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EVIDENCE SEARCH REPORT

RESEARCH QUESTION: What human resources are required in long term care facilities to mitigate or control an ILI outbreak?	UNIQUE IDENTIFIER: LTC042201-01 ESR
REQUESTED RESOURCES: • medRxiv • CDC website/database • Google Scholar • WHO Global Research on COVID-19 • PHAC COVID-19 • Medline • PubMed • CINAHL • EMBASE	
LIMITS/EXCLUSIONS/INCLUSIONS: English	
DATE: APRIL 23, 2020	
LIBRARIAN: Catherine Boden, Michelle Dalidowicz	REQUESTOR: Dr. Brittany Ellis
TEAM: LTC	SEARCH TIME: 7 HOURS

LIBRARIAN NOTES/COMMENTS

Insert your comments here including anything to note that doesn't belong in the Limits/Exclusions/Inclusions.

SEARCH RESULTS

To obtain full-text articles email library@saskhealthauthority.ca.

SUMMARIES, GUIDELINES & OTHER RESOURCES

1. **Lynch RM, Goring R. Practical Steps to Improve Air Flow in Long-Term Care Resident Rooms to Reduce COVID-19 Infection Risk. *Journal of American Medical Directors Association*. 2020. DOI:** https://doi.org/10.1016/j.jamda.2020.04.001

The potential for spread of COVID-19 infections in Skilled Nursing Facilities and other Long-Term Care sites poses new challenges for Nursing Home Administrators to protect patients and staff. It is anticipated that as Acute Care Hospitals reach capacity, Nursing Homes may retain COVID-19 infected residents longer prior to transferring to an Acute Care Hospital. This article outlines 5 pragmatic steps that Long-Term Care facilities can take to manage airflow within resident rooms to reduce the potential for spread of infectious airborne droplets into surrounding areas including hallways and adjacent rooms, using strategies adapted from negative pressure isolation rooms in acute care facilities.

DOI: https://doi.org/10.1016/j.jamda.2020.04.001

2. **World Health O. Infection prevention and control guidance for long-term care facilities in the context of COVID-19: interim guidance, 21 March 2020. 2020.**

URL:
https://extranet.who.int/iris/restricted/bitstream/handle/10665/331508/WHO-2019-nCoV-IPC_long_term_care-2020.1-eng.pdf?sequence=1&isAllowed=y

3. **Yen M-Y, Schwartz J, King C-C, et al. Recommendation on protection from and mitigation of COVID-19 pandemic in long-term care facilities. *Journal of Microbiology, Immunology and Infection*. 2020. DOI:** https://doi.org/10.1016/j.jmii.2020.04.003

The COVID-19 outbreak has drawn heightened attention from public health scholars researching ways to limit its spread. Much of the research has been focused on minimizing transmission in hospitals and in the general community. However, a particularly vulnerable community that has received relatively little attention is elders residing in long-term care facilities (LTCFs). In this article we address this relative lack of attention, arguing that enhanced traffic control bundling (eTCB) can and should be adopted and implemented as a means of protecting LTCF residents and staff. Enhanced TCB has been widely applied in hospital settings and has proven effective at limiting droplet and fomite transmissions both within hospitals and between hospitals and the general community. By effectively adapting eTCB to LTCF conditions, particularly by incorporating compartmentalization within zones plus active surveillance, COVID-19 transmission into and throughout LTCFs can be minimized, thereby saving numerous lives among an especially vulnerable population.

DOI: https://doi.org/10.1016/j.jmii.2020.04.003

ARTICLES FROM LIBRARY DATABASES

Note: References are sorted by year (newest to oldest)

Pre-printed articles

1. **Banerjee A, Pasea L, Harris S, et al. Estimating excess 1- year mortality from COVID-19 according to underlying conditions and age in England: a rapid analysis using NHS health records in 3.8 million adults. *medRxiv*. 2020:2020.03.22.20040287. DOI:** 10.1101/2020.03.22.20040287

RAPID COMMUNICATION 22 March 2020 Estimating excess 1- year mortality from COVID-19 according to underlying conditions and age in England: a rapid analysis using NHS health records in 3.8 million adults Background: The medical, health service, societal and economic impact of the COVID-19 emergency has unknown effects on overall population mortality. Previous models of population mortality are based on death over days among infected people, nearly all of whom (to date at least) have underlying conditions. Models have not incorporated information on high risk conditions or their longer term background (pre-COVID-19) mortality. We estimated the excess number of deaths over 1 year under different COVID-19 incidence rates and differing mortality impacts. Methods: Using population based linked primary and secondary care electronic health records in England (HDR UK - CALIBER), we report the prevalence of underlying conditions defined by UK Public Health England COVID-19 guidelines (16 March 2020) in 3,862,012 individuals aged â‰¥30 years from 1997-2017. We used previously validated phenotypes, openly available (https://caliberresearch.org/portal), for each condition using ICD-10 diagnosis, Read, procedure and medication codes. We estimated the 1-year mortality in each condition, and developed simple models of excess COVID-19-related deaths assuming relative risk (RR) of the impact of the emergency (compared to background mortality) of 1.2, 1.5 and 2.0. Findings: 20.0% of the population are at risk according to current PHE guidelines, of which; 13.7% were age>70 years and 6.3% aged â‰¤70 years with â‰¥1 underlying condition (cardiovascular disease (2.3%), diabetes (2.2%), steroid therapy (1.9%), severe obesity (0.9%), chronic kidney disease (0.6%) and chronic obstructive pulmonary disease, COPD (0.5%). Multimorbidity (co-occurrence of â‰¥2 conditions in an individual) was common (10.1%). The 1-year mortality in the at-risk population was 4.46%, and age and underlying conditions combine to influence background risk, varying markedly across conditions (5.9% in age>70 years, 8.6% for COPD and 13.1% in those with â‰¥3 or more conditions). In a suppression scenario (at SARS CoV2 rates of 0.001% of the UK population), there would be minimal excess deaths (3 and 7 excess deaths at relative risk, RR, 1.5 and 2.0 respectively). At SARS CoV2 rates of 10% of the UK population (mitigation) the model estimates the numbers of excess deaths as: 13791, 34479 and 68957 (at RR 1.2, 1.5 and 2.0 respectively). At SARS CoV2 rates of 80% in the UK population (do-nothing), the model estimates the number of excess deaths as 110332, 275,830 and 551,659 (at RR 1.2, 1.5 and 2.0) respectively. Interpretation: We provide the public, researchers and policy makers a simple model to estimate the excess mortality over 1 year from COVID-19, based on underlying conditions at different ages. If the relative mortality impact of COVID-19 were to be about 20% (similar magnitude as the established winter vs summer mortality excess), then the excess deaths would be 0 when 1 in 100 000 (suppression), 13791 when 1 in 10 (mitigation) and 110332 when 8 in 10 are infected (do nothing) scenario. However, the relative impact of COVID-19 is unknown. If the emergency were to double the mortality risk, then we estimate 7, 68957 and 551,659 excess deaths in the same scenarios. These results may inform the need for more stringent suppression measures as well as efforts to target those at highest risk for a range of preventive interventions.Competing Interest StatementThe authors have declared no competing interest.Funding StatementThis work received no specific funding. AB is supported by research funding from NIHR, British Medical Association, Astra-Zeneca and UK Research and Innovation. BW and HH are National Institute for Health Research (NIHR) Senior Investigators. HH work is supported by: 1. Health Data Research UK (grant No. LOND1), which is funded by the UK Medical Research Council, Engineering and Physical Sciences Research Council, Economic and S cial Research Council, Department of Health and Social Care (England), Chief Scientist Office of the Scottish Government Health and Social Care Directorates, Health and Social Care Research and Development Division (Welsh Government), Public Health Agency (Northern Ireland), British Heart Foundation and

Wellcome Trust. 2. The BigData@Heart Consortium, funded by the Innovative Medicines Initiative-2 Joint Undertaking under grant agreement No. 116074. This Joint Undertaking receives support from the European UnionÂ's Horizon 2020 research and innovation programme and EFPIA; it is chaired, by DE Grobbee and SD Anker, partnering with 20 academic and industry partners and ESC. 3. The National Institute for Health Research University College London Hospitals Biomedical Research Centre. This work was supported by a National Institute of Health Research (NIHR) Clinician Scientist award (CS-2016-007) to L.S.Author DeclarationsAll relevant ethical guidelines have been followed; any necessary IRB and/or ethics committee approvals have been obtained and details of the IRB/oversight body are included in the manuscript.YesAll 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.YesCPRD data used in this analysis can be applied for via https://www.cprd.com/research-applications We have made online calculators available for estimation of excess mortality related to COVID-19.https://covid19-phenomics.org/covid-excess-deaths.html

URL:
https://www.medrxiv.org/content/10.1101/2020.03.22.20040287v1.full.pdf

2. **Fisman D, Lapointe-Shaw L, Bogoch I, et al. Failing our Most Vulnerable: COVID-19 and Long-Term Care Facilities in Ontario. *medRxiv*. 2020.**

URL: DOI:

3. **Kluger DM, Aizenbud Y, Jaffe A, et al. Impact of healthcare worker shift scheduling on workforce preservation during the COVID-19 pandemic. *medRxiv*. 2020:2020.04.15.20061168. DOI:** 10.1101/2020.04.15.20061168

Background: As we contend with the massive SARS-CoV-2 pandemic, preventing infections among healthcare workers (HCW) and patients is critical for delivering care to patients admitted for other purposes, and many standard scheduling practices require reassessment. In most academic hospitals in the United States, inpatient rotations are designed to deliver optimal patient care by staggering rotations of attendings and house-staff, and much emphasis is placed on healthcare worker (HCW) burnout, yet during a pandemic preventing further infection is the single most important factor. Our purpose was to model various inpatient rotation schedules of physicians and nurses to determine patterns associated with optimal workforce preservation and lower nosocomial infections in settings in which personal protective equipment is imperfect or unavailable. Results: We employed Monte-Carlo simulations. Universal model parameters for COVID-19 included incubation period distribution and latent period distribution. Situation-dependent COVID-19 model parameters included pre-admission infection probability, team member infection probability, physician-to-patient, nurse-to-patient, patient-to-physician, patient-to-nurse, and HCW-to-HCW transmission probabilities, team member absence after symptom onset, daily SARS-CoV-2 exposure probability of team members (e.g. via exposure to other staff), length of admission after COVID-19 symptoms, and length of simulation time. Model parameters that varied by hospital setting and service type included average patient load per team, average patient hospitalization, and number of physicians and nurses on a team and on duty. The primary outcome measure was probability of team failure, defined as the likelihood that at some point there are insufficient attendings, house-staff or nurses to staff a fully functioning floor. In all our simulations,

physician and nurse rotation lengths of 1-3 days led to higher team failure rates. Nursing shifts of 12 versus 8 hours and avoiding staggering of physician rotations decreased the chance of team failure. When the patient stay is short, the advantage of un-staggered rotations is consistent and universal. Conclusions: Simple changes in staff scheduling, such as longer nursing shifts, co-rotation of physicians and groups of nurses no more frequently than every 3 days results in improved workforce preservation. These workforce distancing changes are easy to implement.Competing Interest StatementThe authors have declared no competing interest.Funding StatementNoneAuthor DeclarationsAll relevant ethical guidelines have been followed; any necessary IRB and/or ethics committee approvals have been obtained and details of the IRB/oversight body are included in the manuscript.YesAll 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.YesThis study is not based on newly generated datahttps://github.com/KlugerLab/Rotation-Scheduler

URL:
https://www.medrxiv.org/content/10.1101/2020.04.15.20061168v1.full.pdf

4. **Rios P, Radhakrishnan A, Thomas SM, et al. Guidelines for preventing respiratory illness in older adults aged 60 years and above living in long-term care: A rapid review of clinical practice guidelines. *medRxiv*. 2020:2020.03.19.20039180. DOI:** 10.1101/2020.03.19.20039180

Background: The overall objective of this rapid review was to identify infection protection and control recommendations from published clinical practice guidelines (CPGs) for adults aged 60 years and older in long-term care settings Methods: Comprehensive searches in MEDLINE, EMBASE, the Cochrane Library, and relevant CPG publishers/repositories were carried out in early March 2020. Title/abstract and full-text screening, data abstraction, and quality appraisal (AGREE-II) were carried out by single reviewers. Results: A total of 17 relevant CPGs were identified, published in the USA (n=8), Canada (n=6), Australia (n=2), and the United Kingdom (n=1). All of the CPGs dealt with infection control in long-term care facilities (LTCF) and addressed various types of viral respiratory infections (e.g., influenza, COVID-19, severe acute respiratory syndrome). Ten or more CPGs recommended the following infection control measures in LTCF: hand hygiene (n=13), wearing personal protective equipment (n=13), social distancing or isolation (n=13), disinfecting surfaces (n=12), droplet precautions (n=12), surveillance and evaluation (n=11), and using diagnostic testing to confirm illness (n=10). While only two or more CPGs recommended these infection control measures: policies and procedures for visitors, staff and/or residents (n=9), respiratory hygiene/cough etiquette (n=9), providing supplies (n=9), staff and/or residents education (n=8), increasing communication (n=6), consulting or notifying health professionals (n=6), appropriate ventilation practices (n=2), and cohorting equipment (n=2). Ten CPGs also addressed management of viral respiratory infections in LTCF and recommended antiviral chemoprophylaxis (n=10) and one CPG recommended early mobilization of residents. Conclusion: The recommendations from current guidelines overall seem to support environmental measures for infection prevention and antiviral chemoprophylaxis for infection management as the most appropriate first-line response to viral respiratory illness in long-term care.Competing Interest StatementThe authors have declared no competing interest.Funding StatementThis work was funded by the Canadian Institutes of Health Research (CIHR) through the Strategy for Patient Oriented-Research (SPOR) Evidence AllianceAuthor DeclarationsAll relevant ethical guidelines have been followed; any necessary IRB and/or ethics

committee approvals have been obtained and details of the IRB/oversight body are included in the manuscript.YesAll 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.YesAll datasets supporting the conclusions of this article are included within the article

URL:
https://www.medrxiv.org/content/10.1101/2020.03.19.20039180v2.full.pdf

5. **Rios P, Radhakrishnan A, Thomas SM, et al. Preventing respiratory illness in older adults aged 60 years and above living in long-term care: A rapid overview of reviews. *medRxiv*. 2020:2020.03.19.20039081. DOI:** 10.1101/2020.03.19.20039081

Background: The overall objective of this rapid overview of reviews (overview hereafter) was to identify evidence from systematic reviews (SRs) for infection control and prevention practices for adults aged 60 years and older in long-term care settings. Methods: Comprehensive searches in MEDLINE, EMBASE, the Cochrane Library, biorxiv.org/medrxiv.org, clinicaltrials.gov and the Global Infectious Disease Epidemiology Network (GIDEON) were carried out in early March 2020. Title/abstract and full-text screening, data abstraction, and quality appraisal (AMSTAR 2) were carried out by single reviewers. Results: A total of 6 SRs published between 1999 and 2018 were identified and included in the overview. The SRs included between 1 and 37 primary studies representing between 140 to 908 patients. All of the primary studies included in the SRs were carried out in long-term care facilities (LTCF) and examined pharmacological, non-pharmacological, or combined interventions. One high quality SR found mixed results for the effectiveness of hand hygiene to prevent infection (2 studies statistically significant positive results, 1 study non-statistically significant results). One moderate quality SR with meta-analysis found a moderate non-statistically significant effect for personal protective equipment (PPE) in preventing infection and found no statistically significant results for the effectiveness of social isolation. One moderate quality SR reported statically significant evidence for the effectiveness of amantadine and amantadine + PPE to prevent infection with respiratory illness in LTCF. Conclusion: The current evidence suggests that with antiviral chemoprophylaxis with adamantine is effective in managing respiratory illness in residents of long-term care facilities. The rest of the strategies can be used in long-term care facilities, yet have limited evidence supporting their use from systematic reviews.Competing Interest StatementThe authors have declared no competing interest.Funding StatementThis work was funded by the Canadian Institutes of Health Research (CIHR) through the Strategy for Patient Oriented-Research (SPOR) Evidence AllianceAuthor DeclarationsAll relevant ethical guidelines have been followed; any necessary IRB and/or ethics committee approvals have been obtained and details of the IRB/oversight body are included in the manuscript.YesAll 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.YesAll datasets supporting the conclusions of this article are included within the article

URL:
https://www.medrxiv.org/content/10.1101/2020.03.19.20039081v2.full.pdf

Journal articles

1. **Nursing home rules 'won't shield elderly'. *Lamp*. 2020;77(2):25-.**

The article mentions the Australian Nurses and Midwives Federation's (ANMF) call to ban all non-essential visits to nursing homes to protect vulnerable residents from the coronavirus disease 2019 (COVID-19), as of April 2020.

2. **Ahc M. CDC Defines 'Low-Risk' Occupational Exposures to Coronavirus: A move to avoid arbitrary furloughs over minor breaks. *Hospital Employee Health*. 2020;39(5):1-4.**

The CDC recently issued guidelines allowing healthcare personnel (HCP) to continue working if they incur only "low-risk" exposures to patients with COVID-19. With some reported cases of large numbers of HCP furloughed after exposures, the CDC is moving to preserve the workforce in situations where HCP are exposed to infected patients through minor breaks in protocol or personal protective equipment.

3. **Ahc M. COVID-19 Outbreak in Nursing Home Includes HCW Infection, Resident Deaths: Washington state expecting more community spread. *Hospital Employee Health*. 2020;39(4):N.PAG-N.PAG.**

An outbreak of novel coronavirus COVID-19 at a long-term care facility near Seattle has killed at least five elderly residents and infected two healthcare workers. The situation was changing rapidly as this report was filed, but other residents and workers at the facility were under investigation for COVID-19 infection. More cases were expected as the Seattle area is experiencing the largest community outbreak in the United States.

4. **American Geriatrics S. American Geriatrics Society (AGS) Policy Brief: COVID-19 and Nursing Homes. *Journal of the American Geriatrics Society*. 2020. DOI:** https://dx.doi.org/10.1111/jgs.16477

This policy brief sets forth American Geriatrics Society (AGS) recommendations to guide federal, state, and local governments when making decisions about care for patients with COVID-19 in nursing homes (NHs) and other long-term care facilities (LTCFs). The AGS continues to review guidance set forth in peer-reviewed articles and editorials, as well as ongoing and updated guidance from the Centers for Medicare and Medicaid Services (CMS), the Centers for Disease Control and Prevention (CDC), and other key agencies. This brief is based on the situation and any federal guidance/actions as of April 4, 2020. It is focused on NHs and other LTCFs, given their essential role in addressing the COVID-19 pandemic. This article is protected by copyright. All rights reserved. Copyright This article is protected by copyright. All rights reserved.

URL: https://onlinelibrary.wiley.com/doi/epdf/10.1111/jgs.16477

5. **Armijo-Olivo S, Craig R, Corabian P, et al. Nursing Staff Time and Care Quality in Long-Term Care Facilities: A Systematic Review. *Gerontologist*. 2020;60(3):e200-e17. DOI:** 10.1093/geront/gnz053

BACKGROUND AND OBJECTIVES: In long-term care (LTC) facilities, nursing staff are important contributors to resident care and well-being. Despite this, the relationships between nursing staff coverage, care hours, and quality of resident care in LTC facilities are not well understood and have implications for policy-makers. This systematic review summarizes current evidence on the relationship between nursing staff coverage, care hours, and quality of resident care in LTC facilities. RESEARCH DESIGN AND METHODS: A

structured literature search was conducted using four bibliographic databases and gray literature sources. Abstracts were screened by two independent reviewers using Covidence software. Data from the included studies were summarized using a pretested extraction form. The studies were critically appraised, and their results were synthesized narratively. RESULTS: The systematic searched yielded 15,842 citations, of which 54 studies (all observational) were included for synthesis. Most studies (n = 53, 98%) investigated the effect of nursing staff time on resident care. Eleven studies addressed minimum care hours and quality of care. One study examined the association between different nursing staff coverage models and resident outcomes. Overall, the quality of the included studies was poor. DISCUSSION AND IMPLICATIONS: Because the evidence was inconsistent and of low quality, there is uncertainty about the direction and magnitude of the association between nursing staff time and type of coverage on quality of care. More rigorously designed studies are needed to test the effects of different cutoffs of care hours and different nursing coverage models on the quality of resident care in LTC facilities.

6. **Ashurst A. How to .... maintain a safe care home environment. *Nursing & Residential Care*. 2020;22(4):1-2. DOI:** 10.12968/nrec.2020.22.4.7

In the wake of the outbreak of the coronavirus, infection control must be a priority, especially in care environments where older vulnerable people are living. Adrian Ashurst discusses how to ensure residents and staff remain safe and healthy by implementing and maintaining an excellent infection control process

7. Centers for Disease C, Prevention. Interim Additional Guidance for Infection Prevention and Control for Patients with Suspected or Confirmed COVID-19 in Nursing Homes. 2020.

URL: https://www.cdc.gov/coronavirus/2019-ncov/healthcare-facilities/prevent-spread-in-long-term-care-facilities.html

8. Centers for Disease C, Prevention. Preparing for COVID-19: Long-term Care Facilities, Nursing Homes. 2020.

URL: https://www.cdc.gov/coronavirus/2019-ncov/hcp/long-term-care.html

9. **Checovich MM, Barlow S, Shult P, et al. Evaluation of Viruses Associated With Acute Respiratory Infections in Long-Term Care Facilities Using a Novel Method: Wisconsin, 20162019. *J Am Med Dir Assoc*. 2020;21(1):29-33. DOI:** 10.1016/j.jamda.2019.09.003

Residents of long-term care facilities (LCTFs) have high morbidity and mortality associated with acute respiratory infections (ARIs). Limited information exists on the virology of ARI in LTCFs, where virological testing is reactive. We report on findings of a surveillance feasibility substudy from a larger prospective trial of introducing rapid influenza diagnostic testing (RIDT) at 10 Wisconsin LTCFs. Any resident with symptoms consistent with ARI had a nasal swab specimen collected for RIDT by staff. Following RIDT, the residual swab was placed into viral transport medium and tested for influenza using Reverse transcription polymerase chain reaction, and for 20 pathogens using a multiplex polymerase chain reaction respiratory pathogen panel. Numbers of viruses in each of 7 categories (influenza A, influenza B, coronaviruses, human metapneumovirus, parainfluenza, respiratory syncytial virus, and rhinovirus/enterovirus) across the 3 years were compared using chi(2). Totals of 160, 215, and 122 specimens were collected during 20162017, 20172018, and 20182019, respectively. Respiratory pathogen panel identified viruses in 54.8% of tested specimens. Influenza A (19.2%), influenza B (12.6%), respiratory syncytial virus (15.9%), and human metapneumovirus (20.9%) accounted for 69% of all detections, whereas coronaviruses (17.2%), rhinovirus/enterovirus (10.5%) and parainfluenza (3.8%)

were less common. The distribution of viruses varied significantly across the 3 years (chi(2) = 71.663; df = 12; P < .001). Surveillance in LTCFs using nasal swabs collected for RIDT is highly feasible and yields high virus identification rates. Significant differences in virus composition occurred across the 3 study years. Simple approaches to surveillance may provide a more comprehensive assessment of respiratory viruses in LTCF settings.

DOI: https://dx.doi.org/10.1016/j.jamda.2019.09.003

10. **Davidson PM, Szanton SL. Nursing homes and COVID-19: we can and should do better. *J Clin Nurs*. 2020. DOI:** 10.1111/jocn.15297

The COVID-19 pandemic is providing us with many painful lessons particularly the vulnerability of individuals living with chronic conditions and the need for preparedness, coordination, and monitoring. Long-term care facilities, including nursing homes, skilled nursing facilities, and assisted living facilities, provide care for some of the most vulnerable populations in society, including older people and those with chronic medical conditions. In the United Kingdom, there are about 17,000 people living in nursing and residential care homes and 200,000 Australians live or stay in residential aged care on any given day.

URL:
https://onlinelibrary.wiley.com/doi/epdf/10.1111/jocn.15297

11. **Demirbilek Y, Pehlivanturk G, Ozguler ZO, et al. COVID-19 outbreak control, example of ministry of health of Turkey. *Turkish Journal of Medical Sciences*. 2020;50(SI-1):489-94. DOI:** https://dx.doi.org/10.3906/sag-2004-187

Our first COVID-19 case in Turkey was a 44-year-old male who referred to the hospital on March 9, 2020. The first related death occurred on March 17, 2020. Preparedness for the pandemic has been ongoing before the first case was detected. The National Pandemic Plan was published in 2006. The Pandemic Influenza National Preparedness Plan was available after being updated in light of experiences gained during the 2009 Influenza A pandemic. Accordingly, Pandemic Coordination Boards and Operation Centers have been established on the national and provincial levels. This was an adaptable plan to the Novel Coronavirus Disease (COVID-19). We formed teams to work on a 24/7 basis and established a Scientific Committee at the Public Health Emergency Operation Center within the General Directorate of Public Health. "COVID-19 Risk Assessment", "COVID-19 Guideline" and "Case Report Form", regulations of personal protective equipment along with need-based guidelines, treatment algorithms, brochures and related documents have been released. For the case-based follow-up, Public Health Management System (HSYS) is being used. PCR and rapid diagnostic kits are being used to analyze the samples at the central Microbiology Reference Laboratory and the authorized laboratories in several provinces. Various preventive measures were implemented including flight restrictions to certain countries, gradually expanded to suspending all flights and prohibiting the entry of foreign nationals, 14-day isolation and symptom monitoring for those that came from countries under risk. Persons with chronic diseases have been granted an administrative leave, on campus education at schools and activities of public rest and entertainment areas were temporarily suspended. The measures have been implemented for penitentiary institutions, dormitories, nursing homes, public transport and intercity buses, and also weekend curfews are implemented. In accordance with the pandemic plan, actions have been carried out with a multi-sectoral approach, and preventive measures have been implemented to cover the society as a whole.

DOI: https://dx.doi.org/10.3906/sag-2004-187

12. **Dosa D, Jump RLP, LaPlante K, et al. Long-Term Care Facilities and the Coronavirus Epidemic: Practical Guidelines for a Population at Highest Risk. *Journal of the American Medical Directors Association*. 2020. DOI:** 10.1016/j.jamda.2020.03.004

DOI: https://dx.doi.org/10.1016/j.jamda.2020.03.004

13. **Evans G. CMS Drops Routine Surveys to Focus on COVID-19: Infection prevention will be in the spotlight. *Hospital Infection Control & Prevention*. 2020;47(4):1-.**

The Centers for Medicare and Medicaid Services is suspending routine inspections to focus on issues related to infection control and COVID-19 in hospitals, nursing homes, and other accredited sites.

14. **Evans G. Coronavirus Kills 32 Residents in Seattle Nursing Homes: More testing likely to reveal many milder cases. *Hospital Infection Control & Prevention*. 2020;47(4):1-3.**

COVID-19 infections at several long-term care facilities in the Seattle area have killed at least 32 elderly residents and infected two healthcare workers, the King County Health Department reported.

15. **Fallon A, Dukelow T, Kennelly SP, et al. COVID-19 in Nursing Homes. *Qjm*. 2020:20. DOI:** https://dx.doi.org/10.1093/qjmed/hcaa136

16. **Gardner W, States D, Bagley N. The Coronavirus and the Risks to the Elderly in Long-Term Care. *Journal of aging & social policy*. 2020:1-6. DOI:** 10.1080/08959420.2020.1750543

The elderly in long-term care (LTC) and their caregiving staff are at elevated risk from COVID-19. Outbreaks in LTC facilities can threaten the health care system. COVID-19 suppression should focus on testing and infection control at LTC facilities. Policies should also be developed to ensure that LTC facilities remain adequately staffed and that infection control protocols are closely followed. Family will not be able to visit LTC facilities, increasing isolation and vulnerability to abuse and neglect. To protect residents and staff, supervision of LTC facilities should remain a priority during the pandemic.

URL:
https://www.tandfonline.com/doi/pdf/10.1080/08959420.2020.1750543?needAccess=true

17. **Gurwitz J. COVID-19, Postacute Care Preparedness, and Nursing Homes. *Journal of the American Geriatrics Society*. 2020:21. DOI:** https://dx.doi.org/10.1111/jgs.16499

URL:
https://onlinelibrary.wiley.com/doi/epdf/10.1111/jgs.16499

18. **Keeley AJ, Evans C, Colton H, et al. Roll-out of SARS-CoV-2 testing for healthcare workers at a large NHS Foundation Trust in the United Kingdom, March 2020. *Euro Surveillance: Bulletin Europeen sur les Maladies Transmissibles = European Communicable Disease Bulletin*. 2020;25(14):04. DOI:** https://dx.doi.org/10.2807/1560-7917.ES.2020.25.14.2000433

Healthcare workers (HCW) are potentially at increased risk of infection with coronavirus disease (COVID-19) and may transmit severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) to vulnerable patients. We present results from staff testing at Sheffield Teaching Hospitals NHS Foundation Trust, United Kingdom. Between 16 and 29 March 2020, 1,533 symptomatic HCW were tested, of whom 282 (18%) were positive for SARS-CoV-2. Testing HCW is a crucial strategy to optimise staffing levels during this outbreak.

DOI: https://dx.doi.org/10.2807/1560-7917.ES.2020.25.14.2000433

19. **Kimball A, Hatfield KM, Arons M, et al. Asymptomatic and Presymptomatic SARS-CoV-2 Infections in Residents of a Long-Term Care Skilled Nursing Facility - King County, Washington, March 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(13):377-81. DOI:** https://dx.doi.org/10.15585/mmwr.mm6913e1

Older adults are susceptible to severe coronavirus disease 2019 (COVID-19) outcomes as a consequence of their age and, in some cases, underlying health conditions (1). A COVID-19 outbreak in a long-term care skilled nursing facility (SNF) in King County, Washington that was first identified on February 28, 2020, highlighted the potential for rapid spread among residents of these types of facilities (2). On March 1, a health care provider at a second long-term care skilled nursing facility (facility A) in King County, Washington, had a positive test result for SARS-CoV-2, the novel coronavirus that causes COVID-19, after working while symptomatic on February 26 and 28. By March 6, seven residents of this second facility were symptomatic and had positive test results for SARS-CoV-2. On March 13, CDC performed symptom assessments and SARS-CoV-2 testing for 76 (93%) of the 82 facility A residents to evaluate the utility of symptom screening for identification of COVID-19 in SNF residents. Residents were categorized as asymptomatic or symptomatic at the time of testing, based on the absence or presence of fever, cough, shortness of breath, or other symptoms on the day of testing or during the preceding 14 days. Among 23 (30%) residents with positive test results, 10 (43%) had symptoms on the date of testing, and 13 (57%) were asymptomatic. Seven days after testing, 10 of these 13 previously asymptomatic residents had developed symptoms and were recategorized as presymptomatic at the time of testing. The reverse transcription-polymerase chain reaction (RT-PCR) testing cycle threshold (Ct) values indicated large quantities of viral RNA in asymptomatic, presymptomatic, and symptomatic residents, suggesting the potential for transmission regardless of symptoms. Symptom-based screening in SNFs could fail to identify approximately half of residents with COVID-19. Long-term care facilities should take proactive steps to prevent introduction of SARS-CoV-2 (3). Once a confirmed case is identified in an SNF, all residents should be placed on isolation precautions if possible (3), with considerations for extended use or reuse of personal protective equipment (PPE) as needed (4).

DOI: https://dx.doi.org/10.15585/mmwr.mm6913e1

20. **Lee SH, Son H, Peck KR. Can post-exposure prophylaxis for COVID-19 be considered as one of outbreak response strategies in long-term care hospitals? *International journal of antimicrobial agents*. 2020:105988. DOI:** 10.1016/j.ijantimicag.2020.105988

With ongoing global outbreak of coronavirus disease 2019 (COVID-19), management of exposure events is a concern. Long-term care hospitals (LTCHs) are especially vulnerable to cluster outbreaks, since it is difficult to find facilities and healthcare personnel for their separate isolation care in a large outbreak situation. Although several drugs have been proposed as treatment regimens, there are no data on the effectiveness and safety of post-exposure prophylaxis (PEP) for COVID-19. After a large COVID-19 exposure event in a LTCH in Korea, PEP using hydroxychloroquine (HCQ) was conducted to 211 persons including 189 patients and 22 careworkers, whose baseline polymerase chain reaction (PCR) tests for COVID-19 were negative. PEP was completed in 184 (97.4%) patients and 21 (95.5%) careworkers without serious adverse events. At the end of 14 days of quarantine, follow-up PCR tests were all negative. Based on our experience, further clinical studies would be conducted for COVID-19 PEP.

DOI: https://dx.doi.org/10.1016/j.ijantimicag.2020.105988

21. **Liu Y, Gu Z, Xia S, et al. What are the Underlying Transmission Patterns of COVID-19 Outbreak? - An Age-specific Social Contact Characterization. *EClinicalMedicine*. 2020:100354. DOI:** https://dx.doi.org/10.1016/j.eclinm.2020.100354

Background: COVID-19 has spread to 6 continents. Now is opportune to gain a deeper understanding of what may have happened. The findings can help inform mitigation strategies in the disease-affected countries.

Methods: In this work, we examine an essential factor that characterizes the disease transmission patterns: the interactions among people. We develop a computational model to reveal the interactions in terms of the social contact patterns among the population of different age-groups. We divide a city's population into seven age-groups: 0-6 years old (children); 7-14 (primary and junior high school students); 15-17 (high school students); 18-22 (university students); 23-44 (young/middle-aged people); 45-64 years old (middle-aged/elderly people); and 65 or above (elderly people). We consider four representative settings of social contacts that may cause the disease spread: (1) individual households; (2) schools, including primary/high schools as well as colleges and universities; (3) various physical workplaces; and (4) public places and communities where people can gather, such as stadiums, markets, squares, and organized tours. A contact matrix is computed to describe the contact intensity between different age-groups for each of the four settings. By integrating the four contact matrices with the next-generation matrix, we quantitatively characterize the underlying transmission patterns of COVID-19 among different populations.

Findings: We focus our study on 6 representative cities in China: Wuhan, the epicenter of COVID-19, together with Beijing, Tianjin, Hangzhou, Suzhou, and Shenzhen, which are five major cities from three key economic zones. The results show that the social contact-based analysis can readily explain the underlying disease transmission patterns as well as the associated risks (including both confirmed and unconfirmed cases). In Wuhan, the age-groups involving relatively intensive contacts in households and public/communities are dispersedly distributed. This can explain why the transmission of COVID-19 in the early stage mainly took place in public places and families in Wuhan. We estimate that Feb. 11, 2020 was the date with the highest transmission risk in Wuhan, which is consistent with the actual peak period of the reported case number (Feb. 4-14). Moreover, the surge in the number of new cases reported on Feb. 12-13 in Wuhan can readily be captured using our model, showing its ability in forecasting the potential/unconfirmed cases. We further estimate the disease transmission risks associated with different work resumption plans in these cities after the outbreak. The estimation results are consistent with the actual situations in the cities with relatively lenient control policies, such as Beijing, and those with strict control policies, such as Shenzhen.

Interpretation: With an in-depth characterization of age-specific social contact-based transmission, the retrospective and prospective situations of the disease outbreak, including the past and future transmission risks, the effectiveness of different interventions, and the disease transmission risks of restoring normal social activities, are computationally analyzed and reasonably explained. The conclusions drawn from the study not only provide a comprehensive explanation of the underlying COVID-19 transmission patterns in China, but more importantly, offer the social contact-based risk analysis methods that can readily be applied to guide intervention planning and operational responses in other countries, so that the impact of COVID-19 pandemic can be strategically mitigated.

Funding: General Research Fund of the Hong Kong Research Grants Council; Key Project Grants of the National Science Foundation of China.

DOI: https://dx.doi.org/10.1016/j.eclinm.2020.100354

22. **McMichael TM, Clark S, Pogosjans S, et al. COVID-19 in a Long-Term Care Facility - King County, Washington, February 27-March 9, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(12):339-42. DOI:** 10.15585/mmwr.mm6912e1

On February 28, 2020, a case of coronavirus disease (COVID-19) was identified in a woman resident of a long-term care skilled nursing facility (facility A) in King County, Washington.* Epidemiologic investigation of facility A identified 129 cases of COVID-19 associated with facility A, including 81 of the residents, 34

staff members, and 14 visitors; 23 persons died. Limitations in effective infection control and prevention and staff members working in multiple facilities contributed to intra- and interfacility spread. COVID-19 can spread rapidly in long-term residential care facilities, and persons with chronic underlying medical conditions are at greater risk for COVID-19-associated severe disease and death. Long-term care facilities should take proactive steps to protect the health of residents and preserve the health care workforce by identifying and excluding potentially infected staff members and visitors, ensuring early recognition of potentially infected patients, and implementing appropriate infection control measures.

DOI: https://dx.doi.org/10.15585/mmwr.mm6912e1

23. **McMichael TM, Currie DW, Clark S, et al. Epidemiology of Covid-19 in a Long-Term Care Facility in King County, Washington. *N Engl J Med*. 2020. DOI:** 10.1056/NEJMoa2005412

BACKGROUND: Long-term care facilities are high-risk settings for severe outcomes from outbreaks of Covid-19, owing to both the advanced age and frequent chronic underlying health conditions of the residents and the movement of health care personnel among facilities in a region. METHODS: After identification on February 28, 2020, of a confirmed case of Covid-19 in a skilled nursing facility in King County, Washington, Public Health-Seattle and King County, aided by the Centers for Disease Control and Prevention, launched a case investigation, contact tracing, quarantine of exposed persons, isolation of confirmed and suspected cases, and on-site enhancement of infection prevention and control. RESULTS: As of March 18, a total of 167 confirmed cases of Covid-19 affecting 101 residents, 50 health care personnel, and 16 visitors were found to be epidemiologically linked to the facility. Most cases among residents included respiratory illness consistent with Covid-19; however, in 7 residents no symptoms were documented. Hospitalization rates for facility residents, visitors, and staff were 54.5%, 50.0%, and 6.0%, respectively. The case fatality rate for residents was 33.7% (34 of 101). As of March 18, a total of 30 long-term care facilities with at least one confirmed case of Covid-19 had been identified in King County. CONCLUSIONS: In the context of rapidly escalating Covid-19 outbreaks, proactive steps by long-term care facilities to identify and exclude potentially infected staff and visitors, actively monitor for potentially infected patients, and implement appropriate infection prevention and control measures are needed to prevent the introduction of Covid-19.

DOI: https://dx.doi.org/10.1056/NEJMoa2005412

24. **Mills JP, Kaye KS, Mody L. COVID-19 in older adults: clinical, psychosocial, and public health considerations. *Jci Insight*. 2020:17. DOI:** https://dx.doi.org/10.1172/jci.insight.139292

Complications of COVID-19 have been particularly severe among older adults, who are the focus of this article. Public policy goals should prioritize pandemic preparedness in nursing homes, as well as civic and local government-based support programs for community-dwelling older adults, to ensure that risk of infection is mitigated while promoting wellness during a period of stress and uncertainty.

URL:
https://insight.jci.org/articles/view/139292/pdf

25. **Ouslander JG. Coronavirus Disease19 in Geriatrics and Long-Term Care: An Update. *J Am Geriatr Soc*. 2020;03:03. DOI:** https://dx.doi.org/10.1111/jgs.16464

URL:
https://onlinelibrary.wiley.com/doi/epdf/10.1111/jgs.16464

26. **Rolland Y, Benetos A, Villars H, et al. A COVID-19 Support Platform for Long Term Care Facilities. *The journal of nutrition, health & aging*. 2020:1-2. DOI:** 10.1007/s12603-020-1364-x

URL:

https://link.springer.com/content/pdf/10.1007/s12603-020-1364-x.pdf

27. **Rowan NJ, Laffey JG. Challenges and solutions for addressing critical shortage of supply chain for personal and protective equipment (PPE) arising from Coronavirus disease (COVID19) pandemic - Case study from the Republic of Ireland. *The Science of the total environment*. 2020;725:138532. DOI:** 10.1016/j.scitotenv.2020.138532
10.1016/j.scitotenv.2020.138532.
Coronavirus (COVID-19) is highly infectious agent that causes fatal respiratory illnesses, which is of great global public health concern. Currently, there is no effective vaccine for tackling this COVID19 pandemic where disease countermeasures rely upon preventing or slowing person-to-person transmission. Specifically, there is increasing efforts to prevent or reduce transmission to front-line healthcare workers (HCW). However, there is growing international concern regarding the shortage in supply chain of critical one-time-use personal and protective equipment (PPE). PPE are heat sensitive and are not, by their manufacturer's design, intended for reprocessing. Most conventional sterilization technologies used in hospitals, or in terminal medical device sterilization providers, cannot effectively reprocess PPE due to the nature and severity of sterilization modalities. Contingency planning for PPE stock shortage is important. Solutions in the Republic of Ireland include use of smart communication channels to improve supply chain, bespoke production of PPE to meets gaps, along with least preferred option, use of sterilization or high-level disinfection for PPE reprocessing. Reprocessing PPE must consider material composition, functionality post treatment, along with appropriate disinfection. Following original manufacturer of PPE and regulatory guidance is important. Technologies deployed in the US, and for deployment in the Republic of Ireland, are eco-friendly, namely vaporised hydrogen peroxide (VHP), such as for filtering facepiece respirators and UV irradiation and High-level liquid disinfection (Actichlor+) is also been pursed in Ireland. Safeguarding supply chain of PPE will sustain vital healthcare provision and will help reduce mortality.

DOI: https://dx.doi.org/10.1016/j.scitotenv.2020.138532

28. **Yen MY, Schwartz J, King CC, et al. Recommendations for protecting against and mitigating the COVID-19 pandemic in long-term care facilities. *J Microbiol Immunol Infect*. 2020. DOI:** 10.1016/j.jmii.2020.04.003
The COVID-19 outbreak has drawn heightened attention from public health scholars researching ways to limit its spread. Much of the research has been focused on minimizing transmission in hospitals and in the general community. However, a particularly vulnerable community that has received relatively little attention is elders residing in long-term care facilities (LTCFs). In this article we address this relative lack of attention, arguing that enhanced traffic control bundling (eTCB) can and should be adopted and implemented as a means of protecting LTCF residents and staff. Enhanced TCB has been widely applied in hospital settings and has proven effective at limiting droplet and fomite transmissions both within hospitals and between hospitals and the general community. By effectively adapting eTCB to LTCF conditions, particularly by incorporating compartmentalization within zones plus active surveillance, COVID-19 transmission into and throughout LTCFs can be minimized, thereby saving numerous lives among an especially vulnerable population.

DOI: https://dx.doi.org/10.1016/j.jmii.2020.04.003

29. **Ki HK, Han SK, Son JS, et al. Risk of transmission via medical employees and importance of routine infection-prevention policy in a nosocomial outbreak of Middle East respiratory syndrome (MERS): a descriptive analysis from a tertiary care hospital in South Korea. *BMC Pulmonary Medicine*. 2019;19(1):N.PAG-N.PAG. DOI:** 10.1186/s12890-019-0940-5

Background: In 2015, South Korea experienced an outbreak of Middle East respiratory syndrome (MERS), and our hospital experienced a nosocomial MERS infection. We performed a comprehensive analysis to identify the MERS transmission route and the ability of our routine infection-prevention policy to control this outbreak.Methods: This is a case-cohort study of retrospectively analysed data from medical charts, closed-circuit television, personal interviews and a national database. We analysed data of people at risk of MERS transmission including 228 in the emergency department (ED) and 218 in general wards (GW). Data of personnel location and movement, personal protection equipment and hand hygiene was recorded. Transmission risk was determined as the extent of exposure to the index patient: 1) high risk: staying within 2 m; 2) intermediate risk: staying in the same room at same time; and 3) low risk: only staying in the same department without contact.Results: The index patient was an old patient admitted to our hospital. 11 transmissions from the index patient were identified; 4 were infected in our hospital. Personnel in the ED exhibited higher rates of compliance with routine infection-prevention methods as observed objectively: 93% wore a surgical mask and 95.6% washed their hands. Only 1.8% of personnel were observed to wear a surgical mask in the GW. ED had a higher percentage of high-risk individuals compared with the GW (14.5% vs. 2.8%), but the attack rate was higher in the GW (16.7%; l/6) than in the ED (3%; 1/33). There were no transmissions in the intermediate- and low-risk groups in the ED. Otherwise 2 patients were infected in the GW among the low-risk group. MERS were transmitted to them indirectly by staff who cared for the index patient.Conclusions: Our study provide compelling evidence that routine infection-prevention policies can greatly reduce nosocomial transmission of MERS. Conventional isolation is established mainly from contact tracing of patients during a MERS outbreak. But it should be extended to all people treated by any medical employee who has contact with MERS patients.Trial Registration: NCT02605109 , date of registration: 11th November 2015.

URL:
https://bmcpulmmed.biomedcentral.com/track/pdf/10.1186/s12890-019-0940-5

30. **Diaz-Decaro JD, Launer B, McKinnell JA, et al. Bayesian evidence and epidemiological implications of environmental contamination from acute respiratory infection in long-term care facilities. *Epidemiol Infect*. 2018;146(7):832-8. DOI:** https://dx.doi.org/10.1017/S0950268818000729

Skilled nursing home facilities (SNFs) house a vulnerable population frequently exposed to respiratory pathogens. Our study aims to gain a better understanding of the transmission of nursing home-acquired viral respiratory infections in non-epidemic settings. Symptomatic surveillance was performed in three SNFs for residents exhibiting acute respiratory symptoms. Environmental surveillance of five high-touch areas was performed to assess possible transmission. All resident and environmental samples were screened using a commercial multiplex polymerase chain reaction platform. Bayesian methods were used to evaluate environmental contamination. Among nursing home residents with respiratory symptoms, 19% had a detectable viral pathogen (parainfluenza-3, rhinovirus/enterovirus, RSV, or influenza B). Environmental contamination was found in 20% of total room surface swabs of symptomatic residents. Environmental and resident results were all concordant. Target period prevalence among symptomatic residents ranged from 5.5 to 13.3% depending on target. Bayesian analysis quantifies the probability of environmental shedding due to parainfluenza-3 as 92.4% (95% CI: 86.8-95.8%) and due to rhinovirus/enterovirus as 65.6% (95% CI: 57.9-72.5%). Our findings confirm that non-epidemic viral infections are common among SNF residents exhibiting acute respiratory symptoms and that environmental contamination may facilitate further spread with considerable epidemiological implications. Findings further emphasise the importance of environmental infection control for viral respiratory pathogens in long-term care facilities.

DOI: https://dx.doi.org/10.1017/S0950268818000729

31. **Haber N. Respiratory syncytial virus infection in elderly adults. [Review]. *Med Mal Infect*. 2018;48(6):377-82. DOI:** https://dx.doi.org/10.1016/j.medmal.2018.01.008

Respiratory syncytial virus (RSV) is a major cause of severe lower respiratory tract infections in infants and young children. Reinfections are common throughout adult life with more severe presentations occurring in immunocompromised individuals, subjects with underlying high-risk cardiopulmonary diseases, and in the elderly. There is now a significant body of literature indicating that the impact of RSV in elderly adults is similar to that of non-pandemic influenza, both in the community and in nursing homes. Clinical manifestations of RSV infections are similar to those caused by other viral respiratory pathogens, including influenza viruses. Molecular tests (reverse transcription-PCR) now provide a rapid diagnosis. The sputum sample combined with nasopharyngeal swab increases the diagnostic yield. At the present time, treatment is mainly symptomatic. The prevention of RSV consists in various infection control strategies, such as standard precautions, especially hand washing and droplet precautions to limit the nosocomial spread. Vaccines and antiviral agents for the prevention and treatment of RSV infections in elderly adults are currently not available, but they are being developed.

32. **Lee C-Y, Lee M-H, Lee S-H, et al. Nurses' Views on Infection Control in Long-Term Care Facilities in South Korea: A Focus Group Study. *Korean Journal of Adult Nursing*. 2018;30(6):634-42.**

URL:
https://pdfs.semanticscholar.org/2d34/7b2b9a5c72eafeb542413868a36d47308d99.pdf

33. **Mylotte JM. Will Maintenance of Oral Hygiene in Nursing Home Residents Prevent Pneumonia? *Journal of the American Geriatrics Society*. 2018;66(3):590-4. DOI:** 10.1111/jgs.15190

This article is an evaluation of the literature on oral hygiene as a risk factor for nursing home–associated pneumonia (NHAP) and with interventions to improve oral hygiene and reduce the incidence of NHAP. The background for this article is that studies that have evaluated interventions to improve oral hygiene and prevent NHAP have conflicting results. To try to understand the reason for these results, the objective was to examine risk factor and intervention studies and determine their methodological validity. Review of studies evaluating oral hygiene status as a risk factor for NHAP found multiple methodological problems, resulting in limited evidence to support this association. Studies of intervention methods, whether finding benefit or not in preventing NHAP, all had methodological limitations. Therefore, it is unclear whether oral hygiene is a risk factor for NHAP and whether improving oral hygiene decreases the incidence of this infection. A recommendation is made that future studies should carefully define the etiology of suspected NHAP using molecular techniques when evaluating methods to prevent this infection because viral pneumonia and aspiration pneumonitis may mimic bacterial pneumonia even though, at times, there may be coinfection with bacteria. In this latter situation, improving oral hygiene may not prevent pneumonia. Therefore, viral infection and pneumonitis with or without bacterial coinfection need to be excluded so that the focus is on prevention of bacterial pneumonia.

34. **Spires SS, Talbot HK, Pope CA, et al. Paramyxovirus Outbreak in a Long-Term Care Facility: The Challenges of Implementing Infection Control Practices in a Congregate Setting. *Infect Control Hosp Epidemiol*. 2017;38(4):399-404. DOI:** 10.1017/ice.2016.316

OBJECTIVEWe report an outbreak of respiratory syncytial virus (RSV) and human metapneumovirus (HMPV) infections in a dementia care ward containing 2 separately locked units (A and B) to heighten awareness of these pathogens in the older adult population and highlight some of the infection prevention challenges faced during a noninfluenza respiratory viral outbreak in a congregate setting.METHODSCases were defined by the presence of new signs or symptoms that included (1) a

single oral temperature ≥ 37.8°C (100.0°F) and (2) the presence of at least 2 of the following symptoms: cough, dyspnea, rhinorrhea, hoarseness, congestion, fatigue, and malaise. Attempted infection-control measures included cohorting patients and staff, empiric isolation precautions, and cessation of group activities. Available nasopharyngeal swab specimens were sent to the Tennessee Department of Health for identification by rT-PCR testing.RESULTSWe identified 30 of the 41 (73%) residents as cases over this 16-day outbreak. Due to high numbers of sick personnel, we were unable to cohort staff to 1 unit. Unit B developed its first case 8 days after infection control measures were implemented. Of the 14 cases with available specimens, 6 patients tested positive for RSV-B, 7 for HMPV and 1 patient test positive for influenza A. Overall, 15 cases (50%) required transfer to acute care facilities; 10 of these patients (34%) had chest x-ray confirmed pulmonary infiltrates; and 5 residents (17%) died.CONCLUSIONSThis case report highlights the importance of RSV and HMPV in causing substantial disease in the older adult population and highlights the challenges in preventing transmission of these viruses.Infect Control Hosp Epidemiol 2017;38:399–404

DOI: https://dx.doi.org/10.1017/ice.2016.316

35. **French CE, McKenzie BC, Coope C, et al. Risk of nosocomial respiratory syncytial virus infection and effectiveness of control measures to prevent transmission events: a systematic review.** ***Influenza other respi*****. 2016;10(4):268-90. DOI:** https://dx.doi.org/10.1111/irv.12379

Respiratory syncytial virus (RSV) causes a significant public health burden, and outbreaks among vulnerable patients in hospital settings are of particular concern. We reviewed published and unpublished literature from hospital settings to assess: (i) nosocomial RSV transmission risk (attack rate) during outbreaks, (ii) effectiveness of infection control measures. We searched the following databases: MEDLINE, EMBASE, CINAHL, Cochrane Library, together with key websites, journals and grey literature, to end of 2012. Risk of bias was assessed using the Cochrane risk of bias tool or Newcastle-Ottawa scale. A narrative synthesis was conducted. Forty studies were included (19 addressing research question one, 21 addressing question two). RSV transmission risk varied by hospital setting; 6-56% (median: 28.5%) in neonatal/paediatric settings (n = 14), 6-12% (median: 7%) in adult haematology and transplant units (n = 3), and 30-32% in other adult settings (n = 2). For question two, most studies (n = 13) employed multi-component interventions (e.g. cohort nursing, personal protective equipment (PPE), isolation), and these were largely reported to be effective in reducing nosocomial transmission. Four studies examined staff PPE; eye protection appeared more effective than gowns and masks. One study reported on RSV prophylaxis for patients (RSV-Ig/palivizumab); there was no statistical evidence of effectiveness although the sample size was small. Overall, risk of bias for included studies tended to be high. We conclude that RSV transmission risk varies widely during hospital outbreaks. Although multi-component control strategies appear broadly successful, further research is required to disaggregate the effectiveness of individual components including the potential role of palivizumab prophylaxis. Copyright © 2016 The Authors. Influenza and Other Respiratory Viruses Published by John Wiley & Sons Ltd.

URL:
https://onlinelibrary.wiley.com/doi/epdf/10.1111/irv.12379

36. **Ursic T, Miksic NG, Lusa L, et al. Viral respiratory infections in a nursing home: a six-month prospective study.** ***BMC Infect Dis*****. 2016;16(1):637. DOI:** 10.1186/s12879-016-1962-8

BACKGROUND: The knowledge on viral respiratory infections in nursing home (NH) residents and their caregivers is limited. The purpose of the present study was to assess and compare the incidence of acute respiratory infections (ARI) in nursing home (NH) residents and staff, to identify viruses involved in ARI and to correlate viral etiology with clinical manifestations of ARI. METHODS: The prospective surveillance study was accomplished in a medium-sized NH in Slovenia (central Europe). Ninety NH

residents and 42 NH staff were included. Nasopharyngeal swabs were collected from all participants at enrollment (December 5th, 2011) and at the end of the study (May 31st, 2012), and from each participant that developed ARI within this timeframe. Molecular detection of 15 respiratory viruses in nasopharyngeal swab samples was performed. RESULTS: The weekly incidence rate of ARI in NH residents and NH staff correlated; however, it was higher in staff members than in residents (5.9 versus 3.8/1,000 person-days, P = 0.03), and was 2.5 (95 % CI: 1.36-4.72) times greater in residents without dementia than in residents with dementia. Staff members typically presented with upper respiratory tract involvement, whereas in residents lower respiratory tract infections predominated. Respiratory viruses were detected in 55/100 ARI episodes. In residents, influenza A virus, respiratory syncytial virus, and human metapneumovirus were detected most commonly, whereas in NH staff rhinovirus and influenza A virus prevailed. 38/100 ARI episodes (30/56 in residents, 8/44 in staff) belonged to one of three outbreaks (caused by human metapneumovirus, influenza A virus and respiratory syncytial virus, respectively). NH residents had higher chances for virus positivity within outbreak than HN staff (OR = 7.4, 95 % CI: 1.73-31.48, P < 0.01). CONCLUSIONS: ARI are common among NH residents and staff, and viruses were detected in a majority of the episodes of ARI. Many ARI episodes among NH residents were outbreak cases and could be considered preventable. TRIAL REGISTRATION: The study was registered on the 1(th) of December 2011 at ClinicalTrials (NCT01486160).

URL:
https://bmcinfectdis.biomedcentral.com/track/pdf/10.1186/s12879-016-1962-8

37. **Infection control. *McKnight's Long-Term Care News*. 2015;36(10):88-.**

A buyer's guide is presented that shows infection products from companies such as Alimed Inc., Covidien and Gentell Wound & Skin Care that are suitable for health facilities including nursing homes, hospitals, and assisted living facilities.

38. **Green CA, Scarselli E, Voysey M, et al. Safety and immunogenicity of novel respiratory syncytial virus (RSV) vaccines based on the RSV viral proteins F, N and M2-1 encoded by simian adenovirus (PanAd3-RSV) and MVA (MVA-RSV); protocol for an open-label, dose-escalation, single-centre, phase 1 clinical trial in healthy adults. *BMJ Open*. 2015;5(10):e008748. DOI:** https://dx.doi.org/10.1136/bmjopen-2015-008748

INTRODUCTION: Respiratory syncytial virus (RSV) infection causes respiratory disease throughout life, with infants and the elderly at risk of severe disease and death. RSV001 is a phase 1 (first-in-man), open-label, dose-escalation, clinical trial of novel genetic viral-vectored vaccine candidates PanAd3-RSV and modified vaccinia virus Ankara (MVA)-RSV. The objective of RSV001 is to characterise the (primary objective) safety and (secondary objective) immunogenicity of these vaccines in healthy younger and older adults.

METHODS AND ANALYSIS: Heterologous and homologous 'prime'/boost combinations of PanAd3-RSV and single-dose MVA-RSV are evaluated in healthy adults. 40 healthy adults aged 18-50 years test one of four combinations of intramuscular (IM) or intranasal (IN) PanAd3-RSV prime and IM PanAd3 or IM MVA-RSV boost vaccination, starting at a low dose for safety. The following year an additional 30 healthy adults aged 60-75 years test either a single dose of IM MVA-RSV, one of three combinations of IN or IM PanAd3-RSV prime and PanAd3-RSV or MVA-RSV boost vaccination used in younger volunteers, and a non-vaccinated control group. Study participants are self-selected volunteers who satisfy the eligibility criteria and are assigned to study groups by sequential allocation. Safety assessment includes the daily recording of solicited and unsolicited adverse events for 1 week after vaccination, as well as visit (nursing) observations and safety bloods obtained at all scheduled attendances. Laboratory measures of RSV-specific humoral and cellular immune responses after vaccination will address the secondary end

points. All study procedures are performed at the Centre for Clinical Vaccinology and Tropical Medicine (CCVTM), Oxford, UK.

ETHICS AND DISSEMINATION: RSV001 has clinical trial authorisation from the Medicines and Healthcare Products Regulatory Agency (MHRA) and ethics approval from NRES Berkshire (reference 13/SC/0023). All study procedures adhere to International Conference on Harmonisation (ICH) Good Clinical Practice guidelines. The results of the trial are to be published in peer-reviewed journals, conferences and academic forums.

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URL:
https://bmjopen.bmj.com/content/bmjopen/5/10/e008748.full.pdf

39. **Jordan JG, Pritchard S, Nicholson G, et al. Pneumonia Associated with an Influenza A H3 Outbreak at a Skilled Nursing Facility--Florida, 2014. *MMWR Morb Mortal Wkly Rep*. 2015;64(35):985-6. DOI:** https://dx.doi.org/10.15585/mmwr.mm6435a7

In December 2014, the Florida Department of Health, Bureau of Epidemiology, was notified that 18 of 95 (19%) residents at a skilled nursing facility had radiographic evidence of pneumonia and were being treated with antibiotics. Two residents were hospitalized, one of whom died. A second resident died at the facility. The Florida Department of Health conducted an outbreak investigation to ascertain all cases through active case finding, identify the etiology, provide infection control guidance, and recommend treatment or prophylaxis, if indicated.

DOI: https://dx.doi.org/10.15585/mmwr.mm6435a7

40. **Koenig KL. Identify-Isolate-Inform: A Modified Tool for Initial Detection and Management of Middle East Respiratory Syndrome Patients in the Emergency Department. *Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health*. 2015;16(5):619-24. DOI:** 10.5811/westjem.2015.7.27915

Middle East respiratory syndrome (MERS) is a novel infectious disease caused by a coronavirus (MERS-CoV) first reported in Saudi Arabia in September 2012. MERS later spread to other countries in the Arabian Peninsula, followed by an outbreak in South Korea in 2015. At least 26 countries have reported MERS cases, and these numbers may increase over time. Due to international travel opportunities, all countries are at risk of imported cases of MERS, even if outbreaks do not spread globally. Therefore, it is essential for emergency department (ED) personnel to be able to rapidly assess MERS risk and take immediate actions if indicated. The Identify-Isolate-Inform (3I) tool, originally conceived for initial detection and management of Ebola virus disease patients in the ED and later adjusted for measles, can be adapted for real-time use for any emerging infectious disease. This paper reports a modification of the 3I tool for use in initial detection and management of patients under investigation for MERS. Following an assessment of epidemiologic risk factors, including travel to countries with current MERS transmission and contact with patients with confirmed MERS within 14 days, patients are risk stratified by type of exposure coupled with symptoms of fever and respiratory illness. If criteria are met, patients must be immediately placed into airborne infection isolation (or a private room until this type of isolation is available) and the emergency practitioner must alert the hospital infection prevention and control team and the local public health department. The 3I tool will facilitate rapid categorization and triggering of appropriate time-sensitive actions for patients presenting to the ED at risk for MERS.

DOI: https://dx.doi.org/10.5811/westjem.2015.7.27915

41. **Stirling BV, Harmston J, Alsobayel H. An educational programme for nursing college staff and students during a MERS-coronavirus outbreak in Saudi Arabia. *BMC Nursing*. 2015;14(1):1-7. DOI:** 10.1186/s12912-015-0065-y

Background: The Middle Eastern Respiratory Syndrome Coronavirus is a serious and emerging issue in Saudi Arabia and the world. A response was required to reduce possible disease transmission between the hospital and university. College of Nursing academic staff developed a programme in response to the educational and emotional needs of participants. Methods: A MERS-CoV Task Force responded to the rapidly unfolding epidemic. The aim was to find out what nursing staff and nursing students in the college knew about MERS-CoV. While most gaps in knowledge were addressed after an intense information seminar, other learning needs were identified and responded to. The Task Force developed mandatory information sessions for all nursing faculty, students and staff. All staff were informed by email, letters and posters. There are 28 faculty staff, 84 support staff and 480 students in the College of Nursing. The information settings all took place within the College of Nursing, Princess Nourah University, Kingdom of Saudi Arabia. Questionnaires were given to faculty, students and staff to understand their baseline knowledge. After the sessions, faculty, students and staff were asked about what was learned through the sessions, and what educational needs still needed to be addressed. Approval was sought and received by the Ethics Committee for the College of Nursing. Participants completed informed consent forms and the voluntary nature of the study was explained. Results: The total number of people attending the education sessions was133, including 65 students. 18 faculty members attended and 57 support staff. Data was gathered on gaps in participant knowledge and a plan was developed to address the gaps. Policies were established around student participation in clinical and return to work practices for staff with any symptoms. Conclusion: In hospitals there is above average risk for exposure to infectious diseases. Student nurses travel between hospital and university, with the capacity to act as a conduit of pathogens to large, susceptible populations. Nursing colleges must respond thoroughly to protect students and staff and prevent spread of disease into the university community in the midst of an epidemic.

URL:
https://bmcnurs.biomedcentral.com/track/pdf/10.1186/s12912-015-0065-y

42. **Gross AE, Van Schooneveld TC, Olsen KM, et al. Epidemiology and predictors of multidrug-resistant community-acquired and health care-associated pneumonia. *Antimicrob Agents Chemother*. 2014;58(9):5262-8. DOI:** https://dx.doi.org/10.1128/AAC.02582-14

There are limited U.S. data describing the risk factors for multidrug-resistant organism (MDRO) isolation in community-acquired pneumonia (CAP) and health care-associated pneumonia (HCAP). However, concern for the presence of these pathogens drives the prescribing of empiric broad-spectrum antibiotics for CAP and HCAP. A retrospective study of all adults hospitalized with community-onset pneumonia (CAP and HCAP) at a large U.S. medical center from January 2010 to December 2011 was conducted. The objective was to ascertain the rate of pneumonia caused by MDROs and to evaluate whether HCAP is a risk factor for MDRO pneumonia. Univariate and propensity score-adjusted multivariate analyses were performed. A total of 521 patients (50.5% CAP and 49.5% HCAP) were included. The most common etiologies of pneumonia were primary viral and Streptococcus pneumoniae. MDROs were isolated in 20 (3.8%) patients overall, and MDROs occurred in 5.9% and 1.9% of HCAP and CAP patients, respectively. The presence of an MDRO was not associated with HCAP classification (odds ratio [OR]=1.95; 95% confidence interval [95% CI], 0.66 to 5.80; P=0.23) or with most of its individual components (hemodialysis, home infusion, home wound care, and >=48-h hospitalization in the last 90 days). Independent predictors of MDRO included the following: Pseudomonas aeruginosa colonization/infection in the previous year (OR=7.43; 95% CI, 2.24 to 24.61;

P<0.001), antimicrobial use in the previous 90 days (OR=2.90; 95% CI, 1.13 to 7.45; P=0.027), admission from a nursing home (OR=4.19; 95% CI, 1.55 to 11.31; P=0.005), and duration of hospitalization in the previous 90 or 180 days (P=0.013 and P=0.002, respectively). MDROs were uncommon in HCAP and CAP. HCAP did not predict MDRO isolation. Local etiology of community onset pneumonia and specific MDRO risk factors should be integrated into therapeutic decisions to prevent empirical overprescribing of antibiotics for methicillin-resistant Staphylococcus aureus (MRSA) and P. aeruginosa.

DOI: https://dx.doi.org/10.1128/AAC.02582-14

43. **Centers for Disease C, Prevention. Outbreaks of human metapneumovirus in two skilled nursing facilities -West Virginia and Idaho, 2011-2012. *MMWR Morb Mortal Wkly Rep*. 2013;62(46):909-13.**

During January and February 2012, state and local public health agencies in West Virginia and Idaho, with assistance from facility staff members and CDC, investigated outbreaks of unexplained respiratory illness characterized by high proportions of lower respiratory tract infections (LRTIs) at two skilled nursing facilities (SNFs). Investigations were conducted to determine the extent and etiology of each outbreak and make recommendations to prevent further spread. During both outbreaks, influenza was initially suspected; however, human metapneumovirus (hMPV) was identified as the etiologic agent. Among 57 cases of respiratory illness from both facilities, 45 (79%) patients had evidence of LRTI, of whom 25 (56%) had radiologically confirmed pneumonia; five (9%) had evidence of upper respiratory tract infection (URTI), and seven (12%) could not be classified. Six patients (11%) died. These outbreaks demonstrate that hMPV, a recently described pathogen that would not have been detected without the use of molecular diagnostics in these outbreaks, is associated with severe LRTI and should be considered as a possible etiology of respiratory outbreaks in SNFs.

URL:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4585366/pdf/909-913.pdf

44. **Ma HM, Lee KP, Woo J. Predictors of viral pneumonia: the need for viral testing in all patients hospitalized for nursing home-acquired pneumonia. *Geriatr Gerontol Int*. 2013;13(4):949-57. DOI:** https://dx.doi.org/10.1111/ggi.12036

AIM: Community-acquired pneumonia (CAP) is presumed to be bacterial in origin and empirical antibiotics are almost always given on admission. However, early detection of viral infection is also very important for hospital infection control and timely use of antiviral agents. The present study aimed to compare patients with viral and bacterial pneumonia, and identify independent predictors of viral pneumonia.

METHODS: A prospective cohort study was carried out in a tertiary teaching hospital in a 1-year period. Older patients (aged >= 65 years) were recruited if they were admitted for CAP confirmed by chest radiographs.

RESULTS: A cohort of 488 patients was analyzed. Infective causes were found in 137 (28.1%) patients. Bacterial, viral and mixed infections were detected in 86 (17.6%), 41 (8.4%) and 10 (2.0%) patients, respectively. Bacteriology was established mostly by sputum culture and virology by nasopharyngeal aspirate (NPA) viral culture. The commonest bacterial isolates were Haemophilus influenzae (31), Pseudomonas aeruginosa (15), Mycobacterium tuberculosis (14), Klebsiella spp. (9) and Streptococcus pneumoniae (6). Influenza A virus (28, 8 were pandemic 2009 A/H1N1 subtype) and respiratory syncytial virus (16) were the most frequent viral causes. Independent predictors of viral pneumonia included nursing home residence (RR 3.056, P = 0.009) and absence of leukocytosis (RR 0.425, P = 0.026).

CONCLUSIONS: All nursing home residents hospitalized for CAP should undergo NPA viral testing because of infection control, early antiviral treatment and discharge planning. We suggest that empirical antiviral

agents might be considered for nursing home residents hospitalized for CAP if outbreaks of influenza-like illness are reported in nursing homes. Copyright © 2013 Japan Geriatrics Society.

URL:
https://onlinelibrary.wiley.com/doi/epdf/10.1111/ggi.12036

45. **Meijer A, Overduin P, Hommel D, et al. Outbreak of Respiratory Syncytial Virus Infections in a Nursing Home and Possible Sources of Introduction: The Netherlands, Winter 2012/2013. *Journal of the American Geriatrics Society*. 2013;61(12):2230-1. DOI:** 10.1111/jgs.12565

URL: https://onlinelibrary.wiley.com/doi/epdf/10.1111/jgs.12565

46. **Ewig S, Klapdor B, Pletz MW, et al. Nursing-home-acquired pneumonia in Germany: an 8-year prospective multicentre study. *Thorax*. 2012;67(2):132-8.**

URL:
https://thorax.bmj.com/content/thoraxjnl/67/2/132.full.pdf

47. **Ho M-l, Seto W-h, Wong L-c, et al. Effectiveness of multifaceted hand hygiene interventions in long-term care facilities in Hong Kong: a cluster-randomized controlled trial. *Infect Control Hosp Epidemiol*. 2012;33(8):761-7.**

URL:
https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/effectiveness-of-multifaceted-hand-hygiene-interventions-in-longterm-care-facilities-in-hong-kong-a-clusterrandomized-controlled-trial/F3447F8DB21A4B1A0DE014EED028C2BE

48. **Te Wierik MJ, Nguyen DT, Beersma MF, et al. An outbreak of severe respiratory tract infection caused by human metapneumovirus in a residential care facility for elderly in Utrecht, the Netherlands, January to March 2010. *Euro Surveillance: Bulletin Europeen sur les Maladies Transmissibles = European Communicable Disease Bulletin*. 2012;17(13):29.**

Recognition of infections with human metapneumovirus (HMPV) among institutionalised elderly is rising. When HMPV was found to be the causative agent of an outbreak of pneumonia in a residential care facility for elderly in the Netherlands, an elaborate outbreak investigation was set up, including active surveillance for new cases. From clinical cases, defined by fever (> 38degreeC) and symptoms of respiratory tract infections, respiratory samples for analyses of viral pathogens by real-time Reverse Transcriptase Polymerase Chain Reaction (rRT-PCR) and blood samples for determination of HMPV-specific IgM and IgG antibody titres were taken. Five staff members and 18 residents fulfilled the clinical case definition. Of those, five residents tested positive for HMPV by rRT-PCR. The combination of rRTPCR and serology identified nine confirmed cases, six probable cases, six possible cases and ruled out two persons as cases. Among residents, the outbreak of HMPV had an attack rate, ranging from 5% for laboratory-confirmed cases, to 13% for clinical cases. This outbreak investigation shows that HMPV is a potential serious pathogen for institutionalised elderly.

URL:
https://www.eurosurveillance.org/content/10.2807/ese.17.13.20132-en

49. **Gaspard P, Mosnier A, Cohen JM, et al. [Clusters of respiratory tract infections and alert strategy in nursing homes].** ***Med Mal Infect*****. 2011;41(5):253-61. DOI:** https://dx.doi.org/10.1016/j.medmal.2010.12.008

OBJECTIVE: Outbreaks of acute respiratory infections (ARI) are common in institutions for elderly people. We had for objective to investigate clusters of cases (lower respiratory tract infection and influenza-like illness [LRTI/ILI]) in order to improve and validate alert strategies in these institutions.

METHODOLOGY: Prospective surveillance for LRTI/ILI was implemented in 11 institutions in Alsace, over five years. Clinical criteria were used to identify infected residents and clusters. Nasopharyngeal swabs were collected and rapid tests (Immunoassay) were performed to identify the influenza virus.

RESULTS: The three week periods were analyzed if three cases or more were recorded during the first week. This analysis demonstrated an important risk of epidemic when this number of cases was reached in healthcare units. The influenza virus (10 clusters) and respiratory syncytial virus ([RSV], two clusters) were identified.

CONCLUSION: The authors confirmed and emphasized the importance of adequate surveillance for clusters of respiratory tract infection cases. Early identification of an outbreak (three cases) is an important point to prevent transmission, especially during epidemic periods and if a virus is identified in the unit or institution. Copyright © 2011. Published by Elsevier SAS.

50. **Koh Y, Hegney DG, Drury V. Comprehensive systematic review of healthcare workers' perceptions of risk and use of coping strategies towards emerging respiratory infectious diseases.** ***International Journal of Evidence-Based Healthcare*****. 2011;9(4):403-19. DOI:** 10.1111/j.1744-1609.2011.00242.x

Aim To determine healthcare workers' perceptions of risk from exposure to emerging acute respiratory infectious diseases and the perceived effectiveness of strategies used to facilitate healthy coping in acute hospital and community healthcare settings. Methods Electronic databases (Cumulative Index to Nursing and Allied Health Literature, Ovid, PubMed, ScienceDirect, Scopus and Wiley InterScience) were searched using a three-step search strategy to identify the relevant quantitative and qualitative studies published in English from 1997 to 2009. The grey literature was not included in the review. The identified studies were evaluated using the Meta-Analysis of Statistics, Assessment and Review Instrument and the Qualitative Assessment and Review Instrument from the Joanna Briggs Institute. Fourteen quantitative studies were included and the findings included in a narrative summary. The findings from the two qualitative studies were categorised into a meta-synthesis that generated two synthesised findings. Results Findings indicated that healthcare workers perceived personal and familial health risks and stigmatisation from their exposure to emerging acute respiratory infectious diseases, but the majority were accepting of these risks. Organisational implementation of infection control measures, avoidance of patients and complying with personal protective equipment were identified as risk-mitigating strategies. Demographic, individual and organisational factors were found to influence their risk perceptions and their adoption of strategies to mitigate the risk. Conclusions It appears that healthcare workers' risk perceptions can influence their behaviour towards patients with emerging acute respiratory infectious diseases as well as their use of risk-mitigating strategies. Institutions need to ensure that appropriate infection control safeguards are in place to protect workers and their families. Institutions can also offer incentives to encourage healthcare workers to comply with the policies and procedures introduced to mitigate risk. Implications for practice Institutions and government need to ensure that policies and procedures are communicated and adequate institutional measures (i.e. personal protective equipment; education and training; and personal support) are implemented to safeguard healthcare workers during and after pandemic outbreaks. Implications for research Future research needs to examine how perception of risk related to acute emerging respiratory infectious diseases, epidemic or pandemic, and the factors that would influence healthcare workers': decisions to stay within the workforce and provide care or resign from the workforce and compliance with

institutional and government policies and procedures, as well as compliance to use of personal protective equipment.

DOI: https://dx.doi.org/10.1111/j.1744-1609.2011.00242.x

51. **Osbourn M, McPhie KA, Ratnamohan VM, et al. Outbreak of human metapneumovirus infection in a residential aged care facility. *Commun Dis Intell Q Rep*. 2009;33(1):38-40.**

Summer outbreaks of respiratory illness in residential aged care facilities are uncommonly reported in New South Wales. A respiratory illness outbreak in an aged care facility during January 2008 prompted a response to contain the outbreak by implementing infection control measures, including cohorting of symptomatic residents, cohorting nursing care, closure to new admissions and the use of personal protective equipment by staff. In addition, respiratory tract specimens were collected to determine the causative agent. Human metapneumovirus (hMPV) was detected by polymerase chain reaction assay in 3 specimens with no other respiratory pathogens found. This is the 1st reported outbreak of hMPV in an aged care facility in Australia. hPMV should be considered as the possible cause of outbreaks in aged care facilities when influenza and respiratory syncytial virus have been excluded.

52. **Vartti A, Oenema A, Schreck M, et al. SARS knowledge, perceptions, and behaviors: a comparison between Finns and the Dutch during the SARS outbreak in 2003. *International Journal of Behavioral Medicine*. 2009;16(1):41-8. DOI:** 10.1007/s12529-008-9004-6

BACKGROUND: The SARS outbreak served to test both local and international outbreak management and risk communication practices. PURPOSE: The study compares SARS knowledge, perceptions, behaviors, and information between Finns and the Dutch during the SARS outbreak in 2003. METHOD: The participants of the study, who used a modified SARS Psychosocial Research Consortium survey, were drawn from Internet panels in Finland (n = 308) and the Netherlands (n = 373) in June 2003. Multiple logistic regression analyses were used to calculate odds ratios (with 95% confidence intervals) to compare Finns with the Dutch for various levels of perceptions and behaviors. RESULTS: Adjusted for age, education, and income, Finns were more likely to be knowledgeable and worried about SARS as well as to have low perceived comparative SARS risk and poor personal efficacy beliefs about preventing SARS. Finns were also more likely than the Dutch to have high confidence in physicians on SARS issues but less likely to have received information from the Internet and have confidence in Internet information. CONCLUSIONS: The study shed light on how two European populations differed substantially regarding lay responses to SARS. Understanding these differences is needed in formulating and executing communication and outbreak management.

DOI: https://dx.doi.org/10.1007/s12529-008-9004-6

53. **Daugherty EL. Health care worker protection in mass casualty respiratory failure: infection control, decontamination, and personal protective equipment...includes discussion. *Respiratory Care*. 2008;53(2):201-14.**

Maintenance of a safe and stable health care infrastructure is critical to an effective mass casualty disaster response. Both secondary contamination during chemical disasters and hospital-associated infections during epidemic illness can pose substantial threats to achieving this goal. Understanding basic principles of decontamination and infection control during responses to chemical and biologic disasters can help minimize the risks to patients and health care workers. Effective decontamination following toxic chemical exposure should include both removal of contaminated clothing and decontamination of the victim's skin. Wet decontamination is the most feasible strategy in a mass casualty situation and should be performed promptly by trained personnel. In the event of an epidemic, infection prevention

and control measures are based on essential principles of hand hygiene and standard precautions. Expanded precautions should be instituted as needed to target contact, droplet, and airborne routes of infectious disease transmission. Specific equipment and measures for critical care delivery may serve to decrease risk to health care workers in the event of an epidemic. Their use should be considered in developing comprehensive disaster response plans.

54. Koh GC, Sng J, Koh D, et al. Nursing homes during an influenza pandemic...JAMA. 2008 Jul 23;300(4):392-4. Chicago, Illinois: American Medical Association; 2008. p. 2366-7.

DOI: https://dx.doi.org/10.1001/jama.2008.689

55. **Smith PW, Bennett G, Bradley S, et al. SHEA/APIC Guideline: infection prevention and control in the long-term care facility. *Am J Infect Control*. 2008;36(7):504-35.**

URL:
https://www.sciencedirect.com/science/article/pii/S0196655308006044?via%3Dihub

56. **Tarrac SE. Application of the updated CDC Isolation Guidelines for health care facilities. *AORN Journal*. 2008;87(3):534-46. DOI:** 10.1016/j.aorn.2007.12.001

The centers for disease control and Prevention has published updated guidelines for isolation precautions that outline how health care workers can prevent the transmission of infectious agents to their patients and to themselves. The guidelines re-emphasize standard precautions, which guide clinicians in the use of appropriate personal protective equipment (PPE), depending on the expected type of exposure. Respiratory hygiene/cough etiquette is incorporated into infection control practices as a new component of standard precautions. The article provides information on the new guidelines as well as information on newly emerging pathogens and methods to prevent disease transmission in health care settings.

URL:
https://aornjournal.onlinelibrary.wiley.com/doi/epdf/10.1016/j.aorn.2007.12.001

57. **Dominguez-Berjon MF, Hernando-Briongos P, Miguel-Arroyo PJ, et al. Adenovirus transmission in a nursing home: analysis of an epidemic outbreak of keratoconjunctivitis. *Gerontology*. 2007;53(5):250-4. DOI:** 10.1159/000101692

BACKGROUND: An epidemic outbreak of keratoconjunctivitis occurred in a nursing home in Madrid from August to December 2005. OBJECTIVE: This article reports the outbreak, the infection control measures taken, and risk factors for keratoconjunctivitis. METHODS: A cohort study was conducted on the nursing home staff and residents. Specific attack rates and relative risks with their 95% confidence intervals were estimated. A multivariate analysis (logistic regression) was performed proving odds ratios (OR) of becoming ill. Conjunctival swab samples were taken and tested for viral infection. More stringent infection control measures were implemented following the occurrence of the initial cases. RESULTS: Forty-six cases were identified in the nursing home (infection rates of 30.5% in residents and 8.3% in workers). Total duration of the outbreak was 120 days. Corneal ulcer occurred in 3 cases. The factors appearing as independent risk factors were age (OR = 5.7 in people aged >or=90 years compared to those aged <80 years), cognitive impairment (OR = 2.64) and nursing home floor (OR = 2.74 for the first floor, where the outbreak started). Adenoviral DNA was amplified in 10 samples, and 8 of them could be typed as adenovirus serotype 8. CONCLUSIONS: Early adoption of adequate hygiene measures is essential to control these outbreaks. In nursing homes with a high number of people with cognitive

impairment, an additional effort should be made when the first cases occur to provide such people an increased and improved care and monitoring.

58. **Steele CM, Rivera T, Bernick L. Insights regarding mealtime assistance for individuals in long-term care: lessons from a time of crisis. *Topics in Geriatric Rehabilitation*. 2007;23(4):319-29.**

Focus groups were conducted with staff in a geriatric care facility who provided mealtime assistance during a quarantine that prevented family members from entering the facility. The volunteers' accounts reflected 3 primary themes that influenced their experience as mealtime assistants. First, the role of volunteer-recipient relationships emerged as paramount in facilitating optimal mealtime care. Strong reinforcement was derived from small signs of gratitude and awareness in the residents' nonverbal behaviors. This fostered the volunteers' sense of fiduciary responsibility toward the resident, thereby facilitating a meaningful and successful mealtime experience. Second, it was clear that the experience of being a mealtime assistant evolved over time, with changes in volunteer attitude mediated directly by the relationships that developed between volunteers and recipients. Lastly, the data reflect a strong awareness among volunteers of the challenges faced by nursing staff on a daily basis with respect to meeting the mealtime needs of residents in long-term care institutions, and a concern that nursing staff have insufficient time to develop intimate relationships with residents at the mealtime. These data strongly suggest that volunteer-assisted mealtime programs that focus primarily on social relationships can enhance the mealtime experience for residents in long-term care institutions.

URL:
https://insights.ovid.com/article/00013614-200710000-00004

59. **Baumann AO, Blythe JM, Underwood JM. Surge capacity and casualization: Human resource issues in the post-SARS health system. *Canadian journal of public health = Revue canadienne de sante publique*. 2006;97(3):230-2.**

In Ontario, the unpredictable funding climate of the 1990s led health care organizations to look for ways to reduce costs. Adopting a just-in-time staffing policy, they employed fewer full-time workers, scheduled part-time workers to work regular shifts, took on more casual staff, and became increasingly reliant on agency nurses and overtime to cover shifts. These policies resulted in higher costs and reduced surge capacity, and placed the health of nurses and patients in jeopardy. Fewer staff meant more overtime. Stress-related absenteeism increased. Some nurses reacted to casualization by working for multiple employers. During the SARS (severe acute respiratory syndrome) epidemic in Toronto, nursing resources were stretched to their limits. An exploratory investigation, based on relevant literature and interviews with 13 nurse administrators who held key positions during the epidemic, confirmed the lack of spare capacity in the health care system and indicated that community and long-term care sectors had less capacity than acute care. Low surge capacity in these sectors increased the vulnerability of the entire health care system. Capacity issues should be addressed as part of a larger human resources initiative to create a more flexible workforce. Since SARS, a number of government and organizational initiatives have been developed to increase nursing capacity.

URL:
https://link.springer.com/content/pdf/10.1007/BF03405592.pdf

60. **Heung LC, Li T, Mak SK, et al. Prevalence of subclinical infection and transmission of severe acute respiratory syndrome (SARS) in a residential care home for the elderly. *Hong Kong Med*. 2006;12(3):201-7.**

OBJECTIVE: To ascertain the prevalence of subclinical severe acute respiratory syndrome-coronavirus (SARS-CoV) infection and study the transmission of SARS-CoV in a local outbreak at a residential care home for the elderly.

DESIGN: Cross-sectional study.

SETTING: A residential care home for the elderly in Hong Kong with a local outbreak of SARS.

PARTICIPANTS: Residents and staff in the residential care home who had contact with three patients with SARS (residents A and B, and staff C).

MAIN OUTCOME MEASURES: Blood samples were tested for total antibodies to SARS-CoV by immunofluorescence antibody test. The transmission of SARS was elucidated based on information from standardised questionnaires, and records of investigation and surveillance by the Department of Health.

RESULTS: Among the 90 eligible residents, three died, one moved out, and 19 refused to participate. Of the 32 eligible staff, six refused to participate. None of the remaining 93 participants tested positive for antibody to SARS-CoV. Based on the chronological order, resident A might have transmitted infection to resident B and staff C. Sitting close to the bathroom doorway while resident A took a shower was the only contact of resident B with resident A. The only opportunity for staff C to have contact with body fluids/excreta of resident A was in the handling of rubbish from the resident's room.

CONCLUSION: Subclinical SARS-CoV infection was rare in a residential care home for the elderly with an outbreak of SARS. Nonetheless the close working and living conditions for staff and residents in such a home may facilitate transmission of SARS despite vigilant precautionary measures.

61. **Air cleaning technologies: an evidence-based analysis. *Ontario health technology assessment series*. 2005;5(17):1-52.**

OBJECTIVE: This health technology policy assessment will answer the following questions: When should in-room air cleaners be used?How effective are in-room air cleaners?Are in-room air cleaners that use combined HEPA and UVGI air cleaning technology more effective than those that use HEPA filtration alone?What is the Plasmacluster ion air purifier in the pandemic influenza preparation plan?The experience of severe acute respiratory syndrome (SARS) locally, nationally, and internationally underscored the importance of administrative, environmental, and personal protective infection control measures in health care facilities. In the aftermath of the SARS crisis, there was a need for a clearer understanding of Ontario's capacity to manage suspected or confirmed cases of airborne infectious diseases. In so doing, the Walker Commission thought that more attention should be paid to the potential use of new technologies such as in-room air cleaning units. It recommended that the Medical Advisory Secretariat of the Ontario Ministry of Health and Long-Term Care evaluate the appropriate use and effectiveness of such new technologies. Accordingly, the Ontario Health Technology Advisory Committee asked the Medical Advisory Secretariat to review the literature on the effectiveness and utility of in-room air cleaners that use high-efficiency particle air (HEPA) filters and ultraviolet germicidal irradiation (UVGI) air cleaning technology. Additionally, the Ontario Health Technology Advisory Committee prioritized a request from the ministry's Emergency Management Unit to investigate the possible role of the Plasmacluster ion air purifier manufactured by Sharp Electronics Corporation, in the pandemic influenza preparation plan. CLINICAL NEED: Airborne transmission of infectious diseases depends in part on the concentration of breathable infectious pathogens (germs) in room air. Infection control is achieved by a combination of administrative, engineering, and personal protection methods. Engineering methods that are usually carried out by the building's heating, ventilation, and air conditioning (HVAC) system function to prevent the spread of airborne infectious pathogens by diluting (dilution ventilation) and removing (exhaust ventilation) contaminated air from a room, controlling the direction of airflow and the air flow patterns in a building. However, general wear and tear over time may compromise the HVAC system's effectiveness to maintain adequate indoor air quality. Likewise, economic issues may curtail the completion of necessary renovations to increase its effectiveness. Therefore, when exposure to airborne infectious pathogens is a risk, the use of an in-room air cleaner to reduce the concentration

of airborne pathogens and prevent the spread of airborne infectious diseases has been proposed as an alternative to renovating a HVAC system. Airborne transmission is the spread of infectious pathogens over large distances through the air. Infectious pathogens, which may include fungi, bacteria, and viruses, vary in size and can be dispersed into the air in drops of moisture after coughing or sneezing. Small drops of moisture carrying infectious pathogens are called droplet nuclei. Droplet nuclei are about 1 to 5mum in diameter. This small size in part allows them to remain suspended in the air for several hours and be carried by air currents over considerable distances. Large drops of moisture carrying infectious pathogens are called droplets. Droplets being larger than droplet nuclei, travel shorter distances (about 1 metre) before rapidly falling out of the air to the ground. Because droplet nuclei remain airborne for longer periods than do droplets, they are more amenable to engineering infection control methods than are droplets. Droplet nuclei are responsible for the airborne transmission of infectious diseases such as tuberculosis, chicken pox (varicella), measles (rubeola), and dessiminated herpes zoster, whereas close contact is required for the direct transmission of infectious diseases transmitted by droplets, such as influenza (the flu) and SARS. THE TECHNOLOGY: In-room air cleaners are supplied as portable or fixed devices. Fixed devices can be attached to either a wall or ceiling and are preferred over portable units because they have a greater degree of reliability (if installed properly) for achieving adequate room air mixing and airflow patterns, which are important for optimal effectiveness. Through a method of air recirculation, an in-room air cleaner can be used to increase room ventilation rates and if used to exhaust air out of the room it can create a negative-pressure room for airborne infection isolation (AII) when the building's HVAC system cannot do so. A negative-pressure room is one where clean air flows into the room but contaminated air does not flow out of it. Contaminated room air is pulled into the in-room air cleaner and cleaned by passing through a series of filters, which remove the airborne infectious pathogens. The cleaned air is either recirculated into the room or exhausted outside the building. By filtering contaminated room air and then recirculating the cleaned air into the room, an in-room air cleaner can improve the room's ventilation. By exhausting the filtered air to the outside the unit can create a negative-pressure room. There are many types of in-room air cleaners. They vary widely in the airflow rates through the unit, the type of air cleaning technology used, and the technical design. Crucial to maximizing the efficiency of any in-room air cleaner is its strategic placement and set-up within a room, which should be done in consultation with ventilation engineers, infection control experts, and/or industrial hygienists. A poorly positioned air cleaner may disrupt airflow patterns within the room and through the air cleaner, thereby compromising its air cleaning efficiency. The effectiveness of an in-room air cleaner to remove airborne pathogens from room air depends on several factors, including the airflow rate through the unit's filter and the airflow patterns in the room. Tested under a variety of conditions, in-room air cleaners, including portable or ceiling mounted units with either a HEPA or a non-HEPA filter, portable units with UVGI lights only, or ceiling mounted units with combined HEPA filtration and UVGI lights, have been estimated to be between 30% and 90%, 99% and 12% and 80% effective, respectively. However, and although their effectiveness is variable, the United States Centers for Disease Control and Prevention has acknowledged in-room air cleaners as alternative technology for increasing room ventilation when this cannot be achieved by the building's HVAC system with preference given to fixed recirculating systems over portable ones. Importantly, the use of an in-room air cleaner does not preclude either the need for health care workers and visitors to use personal protective equipment (N95 mask or equivalent) when entering AII rooms or health care facilities from meeting current regulatory requirements for airflow rates (ventilation rates) in buildings and airflow differentials for effective negative-pressure rooms. The Plasmacluster ion technology, developed in 2000, is an air purification technology. Its manufacturer, Sharp Electronics Corporation, says that it can disable airborne microorganisms through the generation of both positive and negative ions. (1) The functional unit is the hydroxyl, which is a molecule comprised of one oxygen molecule and one hydrogen atom. Plasmacluster ion air purifier uses a multilayer filter system composed of a prefilter, a carbon filter, an antibacterial filter, and a HEPA filter, combined with an ion generator to purify the air. The ion

generator uses an alternating plasma discharge to split water molecules into positively and negatively charged ions. When these ions are emitted into the air, they are surrounded by water molecules and form cluster ions which are attracted to airborne particles. The cluster ion surrounds the airborne particle, and the positive and negative ions react to form hydroxyls. These hydroxyls steal the airborne particle's hydrogen atom, which creates a hole in the particle's outer protein membrane, thereby rendering it inactive. Because influenza is primarily acquired by large droplets and direct and indirect contact with an infectious person, any in-room air cleaner will have little benefit in controlling and preventing its spread. Therefore, there is no role for the Plasmacluster ion air purifier or any other in-room air cleaner in the control of the spread of influenza. Accordingly, for purposes of this review, the Medical Advisory Secretariat presents no further analysis of the Plasmacluster. REVIEW STRATEGY: The objective of the systematic review was to determine the effectiveness of in-room air cleaners with built in UVGI lights and HEPA filtration compared with those using HEPA filtration only. The Medical Advisory Secretariat searched the databases of MEDLINE, EMBASE, Cochrane Database of Systematic Reviews, INAHATA (International Network of Agencies for Health Technology Assessment), Biosis Previews, Bacteriology Abstracts, Web of Science, Dissertation Abstracts, and NIOSHTIC 2. A meta-analysis was conducted if adequate data was available from 2 or more studies and where statistical and clinical heterogeneity among studies was not an issue. Otherwise, a qualitative review was completed. The GRADE system was used to summarize the quality of the body of evidence comprised of 1 or more studies. SUMMARY OF FINDINGS: There were no existing health technology assessments on air cleaning technology located during the literature review. The literature search yielded 59 citations of which none were retained. (ABSTRACT TRUNCATED)

URL:
https://www.hqontario.ca/Portals/0/Documents/evidence/reports/rev_act_110105.pdf

62. **Kobayashi K, Washio M, Sakauchi F, et al. Efficacy of influenza vaccine in reducing hospital admissions among elderly nursing home residents in winter: the Hokkaido Influenza Study.** ***International Medical Journal*****. 2005;12(2):89-92.**

Background: Although there are many reports supporting the effectiveness of influenza vaccination for the elderly in western countries, we have few reports supporting this for the elderly in Japan. Objective: The aim of the present study was to evaluate the influenza vaccine effectiveness among the institutionalized elderly. Methods: A prospective cohort study was conducted to evaluate the effectiveness of influenza vaccine in reducing influenza-like illness, pneumonia, and hospital admission among elderly nursing home residents during the 2002-2003 influenza season (from November 2002 to March 2003). Four hundred and twenty four elderly nursing homes residents in 2 nursing homes and 2 skilled nursing homes in the city of Sapporo, Hokkaido Prefecture, Japan, agreed to take part in this study. Outcomes were influenza-like illness, pneumonia, and hospital admission. Results: Influenza vaccination reduced pneumonia (hazard ratio: 0.26, 95% confidence interval: 0.07,0.98) and hospital admission (hazard ratio: 0.03, 95% confidence interval: 0.00, 0.23) during the influenza season. Even after adjusting for other factors such as age, sex, institution, hypoalbuminemia, activities of daily living, dementia and other underlying medical conditions, the residents with influenza vaccination had a decreased risk of hospital admission (hazard ratio: 0.02, 95% confidence interval: 0.00, 0.34). Conclusion: Influenza vaccination is effective in reducing hospital admission for elderly nursing home residents during the influenza season.

URL: https://www.sciencedirect.com/science/article/pii/S0140673605673394?via%3Dihub

63. **Koh D, Lim MK, Chia SE, et al. Risk perception and impact of Severe Acute Respiratory Syndrome (SARS) on work and personal lives of healthcare workers in Singapore: what can we learn?** ***Medical Care*****. 2005;43(7):676-82.**

Introduction: Healthcare workers (HCWs) were at the frontline during the battle against Severe Acute Respiratory Syndrome (SARS). Understanding their fears and anxieties may hold lessons for handling future outbreaks, including acts of bioterrorism.Method: We measured risk perception and impact on personal and work life of 15,025 HCWs from 9 major healthcare institutions during the SARS epidemic in Singapore using a self-administered questionnaire and Impact of Events Scale and analyzed the results with bivariate and multivariate statistics.Results: From 10,511 valid questionnaires (70% response), we found that although the majority (76%) perceived a great personal risk of falling ill with SARS, they (69.5%) also accepted the risk as part of their job. Clinical staff (doctors and nurses), staff in daily contact with SARS patients, and staff from SARS-affected institutions expressed significantly higher levels of anxiety. More than half reported increased work stress (56%) and work load (53%). Many experienced social stigmatization (49%) and ostracism by family members (31%), but most (77%) felt appreciated by society. Most felt that the personal protective measures implemented were effective (96%) and that the institutional policies and protocols were clear (93%) and timely (90%).Conclusion: During epidemics, healthcare institutions have a duty to protect HCWs and help them cope with their personal fears and the very stressful work situation. Singapore's experience shows that simple protective measures based on sound epidemiological principles, when implemented in a timely manner, go a long way to reassure HCWs.

URL:
https://journals.lww.com/lww-medicalcare/Fulltext/2005/07000/Risk_Perception_and_Impact_of_Severe_Acute.6.aspx

64. **McCleary L, Munro M, Jackson L, et al. Impact of SARS visiting restrictions on relatives of long-term care residents. *Journal of Social Work in Long-Term Care*. 2005;3(3/4):3-20.**

During the Severe Acute Respiratory Syndrome (SARS) outbreaks in Toronto, Canada, families of residents of long-term care settings were significantly restricted in their visiting. Social workers and other staff had to be creative in order to support families, to keep them informed and involved. The research described here was conducted in order to understand families' experiences and evaluate the effectiveness of social work interventions during the SARS visiting restrictions. Focus groups were conducted with spouses and adult children of residents of a large long-term care facility, to examine how they experienced the visiting restrictions and the facility's attempts to mitigate distress caused by the restrictions, including interventions by social workers and others. Participants described the impact on themselves and their worries about the well-being of their relatives during the time when families, friends, and privately paid caregivers could not visit the facility.

URL:
https://www.tandfonline.com/doi/pdf/10.1300/J181v03n03_02?needAccess=true

65. **McInnes K, Safian L. Keeping SARS out: an education program for SARS screeners in one Ontario hospital. *Journal for nurses in staff development : JNSD : official journal of the National Nursing Staff Development Organization*. 2005;21(2):73-8. DOI:** 10.1097/00124645-200503000-00008

On March 14, 2003, the Ontario (Canada) Ministry of Health and Long-Term Care alerted healthcare providers about four cases of atypical pneumonia resulting in two deaths within a single family in Toronto, Ontario. These cases were just the first of many that occurred in Toronto, Ontario, Canada, in the months to come. This article describes one community hospital's response to the severe acute respiratory syndrome (SARS) crisis and the important, although initially overlooked, role of staff development in keeping SARS out of this Ontario hospital.

URL: DOI: https://dx.doi.org/10.1097/00124645-200503000-00008

66. **Rebmann T. Management of patients infected with airborne-spread diseases: an algorithm for infection control professionals. *Am J Infect Control*. 2005;33(10):571-9.**

BACKGROUND: Many US hospitals lack the capacity to house safely a surge of potentially infectious patients, increasing the risk of secondary transmission. Respiratory protection and negative-pressure rooms are needed to prevent transmission of airborne-spread diseases, but US hospitals lack available and/or properly functioning negative-pressure rooms. Creating new rooms or retrofitting existing facilities is time-consuming and expensive. METHODS: Safe methods of managing patients with airborne-spread diseases and establishing temporary negative-pressure and/or protective environments were determined by a literature review. Relevant data were analyzed and synthesized to generate a response algorithm. RESULTS: Ideal patient management and placement guidelines, including instructions for choosing respiratory protection and creating temporary negative-pressure or other protective environments, were delineated. Findings were summarized in a treatment algorithm. CONCLUSION: The threat of bioterrorism and emerging infections increases health care's need for negative-pressure and/or protective environments. The algorithm outlines appropriate response steps to decrease transmission risk until an ideal protective environment can be utilized. Using this algorithm will prepare infection control professionals to respond more effectively during a surge of potentially infectious patients following a bioterrorism attack or emerging infectious disease outbreak.

URL:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7119117/pdf/main.pdf

67. **Drinka PJ. What has SARS taught us about infection control in nursing homes? *Journal of the American Medical Directors Association*. 2004;5(1):59-60.**

URL:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7128860/pdf/main.pdf

68. **Rainer TH. Severe acute respiratory syndrome: clinical features, diagnosis, and management. *Current Opinion in Pulmonary Medicine*. 2004;10(3):159-65.**

Purpose Of Review: In November 2003, a new, life-threatening, respiratory illness named severe acute respiratory syndrome (SARS) arose from Guangdong Province in China. The illness spread across the globe, caused many major outbreaks, and had an overall mortality rate of 11%. The purpose of this review is primarily to review the clinical features, diagnosis, and management of SARS, but also to comment briefly on the epidemiology and pathogen.Recent Findings: SARS is caused by a novel coronavirus that primarily affects the lower respiratory tract. It starts with an influenza-like illness characterized by nonspecific, systemic symptoms. This is followed by the rapid development of a non-specific bronchopneumonia associated with lower tract respiratory symptoms, or gastrointestinal symptoms. Most patients recover after a week or 2, but some go on to develop acute respiratory distress syndrome. There is no proven treatment, although cocktails of broad-spectrum antibiotics, antiviral, and immunomodulatory therapy have been tried. Secondary spread can be prevented and outbreaks brought under control provided that staff wear personal protective equipment and pay close attention to good personal hygiene, and patients are isolated. The most urgent needs at present are to develop a vaccine, to develop rapid, inexpensive, accurate diagnostic tests that can give results early in the illness and within a few hours of sampling. Other needs are to investigate which therapies have the lowest adverse event/efficacy ratios.Summary: Up-to-date knowledge of SARS should help in early detection, isolation of high-risk patients, to reduce mortality and morbidity, and to prevent a new global epidemic arising.

URL:
https://insights.ovid.com/article/00063198-200405000-00003

69. **Sendra-Gutierrez JM, Martin-Rios D, Casas I, et al. An outbreak of adenovirus type 8 keratoconjunctivitis in a nursing home in Madrid. *Euro Surveill*. 2004;9(3):27-30. DOI:** 10.2807/esm.09.03.00453-en

This work describes and analyses an outbreak of epidemic keratoconjunctivitis which occurred in 2001 and 2002 in a nursing home for the elderly in Leganes (an area of Madrid). This is the first such published case in Spain with these characteristics and this serotype identification. Sociodemographic characteristics, epidemic curve and attack rates are described. Comparisons of the data were carried out using a chi2 test for qualitative variable and t-test for quantitative. Factors associated with the illness are explored by means of contingency tables and logistic regression models. One hundred and two cases were detected, with an attack rate of 36.4% for residents, and 12.9% for workers, not considering spatial or professional differences. The epidemic curve showed an interpersonal transmission pattern. Multivariate analysis identified the following risk factors in the residents: able to wander freely through the building, urinary incontinence and use of shared bathroom. In 34.6% of the conjunctival samples, adenovirus serotype 8 was detected with identical genomic sequence. Establishment of hygienic sanitary guidance adapted for the cleaning of such establishments and contact with residents as well as early diagnosis and good coordination of human and material resources are key factors in the prevention and control of these outbreaks in closed communities.

URL: DOI: https://dx.doi.org/10.2807/esm.09.03.00453-en

70. **Ellis SE, Coffey CS, Mitchel EF, Jr., et al. Influenza- and respiratory syncytial virus-associated morbidity and mortality in the nursing home population. *Journal of the American Geriatrics Society*. 2003;51(6):761-7. DOI:** 10.1046/j.1365-2389.2003.51254.x

OBJECTIVES: To estimate winter viral-related morbidity and mortality in Tennessee nursing home residents during 4 consecutive years. DESIGN: A retrospective cohort study. SETTING: Three hundred eighty-one Tennessee nursing homes. PARTICIPANTS: Nursing home residents. MEASUREMENTS: Viral surveillance data were used to define three seasons: influenza (influenza and respiratory syncytial virus (RSV) cocirculating), RSV (RSV alone circulating), and non winter-viral (neither virus circulating). Adjusted seasonal differences in rates of cardiopulmonary hospitalizations, antibiotic prescriptions, and deaths during these three seasons were calculated to estimate annual hospitalizations, courses of antibiotics, and deaths attributable to influenza and RSV from 1995 to 1999. RESULTS: Nursing home residents had 81,885 person-years of follow-up. In the 63% of residents with comorbid conditions that increase influenza morbidity, influenza infection contributed to an estimated average of 28 hospitalizations, 147 courses of antibiotics, and 15 deaths per 1,000 persons annually. Similarly, RSV accounted for an annual average of 15 hospitalizations, 76 courses of antibiotics, and 17 deaths per 1,000 persons. Influenza and RSV accounted for 7% of cardiopulmonary hospitalizations and 9% of total deaths in high-risk residents during the 4 study years. Absolute morbidity and mortality were lower in residents without identified comorbid conditions but accounted for 15% of hospitalizations and 14% of deaths. These estimates depend on the assumption that morbidity and mortality from other respiratory viruses were distributed evenly between the three defined seasons. CONCLUSION: Influenza and RSV substantially increased hospitalization rates, antibiotic use, and deaths in elderly nursing home residents each winter. These data should encourage persistent efforts toward disease prevention, and thoughtful study of vaccine development and delivery, diagnostic tools, and methods of prophylaxis and therapy.

URL:
https://onlinelibrary.wiley.com/doi/epdf/10.1046/j.1365-2389.2003.51254.x

71. **Emanuel EJ, Emanuel EJ. The lessons of SARS. *Ann Intern Med*. 2003;139(7):589-91.**

Given the low mortality and morbidity of the severe acute respiratory syndrome (SARS) compared with other public health scourges, is the attention devoted to it misdirected? The SARS experience has provided at least 4 enduring lessons. First, by providing a test of the capacity of each part of the public health system, from national to local and hospital responses, it has better prepared the world for the anticipated and much-feared next real pandemic. Second, SARS has reemphasized that from housing, sexual practices, and slaughtering techniques to health care capacity, the situation in other, especially developing, countries affects us. Global cooperation is necessary not only for justice but to ensure our own health. Third, despite trends toward commercialization, easier lives, and self-centered individualism, the response of health care professionals to SARS reaffirmed dedication to caring for the sick even at great personal risks as the core ethical principle of medicine. Finally, SARS also emphasized the importance of the duty of health care administrators and senior physicians to rapidly institute procedures to maximize the safety of frontline physicians and nurses. These lessons will be valuable far beyond the SARS episode.

URL:
https://annals.org/aim/fullarticle/716823/lessons-sars

72. **Ho WW, Hui E, Kwok TC, et al. An outbreak of severe acute respiratory syndrome in a nursing home. *Journal of the American Geriatrics Society*. 2003;51(10):1504-5. DOI:** 10.1046/j.1532-5415.2003.514841.x

URL:
https://onlinelibrary.wiley.com/doi/epdf/10.1046/j.1532-5415.2003.514841.x

73. **Tse MM, Pun SP, Benzie IF. Experiencing SARS: perspectives of the elderly residents and health care professionals in a Hong Kong nursing home. *Geriatr Nurs*. 2003;24(5):266-9. DOI:** 10.1016/s0197-4572(03)00251-9

Severe acute respiratory syndrome (SARS) has affected many areas of the world recently and is becoming a global problem. Hong Kong and China have been most severely affected by this new infectious disease. The elderly population is highly vulnerable, and mortality in those older than 65 years is more than 50%. In our study, 27 health care workers and 40 elderly residents in a nursing home were interviewed to investigate their level of knowledge of SARS and its prevention. Most of the elderly residents knew little regarding SARS and prevention strategies, despite access to outside news by TV, radio, and visitors. Also, the worry and fear of an outbreak of SARS among staff working in the nursing home was considered to be high. Tailored education programs to promote awareness and prevention of SARS for the elderly are needed. Also, more in-service training, support, and counseling are strongly indicated for staff to promote disease prevention and improve quality of care.

URL: DOI: https://dx.doi.org/10.1016/s0197-4572(03)00251-9

74. **Garibaldi RA. Residential care and the elderly: the burden of infection. *Journal of Hospital Infection*. 1999;43:S9-S18.**

Long term care facilities (LTCFs) include a variety of different types of healthcare settings, each with their own unique infectious disease problems. This report focuses on the epidemiological considerations, risk factors and types of infections that occur in elderly patients institutionalized in nursing home settings. In

the US, the number of patients in nursing homes continues to grow as the population ages. Today, patients in nursing homes have more complicated medical conditions than they did five years ago as they become even more elderly and the trend continues towards shorter and shorter hospital stays in acute care facilities. The patient population in nursing homes is uniquely susceptible to infections because of the physiological changes that occur with ageing, the underlying chronic diseases of the patients and the institutional environment within which residents socialize and live. In addition, in nursing home settings, problems with infections may be more difficult to diagnose because of their subtle presentations, the presence of co-morbid illnesses which obscure the symptoms of infection and the lack of on site diagnostic facilities. Delays in diagnosing and treating infections allow transmission to occur within the facility. Both endemic and epidemic infections occur relatively commonly in nursing homes. The incidence of endemic infections, such as catheter-associated urinary tract infections, lower respiratory infections and skin infections, is influenced by the debility level of the patients. Calculations of infection rates are influenced by the intensity of surveillance methods at each institution. Many endemic infections are unpreventable. Epidemic infections account for 10-20% of nursing home infections. These include clusters of upper or lower respiratory infections, gastroenteritis, diarrhoea, and catheter-associated UTI's. Epidemic infections are potentially preventable with sound infection control practices. Special attention must be paid to promote universal precautions and give certain patients, such as those with known infection or colonization with Clostridium difficile, MRSA or VRE, special consideration. The potential for epidemic infections with antibiotic-resistant organisms is real. In the nursing home setting, attention must be given to develop and support strong infection control programmes that can monitor the occurrence of institutionally-acquired infections and initiate control strategies to prevent the spread of epidemic infections. Education in infection control issues and attention to employee health is essential to enable staff to care appropriately for today's nursing home population and to prepare them for the even more complicated patients who will be cared for in this type of setting in future.

URL:
https://www.sciencedirect.com/science/article/pii/S0195670199900610?via%3Dihub

75. **Rada AG. Covid-19: the precarious position of Spain's nursing homes. *Bmj*. 1554:20. DOI:** https://dx.doi.org/10.1136/bmj.m1554

DOI: https://dx.doi.org/10.1136/bmj.m1554

76. **Gaur S, Dumyati G, Nace DA, et al. Unprecedented Solutions for Extraordinary Times: Helping Long-Term Care Settings Deal with the COVID-19 Pandemic. *Infect Control Hosp Epidemiol*.1-8. DOI:** 10.1017/ice.2020.98

DOI: https://dx.doi.org/10.1017/ice.2020.98

SEARCH STRATEGIES

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R) <1946 to April 21, 2020>

1 workforce/ or health workforce/ (75824)
2 "personnel staffing and scheduling"/ or shift work schedule/ or work schedule tolerance/ or workload/ (40044)
3 exp "Equipment and Supplies"/ (1452061)
4 medical staff/ or nurses/ or nursing staff/ (61717)
5 (equipment or supplies).tw. (100632)
6 ("human resources" or "human resourcing").tw. (7207)
7 (staff* or nurs* or physician* or personnel or workforce*).tw. (969403)
8 (workload or "work schedule" or "work schedules" or "hours of work").tw. (26590)
9 (surge adj2 capacity).tw. (469)
10 ((Contain* or mitigation or suppression) adj3 (polic* or strateg* or plan* or capacit* or prepar* or protect*)).tw. (32084)

11 (health* adj3 (work* or staff* or personnel or profession*)).tw. (192311)
12 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 (2699595)
13 exp Dementia/ (163121)
14 Long-Term Care/ (25704)
15 Home Nursing/ (8533)
16 Skilled Nursing Facilities/ (4308)
17 ((nursing or long-term or "assisted living" or "assisted-living" or residential or congregate) adj2 (facilit* or home* or setting* or living)).tw. (50886)
18 Frail Elderly/ (11170)
19 ((vulnerab* or frail* or at-risk or susceptib*) adj2 (elder* or aged or patient# or person# or senior# or resident#)).tw. (48717)
20 residential facilities/ or homes for the aged/ (18942)
21 Hospices/ (4981)
22 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 (149206)
23 Pneumonia, Viral/ (6621)
24 respiratory syncytial viruses/ or respiratory syncytial virus, human/ (8336)
25 (SARS or severe acute respiratory syndrome* or respiratory syncytial virus infection* or Adenovir* or ichtadenovirus* or avian pneumovirus* or metapneumovirus* or turkey rhinotracheitis virus* or parainfluenza or paramyxoviridae infection* or middle east respiratory syndrome or MERS).tw. (74009)
26 parainfluenzae.tw. (1009)
27 SARS Virus/ (2974)
28 ("respiratory syncytial viruses" or "respiratory syncytial virus").tw. (13166)
29 Coronavirus Infections/ (5562)
30 (coronavirus* or corona-virus or COVID* or 2019-nCoV or nCoV).tw. (17612)
31 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 (100922)
32 12 and 22 and 31 (141)
33 limit 32 to yr="2003 -Current" (100)
34 limit 33 to (comment or historical article or interactive tutorial or interview or lecture or legal case or legislation or letter or news or newspaper article or observational study, veterinary or video-audio media or webcast) (6)
35 33 not 34 (94)

EMBASE and EMBASE Classic

1 workforce/ or health workforce/ (75824)
2 personnel management/ or manpower/ (77102)
3 nursing staff/ or staff training/ or medical staff/ or staff/ (23296)
4 (equipment or supplies).tw. (100632)
5 ("human resources" or "human resourcing").tw. (7207)
6 (staff* or nurs* or physician* or personnel or workforce*).tw. (969403)
7 (workload or "work schedule" or "work schedules" or "hours of work").tw. (26590)
8 (surge adj2 capacity).tw. (469)

9 ((Contain* or mitigation or suppression) adj3 (polic* or strateg* or plan* or capacit* or prepar* or protect*)).tw. (32084)
10 (health* adj3 (work* or staff* or personnel or profession*)).tw. (192311)
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 (1282703)
12 nursing home/ (8533)
13 long term care/ (25704)
14 ((nursing or long-term or residential or congregate) adj2 (facilit* or home* or setting* or living)).tw. (49464)
15 frail elderly/ or exp dementia/ (173776)
16 ((vulnerab* or frail* or at-risk or susceptib*) adj2 (elder* or aged or patient# or person# or senior# or resident#)).tw. (48717)
17 residential home/ (0)
18 assisted living facility/ (1357)
19 home for the aged/ (0)
20 hospice/ (4981)
21 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 (292502)
22 virus pneumonia/ or severe acute respiratory syndrome/ (4546)
23 pneumovirus/ or exp human respiratory syncytial virus/ or murine pneumonia virus/ (2731)
24 (SARS or severe acute respiratory syndrome* or respiratory syncytial virus infection* or Adenovir* or ichtadenovirus* or avian pneumovirus* or metapneumovirus* or turkey rhinotracheitis virus* or parainfluenza or paramyxoviridae infection* or middle east respiratory syndrome or MERS).tw. (74009)
25 parainfluenzae.tw. (1009)
26 ("respiratory syncytial viruses" or "respiratory syncytial virus").tw. (13166)
27 coronavirus infection/ or middle east respiratory syndrome/ (5562)
28 (coronavirus* or corona-virus or COVID* or 2019-nCoV or nCoV).tw. (17612)
29 22 or 23 or 24 or 25 or 26 or 27 or 28 (96138)
30 11 and 21 and 29 (118)

31 limit 30 to yr="2003 -Current" (87)
32 limit 31 to (comment or dictionary or directory or editorial or historical article or interactive tutorial or interview or lecture or letter or news or newspaper article or observational study, veterinary or periodical index or personal narrative or portrait or video-audio media or webcast) (10)
33 31 not 32 (77)

CINAHL

	Query
S32	S12 AND S21 AND S31
S31	S22 OR S23 OR S25 OR S27 OR S28 OR S29 OR S30

S30	TI (coronavirus* or corona-virus or COVID* or 2019-nCoV or nCoV) OR AB (coronavirus* or corona-virus or COVID* or 2019-nCoV or nCoV)
S29	(MH "Coronavirus Infections") OR (MH "Middle East Respiratory Syndrome") OR (MH "Severe Acute Respiratory Syndrome")
S28	TI ("respiratory syncytial viruses" or "respiratory syncytial virus) OR AB ("respiratory syncytial viruses" or "respiratory syncytial virus)
S27	(MH "SARS Virus")
S26	(MH "SARS Virus")
S25	TI parainfluenza OR AB parainfluenzae
S24	TI (SARS or severe acute respiratory syndrome* or respiratory syncytial virus infection* or Adenovir* or ichtadenovirus* or avian pneumovirus* or metapneumovirus* or turkey rhinotracheitis virus* or parainfluenza or paramyxoviridae infection* or middle east respiratory syndrome or MERS) OR AB (SARS or severe acute respiratory syndrome* or respiratory syncytial virus infection* or Adenovir* or ichtadenovirus* or avian pneumovirus* or metapneumovirus* or turkey rhinotracheitis virus* or parainfluenza or paramyxoviridae infection* or middle east respiratory syndrome or MERS)
S23	(MH "Respiratory Syncytial Viruses") OR (MH "Respiratory Syncytial Virus Infections")
S22	(MH "Pneumonia, Viral")
S21	S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20
S20	(MH "Hospices") OR (MH "Hospice Patients")
S19	TI ((vulnerab* or frail* or at-risk or susceptib*) N2 (elder* or aged or patient* or person* or senior* or resident*)) OR AB ((vulnerab* or frail* or at-risk or susceptib*) N2 (elder* or aged or patient* or person* or senior* or resident*))
S18	(MH "Frail Elderly")
S17	TI ((nursing or long-term or residential or congregate) N2 (facilit* or home* or setting* or living)) OR AB ((nursing or long-term or residential or congregate) N2 (facilit* or home* or setting* or living))
S16	(MH "Skilled Nursing Facilities")
S15	(MH "Nursing Homes")
S14	(MH "Long Term Care") OR (MH "Nursing Home Patients")
S13	(MH "Dementia+")
S12	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11
S11	TI (health* N3 (work* or staff* or personnel or profession*)) OR AB (health N3 (work* or staff* or personnel or profession*))
S10	TI ((Contain* or mitigation or suppression) N3 (polic* or strateg* or plan* or capacit* or prepar* or protect*)) OR AB ((Contain* or mitigation or suppression) N3 (polic* or strateg* or plan* or capacit* or prepar* or protect*))
S9	TI surge N2 capacity OR AB surge N2 capacity
S8	TI (workload or "work schedule" or "work schedules" or "hours of work") AND AB (workload or "work schedule" or "work schedules" or "hours of work")
S7	TI (staff* or nurs* or physician* or personnel or workforce*) OR AB (staff* or nurs* or physician* or personnel or workforce*)
S6	TI ("human resources" or "human resourcing") OR AB ("human resources" or "human resourcing")
S5	(MH "Staff Development") OR (MH "Personnel, Health Facility") OR (MH "Personnel Shortage") OR (MH "Staff

	Nurses") OR (MH "Medical Staff")
S4	(MH "Equipment and Supplies+")
S3	(MH "Personnel Staffing and Scheduling") OR (MH "Nurse-Patient Ratio")
S2	(MH "Health Services Needs and Demand") OR (MH "Personnel, Health Facility")
S1	(MH "Workforce")

Google Scholar
"long-term care facilities" human resources COVID OR coronavirus OR SARS OR MERS
"long-term care facilities" workforce COVID OR coronavirus OR SARS OR MERS

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