

COVID-19 in a Sydney nursing home: a case study and lessons learnt

Lessons learnt from COVID-19 outbreaks in residential aged care facilities could limit future impacts

Infectious disease outbreaks are a hazard of communal living in places such as military barracks, boarding schools, prisons and residential care homes. The risks are exacerbated when residents are vulnerable because of advanced age, comorbidities and frailty, or there are too few or inadequately trained staff. The home-like setting of modern residential aged care facilities (RACFs), and the overcrowding and limited staffing that are features of many, are not conducive to prevention or control of infectious diseases.¹⁻³

Early in the coronavirus disease 2019 (COVID-19) pandemic it was clear that age would be a risk factor.^{4,5} Internationally, age-stratified case fatality rates (CFRs) have been an estimated three times higher in people aged over 60 years (4.5%) than in those aged under 60 years (1.4%).⁶ In Australia, the overall CFR from COVID-19 is about 3%.⁷ The majority of deaths have occurred in people over 70 years of age. At 14 September 2020, there were 1995 COVID-19 cases among residents of government-subsidised RACFs, of whom 604 (30%) died. This is in contrast to a CFR of 8.5% (7/82) among recipients of government-subsidised domiciliary aged care services. Residents of RACFs represent 74% (602/816) of all COVID-19 deaths in Australia to date.⁷

Comorbidities associated with an increased risk of severe COVID-19, including diabetes, chronic kidney and cardiovascular disease, are more common among RACF residents.⁸ Transmission of COVID-19 can spread silently within an RACF from someone with asymptomatic or presymptomatic infection, or atypical symptoms.⁹⁻¹¹ Outbreaks in RACFs, with high attack rates and CFRs, have been reported in many countries.^{9,10,12-14}

An outbreak of COVID-19 in a Sydney nursing home

The first major RACF outbreak in Australia was at Dorothy Henderson Lodge, an 80-bed nursing home which is part of a BaptistCare-operated retirement living complex in a northern suburb of Sydney (Box 1). When the outbreak began on 3 March 2020, Dorothy Henderson Lodge had 76 residents. The first case was a longstanding personal carer who developed mild respiratory symptoms and sought testing for COVID-19. She had no history of COVID-19 contact or recent travel and had not worked while unwell. A crisis team, comprising Lodge managers and Northern Sydney Local Health District senior public health and infection prevention and control (IPC) staff, was formed immediately. Residents in the wing where the carer had worked were isolated and IPC precautions

were implemented. The next day, an IPC specialist from the NSW Clinical Excellence Commission took charge of IPC. Standard precautions were introduced for everyone entering the facility, along with additional contact and droplet precautions for staff in close contact with residents.

Over the next 2 days, all residents were confined to their rooms and all personal care staff were furloughed to home quarantine; two additional staff members and four residents were diagnosed with COVID-19 (Box 1), including two residents who were already in hospital with hitherto undiagnosed illnesses. A skeleton staff of BaptistCare managers and other volunteer staff, who had not had close contact with residents, provided care for several days until agency staff could be engaged. Enhanced cleaning, laundry and waste collection and food delivery practices were introduced. Symptomatic residents and staff were tested. Between 9 and 19 March, COVID-19 was diagnosed in another four residents and one staff member. All 12 cases diagnosed until then had probably been infected before, or in the few days after, IPC precautions were introduced. An agency nurse who worked at Dorothy Henderson Lodge only from 8 to 12 March was diagnosed with COVID-19 on 20 March.

By 20 March, three of the 76 residents had died from COVID-19, five were in hospital, and the remaining 68 had been confined to their rooms for 17 days. They were becoming increasingly distressed by isolation and immobility, and a few with dementia repeatedly wandered from their rooms. Clearly, there was some urgency to provide relief. Although they had no acute symptoms, all were tested for COVID-19, with a view to allowing them brief periods of supervised exercise outside their rooms if test results were negative. Unexpectedly, five were positive. Review of their records showed that two had had mild symptoms a few days before being tested. They, and two others who remained asymptomatic, remained at Dorothy Henderson Lodge. The fifth, who was asymptomatic when tested, later deteriorated and died in hospital. Ten days later, three more residents developed symptoms of COVID-19 and two died. Altogether, 16 of 76 (21%) residents developed COVID-19; 12 were admitted to hospital, of whom six recovered and six died, including one who returned to Dorothy Henderson Lodge for palliation. All four residents who remained at the Lodge recovered.

By mid-April, about 80% of permanent staff had returned to the Lodge and the previous team-based care of residents in each zone was restored, with ongoing support from agency staff. Residents had been confined to their rooms for more than 6 weeks, with serious adverse effects on mental and

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1 Timeline of COVID-19 outbreak at Dorothy Henderson Lodge

Date: swab taken (result)	Staff or resident	Hospital admission	Outcome and date	Comments
3/3/20 (3/3/20)	Staff	na	Recovered; swab negative 13/3/20	Personal carer; first case diagnosed; probably not first case infected
3/3/20	Crisis team formed; wing where initial case worked closed; infection prevention and control precautions implemented; of the 76 Dorothy Henderson Lodge residents, two were already in hospital with serious but undiagnosed illnesses			
3/3/20 (5/3/20)	Staff	na	Recovered; no repeat swab	Registered nurse
4/3/20 (4/3/20)	Resident	Yes	Died 7/3/20	Admitted to hospital 1/3/20; COVID-19 not suspected on admission
4/3/20 (4/3/20)	Resident	Yes	Died 3/3/20	Admitted to hospital 2/3/20; post mortem diagnosis
4/3/20 (4/3/20)	Resident	Yes	Recovered; swab negative 16/3/20	Admitted to hospital following positive test result
4/3/20	Residents in zone where initial case worked confined to their rooms; standard, contact and droplet precautions for staff in contact (within 1.5 m) with residents; staff contacts of COVID-19-positive staff or residents furloughed to self-quarantine			
5/3/20 (5/3/20)	Resident	Yes	Recovered; swab positive 20/3/20	Admitted to hospital following positive test result
5/3/20	All permanent personal care staff furloughed to self-quarantine and replaced by volunteer skeleton staff; all residents confined to their rooms; staff required to wear masks at all times because of wandering residents			
5/3/20(6/3/20)	Staff	na	Recovered; swab negative 19/3/30	Volunteer BaptistCare staff
6/3/20	Agency staff beginning to come on duty; single agency, permanent staff largely replaced by end of first week			
9/3/20 (9/3/20)	Resident	Yes	Recovered; swab positive 17/3/20	Admitted to hospital following positive test result
9/3/20(12/3/20)	Staff	na	Recovered; no repeat swab	Volunteer BaptistCare staff
14/3/20(15/3/20)	Resident	Yes	Died 14/3/20	Admitted to hospital before diagnosis confirmed
15/3/20 (17/3/20)	Resident	Yes	Recovered	Admitted to hospital following positive test result
16/3/20(19/3/20)	Resident	Yes	Asymptomatic; repeat swab negative 21/3/20	Admitted to hospital for unrelated reason; swab taken on admission
16/3/20	All staff required to wear full personal protective equipment continuously, including eye protection			
20/3/20 (21/3/20)	Staff	na	Recovered	Agency nurse; last on duty 12/3/20
20/3/20	3 residents died; 4 in hospital; 68 remaining (asymptomatic) residents in quarantine for 17 days — all tested with aim of allowing mobilisation			
20/3/20(21/3/20)	Resident	Yes	Died 27/3/20	Asymptomatic when tested; later deteriorated
20/3/20 (22/3/20)	Resident	No	Recovered	Asymptomatic when tested
20/3/20 (23/3/20)	Resident	No	Recovered	Asymptomatic when tested
20/3/20 (24/3/20)	Resident	No	Recovered	Asymptomatic when tested
20/3/20 (24/3/20)	Resident	No	Recovered	Asymptomatic when tested
28/3/20 (29/3/20)	Resident	Yes	Died 31/3/20	Aymptomatic; admitted to hospital following positive test result
28/3/20 (30/3/20)	Resident	Yes	Died 31/3/20	Symptomatic; admitted to hospital following positive test result
30/3/20 (31/3/20)	Resident	Yes	Recovered	Symptomatic; admitted to hospital following positive test result
7/3/20	Outbreak declared over; more than two incubation periods after last case (delayed for a few days because of persistent symptoms in one resident who had otherwise recovered)			

na = not applicable. ♦

physical wellbeing, despite efforts by staff to mitigate them. Strict IPC precautions remained in place, but quarantine was cautiously eased, by allowing residents short, supervised walks outside their rooms, and later to spend time with fellow residents in the same wing. The outbreak was declared over on 7 May 2020, which was more than two incubation periods since the last case.

The COVID-19 outbreak at Dorothy Henderson Lodge occurred at a time when community transmission and experience with control were limited. The source of the outbreak was not specifically identified but whole genome sequencing¹⁵ showed it was part of a community outbreak that also involved a nearby hospital, school and day care centre. The outbreak was limited (21% attack rate) compared with reported RACF outbreaks overseas. For example, in a contemporaneous outbreak in King County, Washington, 101 of 130 (78%) residents were infected and 34 died (CFR, 34%; 26% of all residents).¹² The CFR at Dorothy Henderson Lodge was similar (6/16; 38%) but the overall mortality (6/76; 8%) was lower than in many RACF outbreaks overseas (25–30%)^{9,10} and elsewhere in Australia. Nevertheless, it was inevitably associated with great physical and emotional cost to residents, families and staff, and financial cost to the organisation.

Major challenges and lessons learnt

The Dorothy Henderson Lodge COVID-19 outbreak presented a number of major challenges, and the lessons learnt could limit future COVID-19 impacts on RACFs (Box 2).

Staffing, infection prevention and control, and medical support

From the start, Dorothy Henderson Lodge was supported by experienced IPC professionals and medical practitioners who were crucial to the outbreak response. Strict IPC precautions were

2 COVID-19 outbreaks in residential aged care facilities (RACFs): lessons learnt

- Decisive leadership from management and expert infection prevention and control (IPC) guidance is crucial.
- There is a widespread lack of competence and confidence in IPC among health care and RACF staff when faced with an infectious disease crisis. Regular, targeted training is required to embed IPC principles in routine practice and enable rapid escalation to high level outbreak precautions when required.
- Contingency plans are needed to ensure surge capacity of qualified, experienced RACF staff to deal with sudden demand due to absenteeism from illness or quarantine.
- Proactive allied health support is necessary to maintain social connection, mobility and nutrition to mitigate risks of prolonged isolation or quarantine of aged residents.
- Hospital admission of RACF residents with COVID-19 can be determined on a case-by-case basis, according to medical need, resident preference and facility resources.
- In an RACF, a single confirmed case of COVID-19 in a resident, staff member or frequent visitor requires an immediate outbreak response, including testing of all staff and residents, isolation or quarantine as required, and implementation of strict IPC measures. Contacts should be retested towards the end of the incubation period.

consistent with national guidelines and, while necessary, were also costly and burdensome. The considerable financial costs of the COVID-19 outbreak were due to the need to replace quarantined staff with agency staff, and acquisition and disposal of personal protective equipment (PPE). More than the usual complement of frontline staff and a higher proportion of registered nurses were needed because of the extra workload due to the increased acuity of care. The estimated 800 sets of PPE used each day were disposed of as clinical waste, requiring collection by a licensed contractor. The unfamiliar working conditions for agency staff, many of whom had not worked in an aged care facility before, were stressful and tiring; they were understandably fearful of COVID-19 and unused to the discomfort of continuous PPE use. It was therefore unsurprising that a Clinical Excellence Commission review of IPC in April found a number of breaches.¹⁶ Compliance improved after additional training.

Effects on residents and relatives

The long period of quarantine was distressing for residents and relatives. Dorothy Henderson Lodge staff facilitated contact by phone, video, text messaging, voicemail, or in-person contact with physical distancing from a balcony or behind a transparent barrier. Nevertheless, the lack of physical contact, exercise and fresh air seriously affected residents' mental and physical health. Some became depressed, withdrawn or physically deconditioned and refused to eat or, when later given the opportunity, leave their rooms. This highlights the importance of mobilisation and resuming family contacts as soon as possible.

Hospital admission

Admission of residents with COVID-19 to hospital was appropriate early in the outbreak, before its extent was known and staff numbers and IPC were stabilised. Admission to hospital can be confusing and frightening, especially for residents with dementia. Later in the outbreak, it was possible for residents with COVID-19 to be safely cared for in the home, as most preferred, including at least one who received end-of-life palliative care. Decisions about hospital transfer of aged care residents should consider their medical needs and preferences and the facility's capacity to care for them safely.

Testing and case detection

Clinical indicators are an unreliable guide to COVID-19 testing in high risk settings such as RACFs. When this outbreak began, asymptomatic testing was not recommended, even in the setting of community transmission, and early case detection relied on active screening for acute symptoms or fever. It is now recognised that a single case in a high risk setting such as an RACF should prompt immediate testing of all residents and staff, irrespective of symptoms. Testing should be repeated in the early stages of an outbreak; how frequently depends on the duration and extent of

3 Factors affecting infection prevention and outbreak control in residential aged care facilities

Facilitators of infection and outbreak prevention

Environmental factors:

- Single rooms and private bathrooms for residents
- Good ventilation, access to sunlight, fresh air
- Uncrowded, easily/frequently cleaned, uncluttered communal spaces (eg, sitting/dining rooms)
- Zones or wings that can be separately isolated
- Signage identifying zones and routine and/or enhanced IPC precautions when required
- Strategically placed alcohol-based hand sanitiser; availability of personal protective equipment supplies as required

Administrative and staffing factors:

- Facility-specific IPC policies and procedures, including infection risk assessment and screening
- Leadership by managers and senior staff; eg, as team leaders, mentors, trainers and IPC champions
- Relational care by staff teams each allocated to one group of residents in a zone/wing[†]
- Predominantly full-time, permanent staff
- Staff:resident ratios, including registered nurses, commensurate with residents' acuity-of-care needs
- All staff (managers, nurses, carers, housekeeping, food services, clerical, medical, allied health) trained and competent in IPC practices, appropriate to their roles
- Regular assessment of staff competency in standard IPC precautions and readiness to escalate if required
- An outbreak preparedness plan, including surge workforce, regularly reviewed and ready to implement
- Access to credentialled IPC expert advice on staff training, environmental controls and outbreak control
- Involvement of relatives in resident care and IPC[‡]

Barriers to outbreak control

- Carpets, soft furnishings, residents' personal possessions*
- Intermingling of residents, communal activities*
- Shared rooms and/or bathrooms
- Crowding, clutter, poor ventilation, porous, difficult-to-clean surfaces
- Inadequate cleaning of communal areas and residents' rooms
- Inadequate staff:resident ratios
- High proportion of part-time, temporary or agency staff
- Inadequate or no staff IPC training
- Staff moving between residents' rooms or zones unnecessarily or without adequate IPC precautions
- Inadequate source control during an outbreak; ie, isolation, transfer or cohorting of infected resident(s)[§]
- Failure of staff to observe general outbreak/IPC precautions; eg, staying home when unwell, physical distancing in communal areas or community settings
- Failure to promptly identify and isolate an infectious disease case
- Failure to have or rapidly activate an outbreak response

IPC = infection prevention and control. * The home-like setting of residential aged care facilities and the ability to socialise and engage in communal activities are important for residents' physical and psychological wellbeing. During an outbreak, home-like characteristics of rooms, while not ideal for IPC, can be managed; communal activities must be curtailed. † A team-based care model has many benefits. Staff who know residents well understand and respond to their needs and identify subtle indicators of illness; residents are most at ease with staff they know and trust; if combined with other IPC precautions, it can limit the number of staff having to self-quarantine during an outbreak. ‡ Relatives are a potential but often overlooked source of physical and psychological support for residents and staff during an infectious disease outbreak. With minimal training they are likely to be able to observe IPC precautions. § Whether residents with a highly infectious disease such as COVID-19 are cared for in the home, which most would prefer, or transferred depends on the capacity of the facility to meet residents' needs and protect other residents and staff, and availability of safe, alternative accommodation; cohorting within the facility, if possible, is an alternative. ◆

unrecognised spread and how rapidly IPC measures are implemented.

Embedding infection prevention and control practices into RACF culture

Prevention and control of infection, including COVID-19, in residential care settings, depends on a hierarchy of measures encompassing environmental, administrative and staffing factors (Box 3), which are at least as important as standard and transmission-based IPC precautions. However, IPC training is essential — but often neglected — for protection of staff and residents, not only during a pandemic but also for routine care. IPC training should be tailored to the educational levels and roles of staff; be nationally consistent, to avoid confusion when they move between workplaces; and involve all aged care workers, including personal care, nursing, agency and support staff. IPC training requires additional resources but, if successful, the benefits should include less absenteeism among staff (from illness or quarantine), which has been a major contributor to

high COVID-19 attack and fatality rates among RACF residents.¹⁷ In the long term, improved prevention and control of infection in RACFs should contribute to reducing the impacts of seasonal influenza and antimicrobial resistance,^{18,19} which are important causes of avoidable hospitalisation and cost in aged care.

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