Evidence Search Report

Review Question:	**What are the efficacies and outcomes of Point-of-Care/Antigen testing in Long Term care?**		
Context:	Point-of-care testing in LTC/residential care [include reports on what others are doing]		
Review ID:	LTC020201-01 ESR	**Complete Date:**	**February 5, 2021**
Subject(s):	Antigens; Testing; Long Term Care		
Cite As:	Dalidowicz, M; Mueller, M. What are the efficacies and outcomes of Point-of-Care/Antigen testing in Long Term care? 2021 Feb 5; Document no.: LTC020201-01 ESR. In: COVID-19 Rapid Evidence Reviews [Internet]. SK: SK COVID Evidence Support Team, c2020. 22 p. (CEST evidence search report).		

Librarian Notes & Comments

We have included some resources that were more general in nature and guidance documents as requested. There was very little to be found that discussed the outcomes of POC testing in the LTC setting.

Sincerely,
Michelle & Mark

Disclaimer

Search Results: Guidance, Summaries & Other Grey Literature

Alberta Health Services. Do the rapid COVID-19 tests on the market represent a feasible opportunity for Alberta? [6 Nov 2020]. https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-sag-performance-and-feasibility-of-rapid-covid-19-tests-rapid-review.pdf

CADTH. Rapid Point-of-Care Antigen Testing for SARS-CoV-2 Infection. [20 Oct 2020]. https://www.cadth.ca/sites/default/files/covid-19/en0025-antigen-testing-for-sars-cov-2-update1.pdf

Arizona Department of Health Services. Recommendations for Long-term Care Facility Diagnostic Testing. [19 Oct 2020] https://azdhs.gov/documents/preparedness/epidemiology-disease-control/infectious-disease-epidemiology/novel-coronavirus/healthcare-providers/recommendations-long-term-care-facility-diagnostic-testing.pdf

Centers for Disease Control and Prevention (CDC).

- SARS-CoV-2 Antigen Testing in Long Term Care Facilities: Considerations for Use in Nursing Homes and other Long-Term Care Facilities [7 Jan 2021] https://www.cdc.gov/coronavirus/2019-ncov/hcp/nursing-homes-antigen-testing.html
- Guidance for SARS-CoV-2 Point-of-Care Testing [28 Jan 2021] https://www.cdc.gov/coronavirus/2019-ncov/lab/point-of-care-testing.html
- Interim Guidance for Antigen Testing for SARS-CoV-2. [16 Dec 2020]. https://www.cdc.gov/coronavirus/2019-ncov/lab/resources/antigen-tests-guidelines.html
- Interim Guidance on testing healthcare personnel for SARS CoV-2 [14 Dec 2020] https://www.cdc.gov/coronavirus/2019-ncov/hcp/testing-healthcare-personnel.html

The Center for Health Policy Evaluation in Long-Term Care. Preliminary Report: Discordant Results between COVID-19 Point of Care Antigen and PCR Tests in Nursing Homes. [Sept 2020] https://www.thca.org/files/2020/09/CHPE_Report-on-Discordant-COVID-test-resuls-antiven-vs-PCR-Sept-2020.pdf

COVID-19 Rapid Evidence Access Link. What guidance exists for asymptomatic COVID-19 testing in primary care settings? [24 Jan 2021] https://www.covid19real.ca/real-review/what-guidance-exists-for-asymptomatic-covid-19-testing-in-primary-care-settings/

Delaware Health and Social Services. COVID-19 Rapid Antigen Testing For Long-Term Care Facilities [Dec 2020] https://coronavirus.delaware.gov/wp-content/uploads/sites/177/2020/12/Antigen-Testing-Guidance-for-LTC-Facilities-BD-Veritor.pdf

European Centre for Disease Prevention and Control. Options for the use of rapid antigen tests for COVID-19 in the EU/EEA and the UK. [19 Nov 2020]. https://www.ecdc.europa.eu/sites/default/files/documents/Options-use-of-rapid-antigen-tests-for-COVID-19.pdf

Health Canada. Priority strategies to optimize testing and screening for COVID-19 in Canada: Report. [Jan 2021] https://www.canada.ca/en/health-canada/services/drugs-health-products/covid19-industry/medical-devices/testing-screening-advisory-panel/reports-summaries/priority-strategies.html

Illinois Department of Public Health. Interim Guidance on Antigen Testing for COVID-19 in Long-Term Care. [8 Oct 2020] https://www.dph.illinois.gov/sites/default/files/20201008_LTC_COVID-19_POC_Antigen_Te.pdf

Maricopa County Department of Public Health. Long-Term Care Facility Guidance on Testing for COVID-19. [29 Sept 2020] https://www.maricopa.gov/DocumentCenter/View/63333/LTCF-Testing-Guidance

Massachusetts Department of Public Health. Memorandum: Point of Care Testing Devices for Nursing Homes. [5 Oct 2020]. https://www.mass.gov/doc/point-of-care-testing-devices-for-nursing-homes/download

Minnesota Department of Health. Using Antigen-based Point-of- Care (POC) Testing for COVID-19 in Long-term Care Facilities. [11 Nov 2020] https://www.health.state.mn.us/diseases/coronavirus/hcp/ltcantigentest.pdf

Ontario Ministry of Long-Term Care. COVID-19: Long-term care home surveillance testing and access to homes [8 Jan 2021] https://www.ontario.ca/page/covid-19-long-term-care-home-surveillance-testing

Oregon Health Authority. Provisional Guidance for Point-of-care Antigen Testing for COVID-19 in Long-term Care Facilities. [8 Oct 2020]. https://www.oregon.gov/dhs/PROVIDERS-PARTNERS/LICENSING/AdminAlerts/NF-20-152%20-%20Updated%20POC%20Antigen%20Testing%20Guidance.pdf

Pennsylvania Department of Health. Update: Point-of-Care Testing for Long-term Care Facilities. [22 Jan 2021]. https://www.health.pa.gov/topics/Documents/HAN/2020-PAHAN-547-01-22-%20UPDATE%20POC%20Antigen%20LTCF.pdf

Public Health Canada. Interim guidance on the use of rapid antigen detection tests for the identification of SARS-CoV-2 infection. https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/guidance-documents/use-rapid-antigen-detection-tests.html

Rapid Evidence Access Link (REAL). What guidance exists for asymptomatic COVID-19 testing in primary care settings? [24 Jan 2021] https://www.covid19real.ca/real-review/what-guidance-exists-for-asymptomatic-covid-19-testing-in-primary-care-settings/

South Carolina Department of Health and Environmental Control. Interim Point-of-Care Antigen Testing Guidance for Long Term Care Facilities. [21 Sept 2020]. https://scdhec.gov/sites/default/files/media/document/Interim_Long_Term_Care_POC_Antigen_Testing_Guidance_09.21.2020.pdf

Tennessee Department of Health. Point-of-Care Antigen Testing Guidance for Skilled Nursing Facilities. [22 Oct 2020]. https://www.tn.gov/content/dam/tn/health/documents/cedep/novel-coronavirus/LTCF_Antigen_Guidance.pdf

World Health Organization. Antigen-detection in the diagnosis of SARS-CoV-2 infection using rapid immunoassays [Internet]. [11 Sept 2020] https://www.who.int/publications/i/item/antigen-detection-in-the-diagnosis-of-sars-cov-2infection-using-rapid-immunoassays

NEWS, BLOGS, ETC.

BCCPA (BC Care Providers Association) Newswire. Testing, testing, 1,2,3, … how B.C. seniors' care can win against COVID-19. [7 Dec 2020] https://bccare.ca/2020/12/testing-testing-123-how-b-c-seniors-care-can-win-against-covid-19/

Bloomberg News. Rapid Covid Test Push Wavers on Nursing Home False Positives [9 Oct 2020] https://www.bloomberg.com/news/articles/2020-10-09/rapid-covid-test-effort-stumbles-over-risk-of-false-positives

CBC. Alberta expands rapid COVID-19 testing pilot program. [17 Dec 2020] https://www.cbc.ca/news/canada/edmonton/shandro-rapid-test-plan-alberta-1.5844929

Department of Health and Human Services. Trump Administration announces initiative for more and faster COVID-19 testing in nursing homes. https://www.hhs.gov/about/news/2020/07/14/trump-administration-announces-initiative-more-faster-covid-19-testing-nursing-homes.html.

Government of Ontario. News Release: Ontario Deploys Rapid Testing to Support COVID-19 Response. [24 Nov 2020]. https://news.ontario.ca/en/release/59330/ontario-deploys-rapid-testing-to-support-covid-19-response

Global News. How rapidly is Canada rolling out COVID-19 rapid testing? [26 Jan 2021] https://globalnews.ca/news/7600541/coronavirus-rapid-test-roll-out-canada-covid19/

Times Colonist. Pilot project studies use of rapid COVID tests for care-home staff. [9 Dec 2020] https://www.timescolonist.com/news/local/pilot-project-studies-use-of-rapid-covid-tests-for-care-home-staff-1.24252359

Search Results: Articles (includes preprints)

1. **Green R, Tulloch JSP, Tunnah C, et al. COVID-19 testing in outbreak free care homes: What are the public health benefits? J Hosp Infect. 2021;13:13. DOI:** 10.1016/j.jhin.2020.12.024
BACKGROUND: COVID-19 care home outbreaks represent a significant proportion of COVID-19 morbidity and mortality in the UK. National testing initially focused on symptomatic care home residents, before extending to asymptomatic cohorts. AIM: The aim was to describe the epidemiology and transmission of COVID-19 in outbreak free care homes. METHODS: A two-point prevalence survey of COVID-19, in 34 Liverpool care homes, was performed in April and May 2020. Changes in prevalence were analysed. Associations between care home characteristics, reported infection, prevention and control interventions, and COVID-19 status were described and analysed. FINDINGS: No resident developed COVID-19 symptoms during the study. There was no significant difference between: the number of care homes containing at least one test positive resident between the first (17.6%, 95%CI 6.8-34.5) and second round (14.7%, 95%CI 5.0-31.1) of testing (p>0.99); and the number of residents testing positive between the first (2.1%, 95%CI 1.2-3.4) and second round (1.0%, 95%CI 0.5-2.1) of testing (p=0.11). Care homes providing nursing care (RR 7.99, 95%CI 1.1-57.3) and employing agency staff (RR 8.4, 95%CI 1.2-60.8) were more likely to contain test positive residents. Closing residents shared space was not associated with residents testing positive (RR 2.63, 95%CI 0.4-18.5). CONCLUSIONS:

Asymptomatic COVID-19 care homes showed no evidence of disease transmission or development of outbreaks; suggesting that current infection prevention and control measures are effective in preventing transmission. Repeat testing at 2-3 weeks had limited or no public health benefits over regular daily monitoring of staff and residents for symptoms. These results should inform policies calling for regular testing of asymptomatic residents.
URL: https://www.ncbi.nlm.nih.gov/pubmed/33453349
DOI: 10.1016/j.jhin.2020.12.024

2. **Halfon P, Penaranda G, Khiri H, et al. An optimized stepwise algorithm combining rapid antigen and RT-qPCR for screening of COVID-19 patients. medRxiv. 2021:2021.01.13.21249254. DOI:** 10.1101/2021.01.13.21249254
Background Diagnosing SARS CoV-2 infection with certainty is essential for appropriate case management. We investigated the combination of rapid antigen detection (RAD) and RT-qPCR assays in a stepwise procedure to optimize the detection of COVID-19.Methods From August 2020 to November 2020, 43,399 patients were screened in our laboratory for COVID-19 diagnostic by RT-qPCR using nasopharyngeal swab. Overall, 4,691 of the 43,399 were found to be positive, and 200 were retrieved for RAD testing allowing comparison of diagnostic accuracy between RAD and RT-qPCR. Cycle threshold (Ct) and time from symptoms onset (TSO) were included as covariates.Results The overall sensitivity, specificity, PPV, NPV, LR-, and LR+ of RAD compared with RT-qPCR were 72% (95%CI 62%–81%), 99% (95% CI95%–100%), 99% (95%CI 93%–100%), and 78% (95%CI 70%–85%), 0.28 (95%CI 0.21-0.39), and 72 (95%CI 10-208) respectively. Sensitivity was higher for patients with Ct ≤ 25 regardless of TSO: TSO ≤ 4 days 92% (95%CI 75%–99%), TSO > 4 days 100% (95%CI 54%–100%), and asymptomatic 100% (95%CI 78-100%). Overall, combining RAD and RT-qPCR would allow reducing from only 4% the number of RT-qPCR needed.Conclusion This study highlights the risk of misdiagnosing COVID-19 in 28% of patients if RAD is used alone. Thus, negative results from RAD needs to be confirmed by RT-qPCR prior to making treatment decisions. A stepwise analysis that combines RAD and RT-qPCR would be an efficient screening procedure for COVID-19 detection and may facilitate the control of the outbreak.Competing Interest StatementThe authors have declared no competing interest.Clinical Protocols https://www.health-data-hub.fr Funding StatementThere was no funding source for this study.Author DeclarationsI confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained.YesThe details of the IRB/oversight body that provided approval or exemption for the research described are given below:Comite de Protection des Personnes (CPP) Sud-Mediterranee II - Hopital Sainte Marguerite - Pavillon 9, Marseille, FRANCE (http://www.cpp-sudmed2.fr/) Decision: exemption of approvalAll necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived.YesI understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance).YesI have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable.YesData will be available immediately after publication with no end date to researchers who provide a methodologically sound proposal. Requests should be addressed by email to g.penaranda@alphabio.fr.
URL: http://medrxiv.org/content/early/2021/01/15/2021.01.13.21249254.abstract
DOI: 10.1101/2021.01.13.21249254

3. **Micocci M, Gordon AL, Allen AJ, et al. COVID-19 testing in English care homes and implications for staff and residents. Age Ageing. 2021;22:22. DOI:** 10.1093/ageing/afab015
INTRODUCTION: Care home residents are at high risk of dying from COVID-19. Regular testing, producing rapid and reliable results is important in this population because infections spread quickly, and presentations are often atypical or asymptomatic. This study evaluated current testing pathways in care homes to explore the role of point-of-care tests (POCTs). METHODS: Ten staff from eight care homes, purposively sampled to reflect care organisational attributes that influence outbreak severity, underwent a semi-structured remote videoconference interview. Transcripts were analysed using process mapping tools and framework analysis focussing on perceptions about, gaps within, and needs arising from, current pathways. RESULTS: Four main steps were identified in testing: infection prevention, preparatory steps, swabbing procedure, and management of residents. Infection prevention was particularly challenging for mobile residents with cognitive impairment. Swabbing and preparatory steps were resource-intensive, requiring additional staff resource. Swabbing required flexibility and staff who were familiar to the resident. Frequent approaches to residents were needed to ensure they would participate at a suitable time. After-test management varied between sites. Several homes reported deviating from government guidance to take more cautious approaches, which they perceived to be more robust. CONCLUSION: Swab-based testing is organisationally complex and resource-intensive in care homes. It needs to be flexible to meet the needs of residents and provide care homes with rapid information to support care decisions. POCT could help address gaps but the complexity of the setting means that each technology must be evaluated in context before widespread adoption in care homes.
URL: https://www.ncbi.nlm.nih.gov/pubmed/33481986
DOI: 10.1093/ageing/afab015

4. **See I, Paul P, Slayton RB, et al. Modeling effectiveness of testing strategies to prevent COVID-19 in nursing homes — United States, 2020. medRxiv. 2021:2020.12.18.20248255. DOI:**
10.1101/2020.12.18.20248255
Background SARS-CoV-2 outbreaks in nursing homes can be large with high case fatality. Identifying asymptomatic individuals early through serial testing is recommended to control COVID-19 in nursing homes, both in response to an outbreak ("outbreak testing" of residents and healthcare personnel) and in facilities without outbreaks ("non-outbreak testing" of healthcare personnel). The effectiveness of outbreak testing and isolation with or without non-outbreak testing was evaluated.Methods Using published SARS-CoV-2 transmission parameters, the fraction of SARS-CoV-2 transmissions prevented through serial testing (weekly, every three days, or daily) and isolation of asymptomatic persons compared to symptom-based testing and isolation was evaluated through mathematical modeling using a Reed-Frost model to estimate the percentage of cases prevented (i.e., "effectiveness") through either outbreak testing alone or outbreak plus non-outbreak testing. The potential effect of simultaneous decreases (by 10%) in the effectiveness of isolating infected individuals when instituting testing strategies was also evaluated.Results Modeling suggests that outbreak testing could prevent 54% (weekly testing with 48-hour test turnaround) to 92% (daily testing with immediate results and 50% relative sensitivity) of SARS-CoV-2 infections. Adding non-outbreak testing could prevent up to an additional 8% of SARS-CoV-2 infections (depending on test frequency and turnaround time). However, added benefits of non-outbreak testing were mostly negated if accompanied by decreases in infection control practice.Conclusions When combined with high-quality infection control practices, outbreak testing could be an effective approach to preventing COVID-19 in nursing homes, particularly if optimized through increased test frequency and use of tests with rapid turnaround.Summary Mathematical modeling evaluated the effectiveness of serially testing asymptomatic persons in a nursing home in response to a SARS-CoV-2 outbreak with or without serial testing of asymptomatic staff in the absence of known SARS-CoV-2 infections.Competing Interest StatementThe authors have

declared no competing interest.Funding StatementNo external funding was received. All work was conducted as part of government duties.Author DeclarationsI confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained.YesThe details of the IRB/oversight body that provided approval or exemption for the research described are given below:This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy (see e.g., 45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S. C. 241(d); 5 U.S.C 552a; 44 U.S.C. 351 et seq.).All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived.YesI understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance).YesI have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable.YesData provided in supplemental materials or publicly available through links in the manuscript. https://github.com/cdcepi/Nursing-home-SARS-CoV-2-testing-model/
URL: http://medrxiv.org/content/early/2021/01/29/2020.12.18.20248255.abstract
DOI: 10.1101/2020.12.18.20248255

5. **Shimotsu ST, Johnson ARL, Berke EM, et al. COVID-19 Infection Control Measures in Long-Term Care Facility, Pennsylvania, USA. Emerg Infect Dis. 2021;27(2):644-5. DOI:** 10.3201/eid2702.204265
Residents of long-term care facilities are at risk for coronavirus disease. We report a surveillance exercise at such a facility in Pennsylvania, USA. After introduction of a testing strategy and other measures, this facility had a 17-fold lower coronavirus disease case rate than neighboring facilities.
URL: https://www.ncbi.nlm.nih.gov/pubmed/33211994
DOI: 10.3201/eid2702.204265

6. **Bergstrom T, Bergstrom CT, Li H. Frequency and accuracy of proactive testing for COVID-19. medRxiv. 2020:2020.09.05.20188839. DOI:** 10.1101/2020.09.05.20188839
September 5, 2020The SARS-CoV-2 coronavirus has proven difficult to control not only because of its high transmissibility, but because those who are infected readily spread the virus before symptoms appear, and because some infected individuals, though contagious, never exhibit symptoms. Proactive testing of asymptomatic individuals is therefore a powerful, and probably necessary, tool for preventing widespread infection in many settings. This paper explores the effectiveness of alternative testing regimes, in which the frequency, the accuracy, and the delay between testing and results determine the time path of infection. For a simple model of disease transmission, we present analytic formulas that determine the effect of testing on the expected number of days of during which an infectious individual is exposed to the population at large. This allows us to estimate the frequency of testing that would be required to prevent uncontrolled outbreaks, and to explore the trade-offs between frequency, accuracy, and delay in achieving this objective. We conclude by discussing applications to outbreak control on college and university campuses.Competing Interest Statement Ted Bergstrom and Haoran Li have no competing interests. Carl Bergstrom consults for Color Genomics on COVID testing schedules.Competing Interest StatementCTB consults for Color Genomics on COVID testing.Funding StatementNo external funding supported this work.Author DeclarationsI confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained.YesThe details of the IRB/oversight body that provided approval or exemption for the research described are given below:This is a mathematical model with no human subjects involvement.All necessary patient/participant consent has been obtained and the appropriate institutional forms have been

archived.YesI understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance).YesI have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable.YesThis is an analytic mathematical model. We have implemented a calculator for the formulas developed in the paper.
https://steveli.shinyapps.io/FrequencyAndAccuracyCalculator/
URL: http://medrxiv.org/content/early/2020/09/08/2020.09.05.20188839.abstract
DOI: 10.1101/2020.09.05.20188839

7. **Boďová K, Kollár R. Characteristic spatial scales of SARS-CoV-2 pandemics: lessons from mass rapid antigen testing in Slovakia. medRxiv. 2020:2020.12.23.20248808. DOI:** 10.1101/2020.12.23.20248808
Mass antigen testing in Slovakia conducted in October and November 2020 is a source of important data. We perform its statistical analysis and study epidemic geographical patterns. We observe exponentially distributed test positivity and exponential trends in its geographical distribution, and its approximately 10 km spatial characteristic correlation length. A small correlation between positivity in two consecutive testing rounds appeared on the municipalities level but it significantly increased on the counties level. Recent 7-day PCR tests incidence per capita served as a good proxy for antigen test positivity. Positivity of non-residents was higher than of residents when mass testing was offered only in municipalities with the highest positivity in previous rounds. Reduction in positivity in repeated testing increased with the positivity in the earlier round. Our results contribute to better understanding of pandemic data, and aid an assessment of mass testing efficiency, and planning of mitigation measures.Competing Interest StatementThe authors have declared no competing interest.Funding StatementThis work has been supported by the Slovak Research and Development Agency under the Contract Nos. APVV-18-0308 (RK) PP-COVID-20-0017 and by the Scientific Grant Agency of the Slovak Republic under the Grants Nos. 1/0755/19 and 1/0521/20.Author DeclarationsI confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained.YesThe details of the IRB/oversight body that provided approval or exemption for the research described are given below:Not relevantAll necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived.YesI understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance).Yes I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable.YesAnalysis is based on publicly available data
URL: http://medrxiv.org/content/early/2020/12/26/2020.12.23.20248808.abstract
DOI: 10.1101/2020.12.23.20248808

8. **Dora AV, Winnett A, Jatt LP, et al. Universal and Serial Laboratory Testing for SARS-CoV-2 at a Long-Term Care Skilled Nursing Facility for Veterans - Los Angeles, California, 2020. MMWR Morb Mortal Wkly Rep. 2020;69(21):651-5. DOI:** 10.15585/mmwr.mm6921e1
On March 28, 2020, two residents of a long-term care skilled nursing facility (SNF) at the Veterans Affairs Greater Los Angeles Healthcare System (VAGLAHS) had positive test results for SARS-CoV-2, the cause of

coronavirus disease 2019 (COVID-19), by reverse transcription-polymerase chain reaction (RT-PCR) testing of nasopharyngeal specimens collected on March 26 and March 27. During March 29-April 23, all SNF residents, regardless of symptoms, underwent serial (approximately weekly) nasopharyngeal SARS-CoV-2 RT-PCR testing, and positive results were communicated to the county health department. All SNF clinical and nonclinical staff members were also screened for SARS-CoV-2 by RT-PCR during March 29-April 10. Nineteen of 99 (19%) residents and eight of 136 (6%) staff members had positive test results for SARS-CoV-2 during March 28-April 10; no further resident cases were identified on subsequent testing on April 13, April 22, and April 23. Fourteen of the 19 residents with COVID-19 were asymptomatic at the time of testing. Among these residents, eight developed symptoms 1-5 days after specimen collection and were later classified as presymptomatic; one of these patients died. This report describes an outbreak of COVID-19 in an SNF, with case identification accomplished by implementing several rounds of RT-PCR testing, permitting rapid isolation of both symptomatic and asymptomatic residents with COVID-19. The outbreak was successfully contained following implementation of this strategy.
URL: https://www.ncbi.nlm.nih.gov/pubmed/32463809
DOI: 10.15585/mmwr.mm6921e1

9. **Dumyati G, Gaur S, Nace DA, et al. Does Universal Testing for COVID-19 Work for Everyone? J Am Med Dir Assoc. 2020;21(11):1525-32. DOI:** 10.1016/j.jamda.2020.08.013
The Coronavirus disease 2019 (COVID-19) pandemic has been especially devastating among nursing home residents, with both the health circumstances of individual residents as well as communal living settings contributing to increased morbidity and mortality. Preventing the spread of COVID-19 infection requires a multipronged approach that includes early identification of infected residents and health care personnel, compliance with infection prevention and control measures, cohorting infected residents, and furlough of infected staff. Strategies to address COVID-19 infections among nursing home residents vary based on the availability for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) tests, the incorporation of tests into broader surveillance efforts, and using results to help mitigate the spread of COVID-19 by identifying asymptomatic and presymptomatic infections. We review the tests available to diagnose COVID-19 infections, the implications of universal testing for nursing home staff and residents, interpretation of test results, issues around repeat testing, and incorporation of test results as part of a long-term response to the COVID-19 pandemic. We propose a structured approach for facility-wide testing of residents and staff and provide alternatives if testing capacity is limited, emphasizing contact tracing. Nursing homes with strong screening protocols for residents and staff, that engage in contact tracing for new cases, and that continue to remain vigilant about infection prevent and control practices, may better serve their residents and staff by thoughtful use of symptom- and risk-based testing strategies.
URL: https://www.ncbi.nlm.nih.gov/pubmed/32958402
DOI: 10.1016/j.jamda.2020.08.013

10. **Escobar DJ, Lanzi M, Saberi P, et al. Mitigation of a COVID-19 Outbreak in a Nursing Home Through Serial Testing of Residents and Staff. Clin Infect Dis. 2020. DOI:** 10.1093/cid/ciaa1021
Nursing homes and long-term care facilities represent highly vulnerable environments for respiratory disease outbreaks, such as COVID-19. We describe a COVID-19 outbreak in a nursing home that was rapidly contained by using a universal testing strategy of all residents and nursing home staff.
URL: https://www.ncbi.nlm.nih.gov/pubmed/32687198
DOI: 10.1093/cid/ciaa1021

11. **Goldberg SA, Lennerz J, Klompas M, et al. Presymptomatic Transmission of SARS-CoV-2 Amongst Residents and Staff at a Skilled Nursing Facility: Results of Real-Time PCR and Serologic Testing. Clin Infect Dis. 2020. DOI:** 10.1093/cid/ciaa991
High rates of asymptomatic infection suggest benefits to routine testing in congregate care settings. SARS-CoV-2 screening was undertaken in a single nursing facility without a known case of COVID-19, demonstrating an 85% prevalence among residents and 37% among staff. Serology was not helpful in identifying infections.
URL: https://www.ncbi.nlm.nih.gov/pubmed/32667967
DOI: 10.1093/cid/ciaa991

12. **Graziadio S, Urwin SG, Cocco P, et al. Unmet clinical needs for COVID-19 tests in UK health and social care settings. PLoS One. 2020;15(11):e0242125. DOI:** 10.1371/journal.pone.0242125
There is an urgent requirement to identify which clinical settings are in most need of COVID-19 tests and the priority role(s) for tests in these settings to accelerate the development of tests fit for purpose in health and social care across the UK. This study sought to identify and prioritize unmet clinical needs for COVID-19 tests across different settings within the UK health and social care sector via an online survey of health and social care professionals and policymakers. Four hundred and forty-seven responses were received between 22nd May and 15th June 2020. Hospitals and care homes were recognized as the settings with the greatest unmet clinical need for COVID-19 diagnostics, despite reporting more access to laboratory molecular testing than other settings. Hospital staff identified a need for diagnostic tests for symptomatic workers and patients. In contrast, care home staff expressed an urgency for screening at the front door to protect high-risk residents and limit transmission. The length of time to test result was considered a widespread problem with current testing across all settings. Rapid tests for staff were regarded as an area of need across general practice and dental settings alongside tests to limit antibiotics use.
URL: https://www.ncbi.nlm.nih.gov/pubmed/33180807
DOI: 10.1371/journal.pone.0242125

13. **Herrera V, Hsu V, Adewale A, et al. Testing Healthcare Workers Exposed to COVID19 using Rapid Antigen Detection. medRxiv. 2020:2020.08.12.20172726. DOI:** 10.1101/2020.08.12.20172726
There is a need to develop safe and cost-effective ways to test healthcare workers for COVID19. Here we describe a rapid antigen testing strategy in a cohort of 497 Healthcare workers exposed to SARS-CoV-2 that can be applied by systems facing a surge of COVID19 cases, increased number of exposures in their workforce and limited RT-PCR availability. Our findings support an expanded use for antigen testing beyond its current indication and highlights the importance of further evaluating this modality for the diagnosis of COVID19 on asymptomatic individuals.Competing Interest StatementThe authors have declared no competing interest.Funding StatementNo external Funding was received to support the work presentedAuthor DeclarationsI confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained.YesThe details of the IRB/oversight body that provided approval or exemption for the research described are given below:AdventHealth Central Florida IRBAll necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived.YesI understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance).YesI have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if

applicable.YesAll data generated or analysed during this study are included in this published article (and its supplementary information files if applicable).
URL: http://medrxiv.org/content/early/2020/08/18/2020.08.12.20172726.abstract
DOI: 10.1101/2020.08.12.20172726

14. **Holmdahl I, Kahn R, Hay J, et al. Frequent testing and immunity-based staffing will help mitigate outbreaks in nursing home settings. medRxiv. 2020:2020.11.04.20224758. DOI:** 10.1101/2020.11.04.20224758
Background Nursing homes and other long term care facilities have been disproportionately impacted by the COVID-19 pandemic. Strategies are urgently needed to reduce transmission in these vulnerable populations. We aim to evaluate the reduction in transmission in nursing homes achieved through contact-targeted interventions and testing.Methods We developed an agent-based Susceptible–Exposed– Infectious(Asymptomatic/Symptomatic)–Recovered (SEIR) model to examine SARS-CoV-2 transmission in nursing homes. Residents and staff are modelled individually; residents are split into two cohorts based on COVID-19 diagnosis. We evaluate the effectiveness of two contact-targeted interventions. In the resident cohorting intervention, recovered residents are moved back from the COVID (infected) cohort to the non-COVID (susceptible/uninfected) cohort. In the immunity-based staffing intervention, recovered staff, who we assume have protective immunity, are assigned to work in the non-COVID cohort, while susceptible staff work in the COVID cohort and are assumed to have high levels of protection from personal protective equipment. These interventions aim to reduce the fraction of people's contacts that are presumed susceptible (and therefore potentially infected) and replace them with recovered (immune) contacts. We further evaluate two types of screening tests conducted with varying frequency: 1) rapid antigen testing and 2) PCR testing.Results The frequency and type of testing has a larger impact on the size of outbreaks than the cohorting and staffing interventions. The most effective testing strategy modeled is daily antigen testing. Under all screening testing strategies, the resident cohorting intervention and the immunity-based staffing intervention reduce the final size of the outbreak among residents, with the latter reducing it more. The efficacy of these interventions among staff varies by testing strategy and outbreak size.Conclusions Increasing the frequency of screening testing of all residents and staff, or even staff alone, in nursing homes has the potential to greatly reduce outbreaks in this vulnerable setting. Immunity-based staffing can further reduce spread at little or no additional cost and becomes particularly important when daily testing is not feasible.Competing Interest StatementMJM has received ad hoc speaking fees from Abbott Diagnostics and Roche Diagnostics.Funding StatementMJM is supported by the U01 Serological Centers of Excellence Grant. MJM and JH are supported by the DP5 NIH Director's Award.Author DeclarationsI confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained.YesThe details of the IRB/oversight body that provided approval or exemption for the research described are given below:N/AAll necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived.YesI understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance).Yes I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable.YesCode is available on github.
https://github.com/rek160/NursingHomeABM
URL: http://medrxiv.org/content/early/2020/11/23/2020.11.04.20224758.abstract
DOI: 10.1101/2020.11.04.20224758

15. **Ladhani SN, Chow JY, Janarthanan R, et al. Investigation of SARS-CoV-2 outbreaks in six care homes in London, April 2020. EClinicalMedicine. 2020;26:100533. DOI:** 10.1016/j.eclinm.2020.100533
BACKGROUND: Care homes are experiencing large outbreaks of COVID-19 associated with high case-fatality rates. We conducted detailed investigations in six London care homes reporting suspected COVID-19 outbreaks during April 2020. METHODS: Residents and staff had nasal swabs for SARS CoV-2 testing using RT-PCR and were followed-up for 14 days. They were categorized as symptomatic, post-symptomatic or pre-symptomatic if they had symptoms at the time of testing, in the two weeks before or two weeks after testing, respectively, or asymptomatic throughout. Virus isolation and whole genome sequencing (WGS) was also performed. FINDINGS: Across the six care homes, 105/264 (39.8%) residents were SARS CoV-2 positive, including 28 (26.7%) symptomatic, 10 (9.5%) post-symptomatic, 21 (20.0%) pre-symptomatic and 46 (43.8%) who remained asymptomatic. Case-fatality at 14-day follow-up was highest among symptomatic SARS-CoV-2 positive residents (10/28, 35.7%) compared to asymptomatic (2/46, 4.3%), post-symptomatic (2/10, 20.0%) or pre-symptomatic (3/21,14.3%) residents. Among staff, 53/254 (20.9%) were SARS-CoV-2 positive and 26/53 (49.1%) remained asymptomatic. RT-PCR cycle-thresholds and live-virus recovery were similar between symptomatic/asymptomatic residents/staff. Higher RT-PCR cycle threshold values (lower virus load) samples were associated with exponentially decreasing ability to recover infectious virus (P<0.001). WGS identified multiple (up to 9) separate introductions of different SARS-CoV-2 strains into individual care homes. INTERPRETATION: A high prevalence of SARS-CoV-2 positivity was found in care homes residents and staff, half of whom were asymptomatic and potential reservoirs for on-going transmission. A third of symptomatic SARS-CoV-2 residents died within 14 days. Symptom-based screening alone is not sufficient for outbreak control. FUNDING: None.
URL: https://www.ncbi.nlm.nih.gov/pubmed/32923993
DOI: 10.1016/j.eclinm.2020.100533

16. **Larremore DB, Wilder B, Lester E, et al. Test sensitivity is secondary to frequency and turnaround time for COVID-19 surveillance. medRxiv. 2020:2020.06.22.20136309. DOI:** 10.1101/2020.06.22.20136309
The COVID-19 pandemic has created a public health crisis. Because SARS-CoV-2 can spread from individuals with pre-symptomatic, symptomatic, and asymptomatic infections, the re-opening of societies and the control of virus spread will be facilitated by robust surveillance, for which virus testing will often be central. After infection, individuals undergo a period of incubation during which viral titers are usually too low to detect, followed by an exponential growth of virus, leading to a peak viral load and infectiousness, and ending with declining viral levels and clearance. Given the pattern of viral load kinetics, we model surveillance effectiveness considering test sensitivities, frequency, and sample-to-answer reporting time. These results demonstrate that effective surveillance, including time to first detection and outbreak control, depends largely on frequency of testing and the speed of reporting, and is only marginally improved by high test sensitivity. We therefore conclude that surveillance should prioritize accessibility, frequency, and sample-to-answer time; analytical limits of detection should be secondary.
URL: https://www.ncbi.nlm.nih.gov/pubmed/32607516
DOI: 10.1101/2020.06.22.20136309

17. McGarry BE, SteelFisher GK, Grabowski DC, et al. COVID-19 Test Result Turnaround Time for Residents and Staff in US Nursing Homes. JAMA Intern Med. 2020. DOI: 10.1001/jamainternmed.2020.7330

Skilled nursing facility (SNF) residents comprise over 40% of coronavirus disease 2019 (COVID-19) deaths nationally. Surveillance testing is critical for controlling asymptomatic and presymptomatic viral transmission in these high-risk settings. For surveillance testing in SNFs to effectively guide infection control, results need to be obtained in less than 1 day. To facilitate such rapid testing, Medicare began distributing point-of-care severe acute respiratory syndrome coronavirus 2 antigen test instruments in July 2020, focused on SNFs in COVID-19 hot spot counties. Little is known about the adequacy of test result turnaround in SNFs.
URL: https://www.ncbi.nlm.nih.gov/pubmed/33125044
DOI: 10.1001/jamainternmed.2020.7330

18. **Micocci M, Gordon AL, Allen AJ, et al. Understanding COVID-19 testing pathways in English care homes to identify the role of point-of-care testing: an interview-based process mapping study. medRxiv. 2020:2020.11.02.20224550. DOI:** 10.1101/2020.11.02.20224550
Introduction Care home residents are at high risk of dying from COVID-19. Regular testing producing rapid and reliable results is important in this population because infections spread quickly and presentations are often atypical or asymptomatic. This study evaluated current testing pathways in care homes to explore the role of point-of-care tests (POCTs).Methods Ten staff from eight care homes, purposively sampled to reflect care organisational attributes that influence outbreak severity, underwent a semi-structured remote videoconference interview. Transcripts were analysed using process mapping tools and framework analysis focussing on perceptions about, gaps within, and needs arising from, current pathways.Results Four main steps were identified in testing: infection prevention, preparatory steps, swabbing procedure, and management of residents. Infection prevention was particularly challenging for mobile residents with cognitive impairment. Swabbing and preparatory steps were resource-intensive, requiring additional staff resource. Swabbing required flexibility and staff who were familiar to the resident. Frequent approaches to residents were needed to ensure they would participate at a suitable time. After-test management varied between sites. Several homes reported deviating from government guidance to take more cautious approaches, which they perceived to be more robust.Conclusion Swab-based testing is organisationally complex and resource-intensive in care homes. It needs to be flexible to meet the needs of residents and provide care homes with rapid information to support care decisions. POCT could help address gaps but the complexity of the setting means that each technology must be evaluated in context before widespread adoption in care homes.Key-pointsTesting for COVID-19 in care homes is complex and requires reconfiguration of staffing and environment.Isolation and testing procedures are challenged when providing person-centred care to people with dementia.Point-of-care testing results could give care homes greater flexibility to test in person-centred ways.There was evidence that care home staff interpret testing guidance, rather than follow it verbatim.Each POCT must be evaluated in the context of care homes to understand its effect on care home processes.Competing Interest StatementThe authors have declared no competing interest.Funding StatementThis work was supported by UK Research and Innovation (UKRI), Asthma UK and the British Lung Foundation, as a part of the CONDOR study. MM, PK, AML, SW, and PB are supported by the NIHR London In Vitro Diagnostics Co-operative; ALG is funded in part by the NIHR Applied Research Collaboration-East Midlands (ARC-EM); AJA and TH are supported by the NIHR Newcastle In Vitro Diagnostics Co-operative. The views expressed are those of the authors and not necessarily those of the funders, the NHS, the NIHR or the Department of Health and Social Care.Author DeclarationsI confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained.YesThe details of the IRB/oversight body that provided approval or exemption for the research described are given below:This project was approved as a Service Evaluation by Imperial College Healthcare NHS Trust (ICHNT), registration no. 471All necessary patient/participant consent has been obtained and the appropriate institutional forms have been

archived.YesI understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance).YesI have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent mat rial as supplementary files, if applicable.YesThe data that support the findings of this study are available on request from the corresponding author, [MM]. The data are not publicly available due to their containing information that could compromise the privacy of research participants.
URL: http://medrxiv.org/content/early/2020/11/04/2020.11.02.20224550.abstract
DOI: 10.1101/2020.11.02.20224550

19. **Micocci M, Gordon AL, Seo MK, et al. Is Point-of-Care testing feasible and safe in care homes in England? An exploratory usability and accuracy evaluation of Point-of-Care Polymerase Chain Reaction test for SARS-COV-2. medRxiv. 2020:2020.11.30.20240010. DOI:**
10.1101/2020.11.30.20240010
Introduction Reliable rapid testing on COVID-19 is needed in care homes to reduce the risk of outbreaks and enable timely care. Point-of-care testing (POCT) in care homes could provide rapid actionable results. This study aimed to examine the usability and test performance of point of care polymerase chain reaction (PCR) for COVID-19 in care homes.Methods Point-of-care PCR for detection of SARS-COV2 was evaluated in a purposeful sample of four UK care homes. Test agreement with laboratory real-time PCR and usability and use errors were assessed.Results Point of care and laboratory polymerase chain reaction (PCR) tests were performed on 278 participants. The point of care and laboratory tests returned uncertain results or errors for 17 and 5 specimens respectively. Agreement analysis was conducted on 256 specimens. 175 were from staff: 162 asymptomatic; 13 symptomatic. 69 were from residents: 59 asymptomatic; 10 symptomatic. Asymptomatic specimens showed 83.3% (95% CI: 35.9%-99.6%) positive agreement and 98.7% negative agreement (95% CI: 96.2%-99.7%), with overall prevalence and bias-adjusted kappa (PABAK) of 0.965 (95% CI: 0.932 – 0.999). Symptomatic specimens showed 100% (95% CI: 2.5%-100%) positive agreement and 100% negative agreement (95% CI: 85.8%-100%), with overall PABAK of 1. No usability-related hazards emerged from this exploratory study.Conclusion Applications of point-of-care PCR testing in care homes can be considered with appropriate preparatory steps and safeguards. Agreement between POCT and laboratory PCR was good. Further diagnostic accuracy evaluations and in-service evaluation studies should be conducted, if the test is to be implemented more widely, to build greater certainty on this initial exploratory analysis.Key pointsPoint of care tests (POCT) in care homes are feasible and could increase testing capacity for the control of COVID-19 infection.The test of agreement between POCT and laboratory PCR for care home residents and the staff was good.Adoption of POCT in care homes can be considered with appropriate preparatory steps and safeguards in place.Repetitive errors and test malfunctioning can be mitigated with bespoke training for care home staff.Integrated care pathways should be investigated to test the high variability of the context of use.Competing Interest StatementThe authors have declared no competing interest.Funding StatementThis work was supported by UK Research and Innovation (UKRI), Asthma UK and the British Lung Foundation, as a part of the CONDOR study. MM and PB are supported by the NIHR London In Vitro Diagnostics Co-operative; ALG is funded in part by the NIHR Applied Research Collaboration-East Midlands (ARC-EM). AJA is supported by the NIHR Newcastle In Vitro Diagnostics Co-operative. DSL is funded in part by the NIHR Applied Research Collaboration (ARC) West Midlands and the NIHR Community Healthcare MedTech and IVD Cooperative (MIC) at Oxford Health NHS Foundation Trust. The views expressed are those of the authors and not necessarily those of the funders, the NHS, the NIHR or the Department of Health and Social Care. POCKIT Central Nucleic Acid

Analyzers were loaned, at no cost, by the supplier, HORIBA UK Ltd. The research team were independent of the manufacturer throughout and Horiba have not participated in the research, analysis or write-up of this paper. RP acknowledges part-funding from the National Institute for Health Research (NIHR Programme Grant for Applied Research), the NIHR Oxford Biomedical Research Centre, the NIHR Oxford and Thames Valley Applied Research Collaborative (ARC), NIHR Oxford Medtech and In-Vitro Diagnostics Co-operative and the Oxford Martin School.Author DeclarationsI confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained.YesThe details of the IRB/oversight body that provided approval or exemption for the research described are given below:This project was approved as a Service Evaluation by Imperial College Healthcare NHS Trust (ICHNT) registration no. 47 .All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived.YesI understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance).YesI have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable.YesThe authors confirm that the data supporting the findings of this study are available within the article and its supplementary materials. The data that support the usability study are available on request from the corresponding author, [AG]. The data are not publicly available due to restrictions regarding the privacy of research participants.
URL: http://medrxiv.org/content/early/2020/12/03/2020.11.30.20240010.abstract
DOI: 10.1101/2020.11.30.20240010

20. **Moraes EN, Viana LG, Resende LMH, et al. COVID-19 in long-term care facilities for the elderly: laboratory screening and disease dissemination prevention strategies. Cien Saude Colet. 2020;25(9):3445-58. DOI:** 10.1590/1413-81232020259.20382020
An infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the 2019 Novel Coronavirus Disease (COVID-19) pandemic has unveiled a hitherto hidden reality: the vulnerability of the population living in long-term care facilities for the elderly (LTCF). To date, several scientific publications have revealed a concentration of up to 60% of deaths attributed to COVID-19 in such institutions. Most LTFC residents share the primary risk factors currently associated with increased morbimortality due to the COVID-19 infection. It is crucial to define actions to prevent SARS-CoV-2 spread in this environment, besides the usual measures of social distancing and isolation of the carriers of this disease. This paper proposes strategies for the investigation of this infection in LTCF residents and workers using laboratory tests available in Brazil. The early identification of individuals with SARS-CoV-2, who may actively and continuously spread the virus, allows adopting measures aimed at interrupting the local transmission cycle of this infection.
URL: https://www.ncbi.nlm.nih.gov/pubmed/32876277
DOI: 10.1590/1413-81232020259.20382020

21. **Roxby AC, Greninger AL, Hatfield KM, et al. Outbreak Investigation of COVID-19 Among Residents and Staff of an Independent and Assisted Living Community for Older Adults in Seattle, Washington. JAMA Intern Med. 2020;180(8):1101-5. DOI:** 10.1001/jamainternmed.2020.2233
Importance: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has caused epidemic spread of coronavirus disease 2019 (COVID-19) in the Seattle, Washington, metropolitan area, with morbidity and mortality concentrated among residents of skilled nursing facilities. The prevalence of COVID-19 among older adults in independent/assisted living is not understood. Objectives: To conduct surveillance

for SARS-CoV-2 and describe symptoms of COVID-19 among residents and staff of an independent/assisted living community. Design, Setting, and Participants: In March 2020, public health surveillance of staff and residents was conducted on site at an assisted and independent living residence for older adults in Seattle, Washington, after exposure to 2 residents who were hospitalized with COVID-19. Exposures: Surveillance for SARS-CoV-2 infection in a congregate setting implementing social isolation and infection prevention protocols. Main Outcomes and Measures: SARS-CoV-2 real-time polymerase chain reaction was performed on nasopharyngeal swabs from residents and staff; a symptom questionnaire was completed assessing fever, cough, and other symptoms for the preceding 14 days. Residents were retested for SARS-CoV-2 7 days after initial screening. Results: Testing was performed on 80 residents; 62 were women (77%), with mean age of 86 (range, 69-102) years. SARS-CoV-2 was detected in 3 of 80 residents (3.8%); none felt ill, 1 male resident reported resolved cough and 1 loose stool during the preceding 14 days. Virus was also detected in 2 of 62 staff (3.2%); both were symptomatic. One week later, resident SARS-CoV-2 testing was repeated and 1 new infection detected (asymptomatic). All residents remained in isolation and were clinically stable 14 days after the second test. Conclusions and Relevance: Detection of SARS-CoV-2 in asymptomatic residents highlights challenges in protecting older adults living in congregate settings. In this study, symptom screening failed to identify residents with infections and all 4 residents with SARS-CoV-2 remained asymptomatic after 14 days. Although 1 asymptomatic infection was found on retesting, a widespread facility outbreak was avoided. Compared with skilled nursing settings, in assisted/independent living communities, early surveillance to identify asymptomatic persons among residents and staff, in combination with adherence to recommended preventive strategies, may reduce viral spread.
URL: https://www.ncbi.nlm.nih.gov/pubmed/32437547
DOI: 10.1001/jamainternmed.2020.2233

22. **Telford CT, Onwubiko U, Holland DP, et al. Preventing COVID-19 Outbreaks in Long-Term Care Facilities Through Preemptive Testing of Residents and Staff Members - Fulton County, Georgia, March-May 2020. MMWR Morb Mortal Wkly Rep. 2020;69(37):1296-9. DOI:**
10.15585/mmwr.mm6937a4
Long-term care facility (LTCF) residents are at particularly high risk for morbidity and mortality associated with infection with SARS-CoV-2, the virus that causes coronavirus disease 2019 (COVID-19), given their age and high prevalence of chronic medical conditions, combined with functional impairment that often requires frequent, close contact with health care providers, who might inadvertently spread the virus to residents (1,2). During March-May 2020 in Fulton County, Georgia, >50% of COVID-19-associated deaths occurred among LTCF residents, although these persons represented <1% of the population (3,4). Mass testing for SARS-CoV-2 has been an effective strategy for identifying asymptomatic and presymptomatic infections in LTCFs (5). This analysis sought to evaluate the timing at which mass testing took place in relation to the known presence of a COVID-19 infection and the resulting number of infections that occurred. In 15 LTCFs that performed facility-wide testing in response to an identified case, high prevalences of additional cases in residents and staff members were found at initial testing (28.0% and 7.4%, respectively), suggesting spread of infection had already occurred by the time the first case was identified. Prevalence was also high during follow-up, with a total of 42.4% of residents and 11.8% of staff members infected overall in the response facilities. In comparison, 13 LTCFs conducted testing as a preventive strategy before a case was identified. Although the majority of these LTCFs identified at least one COVID-19 case, the prevalence was significantly lower at initial testing in both residents and staff members (0.5% and 1.0%, respectively) and overall after follow-up (1.5% and 1.7%, respectively). These findings indicate that early awareness of infections might help facilities prevent potential outbreaks by prioritizing and adhering more strictly to infection

prevention and control (IPC) recommendations, resulting in fewer infections than would occur when relying on symptom-based screening (6,7).
URL: https://www.ncbi.nlm.nih.gov/pubmed/32941413
DOI: 10.15585/mmwr.mm6937a4

23. **Vilches TN, Nourbakhsh S, Zhang K, et al. Multifaceted strategies for the control of COVID-19 outbreaks in long-term care facilities in Ontario, Canada. medRxiv. 2020;07:07. DOI:** 10.1101/2020.12.04.20244194
Background: COVID-19 has caused severe outbreaks in Canadian long-term care facilities (LTCFs). Objective: To evaluate the effect of mitigation measures in LTCFs including routine testing of staff and vaccination of staff and residents. Design: Agent-based transmission model parameterized with disease-specific estimates, temporal sensitivity of nasopharyngeal (NP) and saliva testing, preliminary results of vaccine efficacy trials, and data from initial COVID-19 outbreaks in LTCFs in Ontario, Canada. Setting: Characteristics of staff and residents were included in the model with age-dependent risk of hospitalization and deaths, calibrated to the cumulative incidence of COVID-19 reported in these settings. Participants: Synthetic staff and resident populations. Interventions: Routine NP and saliva testing of staff; vaccination of residents and staff. Measurements: Daily incidence and attack rates in the LTCF using large-scale model simulations; estimates of hospitalizations and deaths and their 95% credible intervals. Results: Weekly routine testing of staff with 2-day turnaround time reduced infections among residents by at least 20.3% (95% CrI: 18.7-21.8%), compared to baseline measures of mask-wearing, symptom screening, and staff cohorting alone. A similar reduction of hospitalizations and deaths was achieved in residents. Vaccination averted 2-4 times more infections in both staff and residents as compared to routine testing, and markedly reduced hospitalizations and deaths among residents by 81.4% (95% CrI: 80.6-82.2%), and 82.1% (95% CrI: 81.5-82.7%), respectively. Limitations: Timelines of vaccine distribution and compliance rates with routine testing are key parameters affecting strategy outcomes. Conclusion: Routine testing of staff reduces silent transmission in LTCFs. Vaccination could have a substantial impact on mitigating disease burden among residents, but may not eliminate the need for other measures before population-level control of COVID-19 is achieved.
URL: https://www.ncbi.nlm.nih.gov/pubmed/33330884
DOI: 10.1101/2020.12.04.20244194

Appendix 1: Evidence Search Details

Filters, Limits & Exclusions:	English only 2019-Current	
Sources Searched:	Alberta Health Services CADTH CDC COVID-19 Website CEBM (UK) CINAHL Cochrane Library COVID-19 Best Evidence Front Door COVID-19 Rapid Evidence Access Link DSEN Magic Embase Epistemonikos COVID-19 Evidence Essential Evidence Plus COVID-19 research briefs Evidence Aid Evidence check (Australia) Evidence Synthesis Network	Google Google Scholar Health Canada HSE (Ireland) McMaster Forum McMaster Plus Evidence Alerts MEDLINE medRxiv NCCMT (McMaster) NICE (UK) Rapid Research Information Forum Rapid Evidence Access Link SPOR Evidence Alliance TRIP Usher Network for COVID-19 Veteran Affairs database WHO Global Research Database
Librarian(s):	**Michelle Dalidowicz, Clinical Librarian, Saskatchewan Health Authority** **Mark Mueller, Clinical Librarian, Saskatchewan Health Authority**	

Appendix 2: Search Strategies

MEDLINE

Ovid MEDLINE(R) ALL <1946 to January 29, 2021>

#	Searches	Results
1	exp coronavirus/	45542
2	exp coronavirus infections/	49765
3	((corona* or corono*) adj1 (virus* or viral* or virinae*)).ti,ab,kw,kf.	2810
4	(coronavirus* or coronovirus* or coronavirinae* or CoV).ti,ab,kw,kf.	65819
5	("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	93618

	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,kf.	
6	(respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw,kf.	582
7	(("seafood market*" or "food market*" or pneumonia*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw,kf.	1833
8	((outbreak* or wildlife* or pandemic* or epidemic*) adj1 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw,kf.	357
9	"severe acute respiratory syndrome*".ti,ab,kw,kf.	16627
10	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9	120823
11	Long Term Care/ or exp Nursing Homes/ or Residential Facilities/ or Assisted Living Facilities/ or "Homes for the Aged"/ or Hospices/	76545
12	(long-term care or long term care or "LTC" or "LTCF").ti,kw,kf. or (long-term care or long term care or "LTC" or "LTCF").ab. /freq=2	15511
13	((nursing or long-term or long term or "assisted living" or "assisted-living" or residential or congregate or old-age or old age or retirement) adj2 (facilit* or home* or setting*)).ti,ab,kw,kf.	54000
14	(care home? or "home? for the aged").ti,kw,kf. or (care home? or "home? for the aged").ab. /freq=2	3352
15	11 or 12 or 13 or 14	105911
16	exp point-of-care testing/ or (test* adj1 (beside or "point of care" or point-of-care or rapid)).ti,ab,kw,kf.	12860
17	sentinel surveillance/ or (((sentinel or syndromic or symptom*) adj1 surveillance) or biosurveillance system? or ((symptom* or iterative or asymptomatic or a-symptomatic or presymptomatic or pre-symptomatic or never symptomatic or subclinical infection? or sub-clinical infection? or healthy carrier? or silent spread* or covert transmitter? or paucisymptomatic or oligosymptomatic) adj2 (screening or surveillance or monitoring or testing))).ti,ab,kf,kw.	16057
18	(antigen test? or antigen detection test? or RAD test? or RDT or lateral flow).ti,ab,kf,kw.	8840
19	16 or 17 or 18	36693
20	10 and 15 and 19	50
21	limit 20 to (english language and yr="2019 -Current")	48

Embase

Embase <1974 to 2021 January 29>

#	Searches	Results

1	exp coronavirinae/	22899
2	exp Coronavirus infection/	24429
3	((corona* or corono*) adj1 (virus* or viral* or virinae*)).ti,ab,de,kw.	37323
4	(coronavirus* or coronovirus* or coronavirinae* or CoV).ti,ab,de,kw.	111550
5	("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,de,kw.	87384
6	(respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,de,kw.	1866
7	(("seafood market*" or "food market*" or pneumonia*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,de,kw.	4010
8	((outbreak* or wildlife* or pandemic* or epidemic*) adj1 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,de,kw.	8660
9	"severe acute respiratory syndrome*".ti,ab,de,kw.	37698
10	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9	133962
11	long term care/ or nursing home/ or residential home/ or assisted living facility/ or home for the aged/ or hospice/	202998
12	(long-term care or long term care or "LTC" or "LTCF").ti,de,kw. or (long-term care or long term care or "LTC" or "LTCF").ab. /freq=2	137798
13	((nursing or long-term or long term or "assisted living" or "assisted-living" or residential or congregate or old-age or old age or retirement) adj2 (facilit* or home* or setting*)).ti,ab,de,kw.	77130
14	(care home? or "home? for the aged").ti,de,kw. or (care home? or "home? for the aged").ab. /freq=2	14008
15	11 or 12 or 13 or 14	240178
16	"point of care testing"/ or (test* adj1 (beside or "point of care" or point-of-care or rapid)).ti,ab,de,kw.	26326
17	sentinel surveillance/ or exp disease surveillance/ or (biosurveillance or surveillance or ((sentinal or iterative or mass or population* or universal or community or routine or asymptomatic or a-symptomatic or presymptomatic or pre-symptomatic or never symptomatic or subclinical infection? or sub-clinical infection? or healthy carrier? or silent spread* or covert transmitter? or paucisymptomatic or oligosymptomatic) adj2 (screen* or monitor* or test*))).ti,ab,de,kw.	423780
18	antigen detection/ or ((Ag or antigen or RAD) adj2 (test* or diagnostic or detect* or rapid or RDT or lateral flow)).ti,ab,de,kw.	46679
19	16 or 17 or 18	491228
20	10 and 15 and 19	116
21	limit 20 to (abstracts and english language and yr="2019 -Current")	74
22	remove duplicates from 21	73

CINAHL

#	Query	Limiters/Expanders	Results

S1	(MH "Coronavirus") OR (MH "Coronavirus Infections+") OR (MH "COVID-19")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	24,218
S2	TX ((corona* or corono*) N1 (virus* or viral* or virinae*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	669
S3	TX (coronavirus* or coronovirus* or coronavirinae* or CoV)	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	24,970
S4	TX ("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 "ncov" or "SARS-CoV-2" or "SARSCoV-2" or "SARSCoV2" or "SARSCoV2" 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")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	36,216
S5	TX ((respiratory* N2 (symptom* or disease* or illness* or condition*) N10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	1,339
S6	TX (("seafood market*" or "food market*" or pneumonia*) N10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	802
S7	TX ((outbreak* or wildlife* or pandemic* or epidemic*) N1 (Wuhan* or Hubei* or China* or Chinese* or Huanan*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	934
S8	TX ("severe acute respiratory syndrome" or ""severe acute respiratory syndrome")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	6,195
S9	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	50,208
S10	(MH "Long Term Care") OR (MH "Nursing Homes") OR (MH "Residential Facilities") OR (MH "Assisted Living") OR (MH "Nursing Home Patients") OR ((MH "Hospices") OR (MH "Hospice Patients"))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	63,698
S11	TX (long-term care or long term care or "LTC" or "LTCF")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	73,013
S12	TX ((nursing OR long-term OR "long term" OR "assisted living" OR assisted-living OR residential OR congregate OR old-age OR "old age" OR retirement) N2 (facilit* OR home* OR setting*))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	139,395
S13	TX ("care home#" OR "home# for the aged")	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	15,924
S14	S10 OR S11 OR S12 OR S13	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	183,921
S15	(MH "Point-of-Care Testing") OR TX ((test* N1 (beside OR "point of care" OR point-of-care OR rapid)))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	13,147
S16	((MH "Antigens+") OR TX ((Ag or antigen or RAD) N2 (test* or screen* or diagnostic or detect* or rapid or RDT or lateral flow)))	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	54,103
S17	S15 OR S16	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	66,192
S18	((MH "Population Surveillance+") OR (MH "Disease Surveillance")) OR TX ((biosurveillance OR surveillance OR ((sentinal OR OR iterative OR mass OR population* OR universal OR community OR routine OR asymptomatic OR a-symptomatic OR	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	167,812

	presymptomatic OR pre-symptomatic OR "never symptomatic" OR "subclinical infection#" OR "sub-clinical infection#" OR "healthy carrier#" OR "silent spread*" OR "covert transmitter#" OR paucisymptomatic OR oligosymptomatic) N2 (screen* OR monitor* OR test*))))		
S19	S17 AND S18	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	6,729
S20	S9 AND S14 AND S19	Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	44
S21	S9 AND S14 AND S19	Limiters - Published Date: 20190101-20211231 Expanders - Apply equivalent subjects Search modes - Boolean/Phrase	19

Search terms used in combination in other resources:

- Antigen test or rapid test or point-of-care test
- Care home or nursing home or long-term care