



Medical Technology
Association of Australia



*Disability Care and Support:
Medical and assistive technologies to enable
Australians to remain in their homes
28 April 2011*

Medical Technology Association of Australia Limited
Level 12, 54 Miller Street
North Sydney NSW 2066 Australia
P: (02) 9900 0650
E: reception@mtaa.org.au
www.mtaa.org.au

MEDICAL TECHNOLOGY FOR A HEALTHIER AUSTRALIA

Copyright © 2011 Medical Technology Association of Australia Limited (MTAA)

To the extent permitted by law, all rights are reserved and no part of this publication covered by copyright may be reproduced or copied in any form or by any means except with the written permission of MTAA Limited.

Contents

- 1. Executive Summary.....4
- 2. About the medical technology industry.....4
- 3. Comments on the Productivity Commission draft report4
- 4. Strategies to keep individuals with disabilities in their homes5
 - 3.1. Providing access to medical consumables to individuals in the home5
 - 4.2. Providing access to technology to support telehealth7
 - 4.3. Providing access to remote monitoring technology in the home8
- 5. Continuum of care10
- 6. The home is an appropriate place for healthcare10
- 7. Providing access to technology for individuals in rural and remote communities..... 10
- 8. Use of assistive technologies to enable early intervention11
- 9. Providing access to smart homes.....11
- 10. Providing access to technology to support caregivers12
- 11. Conclusion.....13
- References14
- Annex A Clinical Evidence for telehealth and disability15

1. Executive Summary

This submission is in response to the release in February 2011 of the Productivity Commission draft report *Disability Care and Support*. The Medical Technology Association of Australia (MTAA) welcomes the opportunity to comment on the report and make specific recommendations.

The draft report *Disability Care and Support* proposes a National Disability Insurance Scheme (NDIS) which will be overseen by a new federal National Disability Insurance Agency (NDIA). Additionally, the Commission is proposing a separately funded scheme, the National Injury Insurance Scheme (NIIS) which would provide state-based, no-fault arrangements to provide lifetime care and support for individuals who have acquired catastrophic injuries from accidents. Some of the first recipients to benefit from the NDIS will be individuals with disability who are currently being cared for by ageing carers and individuals who have been inappropriately placed in nursing homes.

MTAA makes specific response to the issue of funding for assistive technology under the NDIS. The Commission states that the NDIS should fund aids and appliances and artificial limbs and asks what other types of items should be included in the NDIS?

MTAA would like to see the NDIS provide funding for aids and appliances, prosthetics such as artificial limbs, consumable medical items, and monitoring technologies to enable people with disability to have better access to innovative medical products and technologies that assist them to live independently.

MTAA recommends:

- Provision of funding for a national scheme for aids and appliances (including prosthetics such as artificial limbs)
- Provision of funding for an Essential Care List scheme to subsidise the purchase of consumable medical items
- Provision of funding for technology for home and remote monitoring of people with disabilities and associated medical conditions (telehealth).

2. About the medical technology industry

The Medical Technology Association of Australia (MTAA) represents the manufacturers, exporters, importers and distributors of medical technology products in Australia. The medical technology industry manufactures many products that contribute to the health and wellbeing of Australians with disability. These include a range of assistive aids and appliances, implantable prostheses (e.g. cochlear implants), continence aids and technologies that can be used to monitor individuals in their homes (e.g. alarms, sensors, vital signs monitors, enuresis sensors, sub-acute medical products etc). The medical technology industry had sales in Australia of more than \$7.6 billion in 2009-10 and employs over 17,500 people.

3. Comments on the Productivity Commission draft report

The NDIS will provide insurance cover for all Australians with significant disability. Long term, high quality care and support will be provided for approximately 360,000 people.

MTAA considers key strengths of the scheme as being:

- The portability of support packages across state and territory borders
- Choice of service provider
- The provision of more individualized support packages which may be assembled by a disability support organization.

The draft report emphasises a ‘consumer choice’ model, which will encourage innovation. Rather than providing a budgeted amount, the NDIS will provide a package of supports and people will be able to choose their service providers. It is likely that service providers with the best options and access to the most innovative technology will have a competitive advantage. The draft report states that the NDIA would need to have research capabilities to, among other things, assess innovative therapies or new aids and appliances that are proposed by suppliers. While not requiring the same level of clinical assessment, useful guidance can be drawn from the processes established for assessment of implantable prostheses which resulted from the Review of Health Technology Assessment in Australia. This process needs to be fit for purpose but the broad principles outlined in the report of the review remain applicable¹.

4. Strategies to keep individuals with disabilities in their homes

The NDIS will provide a range of supports. Of relevance to the medical technology industry these will include aids and appliances (including artificial limbs). Other support includes help with personal care, community access support, respite, accommodation support, domestic help, transport assistance, employment services, therapies, case management, crisis emergency support and assistance dogs (e.g. guide dogs).

Box 4.1 of the draft report outlines the specialist disability supports that will be provided by the NDIS. These include aids and appliances, which are defined as: *“a range of products to improve functioning, enable a person to live at home and in the community, and enhance independence. These would range from low to high-tech aids and encompass toilet supports or hand-held showers, continence aids, wheelchairs, hearing aids, mechanical lifters, electronic communication devices and artificial limbs”*. MTAA recommends that aids and appliances be extended to include subsidised provision of medical consumables in the home, and telehealth technologies. These types of technologies do not tend to be well funded. Even for elderly patients receiving home and community care packages (HACC), data from total instances of care received show that they receive assistance for self care aids, support and mobility aids and medical aids in only 1.14% of instances in total².

3.1. Providing access to medical consumables to individuals in the home

People with disability require access not only to aids and appliances, but also to medical consumables. MTAA has proposed that an Essential Care List (ECL) be developed to ensure that sub-acute care medical products needed by patients for their care, and in some cases, survival, are readily available using a system that is equitable, transparent and affordable. The scheme will enable subsidised access to essential care medical technologies that provide necessities to chronically ill or incapacitated patients in the community setting. The items intended for inclusion in the scheme are consumable, single use, non-implantable medical products, together with the hardware that the consumables are used with, essential to maintain an acceptable quality of life for afflicted patients who without government subsidy would not have adequate access to life supporting medical technology.

¹ For further information see, Commonwealth Government of Australia, Review of Health Technology Assessment in Australia December, 2009.

² Australian Government Department of Health and Ageing, 2009, Home and Community Care Program Minimum Data Set 2008/09 Annual Bulletin, Canberra.

The scheme is outlined in detail in the initial MTAA submission to the Productivity Commission³.

Enabling individuals fairer, more consistent access to aids and equipment is an agreed national reform priority. Current initiatives on the portability of aids and appliances are covered in Box 2.3 (page 225) of the draft report. The Commonwealth is currently working with state and territory governments to implement an aids and equipment portability information sheet for 2011. The aim is to ensure that people who move interstate have continuity of access. The way it is currently envisaged is that the guidelines of the receiving state or territory apply if a person moves interstate. This would include for example waiting list conditions, type of equipment and eligibility.

MTAA supports the arguments put forward in the draft report as to why the NDIS might cover certain prosthetics. These include:

- Items such as prosthetic limbs might have the same functional purpose as a mobility aid (e.g. wheelchair) that is covered by the NDIS and may be able to be substituted (e.g. a person may not need a wheelchair if they have a prosthetic limb)
- Prosthetics require long term maintenance and replacement, similar to other aids and appliances and in many cases ongoing costs might be similar
- It may be possible to consolidate the current delivery methods of prosthetics. Limbs 4 Life (sub. 301) notes that there are over ten different funding programs for prosthetics in Australia, with different service programs and 'rules' in each state and territory leading to inequity. Consolidating these programs would simplify access and lead to economies of scale.

The NDIS would not fund implantable prostheses which are funded via private health insurance or through the state public health systems, for example hip replacements and internal prostheses such as cardiac pacemakers. Many prostheses are related to medical conditions rather than disability (e.g. cardiac stents). The NDIS is not intended to cover people with disability acquired as part of the natural process of ageing, however there is likely to be some overlap between disability and ageing services.

The Commission asks what other types of items should be included in the NDIS? MTAA recommends that the NDIS also covers ECL items (medical consumables). Products identified in an initial scope of the ECL scheme include:

- Oxygen supplies/consumables
- Compression hosiery, bandages and garments for lymphoedema
- Continence products
- Modern wound care devices (including wound dressings)
- Breast prosthetics (non-implantable)
- Pumps and consumables for insulin delivery and continuous flow pumps for drug delivery, together with consumables
- Continuous positive airway pressure (CPAP)/sleep apnoea devices
- Laryngitic products
- Diabetes consumables (pens, strips, pump consumables)
- Home dialysis devices, consumables and set-up costs.

At present many of these essential care items are either unfunded or, if funded, vary in availability and subsidy depending on the place where the patient lives. Currently different

³ <http://www.pc.gov.au/projects/inquiry/disability-support/submissions#initial>, submission 479.

jurisdictions provide services according to what their funding allows. This leads to variations between:

- Assessment tools
- Eligibility criteria
- Conditions of service provision
- The types of services, aids and appliances that are available.

Duplication across states and territories means that if a person moves or transfers between areas services and funding may not be guaranteed. Additionally, a person may find that some assistance is available from the Federal Government; other support is from State Governments. The ECL scheme could operate in conjunction with an aids and appliances scheme. Each has similar objectives with an overlap in users. MTAA's conception of an ECL scheme is that it will operate similarly to a very simplified Pharmaceutical Benefit Scheme (PBS). It is expected there would be some degree of patient co-contribution. The ECL would replace a range of existing schemes that are currently run by Commonwealth, State and Territory Governments. These include:

Federal	
	National Diabetes Services Scheme (NDSS)
	Stoma Appliance Scheme (SAS)
	Contenance Aids Payment Scheme (CAPS)
	National Epidermolysis Bullosa Dressing Scheme
State and Territory	
ACT	Equipment Scheme (ACTES)
NSW	Program of appliances for disabled people. (PADP)
NT	Territory Independence and Mobility Equipment (TIME) Scheme
QLD	Medical Aids Subsidy Scheme (MASS)
SA	Independent Living Equipment Program (ILEP)
TAS	Community Equipment Scheme (CES)
VIC	Victorian Aids and Equipment Program (AEP)
WA	Community Aids and Equipment program (CAEP)

People with disability have a number of health conditions, which would require them to access the types of medical consumables outlined under the ECL. These conditions include diseases of the nervous system; mental and behavioural disorders; congenital malformations, deformations and chromosomal abnormalities; diseases of eye and adnexa and ear and mastoid process; diseases of the circulatory system, respiratory system, digestive system; endocrine, nutritional and metabolic disorders; neoplasms, injury and other of external causes and diseases of the musculoskeletal system and connective tissue.

The ECL scheme is not dissimilar to the proposal by the National Aids and Equipment Reform Alliance (NAERA) (sub. 530) which has proposed an amalgamated, simplified national scheme for aids and appliances that would be complementary to schemes such as Medicare and the PBS. The NAERA notes that currently there is an ineffective patchwork of over 100 separate equipment schemes across Australia. This has led to inconsistent funding and service delivery, duplication of services, cost-shifting to expensive down-stream services such as hospitals and administrative inefficiencies.

4.2. Providing access to technology to support telehealth

There is a large amount of evidence to show that medical and assistive technologies can significantly improve the lives of Australians. The term assistive technology refers to devices that can be used to assist individuals with sensory, motor or cognitive impairments to achieve

greater independence. Telehealth is the delivery of medical services through information technology, multimedia, imaging and telecommunications. It is an overarching definition that includes the discipline of remote patient monitoring. Remote monitoring of vital signs uses equipment and medical devices installed in the home to identify trends and generate alerts when necessary, in order to detect symptom exacerbations, intervene early and improve quality of life. Suitable conditions for home telehealth include health conditions or disabilities that require ongoing routine monitoring.

The medical technology industry manufactures a range of monitoring peripherals including personal alarms and alert systems, enuresis monitoring devices, epilepsy sensors, activity/inactivity sensors, home units for measuring temperature, heart rate, blood pressure, glucose levels, oxygen levels and objective symptoms.

The social and health benefits of telehealth can be summarised as:

- Reducing barriers of access to healthcare due to geography
- Providing access to specialists in remote areas
- Reducing the pressure on the healthcare workforce
- Promoting proactive healthcare
- Early detection of abnormalities/symptom exacerbations
- Decreasing potentially preventable hospitalisations
- Provision of a viable alternative to outpatient or doctor visits
- Reducing congestion in medical centres and emergency rooms
- Increasing quality of life
- Reducing the burden on care givers
- Assisting patients and caregivers to remain in the workforce
- Decreasing the impact of predictable factors that lead to care (e.g. falls, incontinence)
- Reducing residential care admissions
- Decreasing healthcare costs⁴.

A large number of studies on disability report a wide range of clinical benefits associated with telehealth, including reduced mortality, hospital admissions and readmissions, length of time in hospital and critical care utilisation⁵. For further details see Annex A.

4.3. Providing access to remote monitoring technology in the home

The types of technologies that can assist with care in the home include:

- Remote monitoring for assistive living
- Wireless devices combining satellite global positioning systems (e.g. for individuals who wander)
- Home monitoring devices for pulse oximetry, blood pressure, heart rate etc
- Epilepsy sensors
- Smart incontinence management systems
- Remote monitoring and assistance for individuals with hearing or visual impairment
- Help systems to activate alert and reminders for individuals with cognitive impairment
- Alarm systems to monitor falls and other medical alerts
- Videoconference consultations.

⁴ MTAA has outlined cost savings to Government of \$3.1 billion per year, see <http://www.mtaa.org.au/pages/images/MTAA%20pre-Budget%20submission%202011-2012%20final.pdf>.

⁵ For a comprehensive review of the clinical literature see http://www.pc.gov.au/projects/inquiry/disability-support/submissions#initial_submission_479.

At the level of the Federal Government, little policy work has been done to develop funding for telehealth or other assistive technologies in Australia. A small number of devices that fit under the telehealth umbrella are funded in an ad-hoc way. For example, individuals who are eligible for Department of Veterans Affairs assistance may apply under the Rehabilitation Appliances Program (RAP) for a personal response system. A small number of items are funded by private health insurance and are listed on the Prostheses List (e.g. implantable cardiac devices). In these cases the device is funded and the monitoring capabilities tend to be a free or unfunded adjunct. Currently there is no means to reimburse doctors and allied health professionals for these services. There are a range of telehealth pilots operating in each state and territory, however no comprehensive policy pulls all of these services together, to ensure that Australians with disability can access support to remain independent in their homes.

The Federal Government is introducing Medicare Benefit Schedule (MBS) item numbers for telehealth in July 2011. \$402.2 million has been allocated but it is unlikely this funding will cover more than rebates for online consultations. MTAA has recommended that MBS item numbers for telehealth include reimbursement for the assessment and monitoring of medical data collected from a patient's home (remote monitoring). Item numbers should be flexible enough to cover services provided by a range of allied health professionals.

Multiple funding sources can be considered to fund home health technologies, including:

- Provision via the NDIS
- MBS item numbers for telehealth, home monitoring of vital signs and remote monitoring⁶
- Community care packages
- Contributions from private health insurance
- Individual contributions.

Under the current system people with disability have problems accessing multiple services in order to continue living independently. Perverse incentives mean that funding may be available to those in high level care facilities, but not to those who wish to use assistive technologies to remain at home. These factors have led to a financial bias towards residential care.

Chapter 14 of the draft report covers the cost of the scheme. Preliminary analyses estimate the cost of the scheme at approximately \$6 billion per annum. The Commission estimates that approximately 170,330 people need access to aids and appliances and that the estimated cost of aids and appliances ranges between \$331 million and \$824 million (the lower bound likely being more realistic).

MTAA has estimated the cost of funding an ECL scheme as being approximately \$667 million per annum. This sum is a combination of what is currently being spent in the various schemes across Commonwealth and State health budgets, plus additional areas that are currently unfunded. Potential cost savings that can be achieved by keeping patients in their homes are significant. MTAA has calculated savings of approximately \$3.1 billion per annum. The calculations do not take into account cost savings achieved through the merger of current stand-alone schemes, which are estimated to be approximately \$73 million per annum⁷.

⁶ See response to Australian Government paper on *Connecting health services with the future: Modernising Medicare by providing rebates for online consultations* - 27 01 2011, www.mtaa.org.au/pages/page308.asp.

⁷ For further information please see the MTAA Pre-Budget submission to Treasury 2011-2012 - 24 December 2010, www.mtaa.org.au/pages/page308.asp.

5. Continuum of care

There is a continuum of care that ranges from independent living at home, home living with assistive medical technologies, high level support in the home, residential care and 24 hour nursing facility care. The aim of community care and the provision of appropriate support is to aid those with disabilities to remain either in their own homes or in assisted living arrangements. There has been a shift in disability management from residential care to care in the home. Assistive technologies can be used to provide rehabilitation and support services for people with disability who wish to remain at home.

The issues paper references inappropriate models of support, such as cases where young people with disabilities are cared for in aged care homes (page 12). There are currently 6,700 young Australians living in nursing homes as they have no where else to go⁸. Telehealth, smart technology, alarms and medical monitoring can assist in increasing the number of younger Australians with disabilities who live independently. For example, an epilepsy or falls detector may alert a caregiver in an emergency meaning a person can remain independent secure in the knowledge that help can be obtained if necessary.

6. The home is an appropriate place for healthcare

A paradigm shift is needed to address the challenges associated with caring for people with disability. Health care funding supports traditional models of service delivery, for example MBS item numbers are provided for face-to-face consultations.

There are a number of examples where care is pushed into hospital settings that could be provided in the home. For example, individuals with chronic wounds are most appropriately treated at home (by community nurses) or in the general practitioner's office. Because modern wound care products are not funded, patients end up being treated in (costly) hospital settings. Australians wish to live independently in their own homes and are accepting of technologies that enable them to do so (Steele et al., 2009). The draft report notes that innovation in assistive technology (particularly computer-based) has had a major impact on improving the quality of life for some people with disability.

7. Providing access to technology for individuals in rural and remote communities

Rural Australians have the highest rates of potentially preventable hospitalisations, due to inequitable access to health services, medical consumables and medical technology (Department of Health and Ageing, 2009). People with disability who live in rural and remote regions face many challenges accessing services and support.

There are a number of medical technologies that meet the challenges associated with providing healthcare to people with disability in remote areas. For example:

- Videoconferencing can be used to provide medical screening, rehabilitation and treatment to people in remote areas
- A range of telehealth services including vital signs monitoring can be delivered via internet-based systems
- High technology medical devices (e.g. implantable cardiac devices) can be monitored from a distance.

⁸ <http://www.ypinh.org.au/>.

The strategies above increase the likelihood that an individual with disability in an isolated community can remain in their own home and not be transitioned into a residential care setting (most likely situated in a metropolitan area). Telehealth can improve access to care for these individuals by easing logistical burdens and reducing or eliminating unnecessary travel for routine checkups. The draft report states that the NDIS should actively fund telehealth technologies that have proven to be effective as *“the accessibility of high speed internet in rural areas increases”*. The report mentions telehealth technologies such as online consultations and remote interpreting services. MTAA notes that in many cases these technologies do have proven effectiveness and that often it is a lack of access to funding and service reimbursement, rather than lack of internet access, that prevents these types of services being delivered.

8. Use of assistive technologies to enable early intervention

Chapter 11 ‘Early Intervention’ outlines the need for evidence-based early intervention including cost effectiveness. Early intervention has the potential to improve outcomes for people with disability and lead to cost savings. Early intervention can mitigate or alleviate the impact of an existing disability, and/or prevent further deterioration. The types of services that would be covered by early intervention include the provision of aids and appliances, prosthetics, medical consumables, monitoring and telehealth.

The Commission has been asked to consider the incentives for investing in early intervention. This is consistent with a ‘wellness approach’ which recognizes the long term benefits of focusing on early interventions to optimize functioning and independence. There are a number of factors that can be targeted for early intervention, for example predictable factors that lead to individuals being placed in residential care, the impact of which could be lessened if appropriate assistive technologies were available. Research has found that the hazard of residential care placement increases significantly with age, urinary incontinence, impaired peak expiratory flow, physical disability and depression (McCallum et al., 2005). Incontinence, together with factors such as falls and disability rates are significant contributors of increased care needs (McCallum et al., 2007). These types of factors are all potentially amenable to home monitoring interventions.

Falls are a major predictor of institutionalisation. In 2003-04 injuries from falls were the largest group of all cases of hospitalised injury (36%). Assistive technology can be used to decrease falls by reducing potential trip hazards, warning of balance and vision problems via monitoring, and providing individuals and caregivers with falls detectors and alerts for use in an emergency. Additionally, monitoring of vital signs can detect health trends and deterioration at an early stage meaning that treatment and intervention can begin earlier.

MTAA strongly agrees with Draft Recommendation 11.2 which states that *“The NDIA should build an evidence base on early intervention. It should commence this task by identifying, in consultation with stakeholders, existing or potentially promising approaches for further research”*.

9. Providing access to smart homes

Independent living solutions have been piloted throughout Australia, with excellent outcomes. While most pilots have focussed on older people, in many cases the findings are generalisable to people with disability. Personal alarms are a good example of a technology used by Australians to gain faster assistance in an emergency and increase the amount of time they are able to remain in their homes (De San Miguel et al., 2007).

A smart home is termed as a residence that is fitted out with equipment that monitors individuals’ health and safety and enables independence (for review see Chan et al., 2009).

Smart homes that are fitted with medical, assistive and communication technologies are of most benefit to: people who live alone and would have difficulty seeking help in an emergency, disabled people who suffer from cognitive or physical impairments, individuals in isolated communities, those who require continuous monitoring and informal care givers.

The NDIS would, where appropriate, fund home modifications. Some of the types of modifications and technologies that are likely to assist the 4.5 million Australians with a disability and their carers can be included in smart homes and are listed below:

- Assistive devices such as lifts, support rails, pull cords, hoists, seating aids, walkers and mobility aids
- Home automation technologies such as automatic lighting from bed to bathroom, security systems, intelligent keyless entry and automated home appliances
- Medication management and safety such as electronic pill dispensers that alert caregivers if medication is missed
- Motion detectors for monitoring inactivity / mobility
- Falls detectors and falls monitoring
- Environmental detectors, such as smoke alarms, flood detectors, gas / carbon monoxide detectors, temperature extreme detectors, door and property exit sensors
- Pendant style, self activated alarms to alert caregivers in case of emergency
- Technologies to assist with prompts and reminders
- Pressure sensors to detect bed and chair occupancy
- Epilepsy and enuresis sensors
- Communication devices such as telephone amplifiers and sensory enhancements
- Wearable sensors including Global Satellite Positioning (GPS) for people who wander
- Online subjective questionnaires to assess symptom change
- Vital signs monitors
- Monitoring hubs for implantable devices with remote monitoring capabilities
- Devices for disease prevention and alleviation, including CPAP machines, home dialysis etc.

These are the types of solutions that can assist, for example, in preventing people with disability from being inappropriately placed in residential care.

10. Providing access to technology to support caregivers

Chapter 13 of the draft report covers 'Workforce issues' and notes that population ageing may lead to potential workforce shortages. The Commission recognises that carers provide critical support to people with disability. Access Economics estimates that there are 2.9 million carers in Australia, including 540,000 primary carers, and that the value of informal care was over \$40 billion in 2010 (Access Economics, 2010). Family and friends (informal carers) provide most help and care assistance to people with disability and may have low levels of well being (Cummins et al., 2007). There are a wide range of technologies that can be used to assist caregivers, for example alerts that wake carers when an individual leaves the house at night or has a seizure or episode of incontinence. Additionally, there are a range of environmental sensors such as smoke alarms, gas sensors, flood detectors and temperature extremes sensors designed to identify potential risks in the physical environment which can be used to alert a caregiver nearby or emergency services for appropriate assistance.

Informal care givers are predominantly family members and may take blood pressure, administer home dialysis, provide physical therapy, continence assistance, clinical care such as changing bandages, help with dressing and mobility etc. A review of the evidence on the impact of telehomecare in Canada found that one of the primary reasons for informal care

provision was “a care recipient who is not elderly, but is physically or mentally ill or frail in some way” (Hogenbirk et al., 2005). Telehealth was able to support care provision in the home environment, reduce family separation and reduce social isolation. The study concluded that telehealth improved caregiver access to support services and information. Innovative technologies have the potential to reduce the burden on carers. Additionally, the provision of aids and appliances, medical consumables and appropriate assistive technologies may assist in keeping both people with disability and their carers in the workforce.

11. Conclusion

MTAA considers the home an appropriate place for healthcare delivery and recommends

- Providing access to medical consumables to individuals in the home
- Providing access to technology to support telehealth
- Providing access to remote monitoring technology in the home
- Providing access to technology to support people in rural and remote communities
- Using assistive technologies to enable early intervention
- Providing access to smart homes
- Providing access to technology to support caregivers.

The sophistication of home health technologies will increase. In the future wireless technology will enable many medical devices to be monitored from a distance, effectively assisting with ‘hospital in the home’ type care. The Productivity Commission needs to recognise that the home is an appropriate setting for healthcare. MTAA recommends that the NDIS funds aids and appliances, artificial limbs, home monitoring technologies and essential medical consumable items that enable people with disability to receive care in the home.

References

- Access Economics (2010). The economic value of informal care in 2010. Report for Carers Australia.
- Brewer, J. L., Taber-Doughty, T., & Kubik, S. (2010). Safety assessment of a home-based telecare system for adults with developmental disabilities in Indiana: a multi-stakeholder perspective. *Journal of Telemedicine and Telecare*, 16: 265-269.
- Chan, M., Campo E, Estéve D, & Fourniols, J.Y. (2009). Smart homes - Current features and future perspectives. *Maturitas*, 64: 90-7.
- Cummins, R., Hughes, J., Tomy, A., Gibson, A., Woerner, J. & Lai, L. (2007). The Wellbeing of Australians — Carer Health and Wellbeing. Joint publication of The School of Psychology, Deakin University, The Australian Centre on Quality of Life, Deakin University, Australian Unity and Carers Australia.
- Darkins, A., Ryan, P., Kobb, R., Foster, L., Edmonson, E., Wakefield, B., & Lancaster, A.E (2008). Care Coordination/Home Telehealth: The Systematic Implementation of Health Informatics, Home Telehealth, and Disease Management to Support the Care of Veteran Patients with Chronic Conditions. *Telemedicine and e-Health* 14(10): 1118-1126.
- Department of Health and Ageing (2009). Annual Report at <http://www.health.gov.au/internet/main/publishing.nsf/Content/Annual-report2008-09> Canberra.
- De San Miguel, K., & Lewin, G. (2008). Personal emergency alarms: What impact do they have on older people's lives? *Australasian Journal on Ageing*, 27(2):103-5.
- Hill, M. L., Cronkite, R.C., Ota, D.T., Yao, E.C., & Kiratli, B.J. (2009). Validation of home telehealth for pressure ulcer assessment: a study in patients with spinal cord injury. *Journal of Telemedicine and Telecare*, 15:196-202.
- Hogenbirk, J.C., Liboiron-Grenier, L., Pong, R.W., & Young, N.L. (2005). How can telehomecare support informal care? Examining what is known and exploring the potential. Report submitted to Home and Continuing Care Policy Unit, Health Canada.
- McCallum, J., Simons, L. A., Simons, J., & Friedlander, Y. (2005). Patterns and predictors of nursing home placement over 14 years: Dubbo study of elderly Australians. *Australasian Journal on Ageing*, 24(3):169-73.
- McCallum, J., Simons, L.A., Simons, J., Dong, T. & Millar, L. (2007). Risks and Burdens of Incontinence in an Older Community: The Dubbo Longitudinal Study of the Elderly, 1988-2003.
- Russell, T., Truter, P., Blumke, R., & Richardson, B. (2010). The Diagnostic Accuracy of Telerehabilitation for Nonarticular Lower-Limb Musculoskeletal Disorders. *Telemedicine and e-Health*, 16(5): 585-594.
- Sarhan, F., Weatherburn, G., Graham, A., & Thiyagarajan, C. (2010). Use of digital images in the assessment and treatment of pressure ulcers in patients with spinal injuries in community settings. *Journal of Telemedicine and Telecare*, 16: 207-210.
- Steele, R., Lo, A., Secombe, C. & Wong, Y.K. (2009). Elderly persons' perception and acceptance of using wireless sensor networks to assist healthcare. *International Journal of Medical Informatics*;78:788-801.
- Varma, N., Epstein, A.E., Irimpen, A., Schweikert, R., Love, C. for the TRUST Investigators (2010). Efficacy and safety of automatic remote monitoring for implantable cardioverter-defibrillator for follow-up. The Lumos-T safely reduces routine office device follow-up (TRUST) trial. *Circulation*, 122: 325-332.

Annex A Clinical Evidence for telehealth and disability

Reference	Patient population	Type of intervention	Outcome
Brewer et al. (2010)	<i>n</i> =127 remote caregivers, 45 adults with developmental disabilities and client advocates	Monitoring systems were developed for adults with developmental disabilities in residential care. The systems included motion sensors, smoke sensors, and cameras. Caregivers were able to view up to 35 camera feeds per night	<ul style="list-style-type: none"> - The telecare system was perceived to be as secure, safe and private as having a staff member in the home - The findings suggest that reducing the need for onsite caregivers has implications for large cost savings
Darkins et al. (2008)	<i>n</i> =17,025 veterans with diabetes, COPD, heart failure, diabetes and mental health problems	Veterans Health Administration: the national Care Coordination/Home Telehealth (CCHT) aids independent living through implementing home telehealth, health informatics and disease management technologies	<ul style="list-style-type: none"> - The intervention was associated with 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%
Hill et al. (2009)	<i>n</i> =42 patients with spinal cord injury, 2 modalities were investigated: phone only contact and videoconferencing	Each participant was assessed independently using telephone, videoconferencing and in-person assessment. Each skin or pressure wound site was assessed by each of the above modalities, results were compared with the in-person method	<ul style="list-style-type: none"> - Agreement on the presence of a pressure ulcer was high (92% telephone, 97% videoconference) - Diagnosis of ulcer stage had almost perfect agreement with in-person diagnosis
Russell et al. (2010)	<i>n</i> =19 individuals with nonarticular lower limb musculoskeletal conditions	The validity and reliability of remote physical assessment and diagnosis of nonarticular lower limb musculoskeletal conditions via tele-rehabilitation was assessed	<ul style="list-style-type: none"> - There was high (79%+) agreement on primary diagnosis - Physical examination findings also showed high agreement
Sarhan et al. (2010)	<i>n</i> =50 patients with pressure ulcers, <i>n</i> =10 nurses	The study conducted a retrospective review of the digital images in the clinical records of patients with pressure ulcers, 10 nurses independently assessed an image from each patient	<ul style="list-style-type: none"> - The average agreements regarding wounds was: necrosis 85%, ischemia 83%, granulation tissue 81%, infection/cellulitis 69%, erythema 68% - Results suggest that a high percentage of assessments could be performed in the community using digital images
Varma et al. (2010)	<i>n</i> =1,339 patients were randomized to TM or conventional follow-up. All patients had implanted cardioverter defibrillators	Group 1 were remotely monitored and group 2 treated with conventional office visits only. Actionable evaluations included clinically significant reprogrammable changes, medication changes, lead/generator revision	<ul style="list-style-type: none"> - Total in-office visits were reduced 45% remote monitoring group - Arrhythmias were the commonest cause for event notifications