Medical Technology Association of Australia

Caring for Older Australians: Medical technologies to support Australian patients in the community

December 2010

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MEDICAL TECHNOLOGY FOR A HEALTHIER AUSTRALIA

Consumers – healthy ageing and assistive technology

1 What is the evidence that assistive and information technologies can make a significant improvement to the lives of older Australians?

There is a large amount of evidence to show that assistive and information technologies can significantly improve the lives of older Australians. Each state and territory currently has some provision for assistive technology, although the focus is on visual or hearing impairments and mobility. The current challenge is determining how to best fund a wide range of assistive technologies and devices for independent living and home monitoring of medical conditions that will enable older Australians to live independently.

Independent living solutions have been piloted throughout Australia, with excellent outcomes. Personal alarms are a good example of a common form of assistive technology that is widely used. De San Miguel & Lewin (2008) assessed 2,610 Silver Chain CareLink Personal Alarm users. The majority were female, living alone and over the age of 80. Clients reported that they were able to gain faster assistance in an emergency, increase their sense of security, increase the length of time they were able to remain in their own homes and decrease their anxiety about falling. A recent study that followed over 100,000 patients across the US who have implanted cardiac devices — cardiac resynchronization therapy (CRT) devices and implantable cardioverter-defibrillator (ICD) devices found that in those patients whose device included wireless-enabled monitoring had a 50% reduction in mortality rate than those who only received follow-up care at clinics (Saxon et al., 2010).

The largest international study to date was undertaken by the Veterans Health Administration in the US, which analysed data from a national home telehealth program, Care Coordination/Home Telehealth (CCHT). The program aids people to live independently in their own home by implementing home monitoring and disease management technologies. Patients are predominantly male (95%) aged 65 or older. Darkins et al. (2008) analysed data from a cohort of 17,025 patients and report a 25% reduction in numbers of bed days of care, a 19% reduction in numbers of hospital admissions and a mean satisfaction score rating of 86% after enrolment. Due to these impressive results, CCHT is now a routine program.

The types of assistive technologies that that will enable home health care include:

- Electrocardiogram (ECG) and mobile telecardiology systems for monitoring cardiac arrhythmias and cardiac rhythm management
- Wireless devices combining satellite global positioning systems (e.g. for dementia patients who wander)
- Portable anticoagulation monitors
- Smart incontinence management systems and enuresis devices
- Remote monitoring and assistance for cochlear implantees
- Alarm systems to monitor falls and other medical alerts
- Home monitoring devices for pulse, blood pressure, heart rate, heart rate variability, epilepsy and weight monitoring.

The appropriate provision of sub-acute medical products and services for remote patient monitoring will decrease emergency room visits, decrease unnecessary hospitalizations, avoid inappropriate transition to residential care and achieve cost savings through maintaining people in their own homes. High technology implantable devices can be remotely monitored with positive clinical outcomes. The MTAA submission to the Productivity Commission (August, 2010) includes a detailed overview of the clinical effectiveness of assistive technologies used to promote health and independence in ageing

populations. A brief summary of current pilot and full deployment programs in Australia is presented below:

New South Wales

- NSW has 270 telehealth facilities
- The Intel Health Guide is being piloted on 50 high-risk patients who have one or more chronic diseases with Healthe and Hunter Nursing Agencies
- Baptist Community Services are running a Transition Care Pilot including 200 patients using Tunstall telehealthcare systems within a hospital to home program.

Queensland

- Established Statewide Telehealth Services in 2001
- Telehealth initiatives are delivered through Queensland Health
- There are now 656 videoconferencing sites
- The Centre for Online Health runs a large number of projects including telegeriatrics, robot virtual consultations, tele-ENT, teledermatology, retinal screening and teleneurology
- An 18 month Telehealth Lifestyle Coordination project has been launched in Ipswich, which will monitor and manage elderly people with chronic disease in their own homes
- A 5 month pilot trial of telegeriatrics in Mt Isa was associated with positive results (Martin-Khan et al., 2007)
- The Queensland Smart Home Initiative was set up by community, corporate and government bodies and uses innovative technology to support independent living
- Transition care funds a short-term deployment of Telecare to support the client in the home for up to 8 weeks.

Northern Territory

- The Royal Darwin Hospital uses telehealth to allow patients in remote areas to consult with specialists via video conference
- Over 80% of remote health centres and outstations use electronic health records
- The Northern Territory received $15.5 million in 2009 to enable e-health services at 17 remote Territory towns including mobile video-conferencing units, remote digital diagnostics and care monitoring.

Australian Capital Territory (ACT)

- The ACT has just announced a Health Home Telemonitoring Service which will give patients with heart failure, lung disease or diabetes equipment to monitor vital signs. Data will be monitored over the internet for up to 6 months.

South Australia

- The Digital Telehealth Network project is responsible for telehealth networks and has implemented emergency triage and medical consultations via videoconference.

Victoria

- The state government has funded HealthSMART which is responsible for the implementation of health information systems including telemedicine initiatives
- The Hospital Admission Risk Program (HARP) uses assistive technologies to avoid inappropriate hospitalization of elderly people
- Personal Alert Victoria (PAV) is a monitoring service supporting over 21,000 older Victorians. The service responds to calls for assistance from frail older people who live independently.

Tasmania

- A statewide telehealth service was set up in Tasmania by the Department of Health and Human Services in 1998
- There are 134 telehealth facilities in Tasmania
- The VirtualCare@TAS project has led to a reduction in hospitalizations, decreased travel costs and the provision of home monitoring for patients with chronic illness[1].

Western Australia

- The WA Country Health Service is responsible for telehealth in the region
- There are 3,500 remote consultations per annum in WA
- The most common store-and-forward technology used in WA is tele-ECG (Bahaadinbeigly, 2010)
- In most cases videoconferencing is used to bridge the distance between the patient and the health care professional. There are over 390 videoconferencing units used for burns consultations, ear health, tele-opthalmology, mHealth for rehabilitation
- Silver Chain provides hospital@home (24 hour care in the home for patients who are clinically stable but would otherwise need hospitalization)
- Silver Chain is trialing telehealth self monitoring in cardiac patients who have been taught to measure daily vital signs such as blood pressure and ECG. Data are monitored by a telehealth nurse. Preliminary findings indicate a reduction in the number of visits to emergency departments, hospital admissions and number of days in hospital
- Silver Chain runs a Home Independence Program (HIP) which is targeted at older Australians following hospital admission. A study of 200 clients found that the program led to improvements on all personal outcome measures. The program includes assessment, care planning, interventions to optimize functioning in daily activities, chronic disease management and the use of assistive technology. After three months, 63% of the HIP group had been discharged as no longer needing services versus 11% of the usual care clients. This trend continued at 12 months (Lewin & Vandermeulen, 2010).

Nationally

- Department of Veterans Affairs supports thousands of Gold Card holders via their Rehabilitation Appliance Program including a variety of low and high technology items.

2 How does the uptake of assistive technology in Australia compare with overseas?

Australia is a world leader in the provision of unique medical care to remote communities for certain services. The Royal Flying Doctor Service provides over 85,000 telehealth consultations a year. Health professionals are able to conduct assessments, deliver treatment advice and monitor conditions to determine whether follow-up at a remote clinic or aerial evacuation are necessary.

Assistive technologies are widely used in Australia. In states such as Western Australia, 73% of facilities in country areas use videoconferencing for telehealth (Bahaadinbeigy et al., 2010). This percentage is higher than in other countries (e.g. the US, Canada and Ireland). Remote monitoring of implantable and point of care devices are not commonly utilised in Australia due to a lack of reimbursement.

[1] http://www.dbcde.gov.au/digital_economy/clever_networks/isd/virtualcare@tas

While the uptake of some assistive technologies is high, Australia has been slower than the US to reimburse for remote monitoring and consultations. Consistent reimbursement procedures ensure that, in general, US providers pay for services delivered from a remote site using the same code and at the same rate as if the service was delivered in the traditional manner. The use of assistive technologies for independent living is well aligned with Government strategies such as the National Broadband Network (NBN) which will increase broadband speed and access.

3 What are the barriers to the uptake of assistive and information technologies that promote healthy ageing and better care in the community?

There are a large number of assistive technologies that enable with ageing-in-place. The uptake of these technologies has been slow for a number of reasons:

Barriers influencing the user

- Lack of awareness or acceptance by the user that they need assistance
- Variations in the ability of the user to use the technology
- Difficulties associated with simplifying complex technology for older individuals
- Privacy concerns with monitoring and surveillance, these can be implicit
- Ethical issues regarding informed consent in individuals with cognitive decline (e.g. tracking devices for Alzheimer's patients)
- Lack of clarity in the aged care system and difficulties for people and their families to navigate the system and make decisions about sophisticated remote monitoring devices and services.

Barriers due to cost

- The cost of the technology, particularly in the first instance
- The large number of technologies and the difficulty in choosing a solution
- Cost shifting and incentives, e.g. a provider may invest in a technology however the return on investment may not benefit the payer. For example, in the private sector, health funds which potentially may be prepared to pay for home monitoring telecardiology devices are reluctant as the economic beneficiaries are the patients and (public) emergency departments and hospitals
- Lack of consistent policies for reimbursement (and reluctance to use a technology without reimbursement)
- Perverse incentives, e.g. financial help is provided to those in high level care facilities, but not to those who wish to use assistive technologies to remain at home.

Barriers due to regulation and legislation

- Lack of reimbursement for remote monitoring
- Lack of clear standards and policies from the Federal Government regarding the use of assistive technology
- Lack of policy for ageing-in-place goals to 2050
- Different funding streams between states and territories
- Liability concerns by healthcare professions (e.g. missing a medical alert)
- Need for engagement with all stakeholders, including Government, Medicare, TGA, industry, healthcare professionals and private health insurers
- Lack of enforceable standards for telehealth and remote patient monitoring.

Barriers due to systems

- Lack of interoperability between systems
- The need for large scale trials (rather than small pilot projects). In the case of remote monitoring a difference in clinical efficacy is not necessarily expected as the remote service is a replacement of an in-office consultation

- Lack of information sharing between payers, providers, academics, industry and key stakeholders
- Low acceptance rate among providers who may be concerned the technology will take away their business
- Lack of infrastructure to deliver care in the home setting
- Lack of unique patient identifier and electronic health records
- Difficulties in scalability of systems, few trials have expanded to deliver services to the wider community
- Need for training, concerns regarding whether it will be time consuming to learn a new technology
- Lack of high speed broadband - particularly in rural areas.

4 How accepting of new technologies are older Australians?

Older Australians wish to remain in their homes for as long as possible. A recent report by the Australian Housing and Urban Research Institute found that 91% of older home owners would like to remain in their own homes with appropriate supports (Judd et al., 2010). There are a number of assistive living and health monitoring technologies that can delay or stop the transition into residential care. A recent report on internet use in Australia (May 2010) found that only 40 per cent of people aged 64 and over use the internet. The main barriers are a lack of skills and computer knowledge (Ewing & Thomas, 2010). For this reason the complexity of technologies must be taken into account in the design of ageing-in-place technologies. Given that 97.5% of 18 to 24 year olds use the internet, this barrier will decrease with over time.

It is known that intervention in earlier stages in the trajectory of chronic disease may delay nursing home entry (Gaugler et al., 2005). In general older individuals are accepting of technologies that will enable them to maintain their independence and stay in their own homes. Research from the US has shown that assistive technology introduced into new homes to enable independent living, was forgotten by new residents within a few weeks (Alexander et al., 2008). Recent research in Australia has assessed the perceptions of elderly people towards wireless sensor network technologies for health monitoring, with a focus on wireless motes designed to collect data such as ECG, blood sugar and oxygen levels, weight, humidity, sound, temperature etc.

Steele al. (2009) ran a number of focus groups with elderly Australians. The authors found that independence is highly valued and that any system that prolongs it will be considered. Interestingly, privacy was not considered particularly important as individuals preferred knowing that help was readily available over privacy or confidentiality. One participant stated that: "*When you get old you don't really care about privacy, you just want to know someone will come to help you".* MTAA member companies advise that patient acceptance of technology is crucial and that much work has been done to automate the patient interaction. Many high-tech devices (e.g. implantable cardiac devices with remote monitoring capabilities) can simply be placed beside the bed and forgotten about. Data are uploaded automatically using wireless technology at pre-determined time points.

5 Should the government promote the use of assistive and/or information technologies by older people? What could governments reasonably do to reassure or encourage the use of technology?

At the level of the Federal Government, little policy work has been done to develop remote patient monitoring in Australia. A small number of devices that fit under the telemonitoring umbrella are funded in an ad-hoc way, for example personal alarms may be funded under various state and territory schemes. The Federal Government has pledged $392.3 million to

fund specialists and General Practitioners (GPs) to provide remote consultations to rural, regional and outer metropolitan patients via video-conference or online. These changes will revolutionize the way that primary health care services are provided to rural and remote Australians. However there is no indication whether this funding will cover remote monitoring of medical data collected from patients in the home setting.

Federal Government can play a key role in promoting the use of assistive and/or information technologies for the elderly. The aim of assistive medical technologies is to ensure that older Australians are able to remain living independently in their own homes. If this can be achieved, the cost savings to Government will be substantial (we estimate approximately $3.1 billion in savings can be achieved, see Appendix 1). Government should ensure that there are clear guidelines and policies for the use of ageing-in-place technologies and that there is a clear mechanism for funding these technologies. These types of technologies evolve rapidly and any funding mechanism must be flexible enough to ensure that new technologies are readily available. MTAA recommends that the technology equipment that aids independent living be made available with subsidised payments or as part of a care package.

6 Are there any privacy issues arising from the use of technology? If so, what are they and what safeguards are required?

There are likely to be privacy issues regarding the use of these technologies. MTAA does not have specific recommendations in this area. However the principles of the Privacy Act (1988) provide guidelines for how an individual's health data should be managed and protected by healthcare providers.

Providers – including e-health and other technological aids

1 What factors inhibit the take up of technology by providers? Should governments take a role in encouraging its use or distributing lessons? If so, how?

An Australian survey by PriceWaterhouseCoopers (2007) found that the clinical disciplines most commonly using telemedicine in Australia are radiology, oncology and mental health. This is likely to change when funding for remote monitoring and consultations is made available. The most common barriers to use were:

- Access to equipment and infrastructure (including broadband networks, hardware and resources to support requests)
- Funding (lack of permanent funding streams)
- Clinical acceptance and integration into usual practice
- The need for coordination of service provision models between metropolitan and rural regions and state coordination of existing relationships.

Additional factors to consider are the cost of technology, the lack of clear funding, reimbursement and incentives, liability concerns, the need for training and the lack of clear standards and policies from Federal Government regarding the use of assistive technologies and remote patient monitoring. These are all areas within which Government can play a role. In particular clear policy regarding the use of assistive technologies and a clear method of reimbursement that includes flexible MBS item numbers for reimbursement and a clear means of ensuring that the technologies are available to Australians are methods by which Government can assure that assistive technology is taken up by providers and made available to older Australians.

2 What types of technology are principally deployed in the industry and what is

likely to be deployed in the near future?

The types of technology that are commonly deployed in the industry include a range of assistive devices that are funded by state and territory Governments. Alarm systems to monitors falls and videoconference consultations to assist patients in remote regions are commonly used. Remote monitoring of implantable devices has been available for a number of years, however its adoption has been limited by reimbursement and patient awareness and access. Other types of technology that are likely to become more widely available include:

1 Electrocardiogram (ECG) and mobile telecardiology systems for cardiac rhythm management
2 Systems for remote monitoring of implantable cardiac devices
3 Continuous glucose monitoring devices
4 Wireless devices combining satellite global positioning systems (e.g. for dementia patients who wander)
5 Portable anticoagulation monitors
6 Smart incontinence management systems
7 Remote monitoring and assistance for cochlear implantees
8 Smart homes, containing a range of medical technologies.

3 How can assistive and information technologies help to make the working environment more attractive to employees? If so how, in what way? Are there some good examples where technology has significantly improved the satisfaction of employees?

Australia has an ageing population and a limited number of health professionals. Remote patient monitoring covers the exchange of medical data between a patient who is at home and a healthcare professional based (usually) in a medical centre. These technologies will not replace the need for healthcare professionals. Routine remote monitoring of, in particular, stable chronic diseases, will enable over-burdened healthcare professionals more time to spend on direct face-to-face patient care. There is much data to show that remote monitoring makes the working environment more attractive to employees:

- Remote follow-up is endorsed by physicians and written into clinical guidelines to ensure safety (HRS/EHRA Expert Consensus, European Society of Cardiology)
- The burden of device and patient management to hospitals is considerable and growing. Routine in-clinic device monitoring reduces hospital/clinic capacity and efficiency (Varma et al. 2009)
- Remote device follow-up service is equivalent to an in-clinic follow-up visit if device reprogramming is not necessary from a clinical and safety perspective (Crossley et al. 2010, Heidbuchel et al. 2008, Varma et al. 2009)
- The majority of patients do not require changes in device or medical management when attending in-office follow up (Crossley et al. 2010, Heidbuchel et al. 2008, Santini et al. 2009, Varma et al. 2009)
- In many cases the rate of alerts transmissions for implantable devices is low (the majority of alerts occur within the first month of device implantation) (Nielsen et al. 2008, Ricci et al. 2009, Varma et al. 2009)
- Remote monitoring allows hospitals to transfer resources from those who do not require complex intervention towards increased follow-up in high-complex patients (Crossley et al. 2010 (discussion), Ricci et al. 2008)
- Remote follow-up has been found to significantly increase clinical efficiency and capacity (Crossley et al. 2010, Heidbuchel et al. 2008, Varma et al. 2009)

- Remote monitoring has been shown to increase staff efficiency (Alwan et al., 2007) and decrease the number of nursing home visits and the amount of travel time (Litzinger et al., 2007)
- Sorrells-Jones et al. (2006) outline the benefits of assistive technologies to nurses. In general, the solutions equip nurses better to deliver services to large rural populations. They report evidence that the quality of nursing in telehealth programs is equal to or superior to traditional care and point to substantial efficiencies when technologies free up acute care beds
- Home health agencies in the US which are required to cover large distances report that they can see up to 75% more patients if they use telehealth solutions (Peck, 2005)
- A US project that assessed 29 home care agencies in Pennsylvania found that agencies using telehealth report a lower voluntary staff turnover rate (Stanner, 2004)
- A 2004 survey conducted in the US found that the average telenurse was highly satisfied with his/her career (Grady et al., 2004).

4 Can technology reduce care costs (for example, reduce the quantity of labour required) and/or does it simply improve the quality of the care provided to clients and/or reduce the burden on employees?

The use of assistive technology can reduce costs and improve the quality of care in a number of ways:

- Keeping older Australians in their own homes, rather than in high level care facilities
- Decreasing potentially preventable hospitalisations
- Decreasing emergency room admissions
- Early detection of symptom exacerbations
- Decreasing the number of visits to GPs or specialists.

The conditions best suited to remote monitoring are chronic conditions which are more prevalent with age (e.g. coronary heart disease, circulatory diseases, diabetes). Considerable cost savings can be achieved in these areas. For example, in-hospital follow-up visits of patients with pacemakers or implantable cardiac devices, typically take 15 minutes for each patient, twice a year. These can safely be replaced with remote follow-ups which take 1-2 minutes (Varma et al., 2010). We have outlined minimum cost savings to Government of $3.1 billion in Appendix A. This fits with estimates by Access Economics (2010) of cost savings of $2 billion to $4 billion per year.

The role of government, regulation and transitional issues

1 What legislation and regulation particularly inhibits or encourages the adoption of technology in the aged care industry at all levels of government?

There are two major cost considerations for the funding of telemonitoring. The first is the cost of the service (education, care provision, data transmission and data monitoring) and the second is the cost of devices/technology (including monitors, hardware, software and medical devices). Reimbursement strategies must be flexible enough to keep pace with the rapid technological advances associated with both wireless and medical technology. The MTAA submission to the Productivity Commission (August 2010) suggests mechanisms of funding for remote monitoring services under the Medicare Benefits Schedule (MBS). In brief, MTAA proposed flexible MBS item numbers that consider telemonitoring or remote consultations in the same way as a traditional face-to-face consult. For the purposes of

service provision to elderly Australians these services would fit well under Category 1 benefits for Chronic Disease Management. The item numbers would need to be flexible enough to include not only GPs, but nursing staff or specialists.

2 What factors or features are likely to be found in technology projects that can justify government funding?

Clinical effectiveness, safety, cost effectiveness and patient and caregiver benefits of assistive technologies are the factors most likely to justify government funding.

3 Is there a useful role for government to promote or disseminate lessons on the use of technology in aged care? If so, what approach is likely to work best?

Government should promote the use of assistive technologies in healthcare. In particular, Government should have a role in disseminating knowledge about technologies that assist elderly people to remain in their own home and are best used to detect symptom exacerbations and manage chronic disease. Government should promote education around self management of chronic health problems, in particular potentially preventable disorders such as obesity, diabetes and heart disease. Given that we know that increasing age is a predictor of potentially preventable hospitalizations (Melbourne Health, 2009), efforts should be focused in this area. Government should create funding streams for organisations to research, design and effectively deploy new care pathways which incorporate home health care technologies.

4 How can agencies which interact with the aged care sector, such as Medicare and the Department of Health and Ageing, improve their linkages to the industry through the use of technology?

Provided that Privacy Act considerations are kept in mind, telemonitoring can provide useful data on chronic health conditions across age categories. These data can support planning for workforce needs and the location of support services such as clinics.

5 What other cost-effective activities could governments undertake which would significantly affect the take up of technology in the sector?

In 2007-08 health expenditure in Australia was $103.6 billion. Only 2% of this amount was for preventive services or health promotion (AIHW, 2010). Ageing-in-place enables cost savings by reducing hospitalizations and decreasing admissions to residential aged care settings. A large number of assistive technologies fall under the umbrella of tertiary prevention, which aims to slow the progress of diseases when they occur. In addition the types of illness these technologies target are often preventable chronic diseases (e.g. heart disease and diabetes).

Cost-effective activities should target those factors that predict costly medical interventions or transition into residential care. There are a number of predictable factors that lead to older patients being placed in residential care, the impact of which could be lessened if appropriate assistive technologies were available. A study of nearly older 3,000 Australians over a 14 year time period found nursing home placements were primarily due to principal diagnoses such as dementia (44%), stroke (16%) and coronary heart disease (14%). The hazard of nursing home placement increases significantly with age, urinary incontinence, impaired peak expiratory flow, physical disability and depression (McCallum et al., 2005). These factors are all potentially amenable to home monitoring interventions. Incontinence was found to increase the risk of nursing home admission in Australia by 66%. Incontinence, together with factors such as falls and disability rates are significant contributors of increased care needs (McCallum et al., 2007). Dependency levels for residential aged care in Australia

are determined by the Resident Classification Scale. This has levels of care categories which determine subsidy levels. In 2008, approximately 70% were in high-care categories and 30% in low-care categories, the latter of whom would be most likely to benefit from appropriate home monitoring essential care items.

The appropriate provision services and devices for remote patient monitoring will achieve cost savings through supporting people in their own homes. The challenge currently faced is determining how to best fund a range of assistive technologies and devices for independent living and home monitoring of medical conditions that will maintain the independence of older Australians.

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Appendix A Potential Cost Savings in Australia

1. Reduced need for residential care

- The majority leaving a care package do so to enter residential aged care[1]
- A place in a high level care facility has an average annual cost of $48,550 (or $17,750 in low care facilities)[2]
- Dr Kim Sweeney[3] estimates potential costs savings of $526m. This was calculated by assuming that 10% of the current residential population (n=15,700) could be supported in the community on an HACC package ($2,600) versus residential care ($36,100).

saving $525,950,000

2. Reduced need for residential care packages

- The Home and Community Care (HACC) program assists 637,521[4] clients per year at a total cost of per year at a cost of $2,600 per person (total cost $1,657,554,600[5])
- The Community Aged Care Package (CACP) assists 40,280 clients per year at a cost of $9,500 per person (total cost $382,660,000)
- The Extended Aged Care at Home (EACH) and Extended Aged Care at Home Dementia (EACH-D) packages assist 4,244 and 1,996[6] people per year at a cost of $110 per day per person ($250,536,000)
- Assume 5% of overall total ($2,290,750,600) no longer need packages.

saving $114,537,530

3. Reduced costs due to Emergency Room (ER) admissions

- ER Category 5 patients are considered non-urgent and usually have minor illnesses or stable chronic conditions such as diabetes with relatively minor complicating symptoms. In 2008-09 these patients accounted for 12% of ER presentations [7]. Of 7.2 million presentations, 864,000 (12%) people may have been better treated using appropriate home monitoring service
- The average cost for a visit to an emergency department is $373[8]
- Assume 20% of patients can avoid an ER visit (at a cost of $322,272,000).

saving $64,454,400

4. Reduced costs due to reduction in potentially preventable hospitalizations (PPHs)

- The average cost of an admission to a public hospital in 2008-09 was $4,471
- 2007-2008, selected PPHs represented 9.3% of all separations in Australian Hospitals [9]. A total of 431,023 separations were for chronic conditions such as COPD, congestive heart failure and diabetes complications (cost $1,927,103,833)
- Assume 20% of patients can avoid a PPH.

saving $385,420,767

5. Reduced costs of Flying Doctors services in rural areas

- In 08-09 the Royal Flying Doctors Service (RFDS) undertook 36,892 aeromedical evacuations [10] at an approximate cost of $5,500 per evacuation (total cost =

$202,906,000).
- Assume 20% of these evacuations can be avoided

saving $40,581,200

6. Reduced need for high level residential care

- In June 2008 there were 157,087 individuals who were permanent residents in rest homes at a cost of $36,100 per person [11] (total cost $5,670,840,700). 24% of residents were low care [12] (i.e. the percent you would hope to target with home monitoring interventions
- Assume that 20% of these individuals could be cared for in the community.

saving $272,200,354

7. Reduced costs associated with chronic disease management

- 2007-2008 health expenditure in Australia was $103.6 billion. In Australia more than two thirds of all health expenditure is associated with chronic disease management [13] ($69 billion).
- Assume that patient monitoring will detect symptoms earlier and enable better provision of care to patients with chronic diseases and that at a minimum 2% of costs will be saved.

saving $1, 380,000,000

8. Reduced costs associated with patient transports, travel and unnecessary tests

- Access Economics (2010) [14] accessed US cost savings data for patient transports and transfers and unnecessary tests with telehealth. Using a simple population relativity, they estimate cost savings of around $296,000,000 per year in Australia

saving $296,000,000

9. Reduced costs associated with Veterans Home Care (VHC)

- The VHC program, provided through the Department of Veterans' Affairs (DVA),
- provides a range of low-level home care services to enable them to live independently in the community. In 2006/07, expenditure on the VHC program was approximately $95 million[15]
- Approximately 80,000 people in 2006/07 were approved for services[16].
- Assume a 10% reduction in the need for services

saving $9,500,000

10. Reduced costs associated Patient Assisted Travel Schemes (PATS)

- Approximately $81 million is spent on various state and territory government Patient Assisted Travel Schemes (PATS) per year. This sum includes: NSW (15.9 million), ACT ($625,000), NT ($6 million), SA ($6.95 million), TAS ($1.6 million), VIC ($6 million), WA ($13.9 million) and QLD ($30 million) [17].
- Assume a 20% reduction in travel costs

saving $16,195,000

total savings $3,104,839,250

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