

# PANDEMIC PREPAREDNESS IN THE AGED CARE SECTOR: A SYSTEMATIC LITERATURE REVIEW

Jennifer Kosiol\*, Richard Olley, Tracey Silvester, Jo-Anne Vidal, Helen Cooper

Griffith University, Queensland, Australia

Correspondence: [j.kosiol@griffith.edu.au](mailto:j.kosiol@griffith.edu.au)

## ABSTRACT

Infectious disease outbreaks in aged care services present challenges for consumers and staff. The vulnerability of users of aged care services and a lack of preparedness on the part of aged care services to manage the risk associated with viral disease transmission was particularly evident during the COVID-19 pandemic.

We used the PRISMA Method to review the available literature systematically. This qualitative review of the literature on pandemic preparedness assessed eight high-quality research papers and identified themes that emerged to support aged care services in preparing for future pandemics. These articles provided insight into what aged care services require to increase their capacity to respond to communicable disease outbreaks.

Four themes emerged from the literature reviewed: Staff Training and Development, Safety Culture, Creating a Safe Environment by planning for contingencies and Risk and Resource Management (including resourcing for Personal Protective Equipment (PPE), Leader Presence and Time Responses and Clear, Consistent Messaging) were the dominant themes in the literature. The researchers found that using guidelines and checklists is helpful but only if they are clear, not complex and do not take too long to read. Risk strategies in future must also focus on the resources required to protect staff, families, and consumers.

This paper also provides recommendations that will allow aged care services to respond to future communicable disease outbreaks more effectively. Such measures include the need for a planning methodology that incorporates ready access to PPE, the use of meaningful communication, increased hazard and risk awareness and the need to create a safety culture within the service based on sound values, attitudes and behaviours of leaders and staff.

## KEYWORDS

Pandemic, preparedness, aged care, strategic management, infection management.

## INTRODUCTION

This literature review aims to identify the priorities and necessities of preparation of aged care staff and the care environment for another pandemic or for outbreaks of communicable diseases, including those with the potential

to reach pandemic proportions. Understanding factors that influence aged care services in preparing and managing outbreaks is essential to the quality and safety of the aged care residents, their families, and staff. This understanding of the evidence available will assist with

others to develop a preparedness tool that aged care providers can use to create conditions that will ensure that their facilities, staff, residents, and families are well prepared to minimise the effect of communicable outbreaks.

## BACKGROUND

Paralleling global trends, Australia's population is rapidly ageing, resulting in burgeoning demand for aged care services. There is an increasing requirement for aged care staff at all levels in a sector that continues to experience workforce shortages [1]. These workforce shortages, attributed to increased life expectancies, decreased fertility rates, the nature of the work, the aged care sector policy and the regulatory environment, continue to cause challenges for aged care service provision [2].

The World Health Organisation reports that as of 1 April 2022, 486.762 million confirmed COVID-19 cases were reported, with 6.143 million attributed deaths and more than 11 million vaccine doses administered [3]. In Australia, the Federal Department of Health reports 4,443,475 cases and 6,367 deaths since the first case was registered on 25 January 2020 [4]. The case numbers and resultant deaths are significantly lower than in other countries worldwide. As of 2 April 2022, 22,168 cases and 1,938 deaths [4] have been recorded by the Australian Commonwealth Department of Health.

The Royal Commission into Aged Care Quality and Safety was operating when the COVID-19 pandemic was announced and issued a special report on 30 September with Aged Care and COVID-19 [5] as a topic. The Royal Commission conducted a hearing from 10-13 August 2020 [6], concluding that COVID-19 was the greatest challenge that Australia's aged care sector has faced, with those suffering the most being the residents, families, and aged care staff. Six recommendations from the hearing relating to four areas for immediate action. The four priorities cited in the Commission's report relate to staffing levels, Medicare rebates for Allied Health and mental health, publication of a national aged plan for COVID-19, and deployment of accredited infection prevention and control experts into residential aged care. The Australian Government was to implement to better prepare the sector for future outbreaks. Apart from some valiant efforts by aged care providers and aged care advocacy groups,

there is little evidence available to demonstrate the implementation of any of these recommendations six months after the release of this report to the Governor-General of Australia.

The operational level of aged care services, both residential and community-based, would benefit greatly from an evidence-based tool to measure the pandemic preparedness of each aged care service that allows measurement within the context in which the aged care service operates. It is asserted that if pandemic preparedness were measured as part of the risk management plan for an aged care service, impliedly, that would also hold for outbreak preparedness in other communicable diseases regularly experienced in aged care. For example, a study reported in 2010 demonstrated that 37 communicable diseases were reported in the aged care sector, the most common being influenza and Norovirus [7].

The authors do not question the emergence of a national plan for pandemic preparedness as necessary. However, a practical tool to measure pandemic preparedness in aged care that would fit within the national plan would provide aged care consumers and their families, aged care providers, and aged care workers with the confidence of the readiness of each service to cope with outbreaks even at the level of a pandemic. Families and significant others related to the consumers of aged care services would also benefit from the knowledge that quality and safety strategies that included measuring preparedness were regularly assessed in the care services [8].

The authors aimed to examine high-quality evidence that would inform the development of a tool for measuring outbreak and pandemic preparedness and conducted a systematic review of the literature using the PRISMA method [15] to inform the development of an evidence-based tool.

## LITERATURE REVIEW

Infectious disease outbreaks in residential aged care services present significant challenges for residents and staff. There is a substantial risk of developing further morbidity secondary to the incidence of pre-existing comorbidities [6, 8]. Outbreaks can further compromise health status and increase disabilities and deaths [8, 9].

The COVID-19 global pandemic has reinforced the necessity of preparedness for viral communicable disease transmission in aged care services because of the vulnerability of those who access such services. COVID-19 disproportionately impacted vulnerable populations, especially residents in residential aged care facilities [10]. There is considerable evidence in the literature that residential aged care facilities and other aged care services have an increased risk of outbreaks of communicable diseases. Moreover, the severity of the outbreaks intensifies because of the compromised health status of those for whom care is provided [10-13].

Most risk management programs for services that provide care for vulnerable communities contain risk and consequence matrices that place the risk as either high or very high and the consequences as severe to catastrophic. A recent systematic review of the literature found 37 reported outbreaks in long-term care facilities such as residential aged care services. The most reported single pathogen was the influenza virus, followed by group A streptococcus (GAS) [8]. A systematic literature review by Lee and colleagues reported that approximately half of the included studies found that person-to-person was the most common transmission mode. This mode of transmission and suboptimal infection control practices, including inadequate decontamination and poor hand hygiene, propagated transmission in most cases. Therefore, best practices for infection prevention and control (IPC) are necessary to reduce transmission and prevent outbreaks [8].

Aged care is also community-based and provided in the care recipient's home. The evidence relating to infection prevention and management of in-home care situations is limited, with high reliance on hospitals and long-term care facilities experience translated to the home care environment. A recent study assessed the prevalence and characteristics of COVID-19 in older people after a lockdown period to quell the transmission [14]. This study sampled 1505 participants whose mean age was 68 years, with 885 (59%) women, 32 (2%) racial/ethnic minorities, and 906 (60%) with high-risk conditions for influenza e did not identify any COVID-19 infection in the study cohort [14].

The researchers considered that participants' behaviours in adhering to recommended public health measures (RPHM) and their living environment might considerably mitigate the risk of COVID-19 [14].

Other evidence related to preparation for pandemics and epidemics of communicable diseases in community-based care settings for seniors is scant. While considerable grey literature provides sound guidance, empirical evidence of the appropriateness and effectiveness of the advice offered in grey literature is sparse. The lack of an evidence base provides a sound rationale for this systematic review of the literature relating to pandemic preparedness in aged care services in all its forms to determine the research gap.

## METHOD

This qualitative review of the literature used the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) statement [15]. The Griffith University Library electronic catalogue was used and search results from databases used by the catalogue are reported in Table 1. Appendix 1 reports the names of all databases searched by the Griffith University Library Catalogue. The authors used the updated PRISMA 2020 Explanation and Elaboration guidance to guide the systematic literature process [16].

## INCLUSION AND EXCLUSION CRITERIA

Only English language articles published between January 2019 and March 2021 were included for review. The refined search included only academic, peer-reviewed materials with the full online text. There was no grey literature included. Articles were included if they were empirical studies relevant to pandemic preparedness in the aged care sector. Search strings were created using keyword searches derived from the research question and Boolean operators.

## ARTICLE QUALITY ASSESSMENT

Quality assessment of research reports and other evidence-based articles was conducted using the Mixed Methods Appraisal Tool (MMAT), 2018 version [17]. The assessment tool is reproduced in Figure 1.

FIGURE 1-MIXED METHODS APPRAISAL TOOL (MMAT) VERSION 2018 [17]

Category of study designs	Methodological quality criteria	Responses			
		Yes	No	Can't tell	Comments
Screening questions (for all types)	S1. Are there clear research questions?				
	S2. Do the collected data allow to address the research questions?				
	<i>Further appraisal may not be feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening questions.</i>				
1. Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?				
	1.2. Are the qualitative data collection methods adequate to address the research question?				
	1.3. Are the findings adequately derived from the data?				
	1.4. Is the interpretation of results sufficiently substantiated by data?				
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?				
2. Quantitative randomized controlled trials	2.1. Is randomization appropriately performed?				
	2.2. Are the groups comparable at baseline?				
	2.3. Are there complete outcome data?				
	2.4. Are outcome assessors blinded to the intervention provided?				
	2.5. Did the participants adhere to the assigned intervention?				
3. Quantitative non-randomized	3.1. Are the participants representative of the target population?				
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?				
	3.3. Are there complete outcome data?				
	3.4. Are the confounders accounted for in the design and analysis?				
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?				
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the research question?				
	4.2. Is the sample representative of the target population?				
	4.3. Are the measurements appropriate?				
	4.4. Is the risk of nonresponse bias low?				
	4.5. Is the statistical analysis appropriate to answer the research question?				
5. Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?				
	5.2. Are the different components of the study effectively integrated to answer the research question?				
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?				
	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?				
	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?				

## RESULTS

### SEARCH STRINGS

The keyword following keyword combinations was used as search strings and delivered the following results:

TABLE 1- SEARCH STRINGS WITH NUMBER OF RECORDS RETURNED

No.	Search String	Records Returned
11	(infection control) OR (infection management) AND (aged care)	97,691
22	(infection control) OR (infection management) AND (aged care) AND COVID-19	18,914
33	(infection control) OR (infection management) AND (residential aged care) AND Australia	1,230
44	(infection control) OR (infection management) AND (community aged care) AND Australia	7,919
55	(infection control) OR (infection management) AND (home aged care) AND Australia	5,547
66	(infection prevention) AND (aged care)	51,165
77	(infection prevention) AND (aged care) AND COVID-19	11,573
88	(infection prevention) AND (aged care) AND (checklist)	3,387
99	(infection prevention) AND (aged care) AND (checklist) AND (Australia)	849
110	(infection management) AND (aged care) AND (checklist) AND (Australia)	1,179

111	(pandemic preparedness) AND (aged care) AND (checklist)	211
112	(infection management) AND (aged care) AND (checklist) AND (preparedness) AND (Australia)	74
113	(infection management) AND (aged care) AND (checklist) AND (preparedness)	280
	Total	200,019

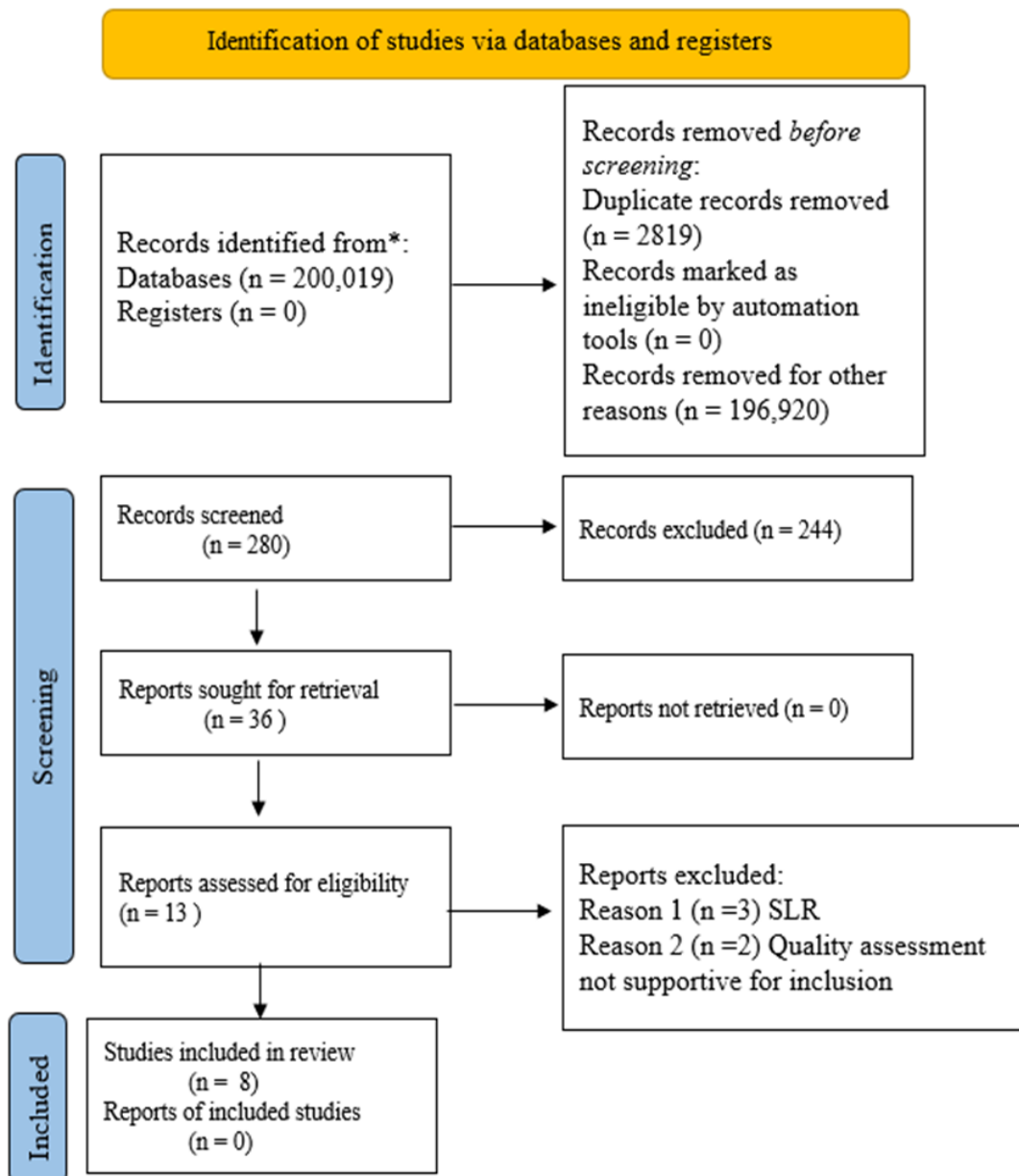
**Databases Searched – See Appendix 1.**

**QUALITY ASSESSMENT**

The authors used a dual independent review of search results; each search result was reviewed by at least two of the authors independently, and a consensus was reached on inclusion or exclusion. The process was repeated when the research team examined the results of the dual

independent review. Quality assessment was blind, with quality assessments reviewed by at least two authors before achieving a consensus on the inclusion or exclusion of all articles.

**FIGURE 2- PRISMA FLOW DIAGRAM [18]**



**TABLE 2- STUDIES INCLUDED IN THIS SLR**

Author/ Title	Synopsis of Findings/Conclusions	Identified Theme(s)
<p>Huhtinen et al. (2019) [19]</p> <p>Understanding barriers to effective management of influenza outbreaks by residential aged care facilities.</p>	<p>This study identified the barriers to implementing the Australian national guidelines on influenza outbreak management with Sydney Local Health District (SLHD) residential aged care services (RACF) staff.</p> <p>The three most common barriers identified are scepticism toward staff influenza vaccination); the effort required to read the national guidelines, and the lack of infrastructure to physically separate residents during an outbreak.</p> <p>Conclusions were that there is a need to implement and evaluate programmes that address misconceptions about influenza vaccination amongst RACF staff and that all RACF staff receive targeted education on the role of infection control in influenza outbreak management</p>	<p>Staff training and development</p> <p>Safety culture</p> <p>Creating a safe care environment</p>
<p>Shi et al. (2021) [20]</p> <p>Perceptions and experiences of risk management by managers of residential aged care facilities: a qualitative study from Hunan Province, China.</p>	<p>Risk management is of utmost importance in reducing risks and improving the quality of care for older adults in long-term care. Although previous studies have made great efforts to explore risk management methods and technologies in RACFs, little is known about how managers identify and respond to risks in practice.</p> <p>Thematic analysis of semi-structured interviews revealed a central theme of managers' responsibility for facilitating an error-free culture with sub-themes of creating an age-friendly physical environment, paying close attention to frail older adults, improving the competence of nursing staff, and building effective management programs.</p>	<p>Contingency planning and/or Risk</p> <p>Management</p> <p>Staff training and development</p> <p>Creating a safe care environment</p>
<p>Brito Fernandes, et al. (2021) [21]</p> <p>COVID-19 Preparedness and Perceived Safety in Nursing Homes in Southern Portugal: A Cross-Sectional Survey-Based Study in the Initial Phases of the Pandemic.</p>	<p>In nursing homes in Portugal, preparedness for a public health emergency has been poor, affecting the safety culture. The mixed-methods study assessed nursing homes' COVID-19 preparedness, including staff's work experiences during the pandemic. The researchers found that 25% of nursing homes did not have an adequate decision-making structure to respond to the pandemic. There was a need for increasing outbreak capacity and training and for pandemic contingency plans.</p> <p>Teamwork facilitation was also necessary as an area of strength for safety culture, compliance with procedures, and a no-blame response to mistakes.</p>	<p>Contingency planning and/or Risk</p> <p>Management</p> <p>Staff training and development</p> <p>Safety Culture</p> <p>Creating a safe care environment</p>

Author/ Title	Synopsis of Findings/Conclusions	Identified Theme(s)
<p>Ochi et.al (2021)[22]</p> <p>Prevention and control of COVID-19 in imperfect condition: Practical guidelines for nursing homes by Japan environment and health safety organisation (JEHSO).</p>	<p>Control measures for nursing homes often ignore the fact that residential aged care facilities are often under-resourced. A Guidelines list was developed and peer-reviewed by eight experts who considered their significance, scientific validity, and feasibility.</p> <p>The study revealed that factors related to the nursing home environment, the nature of SARS-CoV-2 transmission, and patient characteristics were causes of difficulties in infection control.</p> <p>To develop realistic prevention measures in an under-resourced condition, and while there are no perfect control measures that can achieve zero risk, the present risk can be managed.</p> <p>There were 75 guidelines developed based on the concept of deep defence, and practical checklists with 75 items were established. The study supported the evaluation of nursing homes by independent organisations using the checklists would achieve sustainable infection control.</p>	<p>Contingency planning and/or Risk Management</p> <p>Staff training and development</p> <p>Safety culture</p> <p>Creating a safe care environment</p>
<p>Marta Mas et al. (2020) [23]</p> <p>COVID-19 outbreak in long-term care facilities from Spain. Many lessons to learn</p>	<p>This study analysed mortality, costs, residents, and personnel characteristics, in six long-term care facilities (LTCF) during the outbreak of COVID-19 in a Spanish population of 198 residents.</p> <p>Measurements were recorded for baseline demographic, clinical, functional, cognitive, and nutritional variables. 1-month and 3-month mortality were determined, and excess mortality was calculated. The costs associated with the pandemic were analysed.</p> <p>The study found that the pooled mortality rate for the first month and first three months of the outbreak were 15.3% and 28.0%, respectively, with a pooled excess mortality of 564% and 315%. In facility A, the percentage of probable COVID-19-infected residents was 33.6%. Infected patients were older, frail, and in a worse functional situation than those without COVID-19.</p> <p>The most common symptoms were fever, cough and dyspnoea. 25 residents were transferred to the emergency department, 21 were hospitalised, and 54 were moved to the facility's medical unit. Mortality</p>	<p>Contingency planning and/or Risk Management</p> <p>Staff training and development</p> <p>Creating a safe care environment</p>

Author/ Title	Synopsis of Findings/Conclusions	Identified Theme(s)
	<p>was higher among older male residents, with worse functionality and higher comorbidity.</p> <p>During the first month of the outbreak, 65 (24.6%) workers left, mainly with COVID-19 symptoms, and 69 new workers contracted COVID-19. The mean number of days of leave was 19.2.</p> <p>Costs associated with CovidCOVID-19 in facility A were estimated at € 276,281/month, mostly caused by resident hospitalisations, furlough of workers, staff replacement, and interventions of healthcare professionals. The study concluded that the COVID-19 pandemic posed residents with a higher mortality risk, mainly those older, frail and with worse functional status. Personal and economic costs were high.</p>	
<p>Sarabia-Cobo et al. (2021)[24]</p> <p>Experiences of geriatric nurses in nursing home settings across four countries in the face of the COVID-19 pandemic</p>	<p>This qualitative study collected interview data from 24 semi-structured interviews. The transcripts were thematically analysed to explore the emotional impact and experiences of geriatric nurses working in nursing homes and caring for patients with COVID-19. The study sampled geriatric nurses from Spain, Italy, Peru, and Mexico in 2020. Three main themes emerged from the thematic analysis: fear of the pandemic, the sense of duty and professional commitment, and the nursing staff feeling exhausted and overwhelmed. The study recommends considering the most appropriate model of care for nursing homes in a pandemic situation.</p>	<p>Contingency planning and/or Risk Management</p> <p>Creating a safe care environment</p>
<p>Lyng et al (2021) [25]</p> <p>Healthcare leaders use innovative solutions to ensure resilience in healthcare during the COVID-19 pandemic: a qualitative study in Norwegian nursing homes and home care services.</p>	<p>This qualitative research was conducted in a large city municipality in Norway. Phase 1 of the study collected semi-structured interviews of nurses at various organisational levels who worked at 13 nursing homes and home care services. In the second phase, an online survey was distributed at 16 nursing homes and home care services to expand our understanding of the phenomenon from other leaders within the case municipality. Twenty-two leaders participated in the study, demonstrating how nursing homes and home care leaders used innovative solutions to maintain appropriate care for infected and non-infected patients. Innovations were categorised as technology for communication and remote care, practice innovations, service innovations, and physical innovations.</p>	<p>Contingency planning and/or Risk Management</p> <p>Staff training and development</p> <p>Creating a safe care environment</p>



Author/ Title	Synopsis of Findings/Conclusions	Identified Theme(s)
	<p>This study offers a new understanding of crisis-driven innovation's influence on healthcare resilience during the COVID-19 pandemic. Nursing home and home care leaders implemented several innovative solutions to ensure resilient performance during the pandemic's first 6-9 months.</p> <p>In terms of resilience, different innovative solutions can be divided based on their influence into situational, structural, and systemic resilience. The paper outlines a framework for bridging innovative solutions and their impact on healthcare resilience.</p>	
<p>Usher et al. (2021)[26]</p> <p>Preparedness for viral respiratory infection pandemic in residential aged care facilities: A review of the literature to inform post-COVID-19 responses.</p>	<p>This study was conducted across Sydney Local Health District (SLHD) residential aged care staff and investigated potential/perceived barriers to implementing the national guidelines for managing influenza outbreaks.</p> <p>Barriers identified include:</p> <ul style="list-style-type: none"> <li>Scepticism of staff towards vaccination</li> <li>Lack of infrastructure in many facilities to achieve the required isolation of individual residents during an outbreak.</li> <li>The size of the document and the effort required to read, understand, and implement it</li> </ul> <p>The researchers concluded that:</p> <ul style="list-style-type: none"> <li>There is a need for more work required with RACFs on the development and implementation (and evaluation) of programs that will support RACF staff to implement the requirements of the guidelines.</li> <li>Education programs are required to manage the misconceptions about influenza vaccination.</li> <li>Infection control (targeted) training also required in the management of outbreaks</li> </ul>	<p>Contingency planning and/or Risk Management</p> <p>Staff training and development</p> <p>Creating a safe care environment</p>

## DISCUSSION

This review of the existing peer-reviewed literature provides insight into the capacity of aged care services to respond to outbreaks of communicable diseases, including those with the potential to reach pandemic proportions. Four themes emerged from the thematic analysis of the literature: Staff training and development, Safety culture, Creating a safe care environment by planning for contingencies, and Risk and resource management.

## STAFF TRAINING AND DEVELOPMENT

All the articles in the review identified the importance of targeted staff training and education programs to improve pandemic preparedness. Close communication with the staff was essential to preventing social confusion as it minimised the spread of non-scientific conversations and myths [22]. The flow of information from authorities to front-line staff was identified as essential for disseminating new information and guidelines [25]. However, despite several studies using various communication and social media

platforms, there was a notable lack of knowledge regarding infection control procedures, which necessitated additional staff training [27]. Staff education and training were not seen as a barrier to preparedness when available resources and there was access to outbreak management and training programs. Non-compliance was associated with a lack of education. Some educational programs are not providing a translation between education and practice [19].

To improve outbreak preparedness, aged care facilities need to provide education and training programs that promote a clear understanding of the core principles of essential skills such as infection control. Improving the competence of professional staff was seen as a priority for managing well in times of an outbreak [20]. Other skills essential to providing competent and safe care during outbreaks included communication, technical information about the outbreak, and decision-making. Additionally, improving these skills was found to reduce the occurrence of adverse events during crisis management and emergency responses [20]. Education and training programs were often developed after an outbreak rather than facilities already having these programs in place [24].

## **SAFETY CULTURE**

Facilities with a strong safety culture were identified as having aligned individual and group values, attitudes, and behaviours to shape safety management [28]. When a high level of importance is placed on the values, attitudes and behaviours within the organisation, a strong safety culture emanates. This strong safety culture will likely influence positive staff satisfaction, turnaround and well-being [21]. However, developing and influencing the organisation's culture requires strong leadership where there is a commitment and practice directly related to safety performance. This means that attitudes and behaviours not in line with safety and performance are not tolerated in the organisation [28].

Guidelines and checklists were used in some studies associated with preparing for outbreaks [22, 25]. The benefit of the use of checklists was the ability to ensure that healthcare professionals received the correct information. However, checklists that are too complex and take too long to read were less likely to be fully implemented by staff [19]. This highlights the need to have guidelines and checklists that are succinct and made available through regular training and education platforms.

Staff compliance and scepticism was a significant issue concerning infection control prevention (IPC) and compliance with vaccination [19]. The minimisation of scepticism occurred by including vaccination strategies in education programs, and this addressed some of the myths associated with outbreaks [19]. Changing staff attitudes towards health practices during the pandemic was often facilitated by the presence and visibility of senior managers and leaders at the front line. Additionally, the use of procedure and equipment control personnel whose role was to observe that staff were donning and doffing protective equipment appropriately [25].

## **CREATING A SAFE CARE ENVIRONMENT BY PLANNING FOR CONTINGENCIES.**

Creating a safe care environment was often linked to resource availability. A lack of human resources often resulted in managers quickly addressing disruptive events by recruiting staff with limited healthcare experience [25]. Some innovative solutions to seeking staffing resources involve using social media platforms such as Facebook and Instagram to contact potential staff. However, this was not a permanent practice for recruiting staff but a temporary solution to fix an immediate crisis. Using social media platforms was efficient, effective, and timely and could be initiated rapidly during an emergency [25]

Some of the vulnerabilities in the preparedness of aged care facilities were because of various long-lasting structural barriers such as overcrowding and staff shortages [21]. Staff shortages were a significant cause of an unsafe care environment as they often resulted in care that was either missed or rushed [20].

The staff-to-patient ratio was considered an effective way to avoid poor quality care. However, this was not always recognised by management [20]. Increasing the staff-to-patient ratio during a pandemic would allow for the extra time required to implement enhanced infection control strategies [20]. For example, adding staff to ensure that PPE was donned and doffed appropriately minimises the risk of further spread during an outbreak. Additionally, planning alternative workflows can assist with reducing the pressure placed on existing staff. For example, nursing residents in a negative pressure room in full PPE meant staff had to rely on alternative communication tools when working in isolation [29]. However, many aged care facilities with a poor safety culture did not have adequate structure for planning and decision-making in response to an outbreak [28]. They did not have a contingency plan that included

designated staff operationalising it. This added further pressure on existing staff. Teamwork was an area of strength for a safe care environment [21].

The additional pressure placed on healthcare professionals resulted in staff feeling emotional exhaustion with elevated stress, anxiety, and depression levels. Feeling overwhelmed was often a result of other pressures brought about by facilities that were not well prepared for managing an outbreak. Contingency planning, including outbreak capacity assessment and training, was often overlooked and resulted in a poor safety culture [21].

Contingency planning was identified as a major component of preparedness. Many studies found that aged care facilities overlooked the importance of thorough planning for outbreaks. An example of this is reported from a nursing home in Portugal with little contingency planning experienced an event that resulted in 18 deaths, largely due to the absence of adequate contingency planning [28]. Interestingly despite these major events that resulted from a poor safety culture and poor contingency planning, there was little improvement over time [21].

## RISK AND RESOURCE MANAGEMENT

### Resourcing Personal Protective Equipment (PPE)

PPE is an important and significant strategy for preventing the spread of infection to and from healthcare workers, and critical shortages of this essential equipment were experienced in the early stages of the COVID-19 pandemic [30]. There was an unprecedented demand for gloves, face masks, air-purifying respirators, face shields and goggles, and over gowns coupled with a dysfunctional costing model in American hospital operating systems [31]. This magnified the problem and caused a buying panic, depleting available domestic PPE inventories. Australia also seems to have experienced a similar phenomenon, although this requires further investigation. This urgent risk and resource management issue requires careful thought and planning to prevent what Lyng and colleagues called crisis-driven innovation to maintain appropriate care for infected and non-infected care recipients and staff in future pandemic planning [25].

### Leader presence and time responses

A crisis is the true test of leadership, and globally, health leaders were forced to adapt to rapidly changing circumstances to support their teams to navigate through disruption successfully. Different national responses were

mandated [32], all of which have learnings that will prove valuable in preparing for another pandemic. One of the most important functions of a leader is to facilitate and nurture the development of trust in the followership [33]. Leader affective presence and positive interpersonal behaviour in the workplace during crises are essential [34].

### Clear and consistent messaging

One key lesson emerging from the COVID-19 pandemic is the importance of consistency in communications, specifically in crisis communications [35, 36]. The literature contains numerous complaints about messages and advice from different authorities and jurisdictions emerging from various jurisdictions globally [36-38]. For the same reasons, consistency is also important to how organisations manage their COVID-19 communications. Internal staff communication must be consistent with externally facing messages, including organisational social media pages. Positive, accurate and clear messages consistent with the known science must be consistently communicated because it relates to reputation and perception of trust in the organisation. The evidence is clear that consistency of message is a key part of best practice crisis communication. To integrate its communication, an organisation needs to embrace diversity and variety and balance the wisdom of its many voices with the effort to secure clarity and consistency in its overall expression [39].

## CONCLUSION

This literature review has identified some of the priorities and necessities required for preparing aged care staff and the care environment for the pandemic or other outbreaks of communicable diseases. This systematic literature review highlighted the need for a strong safety culture where the organisation's values are lived within the leaders' and staff's attitudes and behaviours.

Building a strong safety culture includes having access to regular training and education for staff to ensure preparedness for communicable outbreaks and the quality and safety of aged care residents, their families, and staff. Creating a safe care environment prepared for outbreaks requires overcoming long-lasting structural barriers, such as staff shortages and poor staff ratios. Being prepared means having contingencies in place, plans ready and staff trained, but it also means paying attention to and minimising structural barriers.

When considering preparedness, guidelines and checklists are useful if they are clear, not too complex or take too long to read. However, for guidelines and checklists to be effective, they must be succinct and made available through regular staff education and training platforms. Additionally, developing a preparedness tool to assist aged care providers in creating conditions that will ensure their facilities are well-prepared must also consider risk management strategies. The risk strategies must focus on the resources essential to protect staff, families and residents, such as adequate PPE. This also includes timely leadership responses and clear messaging to limit confusion and scepticism from staff and minimise the effect of communicable outbreaks.

## RECOMMENDATIONS

### CREATE A SAFETY CULTURE

Aged care facilities need to focus on safety and ingrain this into the values, attitudes and behaviours of leaders and staff. This can be communicated through clear and consistent messaging via policies, guidelines, safety posters, toolkits, safety huddles, and 'walk arounds' by management regularly reinforcing the safety culture.

### RESOURCES

Human and material resources are important in creating a safety culture to ensure the safety and well-being of aged consumers and staff. Organisational succession management of key infection prevention and control (IPC) staff is vital to ensure guideline implementation, compliance monitoring of outbreak trigger points and awareness of escalation pathways. Additionally, equitable access to PPE reserved stockpiles for aged care services is essential.

### PLANNING FOR CONTINGENCIES

Infectious outbreaks are inevitable, so it is important to plan for them, including ensuring that resources are effectively and efficiently managed to reduce the risk to staff and residents. Resources are an important part of ensuring safety and avoiding injuries and fatalities. PPE is essential, and facilities should have access to adequate supplies when needed. Increasing hazard and risk awareness of staff and management will encourage preventative behaviours. Meaningful communication is key to raising risk awareness as it enables the necessary actions to ensure that various structural barriers, such as overcrowding and staff shortages, are overcome efficiently and effectively so they do not become long-lasting.

## FOSTER MORE RESEARCH

This literature review revealed a significant gap in high-quality research into pandemic preparedness and responses in the aged care sector. It is imperative to bridge this gap by fostering more research to solve the many wicked problems in infection control and management in the aged care sector.

## LIMITATIONS

There may be a risk of bias common to some of the included studies, such as a lack of blinding for subjective outcomes or unavailability of data. Moreover, some of the included studies may have inconsistencies of effect or association, as demonstrated by high clinical, methodological or statistical heterogeneity. This means that reported interventions may not work the same way every time the intervention is implemented. Some of the included studies had a relatively small sample size or lack of diversity in the sample. While it was not obvious to the authors when reviewing the included studies, there is a risk of publication bias within the included studies.

## References

1. Temple JB, McDonald PF. Population ageing and the labour force: 2000-2015 and 2015-2030. *Australas J Ageing*. 2017;36(4):264-70.
2. Hussein S, Manthorpe J. An international review of the long-term care workforce: policies and shortages. *J Aging Soc Policy*. 2005;17(4):75-94.
3. WHO. World Health Organization Coronavirus (COVID-19) Dashboard Geneva: WHO; 2022 [updated 1/4/2022; cited 2022 2/4/2022]. Available from: <https://covid19.who.int/>.
4. Australian Government Department of Health. Coronavirus (COVID-19) case numbers and statistics Canberra: Commonwealth Department of Health; 2022 [updated 01/04/2022; cited 2022 2/4/2022]. Available from: <https://www.health.gov.au/health-alerts/COVID-19/case-numbers-and-statistics>.
5. Royal Commission into Aged Care Quality and Safety. Aged care and COVID-19: a special report. Canberra: Australian Government; 2020.
6. Utsumi M, Makimoto K, Quroshi N, Ashida N. Types of infectious outbreaks and their impact in elderly care facilities: a review of the literature. *Age Ageing*. 2010;39(3):299-305.
7. Sweeney MR, Boilson A, White C, Nevin M, Casey B, Boylan P, et al. Experiences of residents, family

- members and staff in residential care settings for older people during COVID-19: A mixed methods study. *J Nurs Manag.* 2022;30(4):872-82.
8. Lee MH, Lee GA, Lee SH, Park YH. A systematic review on the causes of the transmission and control measures of outbreaks in long-term care facilities: Back to basics of infection control. *PLoS One.* 2020;15(3):e0229911.
  9. Calderon-Margalit R, Sheffer R, Halperin T, Orr N, Cohen D, Shohat T. A large-scale gastroenteritis outbreak associated with Norovirus in nursing homes. *Epidemiol Infect.* 2005;133(1):35-40.
  10. Vijh R, Ng CH, Shirmaleki M, Bharmal A. Factors associated with transmission of COVID-19 in long-term care facility outbreaks. *J Hosp Infect.* 2022;119:118-25.
  11. Shallcross L, Burke D, Abbott O, Donaldson A, Hallatt G, Hayward A, et al. Factors associated with SARS-CoV-2 infection and outbreaks in long-term care facilities in England: a national cross-sectional survey. *Lancet Healthy Longev.* 2021;2(3):e129-e42.
  12. Brown KA, Jones A, Daneman N, Chan AK, Schwartz KL, Garber GE, et al. Association Between Nursing Home Crowding and COVID-19 Infection and Mortality in Ontario, Canada. *JAMA Intern Med.* 2021;181(2):229-36.
  13. Fisman DN, Bogoch I, Lapointe-Shaw L, McCready J, Tuite AR. Risk Factors Associated With Mortality Among Residents With Coronavirus Disease 2019 (COVID-19) in Long-term Care Facilities in Ontario, Canada. *JAMA Netw Open.* 2020;3(7):e2015957.
  14. Juhn YJ, Wi CI, Ryu E, Sampathkumar P, Takahashi PY, Yao JD, et al. Adherence to Public Health Measures Mitigates the Risk of COVID-19 Infection in Older Adults: A Community-Based Study. *Mayo Clin Proc.* 2021;96(4):912-20.
  15. Moher D, Liberati A, Tetzlaff J, Altman DG. Reprint—Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *Physical Therapy.* 2009;89(9):873-80.
  16. Page MJ, Moher D, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. *BMJ.* 2021;372:n160.
  17. Hong QN, Gonzalez-Reyes A, Pluye P. Improving the usefulness of a tool for appraising the quality of qualitative, quantitative and mixed methods studies, the Mixed Methods Appraisal Tool (MMAT). *J Eval Clin Pract.* 2018;24(3):459-67.
  18. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ.* 2021;372:n71.
  19. Huhtinen E, Quinn E, Hess I, Najjar Z, Gupta L. Understanding barriers to effective management of influenza outbreaks by residential aged care facilities. *Australas J Ageing.* 2019;38(1):60-3.
  20. Shi C, Xu Y, Chen Y, Pu H, Yu Q, Wu X, et al. Perceptions and experiences of risk management by managers of residential aged care facilities: a qualitative study from Hunan Province, China. *Int J Qual Stud Health Well-being.* 2021;16(1):1978724.
  21. Brito Fernandes O, Lobo Juliao P, Klazinga N, Kringos D, Marques N. COVID-19 Preparedness and Perceived Safety in Nursing Homes in Southern Portugal: A Cross-Sectional Survey-Based Study in the Initial Phases of the Pandemic. *Int J Environ Res Public Health.* 2021;18(15):7983.
  22. Ochi S, Murakami M, Hasegawa T, Komagata Y. Prevention and Control of COVID-19 in Imperfect Condition: Practical Guidelines for Nursing Homes by Japan Environment and Health Safety Organization (JEHSO). *Int J Environ Res Public Health.* 2021;18(19).
  23. Marta Mas R, Almudena Avendaño C, María Teresa Taberner S, Elisa Belén Cortés Z, Cristina Gómez B, Victoria Sánchez-Flor A, et al. COVID-19 outbreak in long-term care facilities from Spain. Many lessons to learn. *PLOS ONE [Internet].* 2020; 15(10).
  24. Sarabia-Cobo C, Perez V, de Lorena P, Hermosilla-Grijalbo C, Saenz-Jalon M, Fernandez-Rodriguez A, et al. Experiences of geriatric nurses in nursing home settings across four countries in the face of the COVID-19 pandemic. *J Adv Nurs.* 2021;77(2):869-78.
  25. Lyng HB, Ree E, Wibe T, Wiig S. Healthcare leaders' use of innovative solutions to ensure resilience in healthcare during the COVID-19 pandemic: a qualitative study in Norwegian nursing homes and home care services. *BMC Health Services Research.* 2021;21:NA.
  26. Usher K, Durkin J, Gyamfi N, Warsini S, Jackson D. Preparedness for viral respiratory infection pandemic in residential aged care facilities: A review of the literature to inform post-COVID-19 response. *Journal of clinical nursing.* 2021.
  27. Hossain MA, Rashid MUB, Khan MAS, Sayeed S, Kader MA, Hawlader MDH. Healthcare Workers' Knowledge, Attitude, and Practice Regarding Personal Protective Equipment for the Prevention of COVID-19. *Journal of Multidisciplinary Healthcare [Internet].* 14:[229-38 pp.].
  28. Brito Fernandes O, Lobo Juliao P, Klazinga N, Kringos D, Marques N. COVID-19 Preparedness and Perceived

- Safety in Nursing Homes in Southern Portugal: A Cross-Sectional Survey-Based Study in the Initial Phases of the Pandemic. *Int J Environ Res Public Health*. 2021;18(15).
29. Cha C, Park S. Information flow and nursing care during the early phase of the COVID-19 pandemic. *J Clin Nurs*. 2021;n/a(n/a).
  30. Livingston E, Desai A, Berkwits M. Sourcing Personal Protective Equipment During the COVID-19 Pandemic. *JAMA*. 2020;323(19):1912-4.
  31. Cohen J, Rodgers YVM. Contributing factors to personal protective equipment shortages during the COVID-19 pandemic. *Prev Med*. 2020;141:106263.
  32. Martínez-Córdoba P-J, Benito B, García-Sánchez I-M. Efficiency in the governance of the COVID-19 pandemic: political and territorial factors. *Globalization and Health* [Internet]. 2021; 17(1):[1-13 pp.].
  33. Frei F, Morriss A. Trust: The Foundation of Leadership. *Leader to Leader*. 2020;2021(99):20-5.
  34. Madrid HP, Totterdell P, Niven K, Vasquez CA. Investigating a process model for leader affective presence, interpersonal emotion regulation, and interpersonal behaviour in teams. *Eur J Work Organ Psy*. 2018;27(5):642-56.
  35. Gross M. Communicating science in a crisis. *Current Biology*. 2020;30(13):R737-R9.
  36. Zhou S, Villalobos JP, Munoz A, Bull S. Ethnic Minorities' Perceptions of COVID-19 Vaccines and Challenges in the Pandemic: A Qualitative Study to Inform COVID-19 Prevention Interventions. *Health Commun*. 2022:1-12.
  37. Pinheiro V. COVID-19 government response measures: analysis in the European Union. *European Journal of Public Health*. 2021;31(Supplement\_3).
  38. Widmann T. Fear, Hope, and COVID-19: Emotional Elite Rhetoric and Its Impact on the Public During the First Wave of the COVID-19 Pandemic. *Polit Psychol*. 2022.
  39. Thøger-Christensen L, Fuat Firat A, Torp S. The organisation of integrated communications: toward flexible integration. *European Journal of Marketing*. 2008;42(3/4):423-52.

## APPENDIX 1 – DATA BASES SEARCHED IN THE SYSTEMATIC LITERATURE REVIEW

---

1. Scopus,
2. Web of Science
3. Science Citation Index expanded
4. ProQuest Central
5. DOAJ Directory of Open Access Journals
6. PubMed; PubMed Central
7. IngentaConnect
8. Gale Academic OneFile
9. Social Sciences Citation Index
10. MEDLINE (Ovid); Medline
11. Springer online Journals Complete; Springer Journals Complete open access; Springer Nature OA/Free Journals; Springer LINK Archive
12. PLoS
13. Journals @Ovid Full text
14. BiomedCentral open
15. MDPI Open access
16. Wiley online library all journals
17. Wiley online Library Database Model 2022
18. Highwire press; BMJ Journals
19. BMJ Open Access Journals
20. Wiley Online Library All Backfiles
21. HighWire Press (Free Journals)
22. CINAHL Complete; Single Journals
23. Freely Accessible Science
24. Wiley Online Library Nursing Backfiles
25. Taylor & Francis Online; Springer Online Journals - CAUL 2019
26. ScienceDirect Journals
27. Gale General OneFile
28. DOVE Medical Press Journals [ SAGE Journals Premier 2021
29. SAGE Journals Premier 2022
30. ScienceDirect Freedom Collection 2021
31. Taylor & Francis Online 2021
32. Nature Journals Online
33. SAGE Complete A-Z List
34. International Bibliography of the Social Sciences– Medicine
35. Taylor & Francis Open Access
36. Wiley-Blackwell Open Access Titles
37. Co-Action Open Access Journals
38. SAGE Open Access Journals; Australia/New Zealand Reference Centre
39. SAGE Deep Backfile 2009
40. Wiley Free Content
41. Elsevier Open Access Journals
42. Social Services Abstracts; Cambridge Journals: 2022 Full Collection
43. Oxford University Press Journals All Titles
44. Clinical Key Australia Flex.