

Evaluation of the CCTV Pilot Project

Final evaluation report
June 2022



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Acknowledgements

PwC thank the residents and their substitute decision makers, family members and carers, and the staff of Mt Pleasant Aged Care and Northgate House for their valuable insights and contributions to this evaluation. We appreciate the time taken by representatives of SA Health and the CCTV Technology Provider to support access to information and data for the evaluation.

We reflect on the ongoing commitment shown by all parties to go above and beyond to make the CCTV Pilot Project successful. This extended to their commitment to provide data and information to the evaluation.



Evaluation scope

PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) was engaged by SA Health to undertake an independent evaluation of the CCTV Pilot Project ('the Pilot').

The Pilot was designed to explore the acceptability and viability of using surveillance and monitoring within residential care settings. As a small scale Pilot across only two sites, it is not appropriate for evaluators to draw overall conclusions about 'if it works' in *all* circumstances and if it should be applied to other residential care sites. It is possible however to draw insights from what has and has not worked well in the Pilot for consideration of the use of similar technology in residential services. These insights can prove valuable for the aged care sector.

The evaluation was focused on understanding feasibility, acceptance and influence on quality and safety at two points in the Pilot (baseline and at completion). The evaluation was not a technology review.

Executive Summary:

Evaluation of the CCTV Pilot Project

Why use surveillance in residential care?

As the Australian population ages and people live longer, governments have begun to focus their attention on a sustainable way to provide older people with the support and care they need. In South Australia (SA), around 19,000 older people are provided this support within a residential aged care service.

Governments and the aged care system in Australia have largely focused on two issues of quality and safety in residential aged care: firstly, the quality of care provided to promote health and wellbeing and to minimise adverse outcomes (such as harm related to falls).

Secondly, the minimisation of risk of abuse, harm or neglect. The Royal Commission into Aged Care Quality and Safety and other reviews have documented quality and safety failures within our aged care system.

In recent years, there has been increased focus on the potential use of technology (including CCTV surveillance systems) to support quality and safety in aged care. However, there is limited research into surveillance technologies in residential care. This presents challenges when determining how appropriate, useful and acceptable surveillance technologies in residential care would be in the Australian context.



What is the CCTV Pilot Project?

In response to the issue of quality and safety in residential care and the limited evidence of the viability and effectiveness of technological solutions, SA Health decided to invest in a CCTV Pilot ('the Pilot').

The Pilot was conducted over 12 months from March 2021 at two South Australian residential care services - Mt Pleasant Aged Care and Northgate House.

The Pilot trialled an Artificial Intelligence (AI) based technology system. The system captured programmed audio and visual activity and sent a text-message alert to an independent remote monitoring centre which was responsible for alerting the sites.

Audio-visual surveillance was installed in common areas and resident bedrooms at both sites, with cameras and sound devices ('recording devices') in bedrooms switched on with resident consent. Over the duration of the Pilot, consent was provided from 41 residents (or their substitute decision makers, family members, and cares) across the two sites.

The evaluation of the CCTV Pilot Project sought to assess the feasibility, acceptance and influence on quality and safety of the Pilot.



The overall aim of the Pilot was to explore the acceptability and viability of using surveillance and monitoring within residential care settings.

Executive Summary:

Evaluation of the CCTV Pilot Project

How was the Pilot evaluated?

SA Health engaged PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) to undertake an independent evaluation of the Pilot. Approval for the evaluation was sought from the SA Department for Health and Wellbeing Human Research Ethics Committee (SA DHW HREC).

The evaluation was focused on the Pilot itself and **was not an evaluation of the CCTV system technology** (a technology review).

The evaluation questions were:

1. **Feasibility:** Is it practical to use audio-visual surveillance and monitoring in SA residential aged care sites?
2. **Acceptability:** What is the acceptability of the surveillance in different locations, common areas and bedrooms at the sites?
3. **Quality and safety:** Can evidence be identified to show the surveillance monitoring influenced the safety and quality of care at the sites?

Phase 1

Data collection activities at baseline (Apr 2021) and towards the end of the Pilot (Feb 2022):

- quality and safety data collected
- data on the surveillance technology alerts
- staff interviews and surveys
- interviews with the CCTV Technology provider.

Phase 2

Data collection activities towards the end of the Pilot (Feb 2022) only:

- surveys and interviews with substitute decision makers, family members of residents
- informal listening post discussions with residents at one of the sites.

Key findings

The evaluation of the Pilot sought to assess the feasibility, acceptance and influence on quality and safety of the Pilot.

The evaluation found that the AI technology had a high rate of alerts and we have concluded that the AI used in the Pilot was not yet sufficiently accurate at detecting incidents in a residential aged care setting. Despite this, the concept of using surveillance technology to improve quality and safety of care has in principle agreement from key stakeholders.

Whilst the accuracy of the system improved over time (as it was designed to), over the 12 months, it did not achieve a level that would be considered acceptable to staff and management at the sites.

The purpose of a Pilot is to test something in a real world setting before introducing it more widely.

We can expect to see the increased digitisation of residential care and it is important to learn from trials like the CCTV Pilot Project to determine what role technology has to play and how and when it will be appropriate to support quality and safety in residential care. While the Pilot did not achieve the aspirations held for it, there are many Pilot insights that can help governments and the aged care sector in Australia when they are considering the use of surveillance technologies in residential care.



Executive Summary:

Evaluation of the CCTV Pilot Project

Insights from the Pilot

1. The concept has in principle agreement from residents, families and staff involved in the evaluation.

The use of an AI-based surveillance system was broadly acceptable to those involved in the evaluation, including staff and residents who opted in to the Pilot. This is due to the perceived potential for it to support safety and to detect resident falls. Whilst some staff are likely to object on the grounds of privacy for residents, the future introduction of surveillance technology can benefit from the acceptance of the concept.

2. The purpose of the surveillance should influence the decisions about what functionality is needed.

The reasons why a surveillance system is being introduced should determine its functionality. Will it be used to support safety and quality of care (e.g. to detect falls) or to prevent or detect resident abuse. The purpose of the system should support decisions about specific functionality needed in the system.

3. The limitations of the technology need to be understood.

The functionality of the surveillance technology needs to be considered. There will be benefits and limitations of every system, and its operations will depend on the type of residential care service and the complexity of care needs of residents. Key aspects to consider include:

- the amount and type of infrastructure used (e.g. number of recording devices including cameras or sound boxes)
- any system 'blind spots'
- the way in which visual footage is viewed (e.g. only viewed on exceptional basis with specific access, or able to be viewed continuously through a monitor)
- the process for alerting of events (e.g. phone call from an independent third party monitoring service or an automated push notification to a device carried by a clinical staff member).

4. Trade-offs will be needed between privacy and dignity and functionality.

SA Health, in designing the Pilot made conscious decisions about how to protect the dignity and privacy of residents and staff. For example, recording devices were installed in common rooms and bedrooms and not in bathrooms, bathroom footage was redacted (blurred / blacked out), access to the footage was restricted to specific senior site officials, and an AI-based system was selected so that staff and residents did not feel they were being 'watched' by someone. Further, recording devices in bedrooms were also switched on only with the consent of residents.

When considering the use of surveillance in residential care, consideration needs to be given to how to protect privacy of residents and staff, and in doing so, concessions may be necessary on the functionality or accuracy of the technology.

5. The surveillance technology should be implemented through a staged process.

Consideration needs to be given to how mature the technology system is prior to installation in the residential care setting. If a system is to be used as a quality and safety process, then the introduction of a mature and tested system that has demonstrated efficacy may be appropriate.

A staged testing process occurred prior to the Pilot. However, more comprehensive, contextual testing prior to piloting the technology across an entire residential care site may support improved implementation. This testing should simulate (as much as possible) the characteristics of the selected pilot site. Alternatively, testing could first be undertaken on a smaller scale (e.g. in one room).

If using AI as part of the surveillance system, then the time taken to train the AI to the context of use should not be underestimated.

Executive Summary:

Evaluation of the CCTV Pilot Project

6. The perceived value needs to outweigh additional workload for staff.

In the context of a workforce shortage and documented pressures on the workload demands of aged care staff across the sector, any additional workload associated with the introduction of a surveillance system needs to be considered carefully.

An AI-based surveillance system may have the potential to decrease the workload of staff if it can be shown to accurately detect important quality and safety events. Staff and management are likely to accept (and possibly embrace) some additional workload if, and only if, they can see the value of the system to resident care, health and wellbeing.



7. Site characteristics are important.

Alignment between the functionality of the surveillance system and characteristics of the sites is important. Consideration needs to be given to how well the system functionality will adapt to the physical environment of the sites and the residents and their risk profiles (e.g. how likely are they to fall when unattended).

Consideration also needs to be given to the staff to resident ratio in any setting to assess how likely the system would detect quality and safety risks (e.g. falls) in the absence of a staff member.

8. Change management is important.

The implementation of the Pilot included several change management activities to support staff, residents, and their substitute decision makers, family members and carers through the Pilot. When introducing a technology system, consideration should be given to change management plans for consent processes, engaging middle management to drive change, training on the technology system, and ongoing communications and messaging.



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Why use surveillance technology in aged care?

As the Australian population ages and people live for longer, governments have begun to focus their attention on a sustainable way to provide older people with the support and care they need.

While many older people are cared for in their own homes, around 230,000 older people are provided the support they need within a residential care service. In SA, there are approximately 19,000 older people living in 240 residential aged care services. Older people living in residential care tend to be people with higher or more complex care needs, and represent some of the most vulnerable people in Australia.

Governments and the aged care system in Australia have largely focused on two issues of quality and safety in residential care:

1. the quality of care provided to promote health and wellbeing and to minimise adverse outcomes (such as harm related to falls).
2. the minimisation of risk of abuse, harm or neglect.

The Royal Commission into Aged Care Quality and Safety and other reviews have documented serious quality and safety failures within our aged care system. The ongoing impacts of the COVID-19 pandemic has also heightened community awareness of the safety and quality of care in residential settings.

In recent years, there has been increased focus on the potential use of technologies (e.g. wearable smart technologies, sensor technologies, telehealth monitoring technologies, and surveillance technologies) to support improved quality and safety outcomes in aged care.

Despite the focus on technology innovation in aged care, there is not a lot of research into the use or impact of surveillance technologies on quality and safety in residential aged care. This presents challenges for service providers, aged care regulators, and governments to determine how appropriate, useful and acceptable surveillance technologies in aged care services would be in Australia.

In response to the issue of quality and safety in aged care and the limited evidence effectiveness of technological solutions, SA Health decided to conduct the CCTV Pilot Project ('the Pilot') in residential care. Since the announcement, there has been national and SA media commentary about the Pilot.

SA Health has led an Australian-first project, the CCTV Pilot Project, to explore the acceptability and viability of using surveillance and monitoring within residential care settings.

The Pilot was conducted over 12 months commencing in March 2021 at two South Australian residential care services - Mt Pleasant Aged Care and Northgate House.

The Pilot trialled an AI-based technology system which captured programmed audio and visual activities (fall, assist, call for help, and scream).

A SA based company was engaged by SA Health through an open tender process to be responsible for the technology system. The selected technology was considered by the tender evaluation panel to be the best available for this pilot. A formal Steering Committee was established by SA Health to oversee the Pilot.

Why use surveillance technology in aged care?

(continued)

What is known about trials of innovative health technologies?

The findings of a comprehensive literature review into trials of digital health innovations (in both health and disability settings) identified a range of factors that need to be considered when designing a pilot.

These were addressed by SA Health in the design and development of the Pilot including:

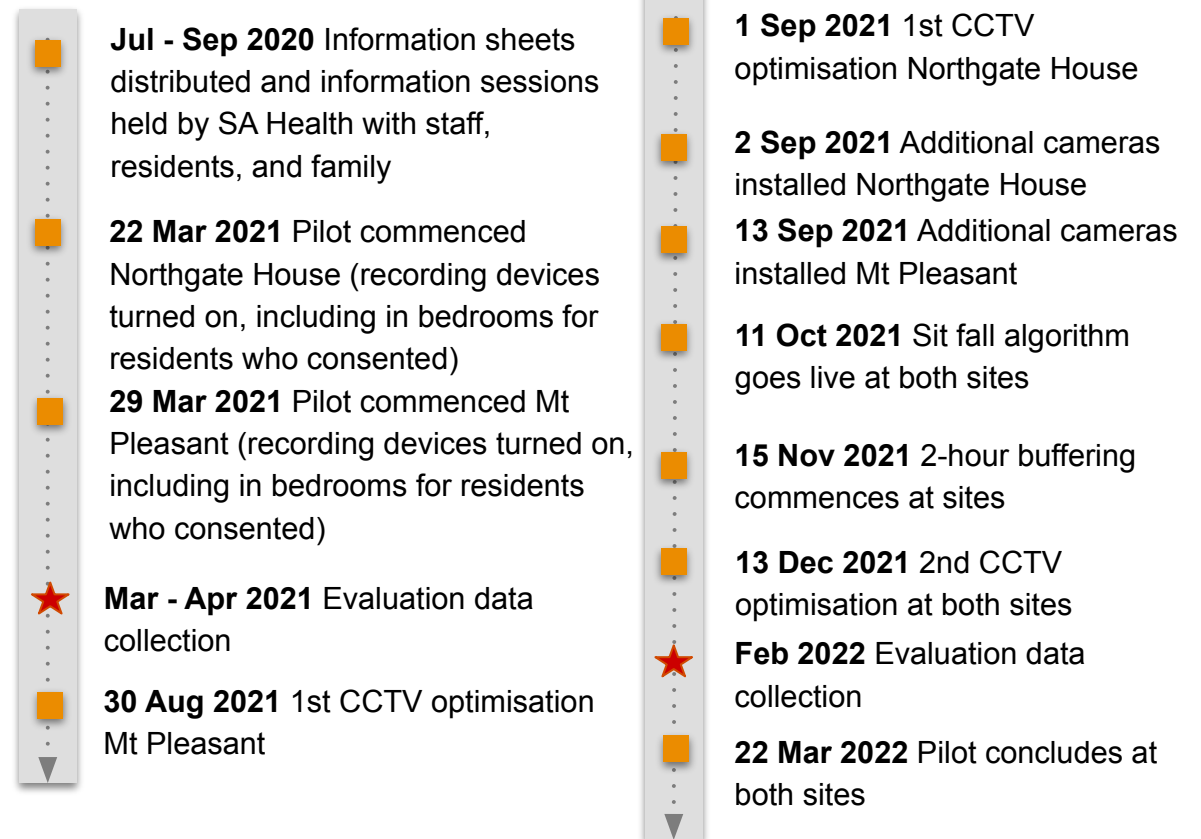
- information security and privacy (including if footage was to be manually 'monitored' by people, and who has access to it).
- consent processes and managing the privacy of residents (including in communal and private spaces)
- staff willingness to adapt new processes during pilot phases

- leadership willingness to drive involvement in a pilot
- communication and information sharing before and during the Pilot to all relevant stakeholders
- the definition of roles and responsibilities for all parties involved in the pilot
- documentation of clear processes and protocols (including where appropriate Standard Operating Procedures)
- education and training opportunities for staff, residents, and family members to participate in an informed way in the pilot.

These factors were considered during the design phase of the Pilot, and deliberate decisions made to establish a Pilot process that accounted for these issues.

What were the key Pilot and evaluation dates?

Key Pilot and evaluation dates



Which aged care services piloted the CCTV system?

SA Health conduct the Pilot in two sites which deliberately differed in terms of location, size of site, complexity of care needs of residents and staffing mix. This allowed insights to be developed through the evaluation as to the type of context factors that impacted on the feasibility and acceptance of the system piloted.

Mt Pleasant Aged Care (Mt Pleasant)

Mt. Pleasant is a permanent residential aged care site for older people with varying levels of care and support needs. The site is attached to the Mt Pleasant District Hospital.



The Pilot commenced at Mt Pleasant on 22 March 2021. Of the 34 people who resided at Mt Pleasant during the Pilot, 20 consented to having recording devices turned on in their bedrooms.



Located in a small town in the Adelaide Hills.



Can accommodate up to 22 residents. Over the Pilot, 34 older people resided for some time at the site.



There is a Nurse Unit Manager (NUM), Director of Nursing (DON), medical and allied health services onsite.



There are Registered Nurses (RN) and Enrolled Nurses (EN) available on site during the day and at night.



There are additional staff including direct care workers, a lifestyle coordinator, administrative staff and service staff.



Located in suburban Adelaide.



Can accommodate up to 16 residents. During the Pilot, 23 older people resided for some time at the site.



There is a Nurse Unit Manager (NUM), medical and allied health services onsite.



There are Registered Nurses (RN) and Enrolled Nurses (EN) available on site during the day and at night.



There are additional staff including direct care workers, administrative staff, and service staff.

Northgate House (Northgate)

Northgate is a neurobehavioural unit for people experiencing severe dementia or behavioural change, and who have the highest levels of support and care needs. Northgate has a high staff to resident care ratio.



The Pilot commenced at Northgate House on 29 March 2021. Of the 23 people who resided at Northgate House during Pilot, 21 consented to having recording devices turned on in their bedrooms.

What are the features of the AI-based CCTV system?

Key features of the surveillance technology used in the Pilot

An open tender process was undertaken to secure the AI technology and overall CCTV system. The selected technology was considered by the tender evaluation panel to be the best available for this pilot.

The surveillance system used in the Pilot has a number of components:

- cameras and audio devices (collectively 'recording devices') including an onsite server
- AI that is programmed to detect specific movements and sounds
- an independent offsite monitoring centre. A deliberate decision was made to use a remote monitoring so no one would be 'watching' a bank of video monitors.

The recording devices are located in common areas and bedrooms. Those in bedrooms are switched on only where the resident provides consent.

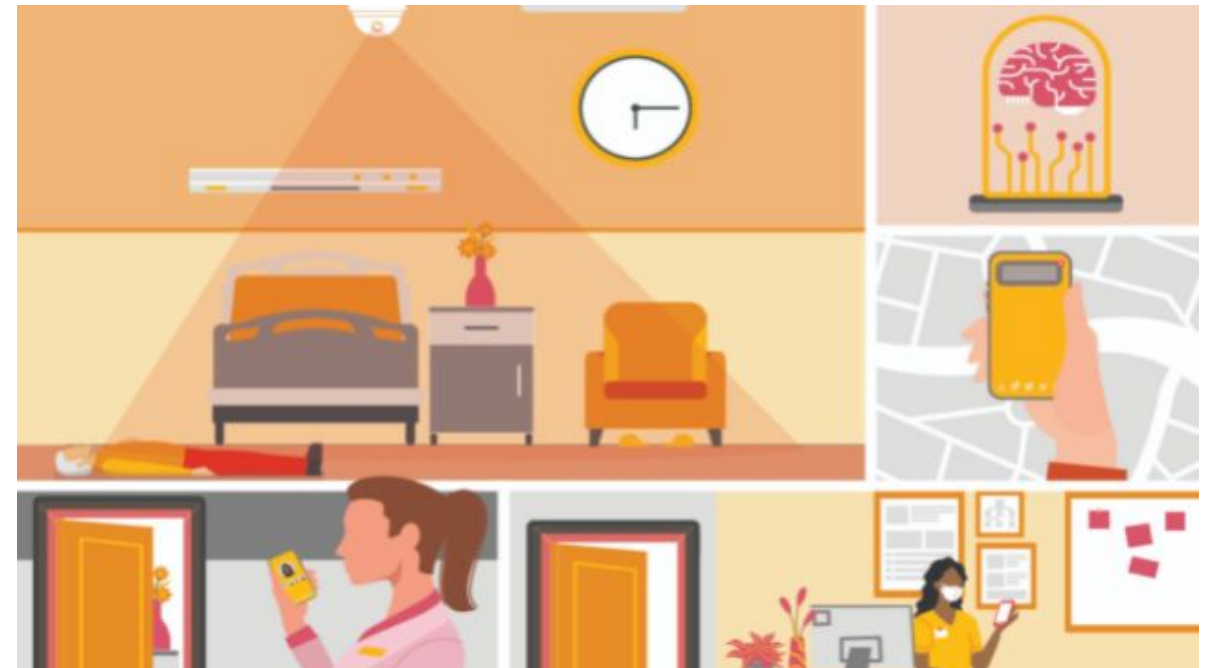
There are no recording devices in the bathrooms and views of the bathrooms are redacted from the video recording.

The AI is programmed to detect specific movements or sounds including falls, assist, calls for help, or screams. The AI is designed to 'learn' over time and improve in its ability to detect programmed events.

When a programmed event is detected by the system, a text message is received by the independent monitoring centre who contact staff at the site via telephone to advise of the alert. Staff at the independent monitoring centre do not see any footage. The staff at the site then respond to the alert and follow normal incident processes to check on the resident.

Where a programmed event is detected by the system, the 90 seconds prior to the event and five minutes following it are captured.

Figure 1: Visual representation of the operations of the CCTV system



This footage is retained for 60 days, after which it is transferred to a Network Attached Storage system (on-site) and stored for seven years. This provides an independent audit trail for all alerts received.

Footage can be reviewed by authorised personnel (access governed by the SA Health Workplace Surveillance Policy Directive) and the CCTV Pilot Project Standard Operating Procedure (SOP).

How was the CCTV Pilot evaluated?

PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) was engaged by SA Health to undertake an independent evaluation of the CCTV Pilot. The evaluation was focused on the Pilot itself and was not an evaluation of the surveillance system (a technology review).

A developmental evaluation approach was chosen by SA Health for the evaluation. This approach uses real-time testing of changes to program design, with feedback on the initiative allowing for rapid and evolving improvements to be made (even while the evaluation and the Pilot are still occurring).

This allows understanding of new innovations, initiatives and programs that are being implemented in complex, changing or uncertain environments.

The evaluation questions were:

1. **Feasibility:** Is it practical to use audio-visual surveillance and monitoring in South Australian residential aged care facilities?
2. **Acceptability:** What is the acceptability of the surveillance in different locations, common areas and bedrooms within the facilities?
3. **Quality and safety:** Can any evidence be identified to show the surveillance monitoring influences the safety and quality of care at the facilities?

Evaluation methodology

The evaluation used a range of different methods to collect information through two phases of data collection.



Surveys of staff at Pilot sites: A survey was provided to all staff at baseline and towards the conclusion of the Pilot. In total 23 surveys were received.



Interviews with staff at Pilot sites: Interviews were held with clinical and non-clinical staff at the Pilot sites at baseline and towards the conclusion of the Pilot. In total 22 interviews were conducted with staff.



Interviews with the CCTV Technology Provider: Interviews were conducted with representatives of the CCTV system provider at baseline and again near conclusion of the Pilot.



Interviews with SA Health and project governance groups: The SA Health project team, internal stakeholders, the Working Group and Steering Committee were consulted regularly.



Collection of data on alerts: Monthly data provided by the CCTV Technology Provider and Pilot sites about the number and type of alerts (fall, assist, call for help and scream).



Comparison of alert data to site incident data: Analysis was conducted by SA Health comparing documented events at the sites to CCTV alert data to identify the number of events captured by the system.



Collection of data on quality and safety indicators: Quality indicator data was collected quarterly by sites, aligned to data required by the Australian Government Mandatory Quality Indicator Program. It includes data on falls, pressure injuries, unplanned weight loss, and use of chemical and physical restraints.

What were the parameters of the evaluation?

Evaluation methodology (continued)



Collection of data relating to complaints: Complaints made by staff, residents, and their substitute decision makers, family members and carers about the Pilot were collected.



Listening posts with residents: Listening post sessions (one-on-one informal conversations) held with residents at one of the Pilot sites.



Surveys of family members: A survey was provided to family members of residents at the completion of the Pilot. Five responses were received (response rate of 12 per cent).



Interviews with family members: Interviews were held with two family members of residents towards the end of the Pilot.

Phase 1

Data collection activities at baseline (Apr 2021) and towards the end of the Pilot (Feb 2022):

- quality and safety data
- data on the surveillance technology alerts
- staff interviews and surveys
- interviews with the technology provider

SA DHW HREC approval: HREC/20/SAH/81.

Phase 2

Data collection activities towards end of the Pilot (Feb 2022) only:

- surveys and interviews with family members of residents
- informal discussions with Mt Pleasant residents.

SA DHW HREC approval: 2021/HRE00080.

Important considerations

The **evaluation methodology was co-designed** with SA Health and the management at both Pilot sites to minimise any disruption and to maximise anonymity of participants.

The scale of the Pilot (two sites and over twelve months) meant that an **evaluation could not draw definitive conclusions about the feasibility of the system in other services** (e.g. generalise to other residential care services).

Applications were made to the SA DHW HREC for ethical review of the evaluation. The approval required some changes to the methodology, including **restricting the ability to present evaluation findings** in a way that describes and identifies differences between the two sites.

All family members at both sites and residents at one site were given the opportunity to participate in the evaluation via survey or interview.

There was **limited data from residents and families** to inform this evaluation - and as such, findings may not reflect the experience and views of all residents and families.

All **staff were provided with the opportunity** to complete evaluation surveys and interviews at baseline and the completion of the Pilot. Whilst key clinical staff and management participated in the evaluation, it is possible the findings do not represent the experiences of all staff involved in the Pilot.

While the evaluation was not a formal technology review, findings have been drawn about the feasibility of this particular CCTV system, as it pertains to the feasibility of the Pilot in these two sites. It is possible that a different surveillance system, adopted at a different point of maturity and in different sites, would have different conclusions drawn.

How did the CCTV system evolve during the Pilot?

A system refined through piloting

The AI-based surveillance system used in the Pilot was designed to 'learn' audio and visual cues and over time, becoming more accurate in detecting the programmed events.

As expected, during the Pilot, several improvements were made to the system. These included:

- **A 4-month commissioning phase** to 'calibrate' the system (to program it to learn specific movements and sounds of spaces and residents). Due to COVID-19 impacts, the AI provider was required to perform the calibration of the technology remotely rather than on-site (as anticipated). This incurred delays in preparing the technology for a 'go live' date.
- **Changes to decrease the sensitivity of audio recording devices** to accommodate high ambient noise levels. This aimed to decrease the number of 'false' alerts that generated from normal noise levels in the facilities.
- **Ongoing training and testing of the system**, including having representatives from the technology provider on site to demonstrate movements for the system to detect and learn from. Redacted footage of actual quality and safety events was used as part of the optimisation processes to 'train' the AI to detect actual events (such as falls).
- **Installation of additional cameras** to reduce 'blind spots' in some locations where the cameras did not have visual coverage of the entire space and to assess whether two cameras working together would increase the incidence of detecting true events.
- **Two major optimisation processes and ongoing minor optimisation processes** where the footage from the system was marked as having accurately or falsely identified an event, and input back into the system to support the AI in 'learning' events. Each optimisation process resulted in an increase in the accuracy of the system (its ability to detect true quality and safety risks).
- **A series of technological 'patches'** to support the AI in distinguishing inanimate objects (e.g. a coat draped over a chair) from people and to refine the AI algorithm to improve accuracy. An upgrade was introduced during the Pilot to enable the system to recognise inanimate objects and understand when these objects were moved within or to outside the room.



How did the CCTV system operate during the Pilot?

The evaluation focused on understanding the feasibility of the Pilot. Whilst it was not a technology review, the feasibility of the Pilot was dependent on the functionality of the surveillance system used.

The AI used in Pilot was designed to learn over time and improve its ability to recognise the actions or audio cues specific to the sites and residents. There is evidence that over time, the system did improve in its ability to detect true quality and safety events.

Types of alerts

The AI-based surveillance technology was programmed to detect four key events - fall, assist, call for help and/or screams. Over the first few months of the Pilot, there were concerns that the way in which these events had been programmed were not well aligned to the common movement patterns of residents at the sites.

For example, a 'fall to one knee' looking like a drop to the floor without a break, or a staff member placing their arm around a resident being confused for an 'assist'.

False alerts

Despite the improvements made over time, during the 12 months of the Pilot, the system generated over 12,000 alerts across the two sites that were not verified as 'true events'. It is important to note that a high percentage of these alerts were sit-fall events which involved staff performing a bend to knee (crouching) motion which resembled a programmed movement and caused an alert.

In these cases, while the system was detecting movement or sounds that it was programmed to detect, it was unable to reliably distinguish between the programmed events and similar movements or sounds that are reasonably expected in residential care.



Given the Pilot was introducing novel technology, some 'false alerts' were anticipated. However, the high volume of 'false alerts' during the AI learning period was unexpected.

Given the innovative AI technology used in the Pilot, it was not known with certainty at the outset what benchmarks of false alerts would be appropriate to set for the Pilot. Evaluation feedback indicated that a threshold of 10 false alerts per day were anticipated by SA Health and the Pilot sites.

The introduction of the 'sit fall' alert

Staff reflected that the introduction of the 'sit fall' alert in the Pilot in October 2021 was valuable as it reflected the more common pattern of falling for residents in residential care. This motion of dropping to one knee does however also resemble a common care position used by nurses and care attendants - the 'knights position'. In turn, the system then detected this movement (by staff) as a 'fall' and initiated a false alert.

As the AI technology evolved, it was able to detect more sophisticated movements (e.g. a specific type of fall). However the increase in the complexity of detection was offset by an increase in sensitivity - resulting in ongoing 'false alerts' when staff made similar movements. At the completion of the Pilot, the technology was not able to reliably distinguish between a knights position and a sit fall.

How did the CCTV system operate during the Pilot?

(continued)

Detecting 'true' events

By the final months of the Pilot, the AI within the CCTV system had sufficiently matured to be able to detect some true quality and safety events, including falls by residents.

SA Health completed an analysis comparing the number of true events (e.g. falls or calls for help) over the Pilot period and the number of these events that were accurately detected by the system.

In the final three months of the Pilot (January - March 2022), 22 per cent of actual events were detected by the CCTV technology (compared to less than 2 per cent between July - December 2021). This improvement reflects significant work by the technology provider to refine the system and maximise the AI 'learning' of the nuances of each site throughout the Pilot period.

Alert 'fatigue'

The evaluation found that the number of 'false alerts' experienced at the sites by the CCTV system was unexpected and unacceptable to staff. The number of false alerts in the first few months of the Pilot meant that staff at both sites were overwhelmed by the workload associated with responding to alerts.

During these months, there is evaluation evidence that staff and management prioritised their resident care at the expense of Pilot activities (including responding to alerts).

Management at the sites advised SA Health that a maximum of 10 false alerts per day was an acceptable threshold. Other staff varied in their response when speaking with the evaluators; some believed all false alerts to be unacceptable and others were willing to accept over 10 if the system detected all true quality and safety events.

In the final months of the Pilot (Jan - Mar 2022), while the system was starting to detect true events, it still initiated an high number of false alerts per month across the two sites. It is likely that many of these 'false alerts' reflect a sit-fall trigger than was a staff member bending down.

In these final months of the Pilot, staff were no longer able to respond to every alert. There was at least one instance where staff did not respond to an alert that turned out to be a 'true' resident fall event.

It is possible that some of the challenges relating to the functionality of the technology may have been resolved through additional changes to the system or alert notification process that were recommended by the technology provider during the Pilot (e.g. mobile phone alerts sent directly to a clinical staff member).

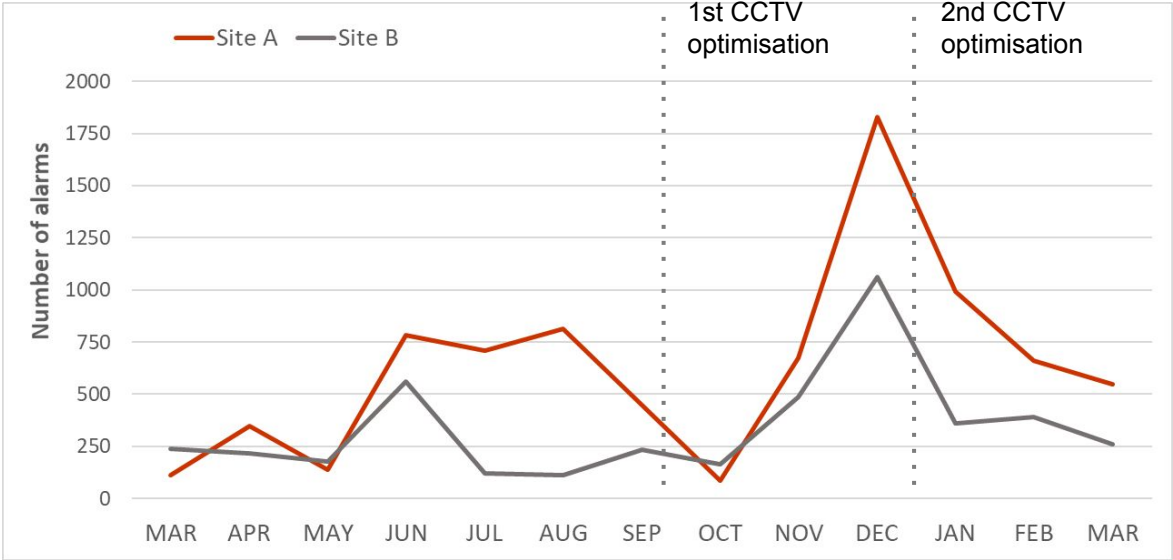
The evaluation found that the AI technology had a high rate of alerts and we have concluded that the AI used in the Pilot was not yet sufficiently accurate at detecting incidents in a residential aged care setting.

There were misalignments in the expectations of staff and management at the sites, families and residents, the technology provider and SA Health on how many 'false alerts' were to be expected throughout the Pilot. Whilst some false alerts were anticipated (given it was a Pilot of innovative technology), the volume of these alerts experienced (even in the final months) impacted on the feasibility of using the technology in these aged care facilities.

How did the CCTV system operate during the Pilot?

(continued)

Figure 2: Number of alerts per month at each site over the 12-month Pilot (March 2021 - March 2022)



* The spike in alerts after October was likely influenced by a combination of on-site system testing (i.e. deliberately setting off alerts to test accuracy) and the introduction of the sit-fall alert.

* The vast majority of the alerts (as identified in Figure 1) reflect alerts that detected pre-programmed movements or sounds (e.g. sit falls). The challenge when applied in real residential care settings is that the system was not able at that point in time to differentiate these movements (e.g. a staff member bending) and sounds from those that actually reflect a quality or safety event (e.g. a resident sit-falling).

What aspects of residential care impact the feasibility of the system?

The CCTV system was deliberately piloted across two very different sites. As part of the evaluation, the SA DHW HREC reviewed the methodology proposed for the evaluation of the Pilot. The approval for the evaluation required that data from the two sites be de-identified and not presented in this report in a way that could distinguish the two sites. Therefore specific examples for each site are not included in this report.

What is possible, however, is to discuss the value in having two very different residential care facilities participate in the Pilot. Aged care across Australia is diverse and older people have very different needs. The Pilot was able to show that there are factors associated with the context of providing aged care that impact on how feasible the CCTV system is.

The type and complexity of support needs of older people in aged care influenced how the CCTV system was able to operate. The complexity of care needs impact on the number of staff routinely providing care, the behaviour of the residents, the way in which the physical space is constructed and the number of people (including visitors) likely to be in any given space.



What aspects of residential care impact the feasibility of the system?

(continued)

The behaviour of residents

The behaviour and movements impacts the functionality of the technology. For example:

- Residents with high mobility who are physically active (moving) around their rooms and communal areas are more likely to be detected by the CCTV system.
- Residents who vocalise often and loudly are more likely to make noise that will be detected by the CCTV system. The system will 'detect' a noise (as programmed), however this noise may not be a true quality or safety event.
- Residents who make large, physically aggressive movements may be detected by the system but those that use small movements of aggression (e.g. pinching) may not be detected. This would also apply to staff or visitors to the service.

The number of people in the space

The number of people in a space influenced the functionality of the surveillance technology. How many staff are in a site at any point in time is often a function of the level of care and complexity of care needs of the residents. For residents with higher care needs, one or more staff may be near them at all times.

Multiple bodies within a space impacts the ability of the AI to accurately detect the pre-programmed movements and sounds, for example where a staff member's body blocks the visual feed of the camera.

Alternatively, a higher staff to resident ratio may mean that if an actual quality or safety event occurs (such as a fall), staff are likely to witness the event and respond rapidly, limiting the usefulness of the system.

Environmental factors

The physical environment at the sites influenced the functionality of the surveillance technology. For example:

- Minimal furniture and clutter in a room was likely to reduce the number of alerts. Conversely, increased clutter, furniture or moving the location of furniture was likely to lead to increased alerts.

Figure 3: Visual illustration of camera blind spots



- The placement of cameras within a space impacted on the existence of 'blind spots'. Blind spots are areas in a room that are not covered by the visual span of the cameras. The configuration of rooms, the lay out and the camera locations all impacted the number of blindspots and therefore the ability of the system to detect pre-programmed movements and sound.

A system with 'no blind spots' vs one with 'minimal blind spots'

The technology selected for the Pilot was one with 'minimal blind spots' as a system with 'no blind spots' was cost prohibitive.

Additional cameras were installed in some rooms during the Pilot to test the 'no blind spots' option and determine if and how additional cameras impacted the detection of true events within a specific space.

Was the AI-based surveillance technology accepted by residents and family members?

The use of AI-based surveillance technology to improve quality and safety of care for residents was acceptable to the residents and their family members who participated in the evaluation.

“The cameras add a level of security, and can help if [my family member] has a fall in their room or in the corridors. Footage can also hopefully be viewed if an assault occurs” - family member

It is important to note that there were few residents and family members who participated in the evaluation. The reasons underlying non-participation in the Pilot (or the evaluation) are not known. It is possible that it may be aspects of the technology itself (e.g. the use of AI as part of the system instead of people ‘watching’ the cameras) that influenced decisions to consent.

False alerts for a ‘good reason’

The residents who participated in evaluation interviews understood that there had been a number of false alerts due to the sensitivity of the cameras but did not find the process to be disruptive. They did not report a change in the way in which staff members provided care to them during the Pilot period.

“I had two calls that were unwarranted in my room but I don’t mind because it is for a good reason. I feel more secure.” - resident

Family members of residents reported that they had seen no change in the way in which their loved ones used the common areas due to the operation of the surveillance technology.

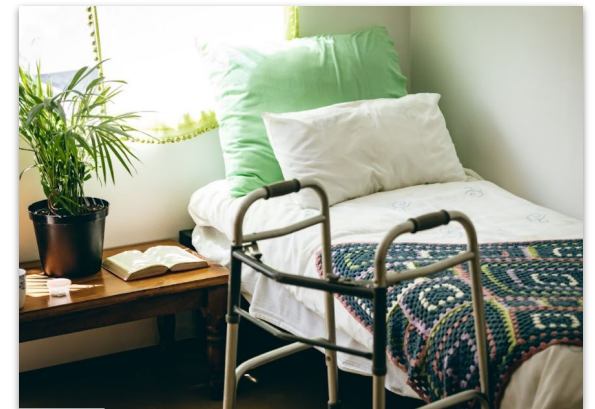
The location of recording devices

While only a small number of residents and family members participated in the evaluation, all of them were broadly comfortable with the use of AI-based surveillance technology in common areas and in the bedrooms of residents.

All evaluation participants had opted into the AI-based surveillance technology. Those who had not opted into the surveillance technology were invited to participate in the evaluation, but chose not to participate. As a result, it should be noted that these views may not be reflective of all residents and their family members.

Most residents and family members said that they, in principle, would be comfortable with the use of audio devices in resident bathrooms in the case of a fall.

“[The bedroom] is the area of the site where my family member spends the majority of their time. That means the [surveillance technology] has to be in the bedroom where he is, and where an accident would occur.” - family



Was the AI-based surveillance technology accepted by residents and family members? (continued)

Information about the Pilot

Information about the Pilot was provided by SA Health to site management at multiple points. This was then disseminated to family members by the two sites. Despite this, some family members reported they would have welcomed further details about the Pilot, including information about the:

- timing of the consent process and details of information provided to residents to support informed consent processes
- details around the operation of the surveillance technology, the approved reviewers (including whether family are able to review footage of incidents), and the permitted uses of the footage
- rationale behind the installation of second cameras in some bedrooms.

Consent processes

The process to collect informed consent from residents and their family members was generally well received by stakeholders.

Given the sensitive nature of the Pilot, issues around privacy and consent were critical. There is evaluation evidence this process was performed well for most residents, though small adjustments could be made. For example, some family members noted they would have liked more time to review information sheets, speak to the SA Health project team, and consider implications of participation prior to providing consent.

Some staff members also noted that they felt rushed to collect consent from residents and their families close to the go-live date.

Was the AI-based surveillance technology accepted by staff?

Most staff involved in the evaluation were supportive of the general notion of using AI-based surveillance technology to improve quality and safety of care for residents. However, key factors were identified that impacted staff acceptance of the specific system used in the Pilot.

The accuracy of the technology

Staff identified that the accuracy of the technology was the key factor impacting their acceptance of it. This had a greater impact on staff responsible for taking calls from the control room, responding to the alerts, recording details of alerts, and reviewing and archiving footage. For these staff members, the high workload associated with responding to false-positive alerts impacted their acceptance of the AI-based CCTV surveillance.

In response to the feedback received from staff regarding the feasibility of the Pilot process, in August 2021, SA Health amended the Standard Operating Procedure (SOP) enabling staff to submit a request to temporarily pause notifications from alerts in one location for a period of two hours.

Sites were notified that it would be reasonable to request that alarms be paused where excessive false alarms were experienced due to a recording device inaccurately detecting an alarm trigger (for example due to repeated vocalisation of a resident or due to a hardware issue). Staff reported that this capacity to 'pause' the system improved the feasibility and, therefore, acceptability of the system for them. To 22 March 2022, the alerts were paused 18 times.

Was the AI-based surveillance technology accepted by staff?

(continued)

The types of alerts

A factor that impacted acceptance of the technology used in the Pilot were the types of triggers that would cause an alert. All staff who participated in the evaluation reported knowing that a 'fall' was one such trigger that the surveillance technology would detect. However, many staff reported at the end of the Pilot that they did not know what the other triggers were (or how many there were in total).

Some staff members who were present at the start of the Pilot reflected on the 'violence' trigger that was relabeled as 'assist' in the first week of the Pilot. Many reported feeling uncomfortable because they perceived that an alert for 'violence' may indicate that they were being violent towards residents, and that the the number of (false) alerts at the time implied that they were being abusive.

Staff responding to the alert calls also reported unease in checking on colleagues following an alert of 'violence'. These staff members reported as being relieved when the alert was retitled.

Some staff expressed a desire to have been consulted through the initial process of selecting and testing alert triggers for the site. While this consultation did occur at the start of the Pilot, staff turnover meant that some staff desired more consultation.

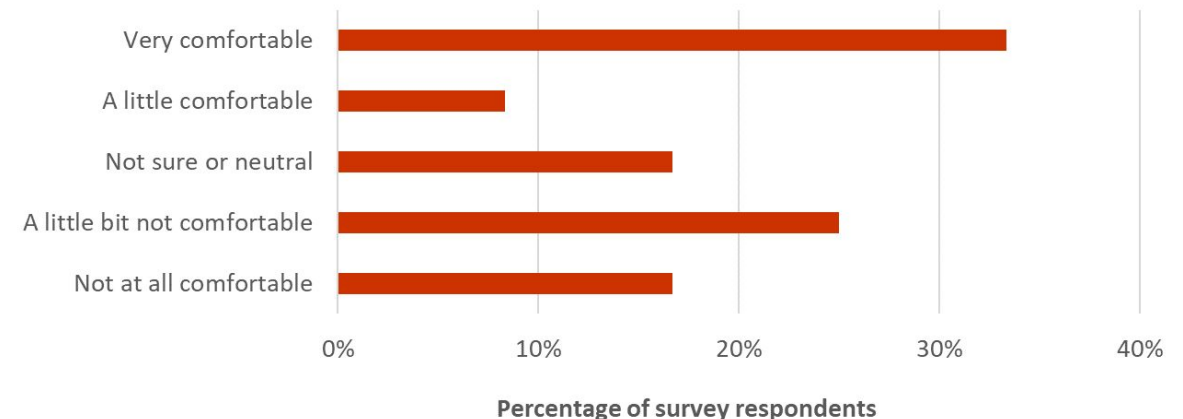
The security of surveillance footage

The evaluation found mixed views by staff as to their levels of comfort with the security arrangements of the video footage. Figure 4 demonstrates that by the end of the Pilot, staff reported mixed views on how comfortable they were with the security of the footage.

Staff involved in the evaluation who were uncomfortable were concerned about three key factors:

- **Purpose of the footage.** Staff expressed concerns about footage being used as a performance management tool. They noted that the purpose of the footage as documented in the SOP would need to be adhered to by any reviewers.
- **Access to the footage.** Staff were supportive of the policies governing access to the footage. However, some reported that they would feel more comfortable if the footage was reviewed and archived by someone external to the SA Health network to maintain independence.

Figure 4: Survey responses to 'How comfortable do you feel that the CCTV surveillance footage is secure?'



Was the AI-based surveillance technology accepted by staff?

(continued)

- **Nature of the footage.** Some staff reported they would be more comfortable if individuals recorded would appear in a way that protected their identity (e.g. redacted or as stick figures). Some staff erroneously believed that the footage was capturing individuals as stick figures in the Pilot and were concerned when they were informed otherwise. This raised concerns for staff regarding the privacy of residents who had cameras in their bedrooms.

Privacy issues

Some residents in residential care settings can require support to toilet, bathe and dress. Some residents may be reliant on staff for continence needs.

The installation of the recording devices in bedrooms and not in bathrooms was a deliberate design choice to reduce impact on the privacy of residents.

In addition, footage with a view inside a bathroom was 'redacted' so that activities in the bathroom could not be seen on the video. The privacy needs of residents were balanced with the need to detect quality and safety events (falls in particular) during the design of the Pilot.

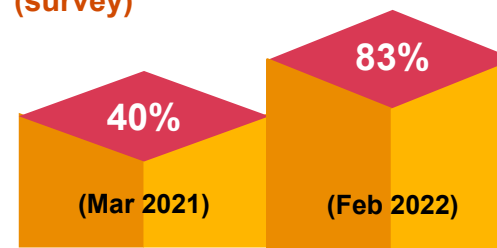
The issue of privacy was expected to be a key issue during the Pilot and was a focus of the evaluation. Stakeholders were divided on how best to balance privacy considerations with the desire to protect residents.

While residents and their family members who participated in the evaluation reported being broadly supportive of AI-based recording devices (both cameras in bedrooms and audio devices in bathrooms), staff generally felt uncomfortable about the impacts of this on the privacy and dignity of residents, especially those who receive personal care (e.g. toileting) in their bedrooms.

It is likely that some staff did not understand the way the AI-based CCTV system operated and presumed people 'watching' the video to detect incidents (which was not the case).

"I find [the use of surveillance technology] in bedrooms very uncomfortable as it makes me feel like client's personal spaces are encroached. We at times are required to attend to their toileting and hygiene care needs in their bedrooms. I feel their privacy and dignity gets hindered mainly in those times." - staff member

Figure 5: Percentage of staff who feel 'a little comfortable' or 'very comfortable' in doing their jobs while the CCTV cameras are active (survey)



Staff comfort in being under surveillance

At an individual level, staff reported that they were generally not concerned about being monitored in common areas or bedrooms while working at the sites (75 per cent of survey respondents feel 'very comfortable' doing their jobs while the surveillance technology is active).

Staff reported they would feel more comfortable with the use of audio recording devices only in resident bedrooms. They felt was an appropriate balance between resident's privacy and AI-based surveillance needed to detect calls for help when in a bathroom. As discussed earlier in this report, the low utility of the audio recording devices in capturing quality and safety risks impacts the feasibility of this suggested approach.

Was the AI-based surveillance technology accepted by staff?

(continued)

Education and training on the Pilot

Staff training and education occurred prior to Pilot commencement and throughout the Pilot. Staff acceptance of the Pilot varied based on their level of understanding about the operation of the AI-based surveillance technology. Some staff reported that they had varied understanding of the Pilot's purpose, the operation of the system, and the processes involved in responding to and recording alerts.

“There was a lot of information and I found it useful to speak to our [Nurse Unit Manager or Director of Nursing] about it. The information sessions with the SA Health team were also useful - it gave us a chance to ask questions about the cameras” - staff member

Staff who started their employment after the Pilot commencement date reported knowing about the Pilot, but had insufficient opportunities to understand the system.

“I didn’t know about the cameras when I started. A session with the CCTV team on the orientation day would have been helpful”. - staff member

Almost all staff noted that their understanding improved following the implementation of consistent, on-site information sessions by SA Health in the second half of the Pilot as it provided them with opportunities to clarify their understanding of the Pilot.

They also found having the CCTV system provider representatives on site (during periods of optimisation) as useful as it presented further opportunities to ask questions and learn about the system.

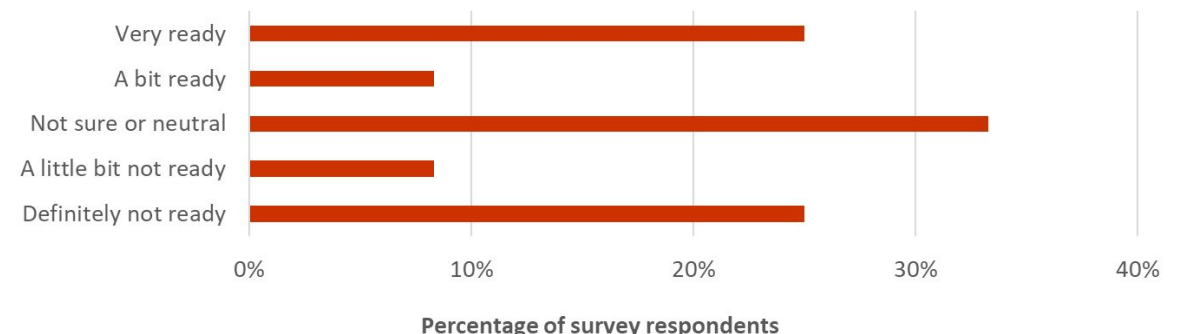
Staff reported that this type of on-site presence by SA Health staff and the surveillance technology provider during the first half of the Pilot would have also been useful in retrospect.

All staff who participated in the evaluation reported that education and training could have been more comprehensive throughout the Pilot.

Staff reported they would have liked further training on:

- demonstrations and guidance materials on the end-to-end event detection, notification, and review process to explain how the AI technology detects verbal and physical activity.
- what the recorded footage looks like when the NUM or others view it.
- what information the AI sends to the control room and how it learns.
- The required review process for authorised staff to access footage.

Figure 6: Survey responses to ‘How ready did you feel for the start of the Pilot?’



Did the Pilot influence quality of care?

At the conclusion of the 12-month Pilot, there was not evidence that the AI-based CCTV surveillance used in the Pilot had influenced either positive or negatively, the quality and safety of the care provided at the sites.

It is important to note that this finding relates to a lack of evaluation evidence during the Pilot and conclusions can not be drawn with certainty about if the AI-based CCTV system, if working optimally, would influence quality or safety.

Influence on indicators of quality and safety of care

The two sites collected and reported data quarterly on key indicators of quality and safety. This included data on relevant indicators such as falls and restraints. Between January 2021 and March 2022, there was no observed change in the quality indicators at both sites.

The requirements of the Human Research Ethics Committee approval process meant we are not able to present the data in this report.

Staff ability to respond to quality and safety risks

Most staff (70 per cent) who participated in the evaluation did not report improvements in their ability to respond to quality and safety events as a result of the AI-based CCTV surveillance used. The remaining 30 per cent noted that their role meant they did not receive alerts or respond to them. The limitations of the surveillance system in detecting true quality and safety events was reported as the reason there were no experienced improvements.

Staff reported that responding to false alerts was time consuming and on occasion meant they were taken away from important activities such as the administration of drugs or provision of personal care to residents.

Some staff reported that they did not respond to alerts when they believed it would compromise the care they were providing at the time to a resident.

Despite this, almost all staff members involved in the evaluation acknowledged that the use of AI-based CCTV surveillance has the *potential* to improve quality and safety of care for residents. Many likened the technology to other useful systems including bed sensors.

“The idea was a good one and if it worked, could have been invaluable in alerting staff to where assistance is needed.” - family member

Changes in site policies and procedures to address quality and safety risks

There is no evaluation evidence that direct changes were made to formal operational policies and procedures at the sites in response to quality and safety risks identified by the AI-based CCTV system.

Changes were made to the Pilot SOP throughout the Pilot however in response to issues identified by staff. A key example of this was the change in process to allow the site to ‘pause’ the system.

However, some staff members noted that the AI-based CCTV surveillance had value as a retrospective review of quality and safety practices at both sites. They suggested that by reviewing the footage of incidents (including false-positive incidents) to support the CCTV system optimisation processes, they were able to identify current care practices that they believed could be improved.

“Even if it does not help to ‘catch’ the incident at the time, it helps to reflect on safety risks which can then support quality improvement.” - family member

Did the Pilot influence safety?

One rationale for the use of surveillance technology within residential care facilities is to detect and prevent instances of abuse or neglect by staff members against older people. Another relates to the perceived potential for CCTV surveillance to support the identification of safety risks. The evaluation sought to determine if there was any evidence the Pilot influenced resident safety.

The Hawthorne effect

It is almost impossible to run an experiment or Pilot that demonstrates that incidences of abuse have been avoided. The Hawthorne effect (sometimes called 'observer bias') describes the situation in which participants in a study or Pilot modify their behaviour during the data collection period because they know they are being observed.

In the CCTV Pilot, it refers to the intentional change in staff behaviour as a result of the operation of the surveillance technology.

It is likely that the presence of these recording devices would increase staff awareness of safety and quality risks in the care they provide to residents. This argument was also made by family members and residents who participated in the evaluation.

“It is reassuring that there are the cameras. My other (family member) is in private service without cameras. I think cameras in any place would be a big advantage. Cameras should keep the staff on their toes.” - family member

Reportable incidents under the Serious Incident Response Scheme (SIRS)

The SIRS is a new initiative from the Australian Government that aims to help prevent and reduce the risk of abuse and neglect of older Australians in residential aged care services. Since April 2021, aged care services are required to notify the Aged Care Quality and Safety Commission if specific incidents have occurred at their service.

These incidents include:

- unreasonable use of force
- unlawful or inappropriate sexual conduct
- psychological or emotional abuse
- unexpected death
- stealing or financial coercion
- neglect
- inappropriate chemical or physical restraint
- unexplained absences

Incidents are classified into Priority 1 and 2 incidents. Priority 1 incidents are those:

- that have caused or could reasonably have been expected to cause, a consumer physical or psychological injury or discomfort that requires medical or psychological treatment to resolve, or
- if there are reasonable grounds to contact the police, or
- when there is the unexpected death of a consumer or a consumer's unexplained absence from the service.

Priority 2 reportable incidents are those that do not meet the criteria for a Priority 1 reportable incident.

Neither site had a Priority 1 SIRS incident during the Pilot.

What have we learnt from the Pilot?

It has been suggested that the use of surveillance technologies has the potential to improve quality and safety in aged care. However, there is limited research into surveillance technologies in residential aged care.

In the absence of good evidence, the SA government decided to invest in the CCTV Pilot Project. The Pilot was conducted over 12 months at two SA residential care services and trialled the use of a AI-based, audio-visual technology system in common areas and resident bedrooms.

The evaluation of the Pilot sought to assess the feasibility, acceptance, and influence on quality and safety of care of the Pilot.

The evaluation found that the AI technology had a high rate of alerts and we have concluded that the AI used in the Pilot was not yet sufficiently accurate at detecting incidents in a residential aged care setting. The accuracy of the system did improve over time (as it was designed to), however it did not achieve a level of accuracy that would be considered acceptable to staff and management at the sites by the end of the 12 months.

However, the concept of using AI-based surveillance technology to improve quality and safety of care for residents has in principle agreement from the key stakeholders involved in the evaluation.

***“The project is important because it helps in the research of effective methods to ensure the health and safety of residents”.
- family member***

The purpose of a pilot is to test something in a real world setting before introducing it more widely. We can expect to see the increased digitisation of aged care and it is important to learn from trials like the Pilot to determine what role technology has to play and how and when it will be appropriate to support quality and safety in aged care.

While the Pilot did not achieve the aspirations held for it, there are many insights that can help governments and the aged care sector in Australia when considering the use of surveillance technologies in aged care.



1. The concept has in principle agreement from residents, families and staff involved in the evaluation.

The use of an AI-based surveillance system was broadly acceptable to the staff and residents involved in the evaluation. This is due to the perceived potential for it to support safety and to detect resident falls.

Whilst some staff are likely to object on the grounds of privacy for residents, the future introduction of surveillance technology can benefit from the acceptance of the concept.

What have we learnt from the Pilot? (continued)



2. The purpose of surveillance should influence decisions about the functionality needed.

The reasons why a surveillance system is being introduced should determine its functionality. Will it be used as a quality and safety process (e.g. to detect falls) or to prevent and detect abuse of residents. The answer will support decisions about the functionality needed in the system.

For example, for prevention and detection of abuse, recording devices without a sophisticated AI system may be sufficient if staff know they are being 'filmed'. If it is for quality and safety purposes, consideration should be given to other systems in use (e.g. sensor mats or other falls prevention strategies) and how the CCTV system will complement or replace these processes.



Conversely, if it is to support the detection of abuse, it may be more appropriate to have a person review live footage.

3. The limitations of the technology need to be understood

The functionality of the technology chosen needs to be considered. There will be benefits and limitations of every system depending on the type of aged care service and the complexity of care needs of residents. Key aspects to consider include:

- the amount and type of infrastructure used (e.g. the number of recording devices)
- any system 'blind spots'
- the way in which visual footage is viewed (e.g. only viewed on exceptional basis with restricted access, or able to be viewed on a continuous basis through a monitor)

- the process for alerting of events (e.g. phone call from an independent third party monitoring service or an automated push notification to a device carried by a clinical staff member).



4. Trade-offs will be needed between privacy and dignity and the functionality of the technology.

SA Health, in designing the Pilot made conscious decisions about how to protect the dignity and privacy of residents and staff.

For example, recording devices were installed in common rooms and bedrooms and not in bathrooms, bathroom footage was redacted (blurred / blacked out), access to the footage was restricted to specific senior site officials, and an AI-based system was selected so that staff and residents did not feel they were being 'watched' by someone.

Further, recording devices in bedrooms were also switched on only with the consent of residents.

When considering the use of surveillance in residential care, consideration needs to be given to how to protect privacy of residents and staff, and in doing so, trade-offs may be needed in what is possible in terms of the functionality or accuracy of the technology. For example, accuracy may be improved by having a human review all footage in real life (compared to AI detection) however residents may be uncomfortable and believe this compromises their privacy.

What have we learnt from the Pilot? (continued)

5. The surveillance technology should be implemented through a staged process before in situ implementation.

Consideration needs to be given to how mature the technology system is prior to installation in the residential care setting. Has the technology successfully been used in other settings including aged care or hospitals? Has it passed a proof of concept phase or been through a full pilot testing of its benefits and limitations in a simulation setting? If the system is to be used for falls prevention, what formal testing has been done (akin to testing for other health devices) to demonstrate effectiveness?

Currently, there is no formal framework to review and approve technology surveillance systems prior to implementation in aged care in Australia.

If a system is to be used as a quality and safety process, then the introduction of a mature and tested system that has demonstrated efficacy may be appropriate. A staged testing process prior to piloting across an entire residential care site may support improved implementation. This may include testing in a simulated residential care setting that mimics the characteristics of the selected pilot site or testing on a smaller scale (e.g. in one room).

If using AI as part of the surveillance system, then the time taken to train the AI to the context of use should not be underestimated.



The perceived value needs to outweigh the additional workload.

In the context of document pressures on the aged care workforce, any additional workload associated with the introduction of an AI-based surveillance system needs to be considered carefully.

An AI-based surveillance system may have the potential to decrease the workload of staff if working optimally (if it detects the quality and safety risks it is programmed to) and this should be considered.

Staff and management are likely to accept (and possibly embrace) some additional workload if, and only if, they can see the value of the system to resident care, health and wellbeing.



Site characteristics are important.

Alignment between the functionality of an AI-based surveillance system introduced and the characteristics of the sites is important.

Consideration needs to be given to the physical environment and how well the system functionality will adapt to this, the residents and their risk profiles (e.g. how likely are they to fall when unattended, the frequency and volume of vocalisation), and how well matched this will be for the specific technology chosen.

Consideration also needs to be given to the staff to resident ratio in any setting to assess how likely the system would detect quality and safety risks (e.g. falls) in the absence of a staff member.

What have we learnt from the Pilot? (continued)



Change management is important.

The implementation of the CCTV Pilot included a range of change management activities to support staff, residents and their families throughout the Pilot period. When introducing a surveillance system, consideration should be given to:

- How and when consent will be sought from residents, their families, and staff.
- Training processes, including what level of training about the system is needed, who requires the training, who should the training be delivered by, in what format is it best delivered, and how often does it need to be delivered given the turnover of care staff in residential care?
- Processes to engage and support middle management to drive the changes needed to achieve the most value out of any system.
- Communication and messaging about the system to staff, residents, and their families. What needs to be understood and how and when will this be communicated?



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