A program for collaborative research in ageing and aged care informatics

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Abstract
There is renewed interest in the application of information management and technology (IM&T) to ageing and aged care. This interest is driven by increases in the percentage of older people in the populations of developed countries, moves towards extending the independence of older people and encouraging more care to be delivered in the home and in the community. These trends are expected to stimulate the development and application of those technologies which will be essential as an enabling infrastructure for the changes.

There is a need for assistance in the practical steps of evaluating technology, development and implementation of information standards, encouraging and enabling adoption of IM&T, and the development of rigorous financial cases for investment incorporating how benefits aims to be realised. There is also a need for the development of specific strategy for information management in aged care. All of these require a stronger research base including the development of methodologies, experimentation and learning through demonstrator projects.

This paper outlines an active and collaborative research program for ageing and aged care informatics to support the development, implementation and evaluation of IM&T.

Keywords: e-Ageing and aged care, ageing and aged care informatics, information technology

1. Introduction
The Centre for Ageing and Agedcare Informatics Research (CAAIR) at the University of Southern Queensland aims to enhance care and independence for older persons and control increases in ageing and aged care costs through research and innovation in information management and intelligent technology. Achieving world class aged care is a major policy direction emphasised in the National Strategy for An Ageing Australia. The Centre will address a key goal of this Strategy, namely: “A care system that provides integrated and coordinated access, assistance and information for older Persons with multiple and significant and diverse care needs” 1. The Strategy states that “Health information has a crucial role to play in quality improvement through the management of information on care standards, complaints and consumer rights”. Research and development is vital to “improve the management of patients’ care by improving the flow and linking of individual patient information”. Highlighted areas of focus in the Strategy include: data comparability and linking for service planning, data on service need and patterns of services.

Operating as a virtual centre across geographically dispersed nodes, the CAAIR links and builds upon its national and international partner centres and aims to be the leading centre for
information management and technology research for ageing and aged care in the Asia-Pacific region. The virtual nature of the centre is made possible by generous funding provided by the University of Southern Queensland to establish a wireless research laboratory for CAAIR.

There is a need for the potential benefits of technologies in providing support for older people to be evaluated. This potential includes managing activities of daily living, supporting families as carers and advocates through technology such as remote monitoring, improving access to service delivery information, enabling clinicians to share care plans and better coordinate care. There is potential through technology to support ageing in place and delaying or avoiding moves to institutional care. Savings are anticipated from applying technology to foster prevention and early detection of the onset of disease or disability, when treatment is often cheaper and more effective.

2. Approach
An Aged Care Informatics research program was developed over a 12-month period in consultation with participating research centres from universities in Australia and Japan, ageing and aged care agencies. Core participants included the Collaborative Centre for e-Health at the University of Ballarat, Niigata University of Health and Welfare, Japan and researchers involved in an emergent Centre for Health and Aged care Informatics in the Faculty of Business, University of Southern Queensland, Australia. Applying for an ARC Centre of Excellence grant was one of the first collaborative activities and provided an opportunity to develop a Research Program around this field. While that grant application was not successful, the exercise ensured that a focus for developing a sustainable consortium was derived. The approach involved consultations which produced a draft Research Program which was then further refined through iterations of consultations.

3. Research Method
The research method used to develop the strategy followed a pseudo derivative of Action Research in a Triangular format. The main objective for following this approach was to represents a form of collective, developmental, self reflective inquiry undertaken by participants in order to bring together ideas that have practical implications to issues of pressing concern to older people. This approach requires skills in engaging in face to face work with others to address issues of mutual concern and to create a wider community of enquiry involving organizations. Key concepts of Action research relevant to this research are; need for change, reflection, participation, inclusion, communication, practice, community, evaluation (reflection). Investigation of specific issues such as in this strategy development often reveal multiple dimensions of the situation requiring attention revealing further possibilities for action. A particular strength of this approach (Action Research) is that participants and stakeholders are able to be involved in one or more levels of the strategy development and implementation of findings enhancing relevance of outcomes. This also enhances the validity of outcomes. The findings of Action Research are context specific and may not be easily transferable however she also states that others argue that sustainability and transferability are high. It is anticipated that results derived through this approach can be easily transferable as and when changes are needed to refine strategies to address emerging practices in aged care sector.

4. Research Program
   a. Electronic Records
Research projects will investigate issues associated with data access and how this can be improved in order to facilitate better quality of service to consumers, carers, clinicians, families and managers. The research will focus on communication between stakeholders, the use of Internet and other technologies to address issues currently challenging aged care:

- **Accuracy and currency of patient records:** Inaccurate records are often the result of poor information sharing among stakeholders. There is often a presumption that the needs of aged care are a subset of hospital or primary care. Anecdotal evidence is that attempts to implement hospital or primary care information systems into aged care have failed. This supports the views held by the researchers that aged care is unique and that systems cannot be developed until there has been a thorough requirements analysis. Improved sharing of accurate and relevant clinical information is the goal and issues associated with clinical information sharing specific to aged care aims to be explored.

- **Integration of client records:** The goal is to achieve progressive electronic individual consumer/client records (e.g. admission data, assessment records, care plans, care management charts and progress notes). Issues associated with the introduction of electronic client records, such as integration into workflow, aims to be investigated as well as the impact on care quality.

- **Decision-making:** Potential solutions aims to be investigated to overcome the problem of over-burdened care staff through projects involving intelligent software, including the emerging field of digital Personal Care Assistants and Clinical Decision Support Systems. Current research in aged care highlights the need for intelligent software to facilitate decision-making and care delivery, for example, reminders, monitors and alerts.

- **Infrastructure for aged care systems:** Health Online, and its HealthConnect projects, is the major infrastructure investment in Australian ageing and aged care information. This will provide an infrastructure that aged care will need to connect to for building and maintenance of the Electronic Health Record (EHR). CAAIR will research the interfaces and standards so as to ensure that aged and community care can take full advantage of HealthConnect and be a significant contributor and user of its information.

- **Use of information technology by older people and their families:** Barriers to the adoption of ICT such as insufficient education and support will be researched. Other issues, such as cost, access, equipment design and jargon, aims to be researched in order that older people gain confidence and access to this technology. A major question to be addressed by research is the extent to which dissemination of information and services can be reliant on electronic delivery without marginalising certain groups of older people.

- **Security and privacy issues:** These aspects aims to be an intrinsic part of the design of software, hardware and database products of the Centre and inform strategic and policy development at a national level.

b. **Efficiency, productivity and quality**

Research activity within this thematic area will concentrate on reducing paperwork, simplifying monitoring and reporting, and on report-generator engines to assist providers in reporting to funders and regulatory authorities. The research of the Centre will focus on reducing paperwork and improving efficiencies. Projects will address:

- **Paperwork:** A common complaint on the part of providers is a perception of a burden of paperwork, detracting from client care. Despite exploration in various forums there is not
yet a solution. Projects will gather metrics, review workflows and analyse the level of paperwork to identify opportunities for process improvements as well as opportunities for automation. This will include examination of availability of reports on individual and aggregate consumer/client data sets, *e.g.* reporting incidents/accidents, restraint use, infections, hospitalisations, medical consults, to identify consumer/client profiles and trends.

- **Exception reporting**: This is required to identify unexpected changes in consumer/client profiles and to increase accuracy of human and other resources required for increased/reduced care requirements. The generation of exceptions would benefit the aged care industry by aiding the re-distribution of human resources. Projects will explore effective ways of achieving exception reporting and measure the benefits.

- **Application of available consumer/client information in decision-making**: This is highlighted in the previous section with a specific focus on information management. It is conceivable that using current technologies, it is possible to achieve efficiency gains in many areas including decision-making.

- **Multidisciplinary care planning and decision-making**: Research will explore the use of communications and information technology to assist professional groups, carers and families in participating in care planning and decision-making.

### c. Innovative technologies

With the increasing cost of providing rural and remote patients with consultations that can only be provided by metropolitan agencies, there is a necessity to research and evaluate innovation that may control costs. The following are the themes that are being followed:

- Remote consultancy services and computerised assessment forms
- Access to geriatric and gerontic expertise in rural and remote Australia
- Monitoring and other intelligent devices for home and community settings.

### d. Information standards

There is a major need for development of information standards for aged care. While there is a national strategy in Health, there has been little work on the requirements and priorities in aged care. Information management and systems must be guided by standards to ensure linking and sharing of information, to ensure there are common meanings so as to avoid errors, and to reduce duplication of data entry and storage. Technologies that conform to standards are likely to have a longer operational life. These standards need to be aligned with international developments. Australia is leading several of the major streams of work within Health Level Seven (HL7) – the major international Health information messaging standard. HL7 has been endorsed for the Australian Health sector. CAAIR Projects will include nationwide consultation on priorities for information standards in aged care, alignment with and contribution to international information standards development and contribution to development of the key information standards for aged care.

### 5. Discussion

CAAIR will undertake research to guide information strategic planning and economic analysis to inform investment decisions, requirements engineering, information standards development, integration of existing technologies, evaluation of technologies and the development of products to address gaps in market offerings.
Reasons for the low investment in ICT in aged care aims to be researched including funding, the availability and suitability of products, the need for requirements engineering, and the level of confidence in realizing the anticipated benefits. Strategic and Economic Analysis will conduct research into tools, methodologies and templates to assist in strategic investment on ICT in aged care. This will include education and training.

There are a small number of devices emerging that will assist in tracking patients, providing falls alerts and medication reminders. There is a need for research into why the adoption is slow and the need for additional or superior devices to facilitate independent and active living in situations that in the past would have necessitated institutional care. There are increasing numbers of on-line services including on-line patient personal Health records, monitoring, consultations, and medication purchasing. Software Personal Care Assistants could link with these and with in-home devices and provider-based Health records providing much-needed integration of information. Nevertheless, the deployment of devices is slow. This may be due to doubts about the benefits, the suitability of the devices, the user-interfaces or the integration with other systems. CAAIR will research these factors, will develop interface engines to better integrate existing technologies and will develop devices to fill gaps. The approach aims to be to use “off-the-shelf” components so as to maximise affordability.

CAAIR will develop guidelines, methodologies and standards for informatics in aged care to ensure their successful adoption and to realise anticipated benefits. The policy and funding barriers to exploitation of ICT in aged care aims to be researched and recommendations made to relevant authorities. CAAIR will usher in a new environment of “plug and play” to fast-track the adoption of ICT in aged care.

6. Strategic and economic analysis

Efforts are currently underway to develop an Australian Aged Care Information Strategy which CAAIR will contribute to. There will be a need for guidelines and methodologies to support the sector in making investments guided by strategy, compliant with standards and supported by rigorous business cases. A planning framework will assist in prioritising investment and in directing resources to achieve benefits aligned with strategic directions. CAAIR will develop a methodology and templates specifically for use in aged and community care to assist in the development of information strategy and as a guide to making ICT investment decisions.

The Centre will undertake economic models to better research the benefits and barriers to ICT investment. It will produce an economic analysis tool and templates that can be used by aged care institutions to develop and project their investment status.

7. What is the Next Step?

The scope of the centre and the research projects provide an initial impetus to start activities of CAAIR. However, at the time of writing we are not able to scope individual projects with deliverables and their alignment to meet various national and international objectives. This is currently being undertaken with stakeholders in Australia and overseas. The main objective of undertaking this task is to scope individual projects and seek support from appropriate industry partners in order to obtain appropriate resources to complete these research projects. CAAIR has also attracted PhD and Masters’ students in 2005 Australian academic year to realise its dreams and visions. The CAAIR wireless research laboratory has been established to conduct research and the local Health district has indicated support in terms of other
resources. Currently grant applications are being prepared for national competitive grant schemes to attract further funds.

8. Summary

This paper reports on the development of the CAAIR Research Program which was developed for ageing and aged care informatics. The CAAIR consortium is an open one that aims to share its outputs and engage in dialogue with others working in this field.

The consortium operates as a virtual centre which will facilitate sharing and exchange of approaches to informatics to support active ageing and delivery of care. There are expected to be large savings from applying technology to foster prevention and early detection of the onset of disease or disability, when treatment is often cheaper and more effective. Researchers and policy-makers are invited to be joined to the initiative.

References