Incontinence is a common problem amongst people living in aged care homes and is often the result of a complex combination of compounding factors. It can impact on an individual’s health, independence and dignity and hence their quality of life. Accurate assessment of voiding patterns is essential to effective care planning, however this typically requires hourly continence monitoring (day and night) over a number of days and can be highly disruptive and embarrassing for both residents and staff.

As a means of addressing this issue, Fred Bergman Healthcare (FBH) developed and trialed an IT-based monitoring system that was used to evaluate the qualitative and quantitative effects of IT on current continence assessment and management practices. Such a system has the potential to support a significant change in continence assessment and management from a predominantly manual to an electronic process and improve quality of life for residents in aged care homes.

**Trial of a Continence Management System**

**Situation**

In 2003 the cost for urinary incontinence care in residential aged care was reported as $1,268 million with a further $111.7 million for continence aids (figures sourced from the Australian Institute of Health and Welfare (AIHW)). AIHW further estimated that caring for urinary incontinence utilises 25% of residential care nursing time (“Hospital and Healthcare”, November 2002, 15-16).

Continence assessments are currently impeded by time restraints, gaps in knowledge, lack of valid instruments and inconsistent practices. It is possible that up to nine or more different staff may be involved during a three day assessment to determine voiding patterns. This is not conducive to accuracy. Staff are busy attending to needs of many residents and the importance of accurate assessment on a consistent basis (hourly) is often not a priority, or is difficult to adhere to. During the night, this may disrupt sleep or prompt premature voiding. If assessment is inaccurate the whole care process will be jeopardised, as will optimal outcomes for the residents. As a result, staff may lose confidence in their ability to improve continence for the resident.

Once a management plan has been determined with designated toileting times, a continence chart has to be maintained to evaluate the effectiveness of the plan. These measures are also important to claim optimal funding through the Residential Classification Scale and to meet the Aged Care Accreditation Standards.

The Clinical IT in Aged Care project provided $275,000 to FBH to conduct a trial of their SIMPAD™ IT-based monitoring system. Substantial in-kind contributions were also sourced from a large number of collaborators.

**Aim of the Trial**

The trial tested the ability of SIMPAD™, an electronic monitoring system, to provide an accurate pattern of urinary voiding, which in turn would enable a more tailored and focussed care plan for each individual resident. In addition, the trial tested if the cost in labour, laundry and pads could be significantly reduced with a system that allowed for accuracy whilst reducing nursing staff workload.

The trial aimed to:
- demonstrate improvement in health outcomes for residents in aged care homes;
- examine the efficiencies and cost/benefits of introducing the solution in aged care homes;
- demonstrate the impact on planning and/or communicating care requirements;
- demonstrate improvement in access to and sharing of relevant clinical information; and
- examine the long term affordability and scalability of the system for aged care homes.

This product trial summary was prepared as part of the Australian Government Department of Health and Ageing's Clinical IT in Aged Care Project. The product trials aimed to assess improvements to the care provided to residents in aged care homes as a result of the implementation of technology. The use of the IT product in this trial should not be taken as an endorsement of the product.
Consortium Members
The project was led by Fred Bergman Healthcare (FBH) who conducted the implementation and evaluation. FBH drew together a range of organisations and expertise including aged care home administrators, clinical staff, researchers, tertiary institutions, product and software developers.

Participating organisations included CSIRO Biomedical Devices who conducted bench tests and made recommendations regarding product development. Monash University contributed to the design of the case report forms used in the study by dedicating a senior nurse adviser to the project. Victoria University contributed to the design of the qualitative study and with ethics approval. Grey Innovations designed the product electronics and software. Smart-Caller Pty Ltd contributed with their nurse call system equipment and technical support. SCA Hygiene provided continence pads which were adapted into SIMPAD™ pads.

The trial took place in the Dava Lodge Nursing Home in Mornington Victoria.

The Solution
SIMPAD™, the IT-based monitoring system used, comprised a specially designed continence pad that monitored wetness events and transmitted information via radio link to a central management system which then sent pager or SMS messages in real time to the relevant nursing staff to attend to the resident.

A specially designed Windows-based database software package was built for the central management system which discreetly monitored events. Using this technology allowed for accurate and valid data to be obtained to identify voiding times for individual residents and determine a pattern to support more efficient pad usage and to maximise the chance for toileting at the appropriate time.

Equipment used in the trial included a laptop PC with custom-made software which was connected to a base station that was used to receive messages from the transmitters and the repeaters. 10 transmitters were available for use with over 1000 pads which were prepared for use in the trial. The pads were specially fitted with sensors beneath strips of liner material. Up to 10 repeaters were installed in locations around the facility. One mobile phone was used for receiving messages and a printer was made available for production of continence charts.

An essential design element was to ensure that the incontinence pad and system were easy to use and did not add additional time to the process of changing or checking pads.

It was important that the trial was carried out in a ‘real world’ rather than a ‘research’ environment. Therefore, as much as possible, assessments were performed in the way they would normally be performed whilst maintaining a balance against the need to maintain data integrity in the daily context of an aged care home.

A range of challenges were encountered during the electronics and software development process which resulted in a narrowing of scope from a ‘diagnostic diaper’ to an incontinence assessment and management tool. Future research and development is likely to lead to the product achieving an even broader potential. The final version used for the trial included improvements made according to nursing and clinical requirements, was user friendly and provided the expected clinical information.

The Trial Design and Setting
The trial was conducted with 35 residents (mean 85 years of age, all high care) in the Victorian based Dava Lodge Aged Care Facility.

The project design included the following three methodologies to enable triangulation of results.

1. A correlation study to measure the accuracy of SIMPAD™.
2. A randomised, controlled, repeated pre and post measures, with single crossover design, where the units of analyses were at times the resident, at times the nursing staff, and at times the organisation. The control intervention consisted of a standard 3 day hourly manual assessment.
3. An observational study using qualitative methodologies and analysis to evaluate the impact of SIMPAD™ on staff within the aged care home and management.
Involvement of Clinical Staff

FBH recruited its own nursing staff who were allocated to perform additional assessments and to collect all necessary evaluation data for the project. Where possible, the nursing staff were recruited from within the participating aged care home or with experience in aged care. It was important that FBH nursing staff were familiar with the residents and had a good working relationship with other staff as well as a good knowledge of the home’s working practices and routines. These staff all had training in the system and the process of change management.

Five training sessions were also held with Dava Lodge nursing staff. Briefing sessions about the project, including the participant recruitment process, were provided to management and staff, residents, relatives and significant others, and project workers. All staff likely to be involved with the residents participating in the trial were approached.

One member of the nursing staff was identified as the project coordinator and was responsible for communications with the project team and for collection of relevant data.

Education materials were prepared to support the education sessions to be presented for all nursing and carer staff. These were refined after dry runs with team members and Unit Managers at Dava Lodge.

Around the clock support was available for nursing staff in the early stages of the trial. Once modifications were introduced which improved and simplified the operation of the system, FBH staff were able to handover management of electronic monitoring to nursing staff.

Correlation and validity clinical studies were used to verify the accuracy of the equipment compared with clinical gold standard and to enable the preparation of a User Manual for nursing staff. Dava Lodge nursing staff were also instrumental in providing advice and feedback on refinements to the User Manual.

Involvement of Residents

Residents were screened by nursing staff for potential eligibility. The Director of Nursing (or Nurse Coordinator) or delegated person then approached the eligible residents or legal representative if the resident was cognitively impaired. All residents (or their guardians) involved in the trial received an explanatory statement and signed the consent forms.

Residents involved in the trial were chosen on the basis that they had suffered from urinary incontinence for at least one month as determined by nursing staff in the aged care home. Exclusions were made where it was determined that an existing clinical condition could impact on the results of the trial or if it was determined by the nursing staff that participation in the trial would be detrimental to the resident. On average, participants had been suffering from urinary incontinence for 4.1 years.

To minimise intrusions on residents’ privacy during the trial, residents were left uninterrupted between the hours of 9.30pm and 7.00am.

Outcomes

Key outcomes demonstrated during the trial included:

♦ **Fewer unnecessary attendances where pads did not need to be changed.** In particular there were 70% fewer attendances when compared to the baseline measures and 30% fewer when compared to care resulting from the control intervention (3 day hourly manual assessment).

♦ **Fewer instances of attendances finding residents with soaked pads as opposed to dry, damp or wet pads** which are situations that affect dignity, comfort and skin integrity. Here there were 32% fewer incidences when compared to the baseline measures and 18% fewer when compared to care resulting from the control intervention.

♦ **Fewer instances of attendances finding wet or soaked linen** which affects resident comfort, dignity, environmental quality (malodour) and comfort. In relation to these incidences there were 84% fewer when compared to the baseline measures and 32% fewer when compared to care resulting from the control intervention.

♦ **Improvements in efficiency** with fewer nursing attendances (47% compared to baseline and 8% to control intervention) and a reduction in nursing time spent in attending to continence (43% compared to baseline and 10% to control intervention).
Consistently, the assessments resulted in improved quality of life and health outcomes and more cost effective care for residents in the trial.

The qualitative study revealed staff and management, in particular those involved in the trial, overwhelmingly perceived positive outcomes in relation to:

♦ significant changes to skin integrity; accurate care plan development; reduction in invasive procedures including manual handling; and reduction of the number of unnecessary interventions as a result of providing more accurate toileting times.

♦ Benefits of the trial were evidenced in areas of improved staff knowledge and understanding of continence management and the need for an accurate voiding pattern to be obtained as an adjunct to a comprehensive assessment.

In general, staff not directly involved in the clinical trial remained somewhat negative about the benefits and the future role technology could play within the facility whereas staff with the greatest involvement were able to identify benefits.

Barriers
Staff attitudes and a lack of willingness to change resident care routines were highlighted as the major barriers to overcome in implementing any new program.

In addition, the cost of equipment for initial implementation of the continence assessment system could be prohibitive as well as the extra staff needed to support and educate staff during the implementation phase.

Key Success Factors
Formal and informal education provided to care and research staff throughout the project assisted in this trials success.

An understanding of the process of change management and applying it throughout the trial facilitated staff participation in the trial leading to accurate outcomes and identification of areas for improvement and change.

Lessons Learned
Education programs need to clearly identify the benefits of technology to both the carer and resident, focusing where possible on the positive patient outcomes achieved and time management and manual labour benefits experienced by staff.

Education support needs to be extensive, not just short in-service sessions. Staff members require assistance to use and understand the technology involved, equipment use and functioning, together with the components of assessment and management procedures being implemented. Additional staff or program representatives are required to facilitate this process for efficient and effective implementation.

Family members are readily engaged when issues of family member comfort, hygiene and individualised care can be supported. It is important for family to be able to see the devices and aids used and receive ongoing feedback on the family member’s care.

Conclusion
This project has shown that the use of IT in this specific area of continence management greatly benefits the residents, staff and management. The greatest benefits were reported to be in the reduction of intrusive episodes and the reduced amount of time spent by nursing staff who used the SIMPAD™ to conduct continence assessments and were then able to prepare more accurate resident-specific toileting plans.