (FFP2) respirators are likely to be more effective than surgical masks, although there is still too little evidence specific to COVID-19 to draw conclusions on this (24 to 26). There is also a lack of COVID-19 evidence on FFP3 effectiveness compared to other masks although they are usually recommended in healthcare settings when performing aerosol generating procedures and in high risk pathways (6,13). Regarding PPE training, evidence from the COVID-19 pandemic tends to suggest that it is associated with decreased risk of infection but the estimates are often imprecise, although wider evidence suggests that IPC training, including on donning and doffing procedures, is associated with reductions in infection risks (23,24).

We previously conducted a rapid review on COVID-19 in care homes and domiciliary care settings (search up to 31 August 2020) (27). Of the 22 studies included in this review, 9 reported on effectiveness of interventions in reducing COVID-19 transmission in care homes suggesting that facility-wide testing, isolation of cases and voluntary confinement of staff in care homes were associated with a reduction of transmission. No evidence from domiciliary care was identified and overall the evidence was considered weak mainly based on study design. A number of reviews have since been conducted, including a rapid review by the National Collaborating Centre for Methods and Tools (NCCMT) on strategies to mitigate risk of COVID-19 outbreaks in long-term care facilities (search up to 1 February 2021) (28), although most of the reviews focused on care home settings. A review with search up to 30 December 2020 which included evidence on different long-term care settings (including domiciliary care and community care) was also identified, but it was a mapping review which did not include results on effectiveness of the interventions (29). There is therefore a need to review the most recent evidence on effectiveness of IPC measures in ASC settings, including care homes, domiciliary care and day centres.

Objective

The purpose of this rapid review was to identify and assess evidence from the COVID-19 pandemic on the effectiveness of IPC measures in reducing transmission of COVID-19 in adult social care settings.

Definitions

Agency staff (also called temporary worker): nurse, carer and other staff such as cook or cleaner who are not directly employed by the facility.

Care home: facility that provides accommodation and personal care for adults who need support in everyday life (residential homes); some facilities also provide nursing care (nursing homes). In the UK, care homes can refer to both care homes for elderly and for adults with learning disabilities, physical disabilities, or both. In other countries, long-term care facility (LTCF) can be used instead of care homes, although it can also be used in a wider sense, for instance including rehabilitation centres.

Cohorting (also called bubbling or compartmentalising): assigning staff, residents or both into groups based on characteristics (infected or not infected residents) or zones within a facility.

Preventive testing: implementation of a facility-wide testing strategy before identification of a COVID-19 case.

Methods

A rapid review was conducted, following streamlined systematic methodologies to accelerate the review process (30). Primary studies were identified through 2 different sources:

1. Three relevant systematic reviews (27 to 29) were identified and used as a source for primary studies published up to 31 December 2020.
2. A literature search was undertaken to look for primary studies related to the COVID-19 pandemic, published (or available as preprint) between 1 January 2021 and 8 July 2021.

Title and abstract screening of records identified through the literature search was done in duplicate for 10% of the studies. Full text screening, screening of the bibliographies of relevant systematic reviews, data extraction and risk of bias assessment were conducted by one reviewer and checked by a second. Characteristics of included studies were tabulated, and data combined in narrative review.

Risk of bias was assessed using the quality criteria checklist (QCC) tool which assesses the methodological quality of a study (31). Studies were given a quality rating of high, medium or low.

Full details on the methodology are provided in Annexe A. A protocol was produced a priori and is available in Annexe D.

Evidence

Search results

A total of 181 primary studies included in the 3 relevant systematic reviews (27 to 29) were screened for eligibility, of which 66 were screened on full text. Of these, 7 met the inclusion criteria. The literature search returned 6,751 records. After removal of duplicates, 4,879 records were screened by title and abstract. Of these, 172 full-text articles were assessed for eligibility and 7 met the inclusion criteria.

A total of 14 studies were included in our review. A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram is provided in Figure A.1.

Four studies were interventional (32 to 35) and 10 were observational (36 to 45). Six were from the US (32,37 to 39,43,44), 4 from the UK (35,40,42,45), 2 from France (36,41), one from Canada (34) and one from Israel (33). One study was not peer-reviewed (preprint) (33).

All studies identified were conducted in long-term care facilities (LTCFs). Three studies included a range of LTCFs settings (such as assisted living facilities, rehabilitation centres and nursing homes) (33,38,39) and 2 studies referred to LTCFs without specifying the settings or population (34,44). Five studies were conducted in 'nursing homes' (32,36,37,41,43) and the 4 studies conducted in the UK referred to 'care homes' (35,40,42,45). No studies conducted in domiciliary care settings were identified.

Six studies reported on testing strategies (32,33,35,38,43,44), one interventional study reported on a multisectoral intervention (34) and 7 observational studies reported on associations between IPC measures and COVID-19 outcomes (36,37,39 to 42,45).

Full details of the included studies can be found in the supplementary material.

Evidence from studies reporting on testing strategies (Table C.1 and Table C.2)

Of the 6 studies that reported on testing strategies in ASC settings, 3 were interventional (32,33,35) and 3 were observational (38,43,44). Five studies used Reverse Transcription – Polymerase Chain Reaction (RT-PCR), of which 3 reported on routine testing strategies (32,33,44), and 2 reported on facility-wide testing conducted only once (38,43). The sixth study reported on the use of self-administered lateral flow tests for staff (35).

In a before and after study (preprint; rated medium for quality) conducted between March and November 2020 in Israel, Maimon and others reported on a national testing programme aimed at reducing the burden of COVID-19 in LTCFs, including nursing homes, residential homes, long-term care hospitals and rehabilitation centres (33). All 1,107 facilities in Israel were included and all employees were tested weekly via RT-PCR for 19 weeks between July and

November 2020 ('second wave') but not before ('first wave', used as a comparator). Positive cases were isolated, and all contacts tested. A higher proportion of total national COVID-19 deaths (45.3% compared with 30.3%; p<0.001) and hospitalisations (13.6% compared with 11.4%; p<0.001) took place in LTCFs during the first wave compared to the second wave, and facilities were better able to control the size of outbreaks in the second wave (p<0.001). While these results suggest that weekly testing of staff may have resulted in a reduced spread of COVID-19, outcomes may have been influenced by other changes that occurred between the 2 waves, including differences in IPC measures and deaths of the most vulnerable during the first wave.

Ehrlich and others conducted a before and after study (rated medium for quality) between April and August 2020 examining the effect of routine facility-wide testing (RT-PCR) in 34 nursing homes in Connecticut, USA (32). Nursing homes were followed up for 12-weeks after initial testing, during which an average of 6.0 (range between one and 10) follow-up testing rounds were carried out in residents and 6.2 (range between 2 and 10) in staff. Compared to the 4 weeks before implementation, incidence rates in residents decreased in 85% of facilities (p<0.05). After adjusting for decreasing community incidence and changes in screening practices, 41% and 80% decreases in incidence rates were observed between 31 and 60 days and between 61 and 90 days after the initial testing, respectively. Testing was followed by isolation and cohorting, but adherence to this was not measured. Results were adjusted for community incidence and variations between facilities, but not for concurrent IPC interventions.

Shimotsu and others (rated low for quality) reported on one LTCF in the USA that implemented a set of IPC measures centred around frequent testing to reduce transmission of COVID-19 (44). RT-PCR testing was carried out twice weekly for residents and daily for staff. During the 10-week study period (23 June 2020 to 1 October 2020), 2 residents and one employee tested positive for COVID-19. After adjusting for facility census (definition of this not provided), the number of cases in this facility was estimated to be 17 times lower than neighbouring facilities but details of the neighbouring facilities were not reported, and it is unclear if the other IPC measures (including isolation of cases, use of face masks, enhanced cleaning frequency, no group activity and so on) were also implemented in these facilities. In addition, the intervention was implemented in only one facility so the findings may not be generalisable to other facilities.

Two studies conducted during the early stage of the COVID-19 pandemic highlighted the importance of facility-wide testing to reduce transmission in care home settings. A cohort study (rated low for quality) conducted in 28 LTCFs in Georgia, USA, between March 2020 and May 2020 reported that facilities that had conducted preventive facility-wide testing had significantly lower COVID-19 prevalence at 4-week follow-up than facilities that had implemented facility-wide testing only once a case had been identified (the analysis was not adjusted for other factors) (38). Additionally, a cross-sectional study (rated low for quality) conducted in 288 US nursing homes between 24 March 2020 and 14 June 2020 reported that for each additional day between identification of the first case and completion of facility-wide testing, an estimated 1.3 (95% Confidence Interval [CI]: 1.0 to 1.5) additional cases were identified in the facility (43). The number of people tested and community incidence were taken into account in the statistical analysis.

Tulloch and others (rated low for quality) trialled a lateral flow pilot testing protocol in a non-randomised, controlled interventional study conducted in Liverpool, UK, between 1 December 2020 and 10 January 2021 (35). Eleven outbreak-free care homes were included in the intervention group, which consisted of weekly testing of staff with self-administered lateral flow devices, and visitors were tested twice in the 24 hours prior to their visit. The control group consisted of the 71 care homes that did not agree to participate to the pilot testing protocol. Pilot care homes were not at lower risk of experiencing an outbreak (odds ratio [OR] = 2.1; 95% CI: 0.5% to 9.4%; p=0.32) and did not experience smaller outbreaks (p=0.42) than the 71 care homes of the control group. However adherence to the protocol was low, with only 9% of homes achieving over 75% adherence. The absence of effect observed may be partly explained by the low adherence to the protocol, although there was no apparent trend between adherence and outbreak status. The low adherence could also suggest that the testing strategy was difficult to implement at the time, but it is unclear whether this would still be the case now that lateral flow testing is more widely accepted.

Main findings

Evidence from 3 studies suggests that routine RT-PCR testing of staff or of both staff and residents, followed by isolation of identified cases, can be effective in reducing COVID-19 transmission in care homes. Additionally, evidence from 2 studies suggests that facility-wide testing is likely be an effective intervention to reduce transmission and that delay in implementing facility-wide testing after identification of a case may result in increased transmission. However, these findings are based on before and after studies and on observational studies, so a number of factors may have impacted the results, including differences between care homes, differences in community transmission and differences in other IPC measures in place.

Evidence from observational studies on associations between IPC measures and COVID-19 outcomes (Table C.2)

Seven observational studies (36,37,39 to 42,45), of which 3 were conducted in the UK (40,42,45) reported on associations between IPC measures and COVID-19 outcomes. One study assessed the effectiveness of the voluntary confinement of staff in care homes (36) and the remaining 6 studies examined associations between a range of factors (including IPC measures) and COVID-19 outcomes, which can provide some evidence of effectiveness of these measures. Information about IPC practices were assessed in person or through video conference site visits in 2 studies and by online or phone surveys in the remaining studies.

Studies conducted in the UK

Between 26 May 2020 and 19 June 2020 Shallcross and others carried out a cross-sectional national survey (rated medium for quality) of 5,126 care homes in England that provided care for people over 65 years old or suffering with dementia (40). Information about care homes characteristics and staffing, IPC measures in place and RT-PCR-confirmed COVID-19 cases were collected by phone interview to identify factors associated with COVID-19 infection in both residents and staff, as well as the occurrence of small (equal to or more than one case) and large (more than 20 cases or one out of 3 of residents and staff) outbreaks. A number of IPC measures relevant to this review were assessed, including staffing policies, use of PPE, cleaning procedures, admission of new residents and closure to visitors. A detailed table of results can be found in Table 2 and Table 3 in the original paper by Shallcross and others (40).

Overall, the results suggest that staffing policies were associated with reduced COVID-19 transmission in care homes. For instance, care homes that did not cohort staff had 20% and 30% higher odds of COVID-19 infection in staff and residents, respectively, and were far more likely to have small outbreaks (OR = 2.60, 95% CI: 1.94 to 3.49; p<0.0001) than facilities that often or always cohorted staff. Employment of agency nurses or carers was also significantly associated with increased odds of infection and outbreaks (most days or everyday compared to none, large outbreaks: OR = 2.42 (95% CI: 1.67 to 3.51; p<0.0001)). Similarly, having a statutory sick pay policy reduced the odds of COVID-19 infection by 20% in residents and 30% in staff compared to no staff sick pay. When staff frequently worked at different sites, the odds of staff infections increased significantly (everyday or most days compared to not at all: OR = 3.04 (95% CI: 2.38 to 3.88; p<0.0001)), but not the odds of resident infections or outbreaks.

The findings from Shallcross and others related to PPE were conflicting. Wearing PPE in a more focused way compared to all of the time (for instance, only when delivering direct care to infected residents) tended to be associated with reduced odds of resident and staff infections, with the exception of wearing PPE for any contact with infected or shielding residents which was associated with an increased odds of infection in residents (compared to all the time: OR = 1.20 (95% CI: 1.05 to 1.37; p=0.009)). Similarly, the use of gloves, face masks, and aprons was associated with increased odds of infections and outbreaks although this could be a result of reverse causality as facilities with higher rates of COVID-19 may have been more likely to use these PPE items. Cleaning frequencies of communal area or staff rooms were not associated with odds of outbreaks and there was conflicting evidence for infections in staff and residents, which could also be due to reverse causality. For instance, cleaning communal areas once compared to twice a day was associated with increased odds of infection in staff (10%; p=0.0027) and moderately in residents (5%; p=0.039), but cleaning communal touchpoints once compared to twice a day reduced the odds of infections in residents by 15% (p<0.0001). Each admission of a new resident increased the odds of resident infections by 1% and by 8% for small outbreaks. Additionally, later closure to visitors was not associated with infection in staff and outbreaks, and was moderately associated with a 2% increase in odds of infection in residents (for each additional week: OR = 1.02 (95% CI: 1.00 to 1.04; p=0.012)). Other resident measures such as restricting use of communal space were not assessed. These results were adjusted for a wide range of factors, including deprivation, care home characteristics and

concurrent IPC measures, but it is possible that some factors not accounted for may have influenced the results. Additionally, data on IPC measures was self-reported by care home managers, and only 56% of eligible care homes accepted to participate (40).

Green and others (rated medium for quality) carried out a cohort study in 34 care homes for elderly and for adults with either learning disabilities, physical disabilities or both in Liverpool that assessed the association between several IPC measures and COVID-19 prevalence in residents between 28 April 2020 and 15 May 2020 (42). Effectiveness of visitor policies and enhanced cleaning could not be assessed as these measures were implemented in most care homes. Employing agency staff was associated with 8 times the risk of having COVID-19 positive residents compared with not employing agency staff (Risk Ratio [RR] = 8.40 (95% CI: 1.16 to 60.8; p=0.018)) but there was no association with restricting the use of shared space for residents and COVID-19 prevalence. However, the small sample size and low prevalence of COVID-19 in the care homes at the time of the study reduced the chance that the study would have detected statistically significant differences. In addition, no adjustments for confounders, such as differences between homes, were made during the statistical analysis and data on IPC measures were self-reported by care home directors, potentially leading to biases.

One observational study (rated low for quality) provided evidence on PPE availability and COVID-19 transmission in care homes in Norfolk, UK (45). Routine data collected by councils (248 of the 307 Norfolk care homes with complete data) were used to assess the association between the availability of 5 PPE items and number of confirmed and suspected COVID-19 cases between the 6 April 2020 and the 6 May 2020. No category of PPE availability was significantly related to the introduction of COVID-19 cases in care home. However, lower availability of eye protection or face masks was associated with higher onward spread of COVID-19 within the home, but the availability of aprons, gloves or hand sanitiser was not. However, it is unclear whether there was a correlation between availability of each PPE item and whether these results highlight the importance of PPE generally, rather than eye protection and face masks in particular.

Non-UK studies

A cohort study (rated medium for quality) evaluated a set of IPC measures to reduce transmission in 360 nursing homes in Massachusetts, US, over a 9-week period from May 2020 to June 2020 (37). Compliance with measures was assessed by auditing nursing homes every month, or twice a month for those who had prior IPC deficiencies (see Table C.2). The audit included a 28-item checklist of which 6 were considered as core competencies: cohorting positive cases, closing communal spaces, training and proficiency in donning and doffing PPE, proper use of PPE, having appropriate IPC policies, and the ability to identify and respond to COVID-19 symptoms. For every one-point increase in the score of the checklist audit, weekly infection rate decreased by 8% (p=0.0007), and the odds of having a zero-infection rate increased by 13% (p=0.004). Compliance with the audit question on PPE use was associated with a 23% reduction in weekly infection rate (p=0.038) and increased odds of having no infections (OR=2.16; p=0.0003) compared to non-compliance. Additionally, cohorting of cases

was associated with both reductions in weekly infection rates (beta value = -0.50, 95% CI: -0.84 to -0.16; p=0.004) and increased odds of a zero-infection rate (OR = 3.00, 95% CI: 1.34 to 6.71; p=0.008). However, the associations were not statistically significant for any of the 4 other core competencies. Analyses were adjusted for community prevalence and audit score but not for care home characteristics.

A case-control study of 124 nursing homes in a region of south-western France (rated low for quality), compared the implementation of IPC measures at facilities that had equal to or more than one confirmed COVID-19 case (n= 30) to those who had no cases (n= 94) between 23 March 2020 and 6 May 2020 (41). After adjusting for other IPC measures, facilities who implemented staff cohorting had significantly lower odds of having equal to or more than one confirmed COVID-19 case (OR = 0.19, 95% CI: 0.07 to 0.48; p=0.001). However, facilities with resident cohorting did not have reduced odds of having a positive case. The use of interim staff was found at 21 out of 30 (70%) facilities with cases and 44 out of 94 (47%) facilities without cases (p=0.03), but the association with odds of COVID-19 cases was not significant after adjusting for other IPC measures. Measures related to face masks (systematic use of face masks, satisfactory supply of face masks and access to surgical masks or FFP2), residents confinement to their rooms, resident cohorting, changes to group activities, satisfactory supply of hand sanitiser and access to IPC training were not associated with differences in likelihood of COVID-19 cases. Although concurrent IPC measures were adjusted for, other factors such as community transmission and care home characteristics were not taken into account. Additionally, facilities were asked to fill an online questionnaire in May to recall IPC measures that were in place in March, and there was no standard by which implementation and enforcement were measured.

In a cross-sectional study (rated low for quality), 24 LTCFs in Georgia (US) were divided into higher and lower COVID-19 prevalence groups (above or below 39%) to assess the impact of various IPC measures (39). There was significant differences in adherence to PPE measures between facilities with lower and higher COVID-19 prevalence (72% compared to 41%; p<0.01), including no PPE shortages, proper mask use in the COVID-unit, training and audit of proper mask use, and training and audits for proper donning and doffing of PPE, but there were no significant differences for training in N95 fit and proper use of masks outside of COVID-units. Additionally, there were significant differences in adherence to social distancing measures between lower and higher prevalence groups (74% compared to 54%; p<0.01), including maximum occupancy in small spaces but there were no significant differences for other social distancing measures such as cohorting of staff and residents or cancelation of group activities. There were no significant differences between the two groups for hand hygiene measures (including availability of hand sanitiser), disinfection measures (including frequency and training) or symptom screening. However, no statistical adjustments were made for potential confounders (such as facility characteristics or other interventions) so other factors are likely to have impacted the results.

One observational study (rated low for quality) provided evidence on the effectiveness of voluntary confinement of staff in 17 nursing homes in France, where staff members remained in the nursing home 24 hours a day, 7 days a week (36). Of these 17, only one (5.8%) nursing

home had confirmed cases of COVID-19 in their residents, compared to 48.3% of the 9,513 nursing homes of a national survey (OR = 0.07, 95% CI: 0.01 to 0.50; p<0.001). In addition, there were only 5 confirmed cases in residents (0.4%), compared to 30,569 (4.4%) in the national survey (OR = 0.09, 95% CI: 0.04 to 0.21; p<0.001). A similar pattern was observed in staff (OR = 0.19, 95% CI: 0.09 to 0.43; p<0.001). However, no adjustments were made in the statistical analysis. In addition, the 17 nursing homes were identified by news report so other facilities that may have implemented staff self-confinement but without positive results may not have been included.

Main findings

The evidence on measures other than testing was limited to 7 observational studies in which measures were implemented as part of a broader set of actions, so it was not always possible to attribute the observed results to specific measures, and other factors are likely to have impacted the findings, including changes in community transmission and differences between care homes (staffing levels, funding and so on). Taking into account these limitations:

1. Evidence from 5 studies (2 medium quality and 3 low quality) suggests that staffing policies such as staff cohorting, not employing agency staff and having statutory sick pay are associated with reduced transmission in care homes.
2. Evidence suggests that limiting the use of shared space and cancelling group activities was not significantly associated with transmission (4 studies, 2 medium quality and 2 low quality); the results on resident cohorting were mixed, with 2 studies of low quality suggesting no association and 1 study of medium quality reporting a reduction in infection rates.
3. The evidence on PPE was mixed (5 studies, 2 medium quality and 3 low quality).
4. The results on the use of specific PPE items and of their use in specific ways (for instance, only when delivering direct care to infected residents) were conflicting, with some results suggesting decreased transmission and others increased transmission, although this could be due to reverse causality as facilities with more cases may be more likely to use PPE.
5. The evidence on PPE training and auditing and PPE supply was mixed, with some studies reporting no association and other suggesting a decrease in transmission, but other factors may have impacted the findings.
6. There were differences between studies in PPE items assessed (for instance, some looked at ‘face masks’, others at specific types of masks and others at ‘PPE’ in general) which is likely to have impacted the results.
7. Hand hygiene practices, mainly assessed by reporting availability of hand sanitiser, was not significantly associated with reduced transmission (3 studies, all low quality) .

8. Three studies reported on cleaning procedures: in one study (medium quality) most facilities reported enhanced cleaning so effectiveness could not be estimated, one study (low quality) reported no association, and the results of the last study (medium quality)were conflicting, with some results suggesting that increased cleaning frequency was associated with reduced transmission and others with increased transmission, although this is potentially due to reverse causality as facilities with more cases may be more likely to clean more regularly.

Evidence from studies reporting on multisectoral interventions (Table C.1)

Vijh and others (rated medium for quality) carried out a before and after study between 28 February 2020 and 30 May 2020 to evaluate the effectiveness of a multisectoral intervention implemented in LTCFs in Vancouver, Canada, (34). The intervention, which was implemented once an outbreak had been declared, encompassed IPC measures (such as masks, eye protection and gloves required for all care provided, IPC training, enhanced cleaning, staff and resident cohorting) as well as case and contact management, proactive case detection, and resource prioritisation (Table C.1). Seven facilities with a confirmed COVID-19 case in residents or staff that resulted in equal to or more than 2 further cases were included in the final analysis that compared incidence rates during the early outbreak period (first 14 days post-intervention) to incidence rates during the post-intervention period (fewer than 14 days post-intervention). After adjusting for a number of factors, including case type (staff or resident) and baseline trend, a 27% decrease in incidence rate was observed in the post-intervention period (RR = 0.73, 95% CI: 0.67 to 0.80; $p<0.001$). In addition, the difference in average incidence rate between the 2 periods was 70% larger in staff than in residents (RR = 0.30, 95% CI: 0.10 to 0.88; $p<0.05$), although the difference was not significant by case type. However, compliance to IPC measures was not assessed and the findings of this study can only be generalised to facilities experiencing an outbreak with more than 2 cases.

Main findings

Evidence from one before and after study suggests that a comprehensive multicomponent IPC intervention might be effective in reducing COVID-19 transmission in care homes and that the protective effect is likely to be greater among staff than residents. However, this study was conducted in the early stage of the pandemic and the analysis was limited to facilities with more than 2 cases, so generalisation of these findings is unclear.

Inequalities

Results from a national survey reported regional inequalities in staff infections and outbreaks across care homes in England and that residents and staff in care homes in the most deprived areas had significantly higher odds of infection compared to those living in all other degrees of deprivation, measured by the postcode-based Index of Multiple Deprivation (40). This study also reported that the inability to isolate residents, for instance due to dementia, was associated with increased odds of infections and outbreaks in care homes (40). But overall there was limited evidence on the differential impact of interventions for different population subgroups or any other dimension of inequalities.

Evidence from our previous rapid review on COVID-19 transmission in care homes had suggested that factors such as the ownership status of a facility was associated with levels of COVID-19 (27). However, the focus of the present review was on the effectiveness of interventions in reducing transmission and we did not report on factors associated with transmission. It is possible that the effectiveness of some of the measures reported in the present review (such as the availability of PPE or being able to provide statutory sick pay for staff) may be associated with wider factors (such as the ownership status or the funding level of a facility), but these were not addressed in the included studies.

Limitations

Our review was limited to evidence from the COVID-19 pandemic, we did not include studies focused on other infectious diseases. Sources of evidence included existing systematic reviews and databases of peer-reviewed and preprint articles. We did not conduct an extensive search of other sources (such as websites of public health organisations or adult social care organisations).

All of the studies identified were conducted in long-term care facilities, none provided evidence on day centres or domiciliary facilities. Eleven studies were conducted before summer 2020; the 3 others up to January 2021. None of the studies identified were conducted in a population that had been vaccinated.

Studies conducted in the COVID-19 context are conducted at pace with the aim to provide evidence in a timely manner, which sometimes impacts on the quality of the studies, both in terms of design and methodological quality (no study rated high for quality, 6 rated medium and 8 rated low). Only 1 of the 4 interventional studies identified had a control group (non-randomised) but this had very low compliance. The 3 others were before and after studies, which have limited validity during a constantly changing pandemic situation. Of the 10 observational studies identified, 6 did not adjust for main confounders such as community transmission and facilities characteristics (staffing level, funding, and so on), while others adjusted for some but not all factors that may have impacted the results. Only 4 included at least 200 facilities, which means that when “no association” was found this may be due to lack

of power to assess such an association. In addition, there were important differences between studies and IPC measures were often implemented as part of a broader set of interventions, so it is not always possible to attribute the observed results to specific interventions within the broader set of actions taken.

Apart from testing strategies, the evidence was limited to observational studies that assessed associations between measures in place and COVID-19 outcomes. It is possible, due to the methods used in these studies, that measures such as staffing policies are less subject to reporting bias (when measures are self-reported by staff) than measures such as cleaning procedures or PPE use. This could at least partly explain the conflicting results or lack of association reported for the latter measures. No studies on ventilation were identified.

The evidence identified did not report on cost effectiveness of the measures, although this was not the focus of our review.

Risk of bias was assessed in each individual study by using a formal risk of bias tool assessment. However, the evidence has not been graded, meaning it has not been possible to describe the strength of evidence in a transparent way.

As with all reviews, the evidence identified may be subject to publication bias, whereby null or negative results are less likely to have been published by the authors.

While the evidence included in this review now spans over 18 months, there is still a lack of evidence from high quality studies. It is nonetheless stronger than in our previous review, both in terms of numbers of studies and study design.

Conclusions

The evidence on the effectiveness of interventions to reduce COVID-19 transmission within adult social care settings was limited to 14 studies (4 interventional and 10 observational) conducted in care home settings. No evidence from domiciliary care or day centres was identified.

There was evidence from interventional and observational studies that strategies based on facility-wide testing and isolation of identified cases was likely to reduce COVID-19 transmission in care home settings.

There was evidence from observational studies that staffing policies such as cohorting staff to infected or to non-infected residents, not employing agency staff and having statutory sick pay were associated with lower COVID-19 transmission.

There was some evidence from observational studies that limiting the use of shared space and restricting group activities was not significantly associated with COVID-19 transmission. Results on resident cohorting were mixed.

The evidence on PPE was limited to observational studies and was mixed. The results on PPE use was conflicting, with some results suggesting reduced transmission and others increased

transmission, although this is potentially due to reverse causality as facilities with more COVID-19 cases could be more likely to use PPE. The evidence on PPE training and auditing and PPE supply was mixed, with some studies reporting no association and others suggesting a decrease in transmission, but it is possible that other factors impacted the results.

There was some evidence from observational studies that availability of hand sanitiser was not significantly associated with reduced transmission. The evidence on cleaning practices was conflicting, with some results suggesting that increased cleaning frequency was associated with reduced transmission and others with increased transmission, although this could be due to reverse causality as it is possible that facilities with more cases clean more regularly.

The evidence on the effectiveness of IPC measures remains limited, partly due to study designs. Factors not accounted for in the studies are likely to have impacted the results. There is a need for higher quality studies.

This rapid review was completed in October 2021.

Acknowledgment

We would like to thank colleagues within the Public Health Advice, Guidance and Expertise function who either reviewed or input into aspects of the review, especially Catherine Heffernan and Warren Coppin.

Disclaimer

UKHSA’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 UKHSA 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. World Health Organization (WHO). 'Preventing and managing COVID-19 across long-term care services: Policy brief, 24 July 2020'. 2020, page 54
2. Office of National Statistics (ONS). 'Coronavirus (COVID-19) related deaths by occupation, England and Wales: deaths registered between 9 March and 28 December 2020'. 2021
3. Department of Health and Social Care (DHSC). 'Overview of adult social care guidance on coronavirus (COVID-19) [last Updated 23 June 2021]'. 2021
4. Department of Health and Social Care (DHSC) and others. 'Coronavirus (COVID-19): adult social care guidance [last updated 19 May 2021]'. 2021
5. Department of Health and Social Care (DHSC). 'Coronavirus (COVID-19) testing for adult social care settings [last updated 9 July 2021]'. 2021
6. Public Health England (PHE). 'COVID-19: infection prevention and control (IPC) [last updated 1 September 2021]'. 2021
7. Public Health England (PHE). 'Personal Protective Equipment (PPE) illustrated guide for community and social care settings [last updated 9 June 2021]'. 2021
8. Department of Health and Social Care (DHSC). 'Adult social care monthly statistics, England: September 2021 [published 9 September 2021]'. 2021
9. Department of Health and Social Care (DHSC). 'Coronavirus (COVID-19) vaccination of people working or deployed in care homes: operational guidance'. 2021
10. Salcher-Konrad M and others. 'Emerging Evidence on Effectiveness of COVID-19 Vaccines Among Residents of Long-Term Care Facilities'. Journal of the American Medical Directors Association 2021: volume 22, issue 8, pages 1602 to 1603
11. Andrews N and others. 'Vaccine effectiveness and duration of protection of Comirnaty, Vaxzevria and Spikevax against mild and severe COVID-19 in the UK'. medRxiv 2021
12. World Health Organization (WHO). 'Transmission of SARS-CoV-2: implications for infection prevention precautions'. 2020
13. Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) Scotland. 'Rapid review of the literature: Assessing the infection prevention and control measures for the prevention and management of COVID-19 in health and care settings. Version 17 (11 August 2021)'. 2021
14. Centers for Disease Control and Prevention (CDC). 'Science Brief: SARS-CoV-2 and Surface (Fomite) Transmission for Indoor Community Environments [last updated 5 April 2021]'. 2021
15. National Collaborating Centre for Methods and Tools (NCCMT). 'Rapid Review Update 1: What is known about how long the virus can survive with potential for infection on surfaces found in community settings?'. 2021
16. Onakpoya IJ and others. 'SARS-CoV-2 and the role of fomite transmission: a systematic review'. F1000Research 2021: volume 10, page 233
17. Centers for Disease Control and Prevention (CDC). 'Scientific Brief: SARS-CoV-2 Transmission [last updated 7 May 2021]'. 2021
18. World Health Organization (WHO). 'Coronavirus disease (COVID-19): How is it transmitted? [last updated 30 April 2021]'. 2020
19. Heneghan C and others. 'SARS-CoV-2 and the role of airborne transmission: a systematic review [version 1; peer review: 1 approved with reservations, 2 not approved]'. F1000Research 2021: volume 10
20. Public Health Agency of Canada (PHAC). 'Rapid review on SARS-CoV-2 aerosol transmission, update 2'. 2021

21. Wang CC and others. 'Airborne transmission of respiratory viruses'. Science 2021: volume 373, issue 6558
22. Chou R and others. 'Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers: A Living Rapid Review'. Annals of internal medicine 2020: volume 173, issue 2, pages 120 to 136
23. Chou R and others. 'Update Alert 9: Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers'. Annals of internal medicine 2021: volume 174, issue 7, pages W63 to W64
24. Tian C and others. 'Risk factors and protective measures for healthcare worker infection during highly infectious viral respiratory epidemics: a systematic review and meta-analysis'. Infection Control & Hospital Epidemiology 2021, pages 1 to 102
25. Chou R and others. 'Masks for Prevention of Respiratory Virus Infections, Including SARS-CoV-2, in Health Care and Community Settings: A Living Rapid Review'. Annals of internal medicine 2020, pages M20 to 3213
26. Chou R and others. 'Update Alert 6: Masks for Prevention of Respiratory Virus Infections, Including SARS-CoV-2, in Health Care and Community Settings'. Annals of internal medicine 2021, pages L21 to 0393
27. PHE COVID-19 Rapid Evidence Service. 'Factors associated with COVID-19 in care homes and domiciliary care, and effectiveness of interventions: a rapid review'. 2020
28. National Collaborating Centre for Methods and Tools (NCCMT). 'Rapid Review Update 2: What strategies mitigate risk of COVID-19 outbreaks and mortality in long-term care facilities?'. 2021
29. Byrd W and others. 'What long-term care interventions and policy measures have been studied during the Covid-19 pandemic? Findings from a rapid mapping review of the scientific evidence published during 2020'. 2021
30. World Health Organization (WHO) and others. 'Rapid reviews to strengthen health policy and systems: a practical guide'. 2017
31. Academy of Nutrition and Dietetics. 'Evidence Analysis Manual: Steps in the Academy Evidence Analysis Process'. 2016
32. Ehrlich HY and others. 'SARS-CoV-2 in Nursing Homes after 3 Months of Serial, Facilitywide Point Prevalence Testing, Connecticut, USA'. Emerging infectious diseases 2021: volume 27, issue 5, page 1288
33. Maimon N and others. 'The Effect of National Weekly COVID-19 Screening Testing of All Workers in Long-Term Care Facilities: a Decrease in Mortality'. 2021
34. Vijh R and others. 'Evaluation of a multisectoral intervention to mitigate the risk of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) transmission in long-term care facilities'. Infection Control & Hospital Epidemiology 2021, pages 1 to 8
35. Tulloch J and others. 'Enhanced lateral flow testing strategies in care homes are associated with poor adherence and were insufficient to prevent COVID-19 outbreaks: results from a mixed methods implementation study'. Age and Ageing 2021: volume afab162
36. Belmin J and others. 'Coronavirus disease 2019 outcomes in French nursing homes that implemented staff confinement with residents'. JAMA network open 2020: volume 3, issue 8, page e2017533
37. Lipsitz LA and others. 'Stemming the Tide of COVID-19 Infections in Massachusetts Nursing Homes'. Journal of the American Geriatrics Society 2020: volume 68, issue 11, pages 244 to 2453
38. Telford CT and others. 'Preventing COVID-19 outbreaks in long-term care facilities through preemptive testing of residents and staff members—Fulton County, Georgia,

March–May 2020'. Morbidity and Mortality Weekly Report 2020: volume 69, issue 37, page 1296
39. Telford CT and others. 'COVID-19 Infection Prevention and Control Adherence in Long-Term Care Facilities, Atlanta, Georgia'. Journal of the American Geriatrics Society 2021: volume 69, issue 3, pages 581 to 586
40. Shallcross L and others. 'Factors associated with SARS-CoV-2 infection and outbreaks in long-term care facilities in England: a national cross-sectional survey'. The Lancet Healthy Longevity 2021: volume 2, issue 3, pages e129 to e42
41. Rolland Y and others. 'Guidance for the prevention of the COVID-19 epidemic in long-term care facilities: a short-term prospective study'. The journal of nutrition, health & aging 2020: volume 24, issue 8, pages 812 to 816
42. Green R and others. 'COVID-19 testing in outbreak-free care homes: what are the public health benefits?'. Journal of Hospital Infection 2021: volume 111, pages 89 to 95
43. Hatfield KM and others. 'Facility-wide testing for SARS-CoV-2 in nursing homes—seven US jurisdictions, March–June 2020'. Morbidity and Mortality Weekly Report 2020: volume 69, issue 32, page 1095
44. Shimotsu ST and others. 'COVID-19 Infection Control Measures in Long-Term Care Facility, Pennsylvania, USA'. Emerging infectious diseases 2021: volume 27, issue 2, page 644
45. Brainard J and others. 'Introduction to and spread of COVID-19-like illness in care homes in Norfolk, UK'. Journal of Public Health 2021: volume 43, issue 2, pages 228 to 235
46. Agency for Healthcare Research and Quality (AHRQ). 'Systems to rate the strength of scientific evidence'. Evidence report/technology assessment (Summary) 2002

Annexe A. Methods (protocol)

This report employed a rapid review approach to address the review question:

1. Which infection prevention and control (IPC) measures, including personal protective equipment (PPE), are effective in reducing transmission of coronavirus (COVID-19) in adult social care settings?

Our rapid review approach follows streamlined systematic methodologies (30). In particular, relevant systematic reviews were used as a source for primary studies published in 2020 and a literature search was undertaken for primary studies published between 1 January 2021 and 8 July 2021; 10% of the screening on title and abstract for records identified though the literature search were screened in duplicate; full text screening, screening of studies from previous reviews, data extraction and risk of bias assessment were performed by one reviewer and checked by another.

Protocol

A protocol was produced by the project team before the literature search began, specifying the review question and the inclusion and exclusion criteria. The protocol is available in Annexe D.

Sources searched

Primary studies were identified through 2 different sources:

1. Searching the bibliographies of relevant systematic or rapid reviews identified through a scoping search
2. Literature search of Ovid Medline, Ovid Embase, medRxiv, SSRN, WHO COVID-19 database, Social Care online and the UKHSA Care Home Digest (an Endnote library of citations relevant to care homes and COVID-19, compiled from a search of databases and websites)

Search strategy

Searching of bibliographies

Systematic or rapid reviews were identified through a scoping search of COVID-19 review repositories (Annexe B) completed on 18 May 2021. Seven reviews relevant to our review question were identified, of which 3 were used to identify primary studies for this review (based on search dates and review questions):

1. Our rapid review on COVID-19 in care homes and domiciliary care (27); search date up to 31 August 2020; 22 primary studies included, of which 9 reported on effectiveness of interventions.
2. A mapping review by Byrd and others on long-term care interventions and policy measures implemented in during the COVID-19 pandemic (29); search date up to 31 December 2020; 137 primary studies included, of which 9 reported on effectiveness of interventions.
3. A rapid review by the National Collaborating Centre for Methods and Tools (NCCMT) on the strategies to mitigate risk of COVID-19 outbreaks in long-term care facilities (28); search date up to 1 February 2021; 22 primary studies included.

These 3 reviews were used to identify primary studies published up to 31 December 2020.

Literature search

Searches were conducted for studies published between 1 January 2021 and 8 July 2021.

Search terms covered the main aspects of the review question. The search strategy for Ovid Medline is presented below.

The 2 studies that had been identified as preprints were last checked on 17 September 2021 to see whether they had been published as a peer-reviewed journal article. One study had been peer-reviewed (35) and our review was updated accordingly; no update was found for the other study (33).

Search strategy Ovid Medline

1. (home adj3 (care or caring)).tw,kw.
2. (nurs* adj home*).tw,kw.
3. ((patient* or client* or resident* or elderly or disabled) adj3 home*).tw,kw.
4. (sheltered hous* or long term care* or long-term care* or residential care* or residential home* or long term facilit* or long-term facilit*).tw,kw.
5. assisted living.tw,kw.
6. (old age home* or old people* home* or retirement home*).tw,kw.
7. (day centre* or day center*).tw,kw.
8. respite care.tw,kw.
9. (short term care* or short-term care*).tw,kw.
10. supported care*.tw,kw.
11. Home Nursing/
12. Home Care Services/
13. exp Nursing Homes/
14. Residential Facilities/
15. Group Homes/
16. Homes for the Aged/
17. Hospice Care/

18. Respite Care/
19. domicil*.tw,kw.
20. home visit*.tw,kw.
21. home service*.tw,kw.
22. home monitor*.tw,kw.
23. community care.tw,kw.
24. health visitor*.tw,kw.
25. district nurs*.tw,kw.
26. community nurs*.tw,kw.
27. (patient* adj2 home*).tw,kw.
28. public health nurse*.tw,kw.
29. (care assistant* or healthcare assistant* or care staff* or home help* or carer or support worker* or rehabilitation worker* or care manager* or care worker*).tw,kw.
30. social care.tw,kw.
31. social worker*.tw,kw.
32. exp Home Care Services/
33. Caregivers/
34. exp Community Health Services/
35. House Calls/
36. Nurses, Community Health/
37. Social Workers/
38. Home Health Aides/
39. 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 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38
40. exp coronavirus/
41. exp Coronavirus Infections/
42. ((corona* or corono*) adj1 (virus* or viral* or virinae*)).ti,ab,kw.
43. (coronavirus* or coronovirus* or coronavirinae* or CoV or HCoV*).ti,ab,kw.
44. covid*.nm.
45. (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 Ncovor 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 SARScoronovirus2 or SARS-coronovirus-2 or SARScoronovirus 2 or SARS coronovirus2).ti,ab,kw.
46. (respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw.
47. ((seafood market* or food market* or pneumonia*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw.

48. ((outbreak* or wildlife* or pandemic* or epidemic*) adj1 (Wuhan* or Hubei or China* or Chinese* or Huanan*)).ti,ab,kw.
49. or/40-48
50. 39 and 49
51. limit 50 to dt=20210101-20210707
52. limit 51 to english language

Inclusion and exclusion criteria

Article eligibility criteria are summarised in Table A.1.

Table A.1. Inclusion and exclusion criteria

	Included	Excluded
Population	• adults receiving social care support • staff working in ASC • visitors to ASC	• children • adults not working, not attending or not visiting ASC settings
Settings	All social care settings for adults, including care homes, supported living, day centres, extra care, respite care, and care at home in the community (domiciliary care)	Healthcare settings
Context	COVID-19 pandemic	Other infectious diseases
Intervention or exposure	All types of IPC, including: • measures to improve hygiene, including hand washing, hand hygiene, more intense cleaning regimens, cleaning and disinfection protocols • physical distancing or isolation of recipients, either staff, visitors or both to ASC • measures to improve ventilation • use of PPE (such as face coverings, gloves and gowns) • testing and screening regimens • staffing policies (such as cohorting, sick pay provision, self-isolation of staff who have tested positive for COVID-19, limiting staff movement between sites, and so on) • visitor policies • vaccination policies	• studies reporting on risk factors (such as relationship between ownership of care homes and COVID-19 response) • feasibility of different testing methods • preventive and therapeutic treatments (such as vitamin D)

	Included	Excluded
	Studies reporting on a combination of interventions will be included, even if they do not provide effectiveness results for individual interventions.	
Outcomes	Cases of COVID-19, transmission of COVID-19, changes in COVID-19 infections or transmission, COVID-19 outbreaks Examples of measures include: • changes in time in incidence or prevalence of COVID-19, or variation in attack rate or secondary attack rate • variations between settings (with compared to without intervention) in incidence, prevalence or attack rate or secondary attack rate	• disease progression, severity or symptom (clinical outcomes) • SARS-CoV-2 antibody prevalence (serological outcomes) [A]
Language	English	
Date of publication	1 January 2020 to 8 July 2021	
Study design	• interventional studies • observational studies	• systematic or narrative reviews • modelling studies • laboratory studies • case report, case series and outbreak investigations [A], unless they include an analytical component • guidelines • opinion pieces
Publication type	Published and preprint	

[A] These studies were excluded however, they were coded at the screening stage to be drawn upon if required (for instance, if insufficient evidence)

Screening

Searching of bibliographies

The primary studies included in the relevant systematic reviews were first screened by one reviewer and checked by a second to identify the studies that reported on effectiveness of interventions based on the description provided in the reviews.

Potentially relevant studies were then screened on full text by one reviewer and checked by a second.

Literature search

Title and abstract screening was done by 2 reviewers: 10% of eligible studies were screened in duplicate (disagreements were resolved by discussion) and the remainder were screened by one reviewer.

Full text screening was conducted by one reviewer and checked by a second.

The PRISMA diagram showing the flow of citations is provided in Figure A.1.

Data extraction and risk of bias assessment

Data extraction was done by one reviewer and checked by a second. Only results directly relevant to the review questions were extracted.

Studies were assessed using the QCC for primary research (31). This risk of bias tool can be applied to most study designs (observational and interventional) and is therefore suitable for rapid reviews of mixed type of evidence. It is composed of 10 validity questions based on the criteria and domains identified by the Agency for Healthcare Research and Quality to assess the methodological quality of a study (that is, the extent to which a study has minimised selection, measurement and confounding biases) (46). In the QCC tool, 4 questions are considered critical (on selection bias, group comparability/confounding, interventions/exposure and outcome). A study will be rated as high quality if the answers to the 4 critical questions are 'yes' (and at least one additional 'yes'). The study will be rated as low quality if 2 or more of the critical questions are answered 'no' or if equal to or greater than 50% of the remaining questions are answered 'no'. Otherwise, the study will be rated as medium quality. Judgments were made on case by case for questions answered as 'unclear'. To note that we report these ratings as 'quality' ratings for consistency with the name of the tool, although here quality needs to be understood as 'methodological quality' as part of a risk of bias assessment.

Risk of bias assessment was done by one reviewer and checked by a second. QCC ratings are reported in the data extraction tables (Table C.1 and Table C.2).

A formal grading of evidence was not undertaken, however if evidence was considered to be limited (due to the number of studies), of low quality (due to QCC rating), provide low level of

evidence (due to research design), or any combination of these, then this was highlighted. Preprint or publication status was also considered in determining this.

Variations across populations and subgroups, for example cultural variations or differences between ethnic, social or vulnerable groups were considered where evidence was available.

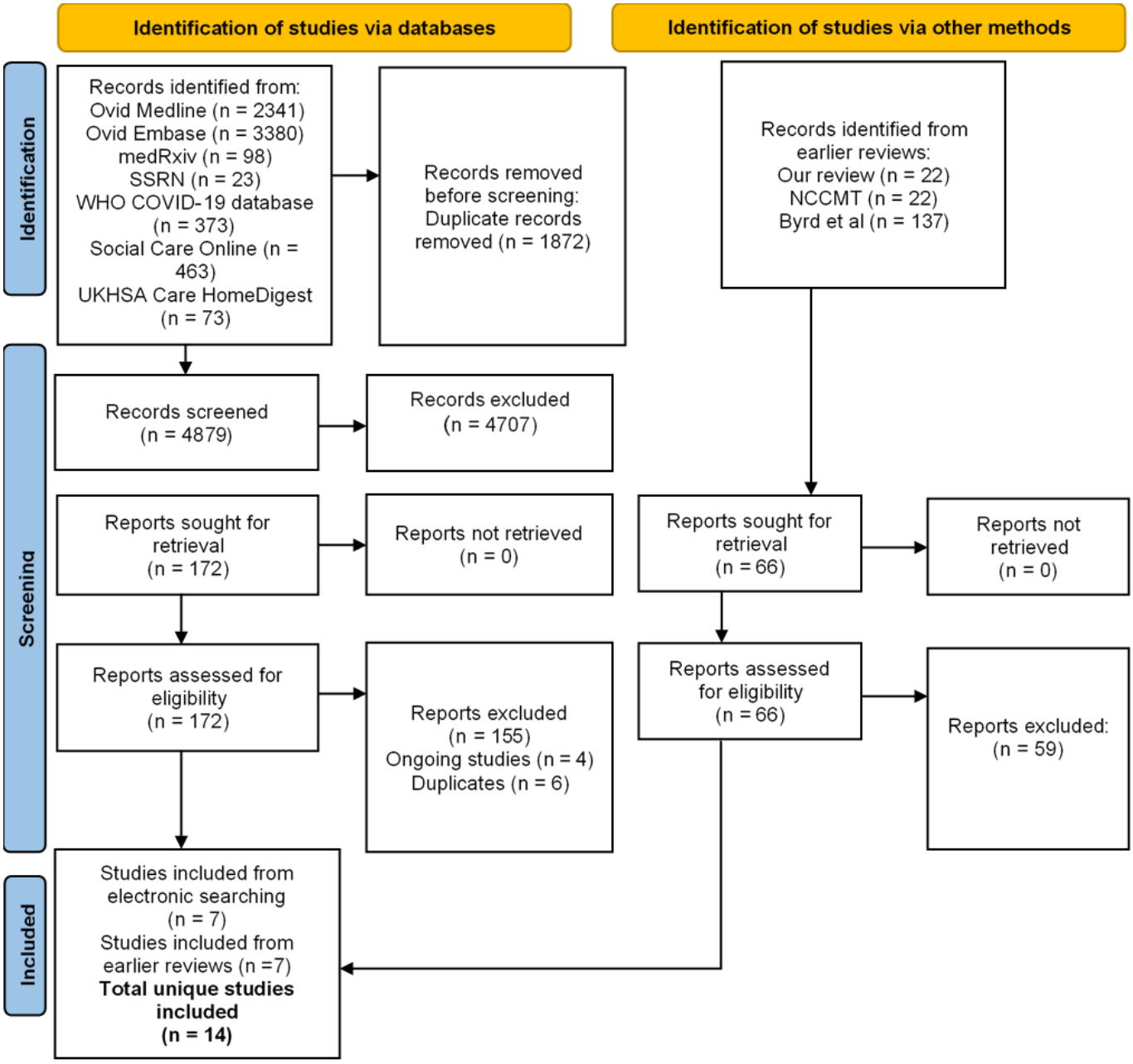

Figure A.1. PRISMA diagram

Figure A.1. PRISMA diagram alt text

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

From identification of studies via electronic searching of databases and registers, n = 6,751 records identified from databases:

- Ovid Medline (n = 2,341)
- Ovid Embase (n = 3,380)
- medRxiv (n = 98)
- SSRN (n = 23)
- WHO COVID-19 database (n = 373)
- Social Care Online (n = 463)
- UKHSA Care HomeDigest (n = 73)

From these, n = 1,872 duplicate records were removed before screening. This left n = 4,879 records screened, of which n = 4,707 were excluded, leaving n = 172 papers sought for retrieval. All identified reports were retrieved.

Of these, n = 165 were excluded:

- reports excluded (n = 155)
- ongoing studies (n = 4)
- duplicates (n = 6)

This left n = 7 studies included from electronic searching.

From identification of studies through other methods, n = 170 records were identified from earlier reviews:

- our review (n = 22)
- NCCMT (n = 22)
- Byrd and others (n = 137)

From these, n = 66 reports were sought for retrieval, with all identified reports retrieved, and n = 59 were excluded. This left n = 7 studies included from previous reviews.

In total, n = 14 unique studies were included; n = 7 records identified through electronic searching, and n = 7 from previous reviews.

Annexe B. COVID-19 review repositories

1. UNCOVER (Usher Network for Covid-19 Evidence Reviews)
2. Epistemonikos, Covid-19 L.ove
3. VA Evidence Synthesis Program
4. COVID-19 Best Evidence Front Door, University of Michegan
5. COVID-END Evidence about public-health measures
6. Health Information and Quality Authority, Ireland
7. McMaster Uni, National Collaborating Centre for Methods and Tools (NCCMT)
8. SPOR
9. LitCOVID
10. NLM Covid portfolio
11. Cochrane
12. Emergency Care Research Insititute (ECRI)
13. Lenus, The Irish Health Repository, Covid-19 Rapid Reviews & Evidence Summaries
14. National Institute for Health and Care Excellence (NICE)
15. National Institute for Health Research (NIHR)
16. Norwegian Institute of Public Health (NIPH)
17. Oxford COVID-19 Evidence Service
18. Santé Publique France
19. World Health Organization (WHO)
20. McMaster Forum

Annexe C. Data extraction

Table C.1. Summary of interventional studies

Acronyms used: CI = confidence interval, IPC = infection prevention and control, LFT = lateral flow test, LTCF = long term care facility, NH = nursing home, PPE = personal protective equipment, PPS = point prevalence survey, RR = relative risk, RT-PCR = reverse transcriptase polymerase chain reaction

Reference	Study design	Methods	Main findings	Risk of bias
Ehrlich and others, 2021 (32) 'SARS-CoV-2 in Nursing Homes after 3 Months of Serial, Facility wide Point Prevalence Testing, Connecticut, USA'	Study design: before after study (interventional) Objective: to evaluate the effectiveness of serial facility-wide PPS testing in reducing COVID-19 incidence rates in nursing homes Settings: 34 out of 212 NHs in Connecticut, US Participants: all residents and staff of the 34 facilities Study period: April 2020 to August 2020 (16 weeks: 4 weeks before first PPS, 12 weeks follow-up) Community transmission: Weekly average incidence rates in Connecticut (cases per 100,000 person-days): approximately 24% early May (start of initial testing in NHs) to around 3% mid-August (end of follow-up) In NHs, peak of incidence mid-May (approximately 30%) down to one to 2% by end of May	Outcome: COVID-19 incidence rates 4 weeks before first PPS, day of first PPS, and 12 weeks after first PPS Intervention: Serial testing (RT-PCR) of all residents and staff of a facility (usually within 1 day), followed by isolation and cohorting of cases Testing interval: • staff: weekly testing state-mandated from late June • residents: weekly testing recommended when new cases detected (and until no detection of new cases in staff and residents for 14 days) Cases also detected through selective screening of those entering and symptom screening Compared to: Pre-PPS period (4-weeks before first PPS) Data collection: Daily online questionnaire by facility staff on number of cases, deaths and census; PPS results confirmed by phone interview Statistical analysis: Poisson regression model, adjusted for community incidence and nursing home variability	PPS testing implementation: After initial PPS testing, average of 6.0 (range: 1 to 10) follow-up PPS in residents and 6.2 in staff Average time between first and second PPS: 30 days; between subsequent PPS: 9 days Thirty-one out of 34 NHs carried out equal to or more than one PPS beyond 14 day recommended threshold after case detected Mean incidence rates in residents (per 1,000 at-risk person-days): • before first PPS: 9.3 cases (95% CI: 0.2 to 49.2) • day of first PPS: 267.8 cases (95% CI: 0 to 861.5) • period after first PPS: 0.54 cases (95% CI: 0 to 18.4) Incidence rates decreased in 85% of facilities (29 out of 34) after PPS implementation ($p<0.05$) Percentage reduction after adjusting for community incidence and change in screening practices: • days 0 to 15 after first PPS: 77%; (95% CI: 71% to 83%) • days 16 to 30: 49% (95% CI: 31% to 63%) • days 31 to 60: 41% (95% CI: 12% to 60%) • days 61 to 90: 80% (95% CI: 64% to 89%)	Confounding: results adjusted for change in community incidence and variability between facilities, but not for other potential confounders, including concurrent interventions such as PPE use Other bias: Selection bias: only 34 out of 212 nursing homes included in sample; facilities chosen based on size of outbreaks Information bias: time interval between PPS varied by nursing homes QCC rating: medium quality
Maimon and others, 2021 (33)	Study design: before after study (interventional)	Outcome: COVID-19 cases in residents and staff Mortality and hospitalisations in residents	Weekly average compliance in employees: 88.5% Deaths in LTCF (proportion of total national COVID-19 deaths):	Confounding: results adjusted for size of the wave, but not for other potential confounders such as differences in IPC measures, or

Reference	Study design	Methods	Main findings	Risk of bias
PREPRINT (v1; January 2021) 'The Effect of National Weekly COVID-19 Screening Testing of All Workers in Long-Term Care Facilities: a Decrease in Mortality'	Objective: to evaluate whether routine testing of LTCF staff would reduce the burden of COVID-19 in LTCF settings Settings: all LTCFs (including long-term care hospitals, skilled nursing facilities, nursing homes, residential homes, hostels for people with disabilities, palliative care and rehabilitation centres) in Israel Participants: 1,107 LTCFs with: • 100,046 residents • 62,159 employees Study period: 21 March 2020 to 21 November 2020 Community transmission: Weekly COVID-19 mortality in Israel: • height of first wave (mid-April): 63 nationally; 33 in LTCFs • near start of screening programme (early July): 34 nationally; 16 in LTCFs • height of second wave (early October): 256 nationally, 80 in LTCFs	Decreased size outbreaks (maximum of 5 residents infected in the 2 weeks after staff tested positive) Avoided outbreaks (no residents infected in the 2 weeks after staff tested positive) Intervention: Weekly RT-PCR testing (by the Israeli Emergency Medical Services) for all employees during the second wave (13 July to 21 November 2020) When staff test positive: • staff isolated; all contacts tested within 24 hours and then every 3 days (until 3 negative tests) • positive residents isolated in dedicated wards, transferred to another facility, or admitted to hospital Compared to: First wave: 21 March 2020 to 13 July 2020 Statistical analysis: Chi-squared test or Fisher's exact test Subgroup for those more than 75 years of age	• first wave: 45.3% (252 out of 556) • second wave: 30.3% (709 out of 2,337) • p value for comparison <0.001 Hospitalisations LTCF (proportion of total national COVID-19 hospitalisations): • first wave: 13.6% (2010 out of 14,790) • second wave: 11.4% (4,224 out of 36,991) • p value for comparison <0.001 percentage of total outbreaks defined as decreased size outbreaks: • first wave: 20.4% (48 out of 235) • second wave: 82.8% (755 out of 912) • p value for comparison <0.001 Avoided outbreaks in second wave: 214 (number from first wave not assessible)	differences in populations (most vulnerable residents might have died during first wave) Other bias: Information bias: one month until screening programme was fully implemented at all LTCFs QCC rating: medium quality
Tulloch and others, 2021 (35) 'Enhanced lateral flow testing strategies in care homes are associated with poor adherence and were insufficient to prevent COVID-19 outbreaks: results from a mixed	Study design: intervention study (non-randomised, parallel control group) Objective: to evaluate a SARS-CoV-2 LFT protocol in care homes Settings: care homes in the Liverpool City Council area, England Participants: Intervention: residents of 11 outbreak-free care homes	Outcome: • COVID-19 cases • Number and size of outbreaks (defined as equal to or more than 2 confirmed or suspected cases with onset dates within 14 days of one another) Intervention: Pilot homes carried out LFT protocol for staff and visitors • staff: tested with self-administered lateral flow device twice weekly	Low staff adherence: • 9% achieved greater than 75% adherence • 25% achieved equal to or more than 50% adherence Cases identified: Seven out of 11 homes identified cases by the end of the study period and 6 had an outbreak within 10 days Only one home identified a positive LFT before the outbreak (other index cases identified through RT-PCR)	Confounding: not adjusted for sociodemographic factors due to small sample size Other bias: Selection bias: • only 11 care homes out of 86 agreed to take part; potential differences between those who agreed and those who did not • nursing homes overrepresented and residential homes under-represented

Reference	Study design	Methods	Main findings	Risk of bias
methods implementation study' Note: May include some of the care homes reported in Green 2021	Control group: residents of 71 out of 75 care homes that did not agree to participate (4 excluded due to having an ongoing outbreak at beginning of study) Study period: 1 December 2020 to 10 January 2021 Community transmission: not reported	• visitors: 2 tests in 24 hours before visit; first self-administered with a trained nurse observing; RT-PCR test performed concurrently as quality assurance; second test performed by care home staff Compared to (control): Homes in the region that did not carry out the lateral flow testing protocol Intervention and control: Routine resident testing: monthly plus symptomatic RT-PCR testing Statistical analysis: Fischer's exact test, Mann-Whitney U test for outbreak size	Outbreaks identified: Number of homes having outbreaks: • pilot care homes: 6 out of 11 • other care homes: 26 out of 71 • odds ratio = 2.1, 95% CI: 0.5 to 9.4, p=0.32 Outbreak size (percentage of residents and staff infected): • pilot care homes: median 0%, range 0 to 38.8%, n=6 • other care homes: median 0%, range 0 to 64.8%, n=26, • p=0.42 No apparent trend observed between protocol adherence and outbreak status (no analysis)	Information bias: • protocol adherence was poor which may have influenced the results • no analysis performed on relationship between adherence and outbreak status due to small sample size QCC rating: low quality
Vijh and others, 2021 (34) 'Evaluation of a multisectoral intervention to mitigate the risk of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) transmission in long-term care facilities'	Study design: before after study (quasi experimental) Objective: to evaluate effectiveness of a multisectoral intervention to reduce COVID-19 transmission in residents and staff of LTCFs Settings: 75 LTCFs in Vancouver Coastal Health region, Canada Participants: • 7 facilities (with equal to or more than 2 secondary cases) included in final analysis • size: 108 to 259 staff, 107 to 210 residents Study period: 28 February 2020 to 30 May 2020 Community transmission: not reported (but accounted for in the model)	Outcome: • Early outbreak COVID-19 rate trend (from first case to 14 days after implementation) • Post intervention COVID-19 rate trend (more than 14 days after implementation) • Difference in average rates and change in trend between the 2 periods • Only symptomatic cases included Intervention: Multisectoral intervention (implemented once outbreak declared): case and contact management, daily symptom monitoring for staff and residents, low threshold for testing (mild symptoms), universal testing in selected facilities, PPE use and training, closure to admissions and discharges, restricting residents to their rooms, staff and resident cohorting, enhanced cleaning, contact and droplet precautions and daily check in with long-term care operation leads around staffing and PPE levels Compared to: Early outbreak rate trend Data collection:	In study period 18 out of 75 (24%) LTCFs in with equal to or more than one case: • 10 out of 18: only one case (staff), no secondary cases • 7 out of 18: equal to or more than 2 secondary cases 275 COVID-19 cases (165 staff, 110 residents) from 18 facilities Regression analysis: Average daily change in rates: • early outbreak: RR = 1.07 (95% CI: 1.03 to 1.11; p<0.001) • post intervention: RR = 0.73 (95% CI: 0.67 to 0.80; p<0.0001) Between early outbreak and post-intervention: • change in trend: RR = 0.68 (95% CI: 0.62 to 0.75; p<0.001) • difference in average rates: RR = 0.83 (95% CI: 0.52 to 1.36; p>0.05) Staff compared with residents: No significant difference between staff and residents in rates during:	Confounding: RR adjusted for background community infection rates, case type (resident compared with staff), and changes in rates and trends Not adjusted for staffing level for IPC but expected to be consistent as provided by study team Other bias: Selection bias: • LTCFs with less than 2 secondary cases not included in the analysis Information bias: • study assumed interventions implemented on day one, but would have taken longer to implement properly (and unclear how day one was defined) • outcome measures based on symptomatic cases only • information collected via survey of care homes and patient and family interviews

Reference	Study design	Methods	Main findings	Risk of bias
		Demographics of cases, exposure history and clinical information collected by staff (form) Statistical analysis: Mixed-effect segmented Poisson regression	• early outbreak period (RR = 1.00 (95% CI: 0.96 to 1.03; p>0.05) • post-intervention period (RR = 1.07 (95% CI: 0.88 to 1.30; p>0.05) No significant difference between staff and residents in trend during: • early outbreak period vs postintervention period (RR = 1.07 (95% CI: 0.88 to 1.31; p>0.05) Staff saw 70% greater reduction in average COVID-19 rate compared to residents between early outbreak and postintervention periods (RR = 0.30, 95% CI: 0.10 to 0.88; p<0.05)	QCC rating: medium quality

Table C.2 Summary of observational studies

CDC = Centre for Disease Control and Prebention, CI = Confidence Interval, COVID-19 = Coronavirus (COVID-19), GEE = Generalised estimating equation, HR = Hazard ratio, IPC: = Infection Prevention Control, LFT = Lateral Flow Test, LTCF = Long-term care facility, NH = Nursing home, OR = Odds Ratio, PPE = Personal Protective Equipment, PPS = Point Prevalence Survey, QCC = Quality Criteria Checklist, RR = Risk Ratio, RT-PCR = Reverse transcription-polymerase chain reaction

Reference	Study design	Methods	Main findings	Risk of bias
Belmin and others, 2020 (36) 'Coronavirus Disease 2019 Outcomes in French Nursing Homes That Implemented Staff Confinement With Residents'	Study design: retrospective cohort study Objective: to evaluate if self-confinement of staff at NHs is associated with better COVID-19 outcomes compared with the national outcomes Settings: NHs, France Participants: Cohort: 17 NHs with 794 staff and 1,250 residents National survey: 9,513 NHs with 385,290 staff and 695,060 residents Study period: 1 March 2020 to 18 June 2020 Community transmission: on 7 May 2020, 4,599 facilities had equal to or more than one case, 12,521 deaths recorded (National Survey data)	Outcome: Mortality rates and cases; confirmed cases (RT-PCR) and possible cases (symptom-based) included IPC measures: Intervention assessed: • staff voluntary self-confinement: staff members remained in the home (24 hours per day, 7 days per week) for equal to or more than 7 days • exceptions for ambulances, doctors, family in end of life situations, funeral care Other interventions in place: • national recommendations: no visitors between 10 March 2020 and 11 May 2020; resident confinement to their room recommended; no new admissions in NHs with COVID-19 cases • in all 17 facilities, staff temperature taken 2 out of 3 times a day and daily symptom check; 3 homes did voluntary RT-PCR check during self-confinement; 2 others did this only during the second period Data collection: Cohort: phone survey of NH directors for NH characteristics and details of staff confinement, as well as number of cases and deaths between 1 March 2020 and 28 April 2020 (follow up call 17 and 18 June 2020) National survey (control): case numbers obtained from Santé Publique France; NH characteristics from 2016 national survey Statistical analysis: Chi-squared test, Fisher's exact test	Twelve facilities had one course of self-confinement, 5 started a second with new staff once the first had finished Residents: NHs with equal to or more than one COVID-19 case in residents: • intervention: 1 (5.8%) • comparator: 4,599 (48.3%) • OR = 0.07 (95% CI: 0.01 to 0.50; p<0.001) Confirmed cases of COVID-19 among residents: • intervention: 5 (0.4%) (all in same NH) • comparator: 30,569 (4.4%) • OR = 0.09 (95% CI: 0.04 to 0.21, p<0.001) Possible cases of COVID-19 among residents: • intervention: 0 • comparator: 31,779 (4.6%) • p value for comparison <0.001 Staff: Confirmed cases of COVID-19: • intervention: 6 (0.8%) • comparator: 14,645 (3.8%) • OR = 0.19 (95% CI: 0.09 to 0.43, p<0.001) Possible cases of COVID-19: • intervention: 6 (0.8%) • comparator: 14,806 (3.8%) • OR = 0.19 (95% CI: 0.09 to 0.43; p<0.001)	Confounding: results not adjusted for potential confounders Other bias: Selection bias: • facilities identified through media reports so may have missed facilities with voluntary staff self-confinement • facilities differed in characteristics, concurrent IPC measures and in how they implemented self-confinement • it is unclear if NHs in the national survey also used staff confinement Information bias: • control group demographic data taken from a 2016 national survey QCC rating: low quality

Reference	Study design	Methods	Main findings	Risk of bias
Brainard and others, 2021 (45) 'Introduction to and spread of COVID-19-like illness in care homes in Norfolk, UK'	Study design: secondary analysis of routinely collected care home data Objective: to evaluate risk factors associated with first cases or spread of COVID-19 cases in care homes Settings: 307 care homes in Norfolk, UK Participants: • 248 care homes included (number of residents and staff not reported) • 59 care homes excluded (missing data) Study period: 6 April 2020 to 6 May 2020 Community transmission: end of May 2020 death rates in Norfolk 'relatively low' compared to the rest of England	Outcome: First COVID-19 infection and spread of infection, confirmed cases (RT-PCR) and suspected cases (symptom-based) included IPC measures assessed: PPE availability: • each care home scored out of 15 (3 for each item) on the availability of 5 items (aprons, eye protection, gloves, masks and hand sanitiser) • higher score indicates lower PPE supply • Impact of staffing levels also assessed (impact of bed capacity not assessed due to lack of data) Data collection: Secondary analysis of care home capacity tracker data available from county councils Statistical analysis: Two-part modelling: 1. Survival analysis explored factors associated with incidence Cox proportional hazards model to analyse time to infection with categories of care home employees and PPE scores 2. Generalised mixed effect model with a negative binomial error structure to determine factors associated with onward spread within the home after ingression	Twenty-five homes had one or more COVID-19 cases (133 cases in total) Predictors of first infection • No category of PPE availability significantly related to cases • Higher numbers of non-care staff related to higher risk of infection (but not the number of care workers) Predictors of spread Daily increment in cases: 1.04 (95% CI: 1.02 to 1.05; p<0.001) Incremental increase in cases as availability decreases: • eye protection: HR = 1.66 (95% CI: 1.29 to 2.13; p<0.001) • facemask: HR = 1.26 (95% CI: 1.09 to 1.46; p<0.001) • not significant for aprons, gloves or hand sanitiser (numerical relationship not shown), and unclear whether availability of different forms of PPE was correlated Count of care workers and of nurses also significantly associated with increase in cases	Confounding: HR adjusted for counts of care home staff, availability of each category of PPE and overall availability, but not for other care home characteristics Other bias: Information bias: • 5 homes with 14 cases not included in analysis due to missing data • results self-reported • confirmed and suspected cases included • those away due to leave or sickness were grouped together, not specified whether illness was COVID-19 related or not QCC rating: low quality
Green and others, 2021 (42) 'COVID-19 testing in outbreak-free care homes: what are the public health benefits?' Note: May include some of the care homes reported in	Study design: cohort study Objective: to evaluate the epidemiology and transmission of COVID-19 in outbreak free care homes and to determine which risk factors may be associated with increased prevalence Settings: all care homes with no confirmed or suspected cases in Liverpool area, England	Outcome: COVID-19 prevalence (measured twice by RT-PCR, 16 to 17 days apart) IPC measures assessed: restricted use of shared space, enhanced cleaning procedures and whether visitors were allowed Data collection: Two-time point survey; information on resident demographics, care home characteristics and IPC practices collected Daily report of COVID cases (symptoms, hospitalisations and deaths)	Twenty-two residents tested positive (16 at first round, 8 at second round; no statistical difference) Restricted use of shared space (yes or no): • RR = 2.63 (95% CI: 0.37 to 18.45; p = 0.55) (n=33) Employing agency staff (yes or no): • RR = 8.40; 95% CI: 1.16 to 60.8, p= 0.018 (n=33) Nursing home (n=16) compared to residential home (n=18): • RR = 7.88 (95% CI: 1.08 to 57.27; p= 0.02) The study was unable to assess the risk of closing homes to visitors (as all were closed) or enhanced	Confounding: Poisson regression model not implemented due to low prevalence of COVID-19, so results not adjusted for potential confounders Other bias: Selection bias: only care homes with no previous confirmed or suspected cases included

Reference	Study design	Methods	Main findings	Risk of bias
Tulloch and others (35)	Participants: 34 care homes (12 elderly care, 5 learning disabilities, 4 mixed client groups, 4 for people with acute brain injuries, 3 elderly mentally infirm, 3 for those with dementia, 3 for those with predominant mental health diagnoses) 818 residents tested Demographic data for 714 residents: • mean age 74 years (median 80 years, range 19 to 106 years) • 60.4% female Study period: 28 April to 15 May 2020 Community transmission: infection rates in England declining compared to early April (2,779 new confirmed cases in England on the first day of the study)	Statistical analysis: Wilcoxon signed-ranks test to compare mean prevalence within homes Poisson regression model use when positive resident prevalence was high enough to explore variables while taking into account care homes differences When prevalence too low for Poisson univariable analysis, Chi-squared test or Fisher's exact test used to examine variables related to transmission	cleaning (as 30 out of 33 carried out enhanced cleaning)	Information bias: • IPC measures self-reported; possible social desirability bias • study covers a short period of time • the small number of care homes included reduced the power to assess care home wide characteristics QCC rating: medium quality
Hatfield and others, 2020 (43) 'Facility-Wide Testing for SARS-CoV-2 in Nursing Homes — Seven U.S. Jurisdictions, March–June 2020'	Study design: cross-sectional study Objective: to compare state-wide testing with targeted testing to control COVID-19 transmission in NHs Settings: 288 NHs in 7 states or local health departments, US Participants: All residents and staff from the 288 NHs • state-wide testing group: 2 health departments (195 NHs) • targeted testing group: 5 health departments (93 NHs)	Outcome: cumulative positive COVID-19 cases IPC measures assessed: State-wide testing strategy: • initial facility-wide testing carried out in all NHs in the state Targeted testing strategy: • initial facility-wide testing targeted to NHs with a newly reported case in a resident or healthcare worker Specific testing strategies varied by health department Testing method: 6 health departments: RT-PCR	State-wide testing strategy (North Dakota and South Carolina) 125 out of 195 hadn't reported any COVID-19 cases before testing 95 out of 22,977 (0.4%) tested positive in 29 out of 125 (23%) during testing Multivariable models found no association between cumulative county incidence and odds of identifying a case in those 125 homes (p=0.67) 331 out of 14,488 (2%) tested positive in the 70 of 195 who reported COVID-19 cases before initial testing Targeted testing strategy: 1,619 out of 13,443 (12%) tested positive for COVID-19 during testing	Confounding: adjusted for the number of persons tested (as a proxy for facility size) and the surrounding county incidence, not for other IPC measures and other differences in nursing home characteristics Other bias: Selection bias: • unclear if other health departments were eligible or approached to be a part of this study

Reference	Study design	Methods	Main findings	Risk of bias
	Study period: 24 March to 14 June 2020 Community transmission: State-wide strategy group in low incidence areas (19 to 38 cases per 100,000) Target testing strategy group in higher incidence areas (28 to 282 cases per 100,000)	One health department: RT-PCR and point-of-care testing Statistical analysis: Targeted testing strategy: linear GEE, adjusted for the number of persons tested and the surrounding county incidence State-wide testing strategy: logistic GEE models to assess associations between COVID-19 incidence in surrounding county and odds of identifying cases at each facility testing event, adjusted for number of persons tested at all facilities that didn't have previous cases Results stratified by case type (resident or staff) where possible	Regression analysis of 88 NHs with a documented case before facility-wide testing showed each additional day between identification of the first case and completion of facility-wide testing was associated with the identification of 1.3 (95% CI: 1.0 to 1.5) additional cases	• health departments that did state-wide testing had relatively low community incidence at the time of testing; may differ for those with higher community transmission QCC rating: low quality
Lipsitz and others, 2020 (37) 'Stemming the Tide of COVID-19 Infections in Massachusetts Nursing Homes'	Study design: longitudinal cohort study Objective: to evaluate the implementation of an IPC measures funding programme in Massachusetts nursing homes Settings: NHs in Massachusetts, USA Participants: 360 NHs, including 123 'special focus' homes with previous IPC deficiencies number of staff and residents not reported Study period: 10 May 2020 to 5 July 2020 (9 weeks) Community transmission: not reported	Outcome: weekly rates of new infections, hospitalisations, and deaths in staff and residents IPC measures assessed: 6 core competencies: proper PPE use (in line with guidance), training and proficiency in donning and doffing PPE, resident cohorting (infected or not infected), closing of communal spaces and limitation of group events, training of staff on COVID-19 symptoms, appropriate IPC policies Part of a wider programme: • monthly audit (28-item, including the 6 core competencies) • payment incentive if passing unannounced audit • weekly webinars and continuous question and answer communication • PPE, staffing and testing resources • on-site and virtual infection control consultation for the 123 'special focus' NHs Data collection: Baseline and monthly unannounced state inspection audits of all NHs, and biweekly of those who failed Weekly NH reports to the Massachusetts Health Agency	Cumulative COVID-19 infection rate in residents in all Massachusetts NHs increased from 46% to 55% in the first 6 weeks, levelling out in final 3 weeks For every one-point increase in checklist audit score: • weekly infection rate decreased by 8% (beta value = -0.08, 95% CI: -0.12 to -0.03; p=0.0007) (mortality: beta value = -0.03 (95% CI: -0.09 to 0.02; p=0.179) • 13% increased odds of a zero-infection rate (OR = 1.13, 95% CI: 1.04 to 1.23; p=0.004) (mortality: OR = 1.16, 95% CI: 1.06 to 1.27; p=0.0009) Cohorting and infection rates: • beta value = -0.50 (95% CI: -0.84 to -0.16; p=0.004 (mortality: beta value = -0.03, 95% CI: -0.75 to 0.00; p=0.0527) • OR = 3.0, 95% CI: 1.34 to 6.71, p=0.0076 (mortality: OR = 1.98, 95% CI: 0.58 to 6.75, p=0.2275) Proper PPE use and infection rates: • beta value = 0.23 (95% CI: -0.45 to 0.01; p=0.0379) (mortality: beta value = -0.02, 95% CI: -0.21 to 0.17; p=0.8296) • OR = 2.16 (95% CI: 1.42 to 3.30; p=0.0003) (mortality: OR = 3.20, 95% CI: 1.87 to 5.48; p<0.0001) Results not statistically significant for any of the other 4 core competencies.	Confounding: adjusted for community prevalence and audit score, but not for differences in NH characteristics Other bias: Selection bias: unclear if all nursing homes in the state were included Information bias: weekly audits done either in person or over video; impact of video on audit results unclear QCC rating: medium quality

Reference	Study design	Methods	Main findings	Risk of bias
		Statistical analysis: Linear mixed model (beta value; weekly rate variation) and logistic model (OR) Covariates: county COVID-19 prevalence and baseline audit score	Increased county prevalence associated with increased weekly infection and mortality rates in all models (p<0.0001)	
Rolland and others, 2021 (41) 'Guidance for the prevention of the covid-19 epidemic In long-term care facilities: a short-term prospective study'	Study design: case-control study Objective: to evaluate and compare the application of guidance in nursing homes that had confirmed COVID-19 cases and those who didn't Settings: NHs in Haute-Garonne, France Participants: 124 out of 132 (93.9%) NHs number of staff and residents not reported Study period: 23 March 2020 to 6 May 2020 Community transmission: not reported	Outcome: confirmed COVID-19 (RT-PCR) cases in residents and staff (self-reported by nursing homes) IPC measures assessed: Systematic wearing of masks, access to either surgical masks, FFP2 or both, satisfactory supply of masks, satisfactory supply of hydro-alcoholic solute, IPC training, use of containment in residents' rooms, meal organisation (such as physical distancing), change to group activities, use of interim staff, compartmentalisation of staff and of residents, dressing procedure at entrance Self-assessment of compliance with the IPC measures Data collection: Online questionnaire with phone call to explain questionnaire (6 to 19 May) completed by coordinating nurse or doctor Questions about measures in place before 23 March 2020, nursing home status and presence of physician Statistical analysis: Bivariate analysis: chi-squared (Fisher's if applicable) and student's t test Logistic regression: full model (all variables with p<0.20 in bivariate analysis p=0.20) and reduced model (step by step backward regression)	Thirty NHs (24.2%) with COVID-19 cases: • 6 with one or more resident • 17 with one or more staff • 7 with both 94 homes had none (75.8%) Staff compartmentalisation within zones • 65 NHs (69.2%) without cases; 9 (30.0%) with equal to or more than one case; p<0.01 • full model: OR 0.17 (95% CI: 0.04, 0.67; p=0.01) • reduced model: OR 0.19 (95% CI: 0.0, -0.48; p= 0.001) Only variable associated with absence of cases when considering separately private and public homes Use of interim staff • 44 NHs (46.8%) without cases; 21 (70.0%) with equal to or more than one case; p=0.03 • full model: OR 1.91 (95% CI: 0.62, 5.93; p=0.26) Meal organisation: • physical distancing: 38 NHs (40.4%) without cases; 21 (70.0%) with equal to or more than one case; p=0.02 • not significant for other organisations (such as in small groups or in bedrooms) Other results: No significant differences for the other measures assessed, including resident compartmentalisation (18% compared to 13%, p=0.55), satisfactory supply of mask (45% compared to 57%, p=0.51) or hydro-alcoholic solute (80% compared to 87%, p=0.77) and changes to group activities (p=0.45) such as cancelling them (59% compared to 67%).	Confounding: adjusted for other IPC measures but not community transmission nor facility characteristics Other bias: Information bias: • data self-reported, possible social desirability bias; there was no standard to measure adherence • the questionnaire required to recall back to March in May possibly resulting in recall bias QCC rating: low quality

Reference	Study design	Methods	Main findings	Risk of bias
			Higher score in self-assessment of quality of IPC measures implementation associated with lower cases (full model: OR = 0.55, 95% CI: 0.33 to 0.93; p=0.03) reduced model: OR = 0.65, 95% CI: 0.43 to 0.98, p=0.04) Association between NHs status (private compared with public) and: • cases (full model: OR = 0.32, 95% CI: 0.15 to 0.67; p=0.002, reduced model: OR = 0.39, 95% CI: 0.20 to 0.73; p=0.003) • difference in testing strategies: 55.6% of private for-profit compared with 17.1% of private non-for-profit and 25.7% of public nursing homes did systematic RT-PCR testing (p=0.005)	
Shallcross and others, 2021 (40) 'Factors associated with SARS-CoV-2 infection and outbreaks in long-term care facilities in England: a national cross-sectional survey'	Study design: cross-sectional study Objective: to evaluate factors associated with COVID-19 transmission among LTCF staff and residents Settings: LTCFs providing dementia care or care to adults equal to or older than 65 years old, England Participants: 5,126 out of 9,081 (56.4%) eligible LTCFs 160,033 residents and 248,594 staff Study period: 26 May to 19 June 2020 Community transmission: not reported	Outcome: RT-PCR confirmed COVID-19 cases in staff and residents, small outbreaks (equal to or more than one case) and large outbreaks (more than 20 cases or one out of 3 residents and staff) (30 April 2020 to 12 June 2020) IPC measures assessed: Cohorting, restricting visitors, cleaning frequency, use of barrier nursing (gloves, aprons and masks), isolation of residents, sick pay for staff, use of agency staff, PPE use and frequency of staff working at other locations, weeks of closure to visitors, numbers of new admissions Data collection: Telephone survey of LTCF managers: LTCF characteristics (degree of social deprivation, size, staff-to-bed ratio, Care Quality Commission rating, funding type, and so on) IPC measures and confirmed cases in staff and residents Statistical analysis: Weighted period prevalence of confirmed SARS-CoV-2 cases in staff and residents, multivariable logistic regression model OR significant at p<0.008 (p=0.008 to 0.05: moderate association)	See complete table of results in Table 2 and Table 3 in Shallcross and others (40)	Confounding: models adjusted for the other IPC measures assessed and for several facility characteristics (such as size, funding, deprivation, region and number of beds) Other bias: Selection bias: only 56.4% of the LTCFs took part (participating and non-participating LTCFs were similar in size, funding and degree of deprivation) Information bias: • results self-reported; possible social desirability bias • difficult to discern a causal association between employment of agency staff and initiation of outbreaks without actual dates of employment and infection QCC rating: medium quality

Reference	Study design	Methods	Main findings	Risk of bias
Shimotsu and others, 2021 (44) 'COVID-19 Infection Control Measures in Long-Term Care Facility, Pennsylvania, USA'	Study design: case report Objective: to evaluate the impact of regular, proactive monitoring to prevent COVID-19 transmission in LTCF Settings: One LTCF, Chester county, Pennsylvania, US Participants: 92 staff, 9 frequent visitors, 111 residents Study period: 23 June to 1 October 2020 (10 weeks) Community transmission: not reported	Outcome: COVID-19 cases in residents, staff and frequent visitors IPC measures assessed: Twice weekly (residents) and daily (staff) RT-PCR testing for 10 weeks (positive cases isolated for 10 days and test negative), daily symptom survey (collected by staff) Additional measures in place: PPE for all staff and visitors (masking at all times, N95 in quarantine and isolation areas), twice daily cleaning, no part time staff, family visits and group activities stopped, new residents quarantine for 14 days and 2 negative tests Testing method: Nasal swabs; RT-PCR • residents: twice per week • staff: daily Statistical analysis: not reported	Two residents tested positive One positive staff member detected early enough to prevent COVID-19 transmission in the facility Case rate compared to neighbouring facilities Compared data collected between 28 September 2020 and 9 October 2020 When adjusted for facility census the case number was 17 times lower in this LTCF compared to neighbouring facilities	Confounding: adjusted for the facility census but not for other potential confounders such as community transmission or facility characteristics Other bias: Information bias: • no detail provided on neighbouring facilities included in comparison, included numbers and IPC measures in place • the effect of individual IPC measures cannot be determined QCC rating: low quality
Telford and others, 2020 (38) 'Preventing COVID-19 Outbreaks in Long-Term Care Facilities Through Preemptive Testing of Residents and Staff Members — Fulton County, Georgia, March–May 2020'	Study design: cohort study Objective: to evaluate effectiveness of response testing and preventive testing for COVID-19 in LTCFs Settings: LTCFs (skilled nursing, memory care, and assisted living facilities), Fulton County, Georgia, US Participants: 28 LTCFs (15 LTCFs in response testing group; 13 in preventive testing group) • 2,868 residents • 2,803 staff Study period: March to May 2020 Community transmission: not	Outcome: COVID-19 prevalence in residents and staff IPC measures assessed: One-day facility-wide testing event at each LTCF (31 March 2020 to 18 May 2020): • Response testing group: testing done in response to confirmed SARS-CoV-2 case • Preventive testing group: testing done before any cases identified Symptom-based screening for 4 weeks follow-up Other IPC measures in place: local shelter-in-place order didn't allow visitors, CDC guidance for IPC measures Testing method: RT-PCR of nasopharyngeal swabs taken by trained health care staff Six facilities contracted with private companies to collect swabs	Initial testing: • 637 (11.2%) cases: • 484 (16.9%) residents • 153 (5.5%) staff Follow-up: • 348 additional positive cases Initial testing and follow-up: • 985 (17.4%) cases • 740 (25.8%) residents, 245 (8.7%) staff Response group compared to preventive group Initial testing • resident prevalence: 28% compared to 0.5% (p<0.01) • staff prevalence: 7.4% compared to 1% (p<0.01) • 8 (61.5%) preventive group LTCFs reported at least one case Follow-up	Confounding: results not adjusted for potential confounders Other bias: Selection bias: • one facility declined testing for all staff; used symptom-based screening which would miss asymptomatic cases • group allocation based on COVID-19 cases; not randomly selected Information bias: • used symptom-based screening for follow-up; may have missed asymptomatic cases

Reference	Study design	Methods	Main findings	Risk of bias
	reported	Statistical analysis: Fisher's exact test	• resident prevalence: 42.4% compared to 1.5% (p<0.001) • staff prevalence: 11.8% compared to 1.7% (p<0.001)	QCC rating: low quality
Telford and others, 2021 (39) 'COVID-19 Infection Prevention and Control Adherence in Long-Term Care Facilities, Atlanta, Georgia'	Study design: cross-sectional study Objective: to assess implementation of IPC measures (CDC May 2020 guidelines) within LTCFs and identify which interventions or lack thereof were associated with higher or lower prevalence of COVID-19 Settings: LTCFs, (defined as skilled nursing facilities and assisted living facilities) in Fulton County, Georgia, US Participants: Twenty-four LTCFs Residents (N=2,580) (85% of LTCF residents in Fulton County) Study period: June 2020 and July 2020 Community transmission: not reported	Outcome: IPC implementation rates in higher and lower COVID-19 infection prevalence in LTCFs (overall: 39%): • higher prevalence group (more than 39%): 11 LTCFs • lower prevalence group (less than 39%): 13 LTCFs IPC measures assessed: 33 indicators across 5 categories: hand hygiene (including hand sanitiser availability and hand washing training), disinfection (including frequency and training), social distancing (including cohorting and limiting group activities), PPE (including training, use and supply) and symptom screening Data collection: Either in person site visits, video conference site visits or a combination of the two (one to 5 people) Statistical analysis: Chi-squared test (differences between higher- and lower-prevalence groups) T-test (between-group differences for continuous variables); p<0.05	Resident infection proportion • higher-prevalence group: 62% (range 46 to 74%) • lower-prevalence group: 15% (range one to 33%) • IPC categories (higher vs lower prevalence facilities) • social distancing: 54% compared to 74%, p<0.01 • PPE: 41% compared to 72%, p<0.01 • hand hygiene: 55% compared to 69%, p=0.14 • disinfection: 27% compared to 36%, p=0.44 • symptom screening: 64% compared to 82%, p=0.08 Indicators within IPC categories (higher compared to lower prevalence facilities) Significant for 7 out of 33 indicators Maximum occupancy in small spaces (such as lift and donning or doffing rooms): 10% compared to 64%, p=0.01 Signage on droplet and contact precaution: 27% compared to 77%, p=0.02 Bathroom and sink in bedroom: 73% compared to 100%, p=0.04 Trainings and audits for proper mask use (staff): 36% compared to 85%, p=0.02 Proper mask use in COVID-unit (staff): 45% compared to 100%, p<0.01 Training and audits for proper donning and doffing of PPE: 55% compared to 92%, p=0.03 No PPE shortages (prior or present): 18% compared to 85%, p<0.01 No significant difference for other indicators, including hand sanitiser availability in hallways and nursing stations (18% compared to 54%, p=0.07) resident (82% compared to 85%, p=0.86) and staff (73% compared to 77%, p=0.77) cohorting, cancelation of group activities (64% compared to 69%, p=0.77), staff training for N95-	Confounding: results not adjusted for potential confounders Other bias: Selection bias: • LTCFs not randomly selected (but represent 85% of LTFC residents in the county included) Information bias: • consultant not blinded to sites' level of COVID-19 • not clear how long IPC measures were in place QCC rating: low quality

Reference	Study design	Methods	Main findings	Risk of bias
			fit (36% compared to 62%, p=0.22), proper use of masks by staff outside COVID-unit (64% compared to 92%, p=0.09), reuse of PPE (61% compared to 48%, p=0.19) and 14-day quarantine or observation for new admissions (91% compared to 92%, p=0.07).	

Annexe D: Protocol

Review question

What infection prevention and control (IPC) measures, including personal protective equipment (PPE), are effective in reducing transmission of COVID-19 in adult social care (ASC) settings?

Notes
For studies published up to 31 December 2020, we will use 3 of the reviews identified in the scoping as source of primary studies (for studies published after the 31 December 2020, a literature search will be conducted). The 3 reviews are:

1. Our (the PHE COVID-19 rapid evidence service) previous 'Rapid review on effectiveness of interventions in care home and domiciliary care' (27) (search date: 31 August 2020)
2. The rapid review the National Collaborating Centre for Methods and Tools (NCCMT). 'What strategies mitigate risk of COVID-19 outbreaks and mortality in long-term care facilities? Rapid Review Update 2' (28) (search date: 1 February 2021).
3. The mapping review by Byrd and others, 'What long-term care interventions and policy measures have been studied during the Covid-19 pandemic? Findings from a rapid mapping review of the scientific evidence published during 2020' (29) (search date: 31 December 2020).

Table D.1: Inclusion and exclusion criteria

	Included	Excluded
Population	• staff working in ASC • patients of ASC • visitors to ASC	• children • adults not working, not attending or not visiting ASC settings
Settings	All adult and social care settings, including care homes, supported living, home care, day centres, extra care, respite care, amongst others	Healthcare settings
Context	COVID-19 pandemic	Other infectious diseases
Intervention or exposure	All types of IPC, including: • hand hygiene • physical distancing • ventilation • PPE (for example, face coverings, gloves and gowns) • cleaning and disinfection protocols • screening and isolation	• studies reporting on risk factors (eg relationship between ownership of care homes and COVID-19 response) • feasibility of different testing methods • preventive and therapeutic treatments (for example, vitamin D)

	Included	Excluded
	• staffing policies (for example, cohorting, sick pay provision, amongst others) • visitor policies • vaccination policies Studies reporting on a combination of interventions will be included, even if they do not provide effectiveness results for individual interventions.	
Outcomes	• change in COVID-19 transmission Examples of measures: • changes in time in incidence or prevalence of COVID-19, or variation in attack rate or secondary attack rate • variations between settings (with versus without intervention) in incidence, prevalence or attack rate or secondary attack rate	• disease progression, severity or symptom (clinical outcomes) • SARS-CoV-2 antibody prevalence (serological outcomes) [A]
Language	English	
Date of publication	1 January 2021 to present	
Study design	• experimental studies • bbservational studies	• systematic or narrative reviews • modelling studies • laboratory studies • case report, case series and outbreak investigations*, unless they include an analytical component • guidelines • opinion pieces
Publication type	Published and preprint	

[A] These studies will be excluded, however, they will be coded at the screening stage and drawn upon if required (for instance, if insufficient evidence)

Sources of evidence

Medline, Embase, medRxiv preprints, WHO COVID-19 Research Database, and Social Square online.

Reference lists of relevant papers will also be searched, as well as relevant systematic reviews or evidence summaries identified.

Search strategy Ovid Medline

1. (home adj3 (care or caring)).tw,kw.
2. (nurs* adj home*).tw,kw.
3. ((patient* or client* or resident* or elderly or disabled) adj3 home*).tw,kw.
4. (sheltered hous* or long term care* or long-term care* or residential care* or residential home* or long term facilit* or long-term facilit*).tw,kw.
5. assisted living.tw,kw.
6. (old age home* or old people* home* or retirement home*).tw,kw.
7. (day centre* or day center*).tw,kw.
8. respite care.tw,kw.
9. (short term care* or short-term care*).tw,kw.
10. supported care*.tw,kw.
11. Home Nursing/
12. Home Care Services/
13. exp Nursing Homes/
14. Residential Facilities/
15. Group Homes/
16. Homes for the Aged/
17. Hospice Care/
18. Respite Care/
19. domicil*.tw,kw.
20. home visit*.tw,kw.
21. home service*.tw,kw.
22. home monitor*.tw,kw.
23. community care.tw,kw.
24. health visitor*.tw,kw.
25. district nurs*.tw,kw.
26. community nurs*.tw,kw.
27. (patient* adj2 home*).tw,kw.
28. public health nurse*.tw,kw.
29. (care assistant* or healthcare assistant* or care staff* or home help* or carer or support worker* or rehabilitation worker* or care manager* or care worker*).tw,kw.
30. social care.tw,kw.
31. social worker*.tw,kw.
32. exp Home Care Services/

33. Caregivers/
34. exp Community Health Services/
35. House Calls/
36. Nurses, Community Health/
37. Social Workers/
38. Home Health Aides/
39. 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 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38
40. exp coronavirus/
41. exp Coronavirus Infections/
42. ((corona* or corono*) adj1 (virus* or viral* or virinae*)).ti,ab,kw.
43. (coronavirus* or coronovirus* or coronavirinae* or CoV or HCoV*).ti,ab,kw.
44. covid*.nm.
45. (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 Ncovor 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 SARScoronovirus2 or SARS-coronovirus-2 or SARScoronovirus 2 or SARS coronovirus2).ti,ab,kw.
46. (respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw.
47. ((seafood market* or food market* or pneumonia*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw.
48. ((outbreak* or wildlife* or pandemic* or epidemic*) adj1 (Wuhan* or Hubei or China* or Chinese* or Huanan*)).ti,ab,kw.
49. or/40-48
50. 39 and 49
51. limit 50 to dt=20210101-20210707
52. limit 51 to english language

Screening

Screening on title and abstract will be undertaken in duplicate by 2 reviewers for at least 10% of the eligible studies, with the remainder completed by one reviewer. Disagreement will be resolved by discussion.

Screening on full text 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. Information will include country, setting, study design, objective, outcomes measures, participants, study period, results and any relevant contextual data (such as timing or level of community transmission at the time of the study). This will be undertaken by one reviewer and checked by a second.

Quality assessment

Quality will be assessed using the Academy of Nutrition and Dietetics quality criteria checklist (QCC) for primary research. This tool is not specific to nutrition and can be applied quickly to most study designs to consider core areas of potential bias. Quality will be assessed by one reviewer and checked by a second.

Synthesis

A narrative synthesis will be provided.

Variations across populations and subgroups, for example cultural variations or differences between ethnic, social or vulnerable groups will be considered, where evidence is available.

About the UK Health Security Agency

UKHSA is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. We provide intellectual, scientific and operational leadership at national and local level, as well as on the global stage, to make the nation health secure.

UKHSA is an executive agency, sponsored by the Department of Health and Social Care.

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