



International evidence on care home COVID-19 outbreak responses: summary of key findings

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Last updated 12 June 2020

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Suggested citation

Salcher-Konrad M and Comas-Herrera A (2020) *International evidence on care home COVID-19 outbreak responses, summary of key findings*. LTCcovid, International Long-Term Care Policy Network, CPEC-LSE, 12 June 2020.

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Acknowledgements

This note builds on joint work with Arnoupe Jhass, Huseyin Naci, Marselia Tan, Yousef El-Tawil: <https://www.medrxiv.org/content/10.1101/2020.06.09.20125237v1>

1. Measures that emerging evidence suggests have worked to contain COVID-19 outbreaks:

- Early detection and rapid response after detection of index case
- Systematic testing of all residents and staff: high prevalence of asymptomatic and presymptomatic cases that would not be detected by a) symptoms screening, and b) one-off testing (if infection has already spread beyond index case).
- Moving high-risk contacts of cases out of the facility
- Isolating cases by removing them from the facility or creating separate wards within the facility

2. About this document:

This note summarises emerging evidence on outbreak responses from a rapid review of the literature on COVID-19 in long-term care. Information on responses was extracted from studies reporting on COVID-19 outbreaks in long-term care settings. These studies were identified through a systematic search of electronic databases and selected using pre-specified inclusion and exclusion criteria in the context of a review that focused on COVID-19 mortality and spread of disease in long-term care more broadly (Salcher-Konrad et al, 2020). Outbreaks in long-term care settings were shown to vary widely in terms of the number of people affected and evidence on the reasons behind this variation is still emerging. Decision makers should be aware of the early nature of this evidence.

3. Measures identified:

3.1. Early detection and rapid response after detection of index case:

In two reports of successful containment of outbreaks from South Korea, a possible outbreak was **detected early on and contacts of index cases were quarantined rapidly** (Lee 2020: one day after diagnosis of index case; Kim 2020: no time reported). Similarly, in one of the US outbreaks (Roxby et al. 2020), various measures were put in place (social distancing; enhanced hygiene; no visitors) within 72 hours after detection of the first two cases, and before comprehensive testing of remaining residents and staff detected further cases. In contrast, Graham et al. (2020) report that comprehensive testing in 4 nursing homes in London was only possible 21 days after the first de novo case in one of the homes due to testing capacity restraints before then (limited to 5 symptomatic cases per home). At the time of comprehensive testing, 40% of residents were already infected.

3.2. Systematic testing of all residents and staff:

Systematic testing of all residents and staff found a **high prevalence of asymptomatic and presymptomatic cases that would not be detected by a) symptoms screening, and b) one-off testing** (if infection has already spread beyond index case). For example, in the outbreak

reported by Arons et al. (2020), residents (twice daily) and staff (at the start of their shift) had been screened for symptoms in response to awareness about COVID-19 in the area, but facility-wide testing was only started 13 days after the first member of staff and 10 days after the first resident tested positive (testing of all residents in the unit where these first two cases lived and worked, respectively, was conducted 7 days after the member of staff tested positive). 64% of residents tested positive, **more than half of which were asymptomatic** at the time of testing. **Repeat testing may be required to detect cases:** In the Arons report, 50% of cases were only detected at the second of two rounds of testing (one week apart). In the report by Dora et al. (2020), 2 of 19 cases were detected through repeat testing, which was only stopped when all residents tested negative.

3.3. Moving high-risk contacts of cases out of the facility:

Removing those exposed to cases from the outbreak facility to the extent possible was reported in both of the Korean examples where no resident was infected (Lee et al. 2020; Kim 2020). Other cases were isolated within the facility. These measures reduced the number of residents in the facilities. However, Kim (2020) comments that effective isolation of cases within care homes and transfer of cases to other hospitals is challenging due to inadequate facilities for quarantine and reluctance to accept patients who could transmit the virus. A relatively low density of residents in an assisted living facility (as compared to skilled nursing facilities) was mentioned as a possible explanation for the comparatively low rate of infections reported by Roxby et al. (2020).

3.4. Isolating cases by removing them from the facility or creating separate wards within the facility:

Dora et al. (2020) report that all cases identified through comprehensive testing were transferred to an affiliated hospital (at the time of comprehensive testing, appr. 16% of the care home population were already infected), and subsequent weekly testing only revealed 3 more cases in residents. Cases were isolated within the facility in a report from a German nursing home (Grabenhorst et al., 2020). However, they reported that isolating cases took a psychological toll on both residents and staff (some cases did not want to move to the isolation ward; some non-cases wanted to move there to remain close to their contact persons).

3.5. Two Korean examples of outbreaks at LTC hospitals contained in the very early stages:

Kim (2020) and Lee et al. (2020) report on **cases where outbreaks at long-term care hospitals in South Korea were contained in the very early stages**. In both cases, a care worker had been infected and had worked at the facility for two days (in one case symptomatic; in the other asymptomatic, and **identified through contact tracing** after a separate, non-care home, outbreak), although most likely wearing at least a mask when in contact with patients. In Lee et al., **all patients and exposed care workers were tested** and one additional case (a member of staff) was identified. In both cases, patients who were considered to have been at highest risk to have been exposed to the care workers were either **moved out of the facility** (including

discharge to home where possible and transfer to other hospitals) **or isolated** as best as possible within the facility (including isolation of febrile patients in single-bed rooms and creating isolation wards with a distance of at least 2m between beds). In addition, **care workers who were considered to have been in close contact with cases were quarantined at home. Care workers who continued to work were either quarantined in a hotel (Lee et al. 2020) or voluntarily moved into the facility (Kim 2020).** Quarantine measures were maintained for 2 weeks. After this period, all patients and staff were tested and, in both cases, no more infections were detected. In the Lee et al. case, exposed patients and staff were also administered hydroxychloroquine as post-exposure prophylaxis. However, in the absence of a control group, no causal effect could be observed, and results from a randomised controlled trial have now shown that hydroxychloroquine is not effective as post-exposure prophylaxis.

Table: Published studies of COVID-19 outbreaks providing information on outbreak response

| Study | Incidence rate | Number of COVID-19 cases | Number of users / staff | Time period | Source population | Response |
|---|----------------|--------------------------|-------------------------|-------------|---|--|
| Incidence of confirmed COVID-19 among long-term care users | | | | | | |
| Arons 2020 (US) | 63.2% | 48 | 76 | 7 days | 76 out of all 89 residents at the investigated skilled nursing facility | In response to awareness about COVID-19, residents (twice daily) and staff (at beginning of shifts) were screened for symptoms. A possible outbreak was detected in one unit of the facility after first a member of staff and then a resident tested positive. In response, communal activities were cancelled, visitors restricted, and staff recommended to wear full PPE (including eye protection, gown, gloves, and face mask) when entering rooms of symptomatic residents. Testing of all consenting residents of the affected unit was conducted 7 days after the member of staff tested positive and 5 days after the resident tested positive. Testing was expanded to the entire facility 13 days after the first member of staff and 10 days after the first resident tested positive. Repeat testing was conducted 7 days later. |
| Osterdahl 2020 (UK) | 47.6% | 10 | 21 | 4 days | 21 out of all 24 residents at the investigated nursing home | Facility-wide testing was conducted 3-4 days after a suspected case was detected based on symptoms (later confirmed by test). No reports of further measures, but focus of paper was on diagnostic testing. |
| Graham 2020 (UK) | 40.3% | 126 | 313 | 7 days | Appr. 94% of all residents at the time of systematic testing (available and consented to testing) | Comprehensive testing of residents and staff was started due to ongoing infections and deaths once increased testing capacity was in place (27 days after the first resident died of suspected COVID-19 and 21 days after the first confirmed new case was detected in the nursing home). Testing had been limited to 5 symptomatic cases before that. Comprehensive testing included all residents as well as a convenience sample of staff (appr. 12%). |
| Dora 2020 (US) | 19.2% | 19 | 99 | 26 days | All 99 residents at the facility at the time of outbreak | 1 day after 2 residents at a skilled nursing facility tested positive, serial (approximately weekly) testing of all residents was started. Clinical and non-clinical members of staff were also tested comprehensively. Detected cases were transferred to the affiliated hospital. No new residents were admitted. A COVID-19 recovery ward was introduced and cases without acute hospital needs were isolated there. |

| | | | | | | |
|-----------------------------------|-------|----|-----|---------|---|---|
| Grabenhors t 2020 (Germany) | 13.1% | 16 | 122 | 69 days | All 122 residents at the time of systematic testing | After a resident at a nursing home in Germany tested positive, initially all contacts of that case were tested (including asymptomatic ones, which, at the time, went against official guidance). Following the detection of additional cases, testing was expanded to all residents and all members of staff (including maintenance personnel). Infected residents were isolated in a dedicated COVID-19 ward, with dedicated staff volunteering to care for these patients. Patients were quarantined for 3 weeks and only allowed to return to their regular beds after a negative test. |
| Roxby 2020 (US) | 5.0% | 4 | 80 | 7 days | All residents at the investigated assisted living facility except for 2 index cases | After 2 residents at a facility for independent and assisted living were admitted to hospital due to COVID-19, initially the following measures were implemented: social distancing (isolating residents in their rooms; no communal meals or activities; no visitors), enhanced hygiene (frequent disinfection; additional hand hygiene stations for staff), daily symptoms screening for staff. An outbreak investigation was started that included testing of all residents and staff. Residents (but not staff) were again tested 7 days later. Detected cases were isolated within the facility and PPE protocols were being followed. |
| Lee 2020 (Korea) | 0.0% | 0 | 193 | 20 days | All 193 inpatients at the investigated long-term care hospital who were exposed to an infected care worker | After a careworker at a long-term care hospital in Busan, Korea, tested positive (and had been working while symptomatic for 2 days; although wearing a mask), all patients and staff at the long-term care hospital were tested. 1 other case was identified. Exposed careworkers were quarantined at home, while remaining careworkers who continued to work quarantined in a hotel. Quarantine measures also included transferring some patients to other facilities and isolating patients with fever in single-bed rooms in the facility. |
| Kim 2020 (Korea) | 0.0% | 0 | 142 | 14 days | All 142 patients were tested at the end of 14-day quarantine. Unclear whether comprehensive testing was conducted at beginning. | After a careworker at a long-term care hospital in Bucheon (?), Korea, tested positive (had been asymptomatic and working for 2 days, wearing mask and gloves), a multi-faceted intervention involving contact-tracing, PPE use, quarantine, repositioning beds to create 2m distance, restricted and revised movement patterns of health care workers within facility was implemented: Residents who could be discharged were discharged and isolated at home; selected health care workers were also isolated at home; some residents were transferred to other hospitals to allow for 2m space between beds for remaining residents; caregivers were isolated together with residents; nurses and nurse assistants voluntarily agreed to be quarantined in the facility to continue patient care; facility was disinfected; movement patterns in the facility were revised and restricted to prevent any cross-contamination. Quarantine was upheld for 14 days. |

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