User reported outcomes from Assisted Living Monitoring Systems implementation in two residential institutions

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Introduction

Assisted Living Monitoring Systems provide non invasive monitoring to home and residential settings, connecting the care team or supporting practitioners to all of the rooms that are being monitored simultaneously. Information flows from the rooms or areas being monitored to the care team to direct their attention to the service users that require timely assistance and response to emerging situations.

Teams implementing the Assisted Living Monitoring systems can expect to find that it will change the processes that they currently engage in to ensure the safety and wellbeing of those under their care. Current models of care that rely on repetitive routines of rounding and checking are challenged by the implementation of Assisted Living Monitoring Systems. Users and teams who implement Assisted Living Monitoring systems are engaging in a new and exciting way of working to provide safe, nourishing environments for those in their care.

This white paper discusses the experience of Staffordshire Council and North Tyneside CCG and how ALM changed the way they work, and the benefits derived from its implementation.

Immediate experience by ALM users.

Users of ALM report it as facilitating better care in their experience. The technology has become incorporated into the daily work routine and is referred to as the "virtual staff member", such an effect it has had on the staff's ability to perform their roles.

The predominant benefits reported by ALM users include:

- Reduced falls occurrence, and reduced harm from falls.
- Increased sensitivity to events in service users' rooms.

- More effective resource utilisation of available staff.
- Responsiveness to casemix and the ability to focus on individuals with highest intensity needs.
- Reduced need for additional staffing models e.g. bank or agency staff for one to one observation.

ALM system benefits for patient monitoring.

The provision of the remote observational data directly from the rooms that are surveyed by the system to the control hub means that the team feel that they can be more responsive to issues and focus their activity on the service users with highest intensity needs.

The function of a 1 to 1 staff member is that they are on hand directly observing the at risk individual. A system such as ALM allows for such observation by one individual of multiple high risk individual service users at the same time, reducing the boredom and natural problems with dips in concentration that 1 to 1 observations suffer from. This reduces cost to the employing organisation and reduces the stress of individual staff members. Reduction of 1 to 1 staffing over and above establishment staffing figures are reported as at least 50% less after the implementation of ALM.

Organisations embracing the use of ALM will need to consider how they work differently to truly benefit from the functionality of the technology at their disposal. The technology puts the information in the hands of the staff and compresses the time between the detection of potential risk events and the need for a response.

Replacing intentional rounding models with hub and spoke models facilitated by technological monitoring systems.

One of the criticisms of well established practices such as intentional rounding is that they are labour intensive, requiring staff to go round to everyone on a rota basis, rather than focussing their attention on individuals with the highest risks or needs. Another, not unfair, criticism is that this approach is broad brush and lacks personalisation or is reflective of individual needs. Rounding operates on the premise that the more often one is checked the less likely individual incidents are likely to occur.

Whilst this has been broadly supported by the available evidence regarding intentional rounding, it is not a perfect approach. Intentional rounding reduces falls risk through addressing the issues that are likely to contribute to falls such as good bedspace management, continence needs, and ensuring a call bell is within reach. This "nursing by numbers" can quickly deteriorate into a tickbox exercise rather than being truly responsive to the needs of service users. Additionally, such rounding practices rely on the rigorous recording of all of the interventions concerned at that time that they took place.

On far too many occasions when falls occur, and the services users or their representatives sue the care team concerned, litigation succeeds because these records have not been rigorously managed, or there appears to be no individualised approach to the specific needs of the service user. Litigation in English law only has to prove that a failure in care "on the balance of probabilities " lead to the fall causing an injury. This is a low bar for care providers to be litigated against. By contrast, a continuous monitoring system which records all events in chronologically stamped detail provides institutions implementing such technology piece of mind that human error won't creep into the recording of the alerts and interventions needed to keep a service user safe.

To actually prevent a "fall in progress" when someone is egressing a bed or trying to stand and mobilise with a strategy such as intentional rounding is almost impossible and based on luck, such as being in the room or immediate vicinity of someone who is engaged in these activities.

On the other hand, a hub and spoke model which relies on technology such as the ALM to transmit data from areas which are surveyed by the system to a team centrally benefits not only from constant monitoring and surveillance, but also that the resource utilisation is timely and more focussed and individualised. Movement sensors pick up when individuals are moving or going to move from the bed and staff can divert to help. This does not remove the need for someone to be checked when they need continence aids to be changed for instance, but does mean that someone who wishes to be as independent as possible can be assisted when required, or if they forget to use their call bell, the system will still afford staff the opportunity to intervene and support a service

user so that they can get themselves to and from toileting facilities with the appropriate supervision and support.

Accelerating post falls care and response

Mitigating falls and the harm that results from falls is not just a function of stopping the potential fall in progress although this also helps. Sometimes falls occur without there being precursors which can be adequately predicted. In those circumstances, being able to identify the fall by having loud noise sensor events which the ALM has, means that falls can be investigated as soon as they occurred, involving staff as soon as possible to assist and assess and seek medical treatment when required. Long lies are a significant risk of an undiscovered fall, increasing the risk of pressure injury damage, rhabdomyolosis and hypothermia.

Total system costs of falls.

Falls are a significant drain on health and social care resources. In at risk individuals falls result in fragility fractures when their bone density is low, such as in cases of osteopenia and osteoporosis. The total cost of these fragility fractures for both Healthcare & Social Care in the UK has been estimated at £4.4bn and mortality for hip fracture at one year is approximately 30%. A third of the people over 65 and half of those over 80 fall at least once a year, incurring pain, injury, psychological distress and loss of confidence. Along with the personal cost, the cost to the health and social care sector is significant – these cost the NHS over £2bn per year and 4 million bed days with a prediction that this is set to double in some scenarios.

The resource utilisation benefit that one would also expect from the implementation of the ALM system is that there would be reduced post falls care required both by the institutional team themselves and by the wider system. Falls commonly require four levels of response. The first immediate response is by the institutional team themselves, which happens in every case. In cases where the institutional team believe that harm occurred that requires medical attention, ambulance staff may be called which is the second level of response. At this point ambulance staff may review a service user and elect to leave them in the hands of the institutional team or primary care team to manage

their ongoing needs, which would count as a non conveyance, or they may elect to convey the service user to a hospital setting. An emergency department attendance due to conveyance by an ambulance team is the third level of response. Lastly should the emergency department team consider that the service users injuries justify hospital admission e.g. suspected head injury, fracture etc., the emergency department team may elect to admit the service user to hospital which is the fourth level of response in the case of falls.

Care and nursing home rates of falls are not available as shown by the health economic report that accompanies NICE Clinical Guideline 161 for Falls in Older People.[1] The Department of Health acknowledge that there is a lack of information related to rates of falls in care homes that do not result in ambulance attendance or hospital admission. This must be acknowledged as a limitation of any calculation of falls improvement and the associated impact of cost in care homes. Care homes that wish to calculate their return on investment in a comprehensive fashion would be encouraged to work with commercial entities such as MyImprovementNetwork to develop locally applicable and well founded case studies that acknowledge both national data sets and local idiosyncrasies of the clinical and social care systems.

The DoH report highlights that cost for a GP home visit which would occur in 60% of cases would be £121 for a care home. Hospital attendance via ambulance would cost £480 which is 20% of cases. Hospitalisation due to a fracture (which occurs in 4% of cases) would be £1829 as a minimum average cost.

The Public Health Outcomes Framework reports emergency admissions for falls in over 65s by local authority. In Staffordshire, the emergency admissions for falls in over 65s (C29) was reported as 4,030 as a total for 2022/23 or 2,025 per 100,000 population[2]. The same measure for North Tyneside was reported as 1,345 as a total for 2022/23, or 3,130 per 100,000 population[3] This translates, using the assumptions in the previous paragraph, to a cost of **£7.37 million** for Staffordshire for falls resulting in hospital

[1] cg161-appendix-k-full-health-economic-report-2013-pdf-6841214714 (nice.org.uk)
[2] Public Health Outcomes Framework - Data - OHID (phe.org.uk)
[3] Public Health Outcomes Framework - Data - OHID (phe.org.uk)

admissions for over 65s during 22/23 and **£2.46 million** for North Tyneside in the same year.

Using the NHS report's figures, we can extrapolate backwards to calculate ED attendance cost and home visit costs. Since according to the NHS report, the figures quoted in the PHOF constitutes approximately 4% of the presentations to hospital, a further 16% of patients will present to Emergency Departments but then not be admitted, which can be used as a multiplier of 4 against the figures to calculate how many patients presented but were not admitted. On this basis, during 2022/23 16,120 patients presented or were conveyed to ED settings with falls but were not admitted in Staffordshire, and 5,380 patients presented or were conveyed to ED settings in North Tyneside for the same period (2022/23). Using the NHS report's own figures, the system cost for this would be **£7.74 million** for Staffordshire and **£2.58 million** for North Tyneside.

Benefits to senior management teams

ALM records constant information regarding the care that is provided to service users. This has sundry benefits to the senior management team of institutions that employ the ALM technology.

Services users and their relatives or representatives commonly challenge whether the appropriate care has been provided in the institution concerned. The ability of senior management teams to demonstrate that this has occurred historically relies on the attentiveness and conscientiousness of staff members recording the individual interventions that prove that the appropriate care and attention took place. Where ALM records that such interventions occurred passively and without the need for human intervention, it means that there is a reduction in the amount of contemporaneous recording that teams are required to undertake, and there is live data to support that care is being provided in the most appropriate fashion.

Senior management teams also can use the data from ALM to manage staff performance as well. Whilst it is not a common occurrence, on occasion there are issues with staff performance, such as not performing in the best interests of service users, not acting appropriately or responsively to alerts, or even taking rest time when they are not rostered

to do so. ALM helps to support senior managers in the monitoring of their staff performance to both demonstrate good practice as much as root out bad practice in institutional settings.

Detecting service user deterioration

The functionality of ALM includes the ability to detect the physical measurements of the service user's health including breathing and heart rate. Heart and breathing rate vary between individuals as a baseline, but in most cases where there is a deterioration in the physical health of a service user, this is usually detectable in the measurement of the physical health markers over time. On at least one occasion the system aided with the detection of the deterioration of a service user:

> "One of the residents was unwell and the sensor detected that they were not breathing correctly meaning staff were able to identify the issue. We were able to get medical support really quickly. He ended up going to hospital to receive treatment which the system triggered us to."

Claire MaCallister Manager

The application of such functionality is obvious. One of the key drivers of primary care innovation is the prevention of hospital admissions. ALM as a technological assistant to the management team and the wider primary care setting would allow pre-emptive intervention to address deteriorating health issues and potentially avoid admission.

Installation, Onboarding and Ongoing support.

Implementation of ALM is supported by the commercial team from the point of installation, through onboarding to the ongoing support of the system.

Installation of the ALM is provided by the commercial team into the rooms that have been nominated to be monitored, and the system collecting the information is installed into the hub designated by the institution for the monitoring of the ALM devices. When the devices are first switched on they calibrate to the rooms and the users, and establish a baseline which is displayed on the service user's relevant monitoring screen. Subsequent measurements are compared to this initial calibration phase, offering the

care team alerts and information regarding the ongoing state of service users when they are in the rooms in question.

Onboarding of the care team is supported by the commercial team remotely, and the use of the ALM system can be monitored by the commercial team with check ins scheduled to support care teams implementing ALM. Ongoing support is intended to ensure that teams are deriving the most benefit that they can from the ALM system, along with troubleshooting any implementation issues and can pick up if there has been suboptimal use of the ALM devices.

The following case studies summarise the overall benefits derived in the implementation of ALM in Staffordshire and North Tyneside. Implementation was for 6 months at a cost of £50k for 13 rooms in total.

Staffordshire council experience

Staffordshire Councils' experience of the use of ALM is typical of the benefits derived from the system.

In the institution in which ALM was installed it was noted that there was only one fall in the room where the sensors were installed, whereas it was observed by the senior management team that there were multiple falls in the other rooms. Casemix had not changed during the implementation of ALM and so running the trial of ALM alongside current working practices demonstrated the superior safety and responsiveness of the ALM monitored rooms.

The system enabled the team to delivery 493 remote welfare checks over 6 months which didn't involve having to move around the home and potentially disturb individuals by entering their rooms.

In 155 cases heart rate alerts were triggered for low rates of beats per minutes) where vital signs had changed from normal parameters.

Bed exits are monitored to provide information regarding the activity in a service users room and to provide the opportunity for care teams to intervene when necessary.

873 bed exits were detected including, 370 times the fall sensor was activated. 439 restlessness/body movements were detected whilst the service user was still in bed. This was helpful to detect the quality of sleep service users are liable to experience.

210 events were labelled as human error, but this is more accurately described as an artefact of the staff helping residents back into bed and is a helpful marker of the assistance and intervention of the care team.

In 43 cases potential falls were avoided, and response times were recorded in one setting and over a period of six months in thirteen beds across two sites. The response time was on average 2 to 6 minutes from the alert starting.

Some homes experienced dramatic improvements in falls reduction:

> "One of our residents had SEVEN falls in five months and we had tried everything. Since we fitted the sensors, she had ZERO falls across the same time period from August – December 2023."

> **CCG Care Home 2023**

North Tyneside CCG Intermediate Care Site

At the North Tyneside CCG intermediate care site, the experience of ALM bore out the findings of the Staffordshire council.

5 falls were detected during the trial of the ALM system, a 100% detection rate. Falls rates increased significantly after the removal of the system. 16 of the residents showed a decrease in the number of falls they experienced.

Inevitably in an intermediate care site, falls are a constant risk as people seek to become more independent. Complete falls avoidance is not possible if intelligent risk is to be taken in the promotion of independence. However having ALM in place means that assistance can be provided in a timely manner, and monitoring can be less invasive, giving individual service users the opportunity to try to manage themselves as much as possible.

Over 9 months, 83% of patients experienced improvements in nutrition and hydration. This is likely due to the improvement in sleep pattern that the service users experienced.

North Tyneside observed similar improvements in sleep cycle. Challenging behaviour was significantly improved during the trial and returned after the removal of the system. On one notable occasion the ALM system was noted to significantly improve a male service users behaviour, who had previously required police attendance, and had attracted staff, relative and other service users' complaints.

Summary

The experience of both Staffordshire and North Tyneside demonstrate the individual service user, care team, senior management, and systems benefits of the implementation of ALM.

Falls rates are calculated in falls per 100,000 occupied bed days. This measure allows us to calculate the reduction in falls as a result of the implementation of ALM. On 43 occasions falls were reported as prevented in 13 occupied beds across 6 months. This equates to a reduction in falls of just over 18 falls per 100,000 occupied bed days. Calculated in this way, institutions thinking of implementing ALM can look at their own falls rates and apply this to see what benefit they would derive from the installation of ALM.

Systems costs for falls alone in the areas in which ALM was trialled were demonstrated in this report as being in excess of £15 million for Staffordshire and £5 million for North Tyneside. It can be reasonably be predicted that with the efficacy of the ALM demonstrated in these trials that these costs could be substantially impacted positively with widespread adoption.

Institutions already employing ALM or thinking of doing so are encouraged to engage not only with the evaluation of the product but also in developing their own data collection and metrics to demonstrate and support the return on investment that is most likely to follow implementation of the ALM system.

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