

Guest editors' introduction to special issue on aged care informatics

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Welcome to the first Special Issue of the eJHI devoted to Aged Care Informatics. The eJHI, by sponsoring this special issue, has recognised the emergence of a growing field within Health Informatics that will be increasingly important in environments of population ageing, increasing pressures on hospital services, shortages of carers and increasing consumer demand balanced by an increasing availability of assistive technologies to support care delivery, particularly in home settings.

A major shift is underway in healthcare around the world, due at least in part to the attention that population ageing and its anticipated impacts is demanding. There is interest in many countries in better enabling frail older people and the chronically ill to receive care in their own homes and delay or avoid moving into institutional care. The NHS in the UK plans to have monitoring systems in all homes that need them by 2010. Australian projects include telehealth initiatives of the Centre for Online Health at the University of Queensland and home remote monitoring at the University of New South Wales. In South Australia a system of referrals from hospital admission to home care is already in use, and is reported on in the Soar, Yuginovich and Whittaker paper in this journal. Similar initiatives include the HARP programs in Victoria,

and in Queensland the Queensland Smart Home Initiative, a project of the Collaboration for Ageing and Aged-care Informatics (CAAIR) at the University of Southern Queensland, was launched by that state's Minister for Health in April 2007. There is an increasing availability of products and innovative pilot projects across many of the countries that are facing increases in their older populations with resulting impacts on demands for health and aged care services.

A number of forums and associations have been established to promote aged care informatics. In Australia, the Collaboration for Ageing and Aged-Care Informatics Research links researchers in several universities, while in the USA the Center for Aging Services Technologies has engaged the White House in its advocacy of research to advance ICT for ageing and aged care. Aged Care Informatics Australia, a HISA Special Interest Group, was formed in 2004 and the HISA Aged Care Informatics Conference has been held annually since then. The industry associations ACSA and ACAA have sponsored the Aged Care IT Roadshows held across Australia. Within the ARC-NHMRC Research Network, an ICT Group has emerged and held its first event in Canberra on 26 October 2006.

There is great potential for technology to enhance the safety and inde-

pendence of frail older people, enable access to quality care services and to extend their ability to remain in their own homes. Intelligent monitors can keep a continuous watch on patients' vital signs, activity patterns, their safety and security. The technology can monitor indicators of their state of health, provide alerts to events such as falls, and give early warnings of potential problems.

Monitors include personal alarms, motion and smoke sensors, and fall detectors. These can be supported by intelligent software that can alert carers or call centres as required. Some monitors keep track of household equipment and how it is being used. This could indicate that a person is no longer cooking for themselves, or could turn off appliances that have been left on. Sensors are available to turn lights on. They can track and alert for wandering by patients with dementia, and can monitor arrivals and departures of people including the patient or authorised visiting carers. Bed pressure sensors can detect when a patient leaves their bed during the night, and will trigger an alarm if they do not return within a reasonable time. Monitors can record visits to the bathroom and how long they might spend there as well as any change in physical activity such as using the stairs. The technology can alert patients to their own levels of physical activity; it could set goals and

prompt them to undertake more activity to maintain muscle, bone and mental fitness.

Older patients, particularly those living alone, can be at risk of poor nutrition. Sensors on kitchen cupboards, refrigerators and other electric appliances can indicate when the patient is eating and drinking and pass this information to the control system, which gradually builds up a pattern of typical behaviour. The technology will notice particular changes in activities and alert a carer. Home diabetes monitoring is already well established in some countries and a system has been also developed in Australia by Global Health, based in Melbourne. Monitoring devices can be more accurate guides to the health risks such as a heart attack than are the patient's symptoms, providing advance warnings and reducing unnecessary emergency callouts. Devices can monitor different life signs such as temperature, pulse rate, blood oxygenation levels, blood pressure and breathing rate and amplitude. These are all important indicators in disease management.

Existing home security monitors in Australia use simple landline telephones and some additional functionality can still be provided using that service. Broadband, however, will be required for always-on continuous monitoring, especially for image capture and transmission. RFID, Bluetooth and Wi-Fi technology will allow connectivity of devices around the home and in the community without cabling. Passive RFID tags can absorb enough power from the sensing device to perform simple functions. Devices that are powered electrically can use Ethernet Over Power.

While the number and sophistication of available technologies continues to increase, there is a need for research into adoption issues, return on investment, realisation of benefits, integration and interoperability. There are gaps in the range of technologies and particularly in intelligent software and interfacing. It is in these areas where Australia can take a lead and potentially supply markets in Japan, Hong Kong, Europe and the USA.

Current developments and a vision

for the future are presented in the articles in this Special Issue of the eJHI. An invited article from Graeme Philipson and Jann Roberts, *Caring for the future: the impact of technology on aged and assisted living*, discusses the growth in functionality of digital technologies as one of the key trends of the modern age. They discuss a 2005 report from Connection Research Services which was commissioned to research the key issues in the use of technology for the aged and disabled and identified four key areas where digital technologies can be used to improve the lives of the aged, disabled and chronically ill. These include selfmanagement of healthcare in home settings with enormous potential savings and other benefits. Home automation will enhance security, safety and independence at home. This will help maintain quality of life and decrease the demand for carer support hours. Communication technologies will provide important benefits for people whose mobility is limited, or who live alone. Finally, various home automation and digital technologies can benefit the aged and the disabled, improving their quality of life by enhancing their independence. Technology has the potential to extend their physical independence, so they can stay for longer in their homes. It gives them a more dignified life, and it saves public and private money.

In this issue, Anna Essén and Moya Conrick discuss some of the issues that have arisen in "real" implementations of smart home in *Visions and realities: developing 'smart' homes for seniors in Sweden*. They discuss the implementation of electronic enhanced assistive technologies and telecare or telehealth solutions that supplement these solutions, their strengths and weaknesses and some of the practical issues that come from these implementations. This paper urges management on three levels: the *component* or subsystem level, the *interaction* level where the components interact with each other and the overall *system* or *integration*. It also discusses the critical factors for success in implementing smart home technology for older people and those with disabilities.

Jeffrey Soar, Trudy Yuginovich and Frank Whittaker report on an approach to reducing avoidable hospital admissions of frail older people through information technology that involves a real-time assessment tool, an intelligent agent to identify candidates for assessment, and referrals to home-care providers assisted by electronic transfer of information. The paper is based on a model that is operational in South Australia and which is being explored by other state Departments of Health for adoption.

Bill Koch reports the results of a survey mailed to users of an expert system that provides decision support to nurses within aged care settings. The educational impact of using the program is reported, along with perceived benefits to both residents and nurses. Issues of implementation and use are identified which should help managers rolling out computerised systems in aged care facilities.

Evelyn Hovenga *et al* in their article, *Innovative approaches and processes for capturing expert aged care knowledge for multiple purposes*, discuss the current status and challenges for Information Technology (IT) in residential aged care. The openEHR approach is presented as one of the most recognised approaches for EHR systems. Residential aged care is largely considered a 'green field' with regard to IT. The implementation of Electronic Health Records (EHRs) is a key strategy for improving the quality, safety and efficiency of residential aged care delivery. The definition and use of aged care openEHR Archetypes (clinical models representing semantic constructs) is presented as an approach to contribute to interoperability of EHRs as well as various health information systems. Based on a review of scientific literature, other relevant documents and stakeholder identification and consultation, this paper describes the current state of play with regard to EHRs in residential aged care. The paper further compares *openEHR* archetypes, clinical guidelines, terminologies and standards, as well as the processes needed for their development to enable the capturing of expert aged care knowledge for multiple purposes.

The Editors invite you to provide feedback and comment, either in the form of your own articles for future issues or in letters to the Editor. We wish you enjoyable reading.

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