



Medical Technology
Association of Australia



New inquiry into the National Broadband Network
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About the Medical Technology Association of Australia and 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 a diverse range of products that contribute to the health of Australians. Many of these devices have wireless capabilities and can be used in conjunction with internet based services to promote the health and independence of patients in their homes (e.g. implantable cardiac defibrillators/pacemakers with wireless monitoring capabilities, heart rate and other vital signs monitors, pressure sensors, enuresis sensors and medical alarms and alert systems). The medical technology industry had sales in Australia of \$7.6 billion in 2009-10 and employs more than 17,500 people. It is strongly research-based, often working closely with healthcare professionals to design and develop products for improved patient benefit.

New inquiry into the National Broadband Network

The House of Representatives Standing Committee on Infrastructure and Communications has commenced a new inquiry. The Committee has been asked to 'examine the capacity of the National Broadband Network to contribute to:

- a) the delivery of government services and programs;
- b) achieving health outcomes;
- c) improving the educational resources and training available for teachers and students;
- d) the management of Australia's built and natural resources and environmental sustainability;
- e) impacting regional economic growth and employment opportunities;
- f) impacting business efficiencies and revenues, particularly for small and medium business, and Australia's export market;
- g) interaction with research and development and related innovation investments;
- h) facilitating community and social benefits; and
- i) the optimal capacity and technological requirements of a network to deliver these outcomes.'

MTAA makes specific response to:

- b) achieving health outcomes**

How the National Broadband Network can influence health outcomes

The Federal Government is investing \$43 billion over 8 years to fund the rollout and operations of the National Broadband Network (NBN). The NBN will deliver high speed, affordable internet across Australia. The NBN will operate around 100 times faster than today and will increase the number of premises which receive optical fibre broadband. The introduction of the network is well aligned with Federal Government strategies for electronic health records and telehealth. The provision of high speed broadband to all homes, hospitals, doctors' surgeries and medical facilities will revolutionize health care (particularly home healthcare) in Australia.

Telehealth is the delivery of medical services through information technology and telecommunications. Telehealth technologies include web-based applications such as email, videoconferencing, electronic data access, storage and transfer, digital display (e.g. diagnostic scans), user interface interactions and visualisations, network connectivity

(including wireless connectivity), informatics (e.g. data mining and analysis) and store and forward technologies (e.g. the exchange of pre-recorded data such as vital signs).

The Government previously commissioned a report by National Information Communication Technologies Australia (NICTA) to identify barriers to the adoption of telehealth in Australia. One of the key barriers was the lack of ubiquitous high speed broadband to all homes and businesses in Australia(1). A second barrier was interoperability (i.e. difficulties with lack of standards around device and data conformity, which includes lack of compatibility between videoconferencing systems, home monitoring devices etc). The literature review undertaken by NICTA found that pervasive access was cited as a barrier in 26% of Australian references and interoperability in 47% of case studies from Australia(1). The NBN is expected to have the biggest positive impact on pervasive access. The NBN launch site was Tasmania and it has been reported that NBN trials in the State were directly associated with an uptake of telehealth services(2).

The NBN is not essential to the delivery of telehealth and home-based healthcare. Many of these services can be effectively delivered today. What the NBN should enable is greater access to these services, a decrease in the cost of delivering services, and faster, more efficient services. The benefits of the NBN to healthcare are indirect, for example, having large amounts of low-cost broadband bandwidth enables high quality videoconferencing and fast data transfer between healthcare facilities. There are a number of (indirect) ways in which the NBN will enhance the delivery of healthcare in Australia. These are listed below.

1. Allowing fast, secure access to electronic health records

Electronic health records will provide health professionals with fast access to correct, up-to-date, relevant patient healthcare information, including medical history and drug allergies. Electronic health records will list currently prescribed medications and should decrease errors such as incorrect prescribing of medications. Medical images can be stored securely within the electronic record and patients will be able to access their own health records online. Patients will have the means to be more involved in their own healthcare by having access to their health records and the ability to use secure messaging to communicate with health professionals.

2. Enabling rapid delivery of test results / medical data

Access to high speed broadband will increase the speed of processing of medical data and mean that test results can be sent immediately over the internet for interpretation. High speed broadband will enhance image quality and increase the speed of data transfer. This will benefit radiology specialties where large files must be transferred and disciplines that use medical photography (e.g. for wound care). Large data intense files such as magnetic resonance image (MRI) and computer aided tomography (CAT) scans will be able to be downloaded and transferred more easily. The availability of high speed broadband will enhance the use of imaging technologies which rely on high resolution images. The types of technology used in telehealth that will be enhanced by the NBN include videoconferencing, electronic data storage and transfer (e.g. prescription orders), network connectivity (including wireless technology), adverse event monitoring, public health monitoring, user interface interactions (including visualizations), informatics and comparative effectiveness research (comparing, for example, medications and medical devices used to treat cardiac conditions).

3. Changing the way that healthcare is delivered in Australia

Traditional medical consultations involve a face-to-face encounter between a patient and a healthcare professional. The report by NICTA stated that the NBN will provide a "unique

opportunity to catalyse change in the way that healthcare is delivered” (page 11). Fast, accessible internet (alongside appropriate policies and reimbursement) can fundamentally change the way that healthcare services can be delivered. Information (as opposed to physical examination) can be exchanged online in a number of ways, for example:

- A videoconference consultation can occur between a patient in a rural area and a specialist in a city location.
- Implantable cardiac devices are able to wirelessly transmit cardiac data or information regarding the performance of a device, which can be assessed by a specialist without the need for a face-to-face routine check up.
- Vital signs monitoring uses equipment and medical devices installed in the patient's home to identify trends and send alerts when necessary, in order to detect symptom exacerbations and intervene early.
- Online health alerts and medication reminders can be delivered to patients online to enhance medication compliance and remind patients to take the right medication at the right time.
- Incontinence assessment does not have to take place in a hospital or nursing home setting. A device with enuresis sensors can record incontinence events over a 72 hour period while the patient is at home.
- Diabetic patients can have insulin levels and other vital signs monitored using automated data upload and online services.
- There are a number of wireless devices that combine satellite global positioning systems and can be used to track dementia patients who wander.
- Cognitive assessments can be performed in a patient's home using a personal computer and data automatically scored and sent to a specialist in a different location.
- Patient safety can be monitored in the home using a range of alarms, alert systems and sensors.
- Health education can be delivered online to a patient at home.
- There are a range of Therapeutic Goods Administration (TGA) approved home monitoring systems that record and transmit daily vital signs. Peripheral devices can be used to monitor pulse, weight, blood pressure, temperature, epilepsy and subjective symptoms associated with a range of chronic diseases.

4. Improving access to healthcare through telehealth services

Patients in rural and remote areas have difficulties accessing the specialised health care services and skills required to use advanced medical technologies (e.g. the majority of diabetes services that support insulin pump therapy are based in metropolitan teaching hospitals(3)). The availability of high-definition videoconference facilities in rural areas will increase patient access to specialists in city centres. Fast, inexpensive internet will enhance the delivery of telehealth. The benefits of using online technologies to deliver healthcare to patients in their homes include:

- Decreasing the burden on informal care-givers, nurses and doctors.
- Decreasing patient travel and travel by health care professionals(4).
- Increasing home management of age-related chronic diseases such as chronic obstructive pulmonary disease (COPD), diabetes, cardiovascular disease and dementia.
- Increasing the independence of patients in their homes.
- Better (earlier) detection of symptom exacerbations that lead to hospitalization.
- Decreasing the impact of predictable factors such as falls and incontinence which lead to older patients being placed in residential care.

- Decreasing emergency room presentations for minor illnesses or stable chronic conditions with complicating symptoms.
- Decreasing potentially preventable hospitalizations due to chronic ailments, which could be prevented or managed through effective monitoring and timely care (usually non-hospital).
- Enabling earlier intervention in the trajectory of chronic disease.
- Decreasing nursing home and residential care admissions.
- Providing a viable alternative to outpatient or doctor visits.

5. Improving access to healthcare through remote monitoring of medical conditions

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. Data can be automatically transferred using wireless technology and the internet. Medical devices may be used for diagnoses (e.g. an implantable loop recorder), assessment (e.g. incontinence sensors) and to monitor symptoms associated with an undiagnosed condition (e.g. atrial fibrillation). A number of surgically implanted devices can be monitored remotely for clinical or device assessment (e.g. pacemakers and cardiac defibrillators).

Examples of clinical benefits associated with remote patient monitoring via the internet include:

- Significant improvement in glycemic control in diabetics who transmitted blood glucose and blood pressure data to a nurse(5).
- A 71% reduction in emergency room admissions in respiratory patients who had oxygen saturation measured by pulse oximetry and monitored daily(6).
- A 25% reduction in numbers of bed days of care and a 19% reduction in hospital admissions in 17,025 veterans with chronic disease who were enrolled in a home telehealth program(7).
- A 43% reduction in hospitalizations and a 68% reduction in bed days of care in cardiac patients who transmitted daily electrocardiogram (ECG) and blood pressure data(8).
- A reduction in office visits and earlier detection of anomalies in patients with implantable cardiac devices who were monitored using automated, wireless technology(9).
- A significant decrease (45%) in the need for in-patient hospital evaluation in 1,339 patients with implanted cardiac defibrillators who were remotely monitored(10).
- Reduced time to clinical decision in a large group ($n=2,000$) of patients with implantable cardiac devices who were monitored using wireless telemetry devices and alerts(11).
- Detection of a far greater number of clinical or device related events than during scheduled office visits in patients with implantable cardiac devices(10).
- A 50% reduction in mortality in a large sample ($n=69,556$) of patients with implantable cardiac devices, including cardiac defibrillators(12).
- A decrease in blood pressure and a reduction in the number of medications needed to treat high blood pressure in an analysis of 37 clinical trials, including 9,446 individuals using home blood pressure monitors(13)

6. Enabling smart medical homes

The NBN will provide elderly people (particularly those in rural regions) with better internet access. The Broadband for Seniors Initiative is opening 2,000 kiosks throughout Australia to

provide seniors with internet connections and education¹. There is a continuum of care from independent living, assisted living, nursing home facility to residential care. If health services can be supported by fast, accessible, affordable internet the NBN will support ageing in place which will increase the length of time elderly Australians can remain in their homes and defer the move to residential care. One of the barriers to internet use is cost(14). If the NBN can deliver low cost broadband, individuals with home internet will be more likely to engage with telehealth services.

A large proportion of health expenditure in Australia is spent on chronic disease management in the hospital setting. Inexpensive, high speed internet will enable a patient access to medical care regardless of location. In the future wireless technology will enable almost all medical devices to be monitored from a distance, effectively establishing 'hospital in the home' type care. Older Australians wish to remain in their homes for as long as possible and are accepting of technologies that enable them to do so(15). The use of internet enabled solutions to monitor health conditions will enhance quality of life and delay the move into residential care.

There are a number of examples where care is pushed into hospital settings that could be provided in the home (e.g. routine monitoring of cardiac conditions). Additionally, a wide range of medical devices is moving out of the clinic/hospital and into the home. The Australian Academy of Technological Sciences and Engineering (ATSE) has written a detailed report outlining how smart homes and medical technology can decrease hospitalisations and delay the need for people to go into institutional care(16).

Monitoring and diagnostic devices can already be found in many homes. These include basic equipment such as scales and thermometers to more specialized devices such as pulse oximeters, glucose monitors, blood pressure monitors, peak flow meters, drug delivery/infusion pumps, modern wound care devices, ECG and masks for sleep apnea. Many of these devices can upload data to the internet enabling continuous, real-time monitoring of multiple sources of physiological data.

An independent review has raised concerns that the NBN business plan underestimates the potential impact of high speed wireless broadband as a competitor to the NBN. Wireless homes do not have fixed-line telecommunications and rely on mobile telephones and broadband². The concerns are largely due to financial competition to the network from wireless technology. In most cases medical technologies can rely on either fixed line or wireless technology.

7. Decreasing healthcare costs

Delivering medical care in the home through the use of online technologies can reduce health-related expenditure in a number of ways.

¹ <http://www.fahcsia.gov.au/sa/seniors/progserv/broadbandseniors/Pages/default.aspx>

² for concerns raised see, <http://www.smh.com.au/business/mobileonly-poses-risk-to-nbn-20110214-1atoq.html>

- A report by the ATSE estimates potential cost savings to the Australian Government of up to \$526 million per year⁽¹⁶⁾. This was based on the assumption that 10% of individuals currently in residential care could be maintained at home with community care packages.
- Access Economics⁽¹⁷⁾ estimate that telehealth could lead to cost savings of \$2-4 billion per year.
- MTAA has outlined cost savings to the Australian Government of \$3.1 billion per year. Considerable savings can be achieved by reducing the need for residential care and residential care packages and reducing the costs associated with emergency room admissions, potentially preventable hospitalizations, flying doctor services in rural areas, patient travel and unnecessary tests and chronic disease management³.

8. Conclusion

Ubiquitous, affordable broadband is essential for extending healthcare into the home, particularly for communities that are rural and underserved. As the NBN is rolled out, it will be necessary to ensure the infrastructure meets the requirements for a community to ensure adequate connectivity among all of the constituents in a coordinated care model: hospitals, clinics, doctors' offices, laboratories, pharmacies and homes. Flexible connection services should be expedited for patients with health related needs.

Australia's growing population of both elderly and chronically ill people makes it imperative that government investigate, and invest in, solutions that improve self-care and enable those who are capable of doing so, to remain in their own homes. In many cases care needs can be met in the community. MTAA proposes improved access to technologies that assist the elderly and chronically ill to continue to live in their homes. MTAA hopes that the provision of fast, affordable internet to all individuals, medical professionals and healthcare facilities will enhance the delivery of healthcare to all Australians regardless of location.

³ for further information, please see MTAA's 2011-2012 Pre-Budget Submission to Treasury, <http://www.mtaa.org.au/pages/page308.asp>

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