Solutions for people living with a disability

Presented by

Tunstall Healthcare Asia Pacific

July 2010

All the reassurance you need

Tunstall

A member of Tunstall Healthcare Group

Certified System

Quality

ISO 9001

SAI GLOBAL

Continua

Table of Contents

1 Introduction

How we meet the growing demand for health and social care at home is one of the greatest challenges facing our country today. Faced with increasing population and increased costs of care to support persons living with a disability, the search for cost containment in the public sector has never been more important.

What is the impact on families today? For many, finding appropriate care services is a challenge from start to finish. Getting the right information, negotiating assessments and care packages and finding the money to pay for care, can seem like a never-ending struggle. It is something that very few people think about until it happens to them and it is hard to know how to plan ahead.

With a declining workforce and in order to prepare for the tidal wave of community care which will be required for the future, to meet the demand of support for people living with a disability, organisations and governments around the world are recognizing the benefits of technology and where technology has a role. For a person living with a disability, it's the everyday activities of life, such as shopping, cooking, cleaning and social isolation that create challenges and impact on their ability to remain independent and safe in their home environment. Some of these everyday living activities can be supported with assistive technology and combined with community and informal care, have been proven to enhance the quality of care and relieve the pressures on families and carers, with significant efficiencies.

The following paper outlines some scenarios which are all too common and some of the solutions which would better meet the expectations that people rightly have about the sort of care they can expect for themselves and their family. Further evidence is provided for consideration which describes the approach taken by local authorities and health trusts based in the United Kingdom. Evaluation results are summarised, proving the significant cost savings and quality of life improvements that can be achieved by implementing telehealthcare into care delivery pathways.

As the Government has asked the Productivity Commission to advise on a scheme that will cover those most in need, with a disability present at birth, or acquired through an accident or through a health condition, but not as a result of the natural process of ageing, for the purposes of this submission, the correlations between disabilities and the aging population have not been highlighted. Whether a person is young or old, living with a disability brings the same and sometimes different challenges. This submission does not provide solutions separately for the young or the old, or define every possible scenario to suit specific population demographics. Rather than this, the following information is meant to provoke discussion and present compelling evidence that regardless of a person's individual needs or demographic profile, assistive technology can help and does challenge and enhance traditional models of care.

The real life case studies presented here for information were not selected based on age, gender or disability. The selection was based on the type of disability to

describe how assistive technology provided benefits and cost savings for the person living with their disability and their carers.

2 Defining Assistive Technology

Assistive technology is a broad term used to denote technology used for assisting people in their day to day activities. In terms of this paper the primary focus is upon telehealthcare, or rather electronic devices integrated with telephony systems which provide assisted health or community care to individuals in their home environment.

2.1 Telecare

Telecare is the use of technology such as alarms and sensors in conjunction with telecommunications channels to provide proactive and/or reactive care to people in their home environment. Communications may be directed to a carer or via a monitoring centre. Telecare offers a way of helping to minimise potential risks in the home and help people remain independent in their own homes for longer. Unobtrusive sensors are placed around the home which automatically raises an alert if they detect a possible problem, such as smoke, gas, flood, fire, or a fall. The sensors are wireless and a flexible solution can be created to suit the needs of the individual. As a person's needs change over time, the telecare solution can be adapted to ensure they are always receiving the most appropriate level of support.

Telecare sensors are remotely monitored on a 24 hour basis and when triggered they will raise a local audible alarm to warn the user. They also automatically raise an alert with a monitoring centre, carer, or family member who can respond appropriately. Services from the Response Centre can also include proactive calls, including reminders to take medication, social calls to provide reassurance and support and pendant test calls to ensure users understand how to use their equipment should they need it.

Telecare sensors, combined with a telehealth solution, can create a truly comprehensive support package that allows individuals to remain independent in their own homes for longer. Over fifty years ago the first simple personal reassurance alarm system was created by Norman Tunstall, over time this has evolved to include a range of sophisticated telecare technologies available in today's market which support over 4.5M people worldwide.

Telecare Solutions with 24/7 Support

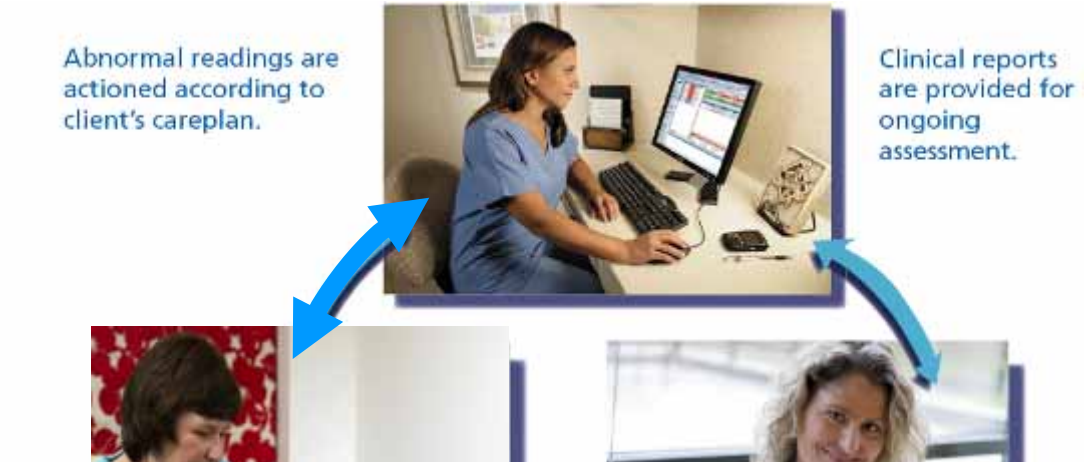
2.2 Telehealth

Telehealth systems help monitor the condition of people with long-term health conditions for example, Chronic Obstructive Pulmonary Disease (COPD) and Chronic Heart Failure (CHF), Hypertension and Diabetes in the home, giving them peace of mind that their health is being checked and managed in a comfortable environment. The technology involves a Telehealth system being installed in the patient's home which takes readings of their vital signs - such as temperature, blood pressure, blood glucose and oxygen levels - depending on their condition. These readings are then sent directly, via the telephone line, to a central monitoring centre where any abnormalities are flagged and a clinician is alerted to contact the patient.

The main purpose of Telehealth is to identify and act on any deterioration in a patient's condition before it gets to the point they require admission to hospital. It can also be used to help facilitate patients being discharged home early from an acute setting. In the past decade advances in technology have enabled the development of Telehealth systems, which monitor patients' vital signs remotely using a patient friendly monitor in their home. Patients (or where necessary supported by their carer/ family/friends) are prompted take their own readings, which are then communicated via a telephone line to a central triage facility. A trained Telehealth Consultant at the Monitoring Centre then reviews the readings from the patient and, where these readings fall outside of individually set parameters set by the patients' health care professional the Telehealth Consultant will follow clinical process maps defined by the principle health care provider.

Healthcare professionals establish the patients' individual alert parameters and appropriate response and actions where readings fall outside of set parameters. The Telehealth Consultants view the readings received from patients at set times and those requiring attention are automatically highlighted by the system based on the set parameters and the agreed process is implemented.

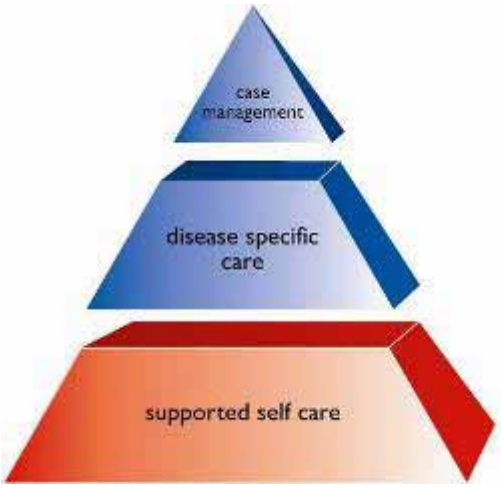
Telehealth Solutions with Remote Clinical Support



2.3 Telehealthcare

Telehealth care is a phrase coined by the industry which illustrates the more recent innovation where the use of telecare and telehealth is combined to deliver a comprehensive care model to support an individual's health and community care needs within their home environment.

Telehealthcare a Combined Solution



3 Telecare Programs

There are many drivers for implementing telecare programs. Government funded programs are generally implemented as a social obligation to care people living with a disability, to help manage the risk of falls, to mitigate the risks associated with environmental conditions such as increases and decreases in temperature and others associated with the management of chronic disease, health and mental conditions. Most governments are also motivated by cost control as telecare can reduce hospital admissions, delay high level care transitions, reduce institutionalised stays and increase case management for care workers. Telecare is becoming 'mainstream' in many countries. Rather than a 'nice to have', governments are viewing telecare as 'an essential service' in supporting people living with a disability and those that care for them.

There are various ways to implement telecare programs. Some governments prefer to own and fully operate the entire service, from assessment, through to installation, asset management and including the provision of a 24 hour monitoring service. Others go out to tender for components of the service delivery, whilst still maintaining controls over the individual assessment and eligibility criteria. There are standards of service delivery which are adhered to in most countries. Governments should ensure that either model can be independently audited and assured. All programs need to be cost effective and in fact should be measured against traditional models of care to justify full scale implementation.

The following are some examples of programs being conducted throughout the world, while predominantly focussed on aged care many of these programs include supporting other people with chronic disease or disabilities:

3.1 Australia: State Disability Funding Schemes

Each state in Australia provides for some type of assistive technology funding for people with disabilities, however clarity around the use of funding regarding extended Telecare rather than simply personal alarms is vague or non-existent, while the use of Telehealth is certainly not addressed. Most of the funding schemes address mobility, vision impairment or hearing impairment, but do not address chronic disease or mental health. Some programs focus solely on supporting children with disabilities and their families, but do not address the needs of young adults. Funding may be administered by government agencies or by non-profit organisations. Consistency and clarity around funding for assistive technology needs to be more consumer focussed – "what do I need" rather than "what do I get"; and the pathway to access the funding needs to be clearer to the people who need it.

3.2 Australia: Department of Veterans' Affairs

Under their Rehabilitation Appliances Program, the Department of Veterans' Affairs in Australia fully subsidises the Personal Emergency Response Service for Australia's veterans. This is a federally funded program. To be accepted for this program, the person and their living environment, needs to be assessed by an Occupational Therapist (OT). To be eligible for this program free of charge – the person must either be living alone, have a history of falls or be at risk of falling. The driver for this program is to 'reduce risk in the home' for the person, primarily because they could fall and if living alone or on their own, may not receive help for a very long time or not at all. The pendant with the alarm is a reassurance to them, their carers and the Department. The OT refers the person to the program and the

Department then sends a referral request through to the external provider to install the alarm and provide the 24 hr response service. Providers must tender for the service delivery every three years under a competitive process. To be successful, the provider must be compliant to the Australian Standards for Personal Emergency Response (AS4607). The DVA currently provides this service to more than 30,000 Gold Card veterans and their spouses across Australia.

SOURCE: Department of Veterans' Affairs http://www.dva.gov.au

3.3 New Zealand: Disability Allowance Scheme

In New Zealand, 'Pensioners' (older, disabled or otherwise) seeking assistance may be 'prescribed' a medical alarm for long or short term use. If a medical alarm is prescribed by a doctor or other health professional the cost of the alarm, rental and monitoring will be fully or partially covered by the *Department of Work and Income* through their disability allowance scheme. The pensioner may select which alarm service to use. The telecare service and equipment providers must be approved and registered by an independent body, *Enable New Zealand*. Tunstall's alarm products have been approved by *Enable* for the Disability Allowance scheme.

SOURCE: Work and Income http://www.workandincome.govt.nz

3.4 United Kingdom: Assistive Technology Programs

For over 50 years the United Kingdom has pioneered the use of assistive technology in community care. A range of community based programs and funding for these programs is available. Tunstall provides equipment and services to support many of the local government funded programs.

3.4.1 Preventative Technology Grant

The purpose of the Preventative Technology Grant was to initiate a change in the design and delivery of health, social care and housing services and prevention strategies to enhance and maintain the well-being and independence of individuals.

The grant was designed to help councils and their partners address the challenges of a changing and ageing society with increased expectations, such as the right to have choice about services, control over their delivery and the right to be able to live independently at home with dignity for life.

Integrating telecare into mainstream services will help councils and their partners to be best prepared to meet the challenges.

Telecare offers choice and flexibility of service provision, from familiar community alarm services that provide an emergency response and sensors that monitor and support daily living, through to more sophisticated solutions capable of monitoring vital signs and enabling individuals with long-term health conditions to remain at home.

Typical beneficiaries of telecare may include:

- older people and people with long term conditions and disabilities who will be able to maintain more effective control over their independence, dignity and health
- older people living alone starting to become forgetful or anxious, who may be able to remain independent and more in control of their lives for longer without intrusive visiting from health and social care professionals

- people with dementia
- people moving through intermediate care pathways
- people who are at risk of falls
- their carers

Although this grant funding is primarily aimed at supporting older people, the Government's vision is for telecare and other new technologies to be used, **where appropriate, for the benefit of people of all ages including those with long-term conditions, learning disabilities, mental health problems** and those needing end of life care.

The service transformation envisaged was based on locally-determined changes from reactive, to preventative, activities. Essentially the PTG enabled local authorities to apply for the grant to establish a new structure for community care including redeployment of resources and establishing the facilities and purchasing equipment for technology-enabled services.

SOURCE: Local Authority Circular "Preventative Technology Grant 2006/07 – 2007/08" Department of Health, 23 March 2006.

3.4.2 A Healthier Scotland

The Scottish government are building on the platforms developed with the PTG by supporting a continuing telecare program with a further investment of £8m provided for telecare funding in 2008-9 to 2009-10.

Over the next two years the 32 local partnerships are expected to:

- Extend telecare services to at least 7,500 additional people through this funding
- Increase awareness of telecare amongst service users and carers, and the general public
- Improve the assessment process for service users that could benefit from telecare
- Provide care staff with the skills they need to incorporate telecare within care packages
- Ensure all aspects of telecare service pro vision are delivered to recognised standards
- Enhance innovation and telehealth/care convergence where it is appropriate to do so.

The National Telecare Programme Board will continue to support local partnership delivery, to monitor and report progress, and to identify and contribute to international good practice in telecare innovation and implementation.

SOURCE: Seizing The Opportunity: Telecare Strategy 2008-2010, Joint Improvement Team Scotland. http://www.jitscotland.org.uk

Outcomes of the Scottish telecare programs were the key driver behind their proactive health and community care reform by the end of 2007/08, 18 partnerships reported having avoided unplanned hospital admissions, with these savings being made across 22 projects:

- During this period it is estimated that the number of unplanned hospital admissions was reduced by 1,220 (and by 13,870 bed days);

- The main beneficiaries were older people.

Increase the speed of discharge from hospital once clinical need is met:

- By the end of 2007/08, 20 Partnerships reported having reduced the number of delayed discharges (used as a proxy for increasing the speed of discharge), with these savings being made across 21 projects;
- During this period it is estimated that the number of discharges facilitated by TDP funds was 517, with an accompanying saving of 5,668 bed days;
- The number of bed days saved for each facilitated discharge appears generally to be between 7 and 15 days;
- The main beneficiaries were older people.

Reduce the use of care homes:

- By the end of 2007/08, 23 Partnerships reported having avoided care home
- admissions, with these savings being made across 26 projects;
- During this period it is estimated that the number of care home admissions was reduced by 518 (and by 61,993 care home bed days);
- Over half of the beneficiaries were older people – telecare appears to have been particularly successful at preventing (or possibly just delaying) admission to a care home for people with dementia

SOURCE: "Evaluation of the Telecare Development Programme", York Health Economics Consortium, January 2009.

3.4.3 Northhamptonshire: Safe at Home

In 2005 Northamptonshire ran a pilot telecare program to determine the effectiveness of telecare for people with dementia. A range of telecare equipment was provided to 233 participants. The primary objective of the delay or prevent the need for residential care. A comparison was made against a similar demographic control group of 123 people with dementia living in the neighbouring county of Essex.

After 21 months the following outcomes were determined: Carer stress was reduced and people with no telecare were 4 times more likely to move to high care. The program cost £286,853.46, while the net equivalent saving was £1,504,773. This has resulted in an ongoing telecare program within Northamptonshire.

SOURCE: http://www.northamptonshire.gov.uk

3.5 Spain: Teleassistance - Law of Dependency

Law for the Promotion of Personal Autonomy and attention to Persons in Situation of Dependency was introduced in January 07 and consists of £17.9 billion funding over the years 2007-2015. The law allows citizens the universal right to domiciliary care where required, at nominal cost to the beneficiary. It encourages social services to find ways to enable older people and those with disabilities to live independently at home. The Spanish government recognised that manpower alone could not be used, and providers soon agreed. "Spain could never recruit the necessary manpower to respond to the homecare service requirements for the Law of Autonomy for

Dependants at Home, not even internationally, as the skill sets for the additional 300,000 workers simply don't exist." National Newspaper El Pais, 9.7.07.

Spain has developed a long term strategy to 2015 designed to support people to live independently at home or within the community. There are two levels of care under the programme:

- Services for the promotion of autonomy include:
  - prevention of dependent situations
  - teleassistance

- Services of attention and care include, home and personal care, respite centres and nursing homes (for short or long term care).

The teleassistance programme is delivered by 3 NGO service providers across Spain. By 2015 it is estimated the teleassistance programme will support more than 311,000 users which equates to 85.6% of the projected population aged <65 years and identified as dependent.

SOURCE: "Ageing Y Dependency", Dr Juan Manuel Martinez Gomez, General Director of Eulen Servicios Sociosanitarios, Asemblea General CISS, Cancun October 2006.

3.6 Malta: Telecare

Since 2000 Malta has implemented a country wide telecare program, and now supports over 9,000 subscribers. The Telecare Service enables the subscriber to call for assistance when required. It aims to provide peace of mind to older adults, disabled persons and those with special needs, thus encouraging them to continue living in their own home. Telecare is also a source of reassurance for the subscriber's carers and relatives. The service is provided free of charge to people who meet the eligibility criteria, otherwise the service is provided at a subsidised cost of €2.33 to €3.10 + VAT per month.

Eligibility for the free service is based upon the following:

- Older couples/persons living alone, aged eighty years and over.
- Persons who are seventy years old and over suffering from a chronic illness.
- Persons of any age who are afflicted by life threatening illnesses and who are living alone and who are not gainfully occupied.
- Persons who are afflicted by life threatening illnesses and whose carer will benefit from the service, who are not in a gainfully occupied household.

SOURCE: Ministry for Social Policy http://www.gov.mt

3.7 Japan: Long-term Care Insurance

Japan's "Long-term Care Insurance" (LCI) law enacted in 2000, provides for home-care services or facility based services covering up to 90% of the service costs for eligible individuals. There are four key objectives of the LCI program, and they are to:

- reduce the burden of home care of the older person, traditionally borne by women;

- provide greater transparency of premiums paid in to the system vs expenditure;
- integrate health, medical and welfare services;
- reduce social hospitalisation cases where older persons were hospitalised due to a lack of viable alternatives.

All persons aged 65+ years are potentially eligible along with people **aged 30-64 with age related disabilities e.g. dementia.** Eligibility is based on condition rather than income and/or assets and is to be re-evaluated every 6 months. Each municipality is charged with administering the LCI and their appointed committee evaluates applications for eligibility. While national guidelines are provided the local committee may vary their eligibility criteria to suit local needs.

Each municipality provides a telecare program as part of their LCI service offering, this may include monitored personal alarms and sensors (such as smoke and gas detectors), to healthcare counselling, and psychological counselling. Local municipalities budget around US$30 per person per month for personal alarm rental and monitoring. There are over 60,000 funded personal alarms in Japan through local municipal programs operated by local providers such as the fire brigade, or national service provider Anzen (a not-for-profit organisation).

SOURCES:

"Health and long-term care expenditures of the elderly in Japan using a micro-simulation model"; Fukawa; Japanese Journal of Social Security Policy, Vol.6. No.2 (Nov, 2007)

"Aged-Care Support in Japan: Perspectives and Challenges"; Mitchell, Piggott and Shimizutano, January 2004

Introduction of Anzen Centre Co Ltd (Safety Service Center), August 2008

3.8 Hong Kong: Emergency Alarm Systems

The Hong Kong Housing Association has installed two types of Emergency Alarm Systems (EAS) for older tenants living in its public housing estates

EAS with panic alarm buttons is provided in each Housing for Senior Citizens (HSC) units, which is connected to the wardens' office and their quarters. In case of emergencies, the older person may press one of these buttons to call the warden for assistance.

EAS may also be installed in other public housing units. Since 1991, the HA had installed the EAS for older tenants who were receiving Comprehensive Social Security Assistance (CSSA) and living alone in estates where the Estate Social Service for the Elderly Scheme had once been introduced. However, as this type of EAS was not connected to a central control centre, its functioning relied heavily on the support of the neighbours and it only offered limited assistance to the older person in distress, the installation of such was therefore suspended in April 1996.

Grant for Emergency Alarm System (EAS Grant). In May 1996, the Social Welfare Department (SWD) introduced the "Special Grant for Emergency Alarm System" whereby older CSSA recipients who have met the eligibility criteria stipulated by the SWD can obtain a special grant, on a reimbursement basis, to acquire any EAS service on the market to meet their needs.

To cater for the need of those older persons who are in need of EAS but do not qualify for, or are not currently receiving CSSA, the HA has, since September 1996, provided them with an EAS Grant to enable them to purchase any EAS on the market to meet their needs. To qualify for the EAS Grant, older tenants must meet the following criteria:

- not receiving CSSA;
- living alone or in household with all members aged 60 or above; and
- satisfying one of the following conditions which took effect from 2 March 2000:
    - if aged 65 or over, having an income and asset not exceeding the prescribed limits detailed below; or
    - if aged 60-64, having an income and asset not exceeding the prescribed limits detailed below and are certified by a public medical officer to be more than 50% disabled or suffering from such medical conditions which could develop life threatening conditions as to require immediate attention (medical certification for those receiving disability allowance from SWD for being 100% disabled or in need of constant attendance is not necessary).

The income and asset limits are based on the prevailing financial eligibility limits for the Normal Old Age Allowance administered by the SWD.

	Single Person	**Married Couple**
Monthly Income Limits	$5,910	$9,740
Asset Limits	$169,000	$254,000

The EAS Grant is given to eligible older persons on a reimbursement basis for a one-off installation cost up to a maximum of $2,500.

Subject to meeting the prevailing eligibility criteria, older persons living either alone or in household with all older members in interim housing and Rent Allowance for Elderly Scheme recipients are also offered the EAS Grant from 2 March 2000 and October 2001 respectively.

Households having family members with disabilities/chronic diseases or in need of special care, such as those who are mobility handicapped (wheelchair-bound), visually impaired or hearing impaired, those who need to undergo renal dialysis at home or need the aid of oxygen breathing apparatus and those implanted with a cardiac pacemaker, may provide their emergency telephone contacts and other relevant information to the staff of the estate offices by telephone or in person. To address the special needs or requests of individual households, the staff of the estate offices will provide suitable assistance to them as far as possible, e.g. to inform the households direct in case of emergencies such as fire, theft, bursting of pipes and suspension of water or electricity supply.

Households having family members with disabilities or chronic diseases may approach the Social Welfare Department direct or through the respective estate offices for other support services such as home help, rehabilitation and counselling services.

SOURCE: www.housingauthority.gov.hk

4 Telehealth Programs

Telehealth (or vital signs monitoring) enables clients to carry out routine monitoring of vital signs at home. Telehealth products and project implementation services are provided to host organisations to operate pilot programs for the remote monitoring of persons with chronic disease. The development of such programs usually includes working with universities and community care organisations in the preparation of applications and submissions to government departments for research grants and program funding.

Internationally, successes have been well documented, demonstrating Telehealth in community care settings; resulting in reduced operational costs, reduced hospital admissions, increased case load management, and reduced patient episodes.

The objectives of these type of programs is to not only measure the effectiveness of telehealth but to proactively assist patients and health care providers in the management of chronic conditions), reduce hospital admissions, engage patients to participate in the management of their own condition, improve the effectiveness and use of public health care resources, and deliver a high level of patient centred care, cost-effectively.

An effective telehealth program includes the provision and maintenance of Telehealth equipment, project management, and training of operational staff in: administration, product knowledge, triage and response and the installation removal, storage and infection control of the Telehealth equipment.

Each participating patient undergoes a personal Telehealth assessment process (both physiological and home environment) and signs a participation consent form. The participation form will include their personal profile and agreement to share their information with relevant personnel involved in their treatment. A client establishment record form is also required, signed off by the clinician identifying the individual set up required for the patient's monitors and the individual alert parameters, which need to be set for each participant, and any other special requirements.

The host organisation can provide the monitoring service, the health care providers, and establish protocols for response and reporting, and the resources which will be used e.g. when ambulance should be dispatched, hospital patients are to be transferred to, community nurse to visit, GP to visit etc.

4.1 Telehealth Programs

Small telehealth pilot studies or trials are effective catalysts for health care providers to determine how to implement larger scale telehealth programs. In developing an effective telehealth program, providers need to determine what outcomes they want to achieve, program resources, and funding streams. Small scale pilots enable healthcare providers to identify issues, create change management programs, develop new operating procedures, identify savings and expenditure,

4.1.1 Scotland: Lothian Council

Lothian Council is pioneering a large telehealth system in Scotland, with 400 patients with long term conditions set to benefit from the telehealth personal healthcare system.

The telehealth personal healthcare system which was piloted in practices in West Lothian, Midlothian and Edinburgh is now being rolled out to patients across Edinburgh and the Lothians.

The state of the art high tech system allows people with chronic conditions, such as Chronic Obstructive Pulmonary Disease (COPD) to monitor their own conditions on a daily basis at home. The telehealth personal healthcare system uses touch screen technology and can undertake a range of health tests including blood pressure, breathing, weight and blood glucose and oxygen levels. It also provides wireless connections to medical devices such as peak flow meters and weight scales.

This initiative offers excellent benefits to patients by allowing them more control of their condition. It allows the patient to carry out self-monitoring while still being supervised by a clinician. This ensures the safe management of the patient, provides added reassurance and more frequent patient, clinician contact. The telehealth system provides early monitoring of the patient's condition, thereby preventing the condition worsening and reducing the need for unplanned hospital admissions.

Similar sized trials in other countries have shown hospital admissions reduced by around 30 per cent. Evaluation of the roll out will be undertaken in the form of a randomised controlled trial by The University of Edinburgh. The telehealth project has been developed following the successful telecare initiative spearheaded in West Lothian.

SOURCE: www.sct.scot.nhs.uk

4.1.2 UK: National Health Service North Yorkshire and York

In 2008/09, over 6,000 patients in North Yorkshire and York were admitted to hospital with respiratory or cardiac problems.

NHS North Yorkshire and York recently unveiled plans to implement 2,000 Telehealth systems to support patients living with long term health conditions in the area - making it the largest scale Telehealth programme in the UK. The programme follows an eight month trial of revolutionary telehealth technology which has demonstrated the huge benefits it can bring for both patients and clinicians alike. The technology involves a telehealth system being installed in the patient's home which takes readings of their vital signs - such as temperature, blood pressure, blood glucose and oxygen levels - depending on their condition. These readings are then sent directly, via the telephone line, to a central monitoring centre where any abnormalities are flagged and a clinician is alerted to contact the patient. The main purpose is to identify and act on any deterioration in a patient's condition before it gets to the point they require admission to hospital. It will also be used to help facilitate patients being discharged home early from an acute setting.

Telehealth is targeted at patients living with long-term health conditions including Chronic Obstructive Pulmonary Disease (COPD), Chronic Heart Failure and Diabetes. Rosie Walker Smith, a Case Manager working in the Hambleton and Richmondshire area of North Yorkshire, has seen the benefits of Telehealth first hand. She added: *"Feedback from patients already using Telehealth has been*

overwhelmingly positive. Not only does it reduce the risk of their condition deteriorating to the point they need hospital treatment, but also gives them the peace of mind that their condition is being monitored. "It's great that more patients will get to benefit from this technology."

SOURCE: www.ehealthnews.eu

4.1.3 UK: NHS Medway

A telehealth pilot scheme was undertaken by Medway Primary Care Trust (PCT) and Medway Council of Social Services. The pilot used 5 telehealth monitors, 1 was shared amongst a group within a nursing home. 31 patients with chronic conditions and acute related episodes were selected for the trial, 15 in a nursing home facility and the other 16 living at home. The aim of the study was to assess the social and financial benefits of using telehealth in a community setting.

The following outcomes from the study were determined:

- Nursing home
  - 1 monitor measured 15 residents (multi user capability)
  - 10 were stabilised and no intervention was required
  - 127 hospital bed days saved
  - 112 nursing hours saved
- Community setting
  - 16 home based patients
  - 133 bed days saved
  - 117 nursing hours saved
  - Almost 9 hours GP time saved

An overview of responses from a client satisfaction survey revealed very positive responses to using telehealth. Benefits from the users' perspective included:

- Being able to be treated at home saving travel time an expense
- Ease of access for family visits
- Clients involved in their own treatment crated peace of mind
- Nearly all believed their condition was monitored more frequently resulting in quicker medical intervention if their condition deteriorated

From the results of this study, NHS Medway have developed a larger ongoing telehealth program.

SOURCE: "Telemedicine: - Unplanned Care Versus Planned and Co-ordinated Care"; Taylor; Medway Council, January 2007.

4.1.4 UK: Cornwall's Telehealth Program

The Cornwall Telehealth project is aimed at patients who suffer from lung disease, heart disease and diabetes.

The Telehealth equipment enables patients to monitor their own health from the comfort of their own homes. It also enables the Community Matron or Specialist Nurse to monitor trends developing over a period of time. This gives a more consistent picture of health and helps identify problems at a much earlier stage.

Telecare and assistive technology uses equipment that supports independent living through automatic prompts, reminders or alerts.

The aim of the technology is to enable or maintain independent living. It can be used to support living in a manner chosen by the individual, safe in the knowledge that help can be raised in an emergency. When an alert is raised by pressing a red pendant, usually around the user's neck, the control centre endeavours to speak directly to the person, if this is not possible they will either phone the carer (responder) or contact the emergency services.

A team that includes the University of Birmingham and The Kings Fund, led by Professor Chris Ham, is evaluating all three pilot sites, with a focus on emergency hospital admission rates, patient/carer experience and quality of life and the impact on primary care.

The population eligible to receive telehealth and/or telecare are: Adults with severe Chronic Obstructive Pulmonary Disease, Diabetes, heart failure or co-morbidity. Frail adults who do not have one of these long term conditions; frail adults with one or more of the selected long term conditions.

The pilot is being run as a Randomised Control Trial by the evaluation team, testing the benefits of both types of assistive technology, either singly or combined. The evaluation team is seeking ethical approval on behalf of all the sites.

SOURCE:
http://www.cornwallandislesofscilly.nhs.uk/CornwallAndIslesOfScillyPCT/Homepage.aspx

4.1.5 UK : Sheffield PCT : COPD telehealth program

Sheffield has a high prevalence of chronic obstructive pulmonary disease (COPD) resulting from the mining and other industries in their region. The rate of COPD is three times the national average. The local hospital has over 2000 presentations per year as a result of complications from COPD.

Sheffield's Primary Care Trust (PCT) implemented a small telehealth pilot with 30 participants over a 5 month period. Over the period of the trial the following results were attained:

- Hospital admissions were down 50%
- Home visits were down by 80%
- Approximately £40,000 was saved

The PCT extrapolated that if telehealth was rolled out on a broader scale they could save as much as £1.2M per annum. Sheffield has since expanded their telehealth program.

SOURCES: www.sheffield.nhs.uk www.tunstall.co.uk

4.1.6 Europe: CommonWell Project

400 users across four locations in Europe will receive an integrated health and social care service for at least 12 months. Patients will be using telehealth monitors from Tunstall to help them better manage their long-term conditions at home. Milton Keynes and Eindhoven Councils in the Netherlands are the first locations that will initially address chronic disease management for older people suffering from Chronic Obstructive Pulmonary Disease and Chronic Heart Failure. The results will be used to extend service provision and promote this model of care across Europe. Designed to address issues such as:

- Ability to remain independent
- Reducing ability
- Vision and hearing
- Improving quality of life for older people and their families

Expected benefits:

- Reduced hospital stay for clients through supported early discharge
- Demonstrated cost benefits through improved operational efficiencies i.e. reduced travel costs, increased case load management
- Improved resource utilisation, both of staff resources and physical resources
- Decreasing the cost of health care, which is a product of preventing unnecessary clinic visits, hospitalisations and trips to the emergency room.
- Reduction in unnecessary primary care visits through early detection, diagnosis and intervention, a savings of 30 or more minutes of primary care clinician time.

Time savings and cost saving strategies improve efficiency and productivity in multiple interrelated ways:

- Data collection with peripheral devices in the home environment
- Transmission of data over phone lines
- Automatic electronic medical entry of within data range
- Automatic alerts for out of range data
- Trigger of out of range data
- Integration of primary and secondary services
- Client specific disease feedback.

Patient / Client Benefits and Outcomes:

- Client empowerment, obtained through information provision, more active involvement in the management of their condition.
- Reduced numbers and lengths of hospital stays
- Fewer outpatient attendances through remote monitoring
- Cost savings for clients through not having to travel (and cost of parking) to hospitals, and GP clinics
- Delay or avoidance of admission to residential care facilities

- Better compliance with medication regimes
- Earlier detection, diagnosis and treatment; and
- Reduced stress and greater convenience for clients.
- Improved quality of life

Paul Timmers, head of the European Commission's 'ICT for Inclusion' Unit said, *"This is an important project for the EU because it addresses the challenging issue of interworking between social services and health care. We support projects like CommonWell to get the results of innovative new technologies and services to consumers faster. We also want ICT to help improve the quality of life and perspectives of being able to live independently and healthily in real-life situations. Projects like CommonWell fulfil all these criteria by making it possible to deliver cheaper and better healthcare with ICT. These kinds of solutions are ever more important to help Europe face demographic and financial challenges."*

SOURCE: European Commission http://ec.europa.eu

4.1.7 USA: Department of Veterans' Affairs Care Home Telehealth

Between July 2003 and December 2007, the Veterans' Health Administration (VHA) introduced a national home telehealth program, Care Coordination/Home Telehealth (CCHT). Its purpose was to coordinate the care of veteran patients with chronic conditions and avoid their unnecessary admission to long-term institutional care.

Demographic changes in the veteran population necessitate VHA increase its non-institutional care (NIC) services 100% above its 2007 level to provide care for 110,000 NIC patients by 2011. By 2011, CCHT will meet 50% of VHA's anticipated NIC provision. CCHT involves the systematic implementation of health informatics, home telehealth, and disease management technologies. It helps patients live independently at home. Between 2003 and 2007, the census figure (point prevalence) for VHA CCHT patients increased from 2,000 to 31,570 (1,500% growth).

CCHT is now a routine NIC service provided by VHA to support veteran patients with chronic conditions as they age. CCHT patients are predominantly male (95%) and aged 65 years or older. Strict criteria determine patient eligibility for enrolment into the program and VHA internally assesses how well its CCHT programs meet standardized clinical, technology, and managerial requirements.

VHA has trained 5,000 staff to provide CCHT. Routine analysis of data obtained for quality and performance purposes from a cohort of 17,025 CCHT patients shows the benefits of a 25% reduction in numbers of bed days of care, 19% reduction in numbers of hospital admissions, and mean satisfaction score rating of 86% after enrolment into the program.

The cost of CCHT is $1,600 per patient per annum, substantially less than other NIC programs and nursing home care. VHA's experience is that an enterprise-wide home telehealth implementation is an appropriate and cost-effective way of managing chronic care patients in both urban and rural settings.

SOURCE: "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"; Darkins, et al; TELEMEDICINE and e-HEALTH; VOL. 14 NO. 10, DECEMBER 2008.

4.1.8 Taiwan: Department of Health and Council for Economic Planning and Development

A long-term care insurance program is being developed by the Council for Economic Planning and Development (CEPD) in response to Taiwan's increasing proportion of aged citizens. Those 65 and older are expected to make up 22.5 percent of the total population by 2018, when the number of **physically and mentally impaired individuals could reach 810,000.** The bill pertaining to the program will be sent to the Legislative Yuan for deliberation before the end of 2010. Plans are to put the program into effect officially by 2011, the centenary year of the Republic of China (Taiwan).

SOURCE: http://www.taiwantoday.tw (Taiwan Today News 28 October 2009).

In order to respond to the growth of the elderly population, to achieve the goal of "aging in place," and to promote the vital development of the healthcare industry, the Department of Health, under Taiwan's Executive Yuan, commissioned a Telecare project in 2007 to manage long-term care needs by utilizing information technologies to support healthcare. With the collaboration of medical institutions, information and communications technology laboratories, and home security providers, and in order to establish comprehensive health service provision, the project team has planned and established not only community-based care services, home-based care services, and institution-based care services, but also a Telecare information integration platform to support care management, exchange of information, and information security. The Telecare project pilot study is expected to prove the efficacy of this innovative service model and bring long-term care services in Taiwan into a new era.Huang Tung-liang, TIAT secretary general, reported that both the and the Department of Health (DOH), under the Executive Yuan, have completed the first stage of their respective telecare pilot projects and the DOH will launch the second-stage project next year, rallying the participation of even more companies and medical institutions.

In addition, China Medical University Hospital has joined forces with some clinics in central Taiwan in offering telecare service on a trial basis, which has created NT$200 million of annual revenue for the hospital and achieved NT$400 million of saving for the national health insurance program, according to the Bureau of National Health Insurance.

SOURCE: "The functional structure of Taiwan's Pilot Telecare Project" Information and Communications Research Laboratories, Industrial Technology Research Institute, ROC. 2008 Aug;55(4):17-23.

4.1.9 Australia: Telehealth Lifestyle Coordination Project

The Telehealth Lifestyle Coordination (TLC) Project, launch on 4 February 2009 in Ipswich, Queensland, Australia is championed by Ipswich Community Aid, a not-for-profit community care organisation. The project will involve 30-50 users from the local community with chronic conditions to investigate the effects and benefits of daily monitoring on the individual and benefits to the healthcare system. The project will run for 18 months with each participant using the system for a period relevant to their condition and needs. The focus will be on, cardiac, respiratory, endocrine and others. The TLC Project aims to prove the implementation of telehealth solutions will:

- Increase awareness on behaviours affecting individual health
- Actively involve patients in their own health management
- Decrease emergency episodes for people with chronic diseases
- Create greater feelings of safety for a patient within their own home
- Encourage collaboration between health care partners for the patient's benefit

SOURCE: www.tlcproject.com.au

4.2 Case Studies

Quite often the most significant benefits of telecare and telehealth are well described through individual case studies. Although one person's individual story does not produce enough evidence to encourage governments to spring into immediate action, it does however bring commonsense and food for thought to the complex discussions and planning that needs to go into significant change. The following real life case studies provide compelling 'food for thought'. (For privacy adherence full names have been withheld).

4.2.1 Multiple Sclerosis – Valery

Valery suffers from Multiple Sclerosis and is only able to move her neck and head – pressing a pendant for help is just not possible. Valery was provided with a specially designed wand switch to enable her to call for help and reassurance. The wand switch is located on the back of her wheelchair so all she needs to do is tilt her head back to activate an alarm call. Additionally, on the front of Valery's wheelchair, a special sip/puff switch was also added, allowing her to suck or blow into the tube to activate an alarm call or answer the telephone. Whilst in bed, Valery is able to also activate an alarm through a uniquely designed flexible rotational tube attached to an additional sip/puff switch which allows her to call for help and answer her telephone from her bed. The 24 hour response centre is alerted to Valery's specific medical conditions and can organise the appropriate help whether that is emergency services, family, friends or a carer. Valery says, *"I will never give up; I am so glad I have my mind unlike some others. Before my new wheelchair and the alarms I would be put in one spot where I would have to stay until the next carer visit. Now I can control my chair and I am working on ways that I can begin my artwork again – I have works of art inside my head just waiting to come out!".* Valery believes the special sensors have allowed her to remain living in her own home and enabled her to feel secure whilst living in her own home should she ever need any help.

Wand switch

Flexible rotational tube with sip/puff switch

Valery's wand switch

4.2.2 Living with Epilepsy – Tony

Tony has had epilepsy since he was 14. Still a young man, he lives alone but close to his family. Tony regularly carries out voluntary work, teaching basic skills in computers and helping people with mental disabilities. Most of all he is determined that epilepsy will not affect his independence. Like many other people who have epilepsy, Tony has seizures. He may black out or experience a number of sensations and movements. But he has no warning when these will occur. He often lies uncomfortably on the floor or even injured for house until the seizure is over.

Most people with epilepsy can and do lead perfectly normal lives with only a few minor changes to their everyday lifestyle. Wearing a fall detector is one of these small changes. It can play a huge part in helping people with epilepsy enjoy their life to the full. The first day Tony wore his fall detector he had a seizure. The local monitoring centre responded to the call and contacted his mother who Tony had nominated as his closest keyholder. The monitoring centre requested that she check on Tony and she visited his house to make sure he was safe. Some hours later when Tony woke up he noticed that the dishes had been cleaned and the house tidied. He realised his mother must have been to check that he was okay. So he now refers to his fall detector as *"the best dishwasher I've every had!".*

Fall Detector

4.2.3 Incurable Syncope Drop Attacks – Gavin's story

Since his early 40's Gavin had been living with severe drop attacks, the doctors identified as syncope drop attacks which are incurable and unable to be managed with medication. The drop attacks come on suddenly with no warning and can mean that Gavin is unconscious for long periods of time. There had been many dangerous incidents of falling outside and in the home and once he had an attack whilst cooking and awoke to find the whole house in smoke.

The attacks can be as frequent as twice a day and mean that he can't drive or go on outings unsupervised, something as simple as travelling on escalators becomes a hazard for him. As a result Gavin had no other choice but to move in with his parents. For 3 years, everyday, someone had to keep an eye on him at all times and although he tried to stay positive, at times it was quite depressing. It seemed like the only solution would be to go into respite where the environment is more suited for older clients, much older than Gavin.

Through his doctor, Gavin found out about assistive technology solutions such as the fall detector which he now wears on his waistband. The fall detector automatically alerts the 24 hour response centre in the event that Gavin has a fall. The response centre advises his parents and will call for emergency assistance if needed. Gavin states, *"It has saved my life numerous times not only from an assistance point of view but personally – I can now live independently in my own home with the assistance of a helper who comes two hours a day for cooking and cleaning….My goal is to continue to live independently for as long as I can and live each day as it comes…..the service is not just for the elderly, but for anyone in the community like myself who may need reassurance or support."*

4.2.4 Tuberous sclerosis and epilepsy - Elaine's son

Elaine's young son has tuberous sclerosis and epilepsy, requiring Elaine to be nearby during the night in case he experiences a seizure. Elaine's son also has a weight problem, making him too heavy to carry upstairs to the bedrooms. Consequently Elaine has to sleep downstairs with her son.

An epilepsy sensor has been installed that is placed between his mattress and sheet. The system is connected to a pager and personal alarm for Elaine. If Elaine's son experiences a seizure Elaine's pager is activated. Elaine is then able to use her personal alarm to call for assistance while she helps her son.

The epilepsy sensor, pager and personal alarm has allowed Elaine to sleep in her own room knowing she will be alerted if her son experiences a seizure. Elaine's quality of life for herself and her family has improve, enabling her to spend more time with her other children during the day.

Epilepsy sensor

4.2.5 Learning disabilities – Mr T

Mr T lives in his own home in a supported living community. Mr T has severe learning disabilities and had fallen out of bed and badly hurt his hip. He was admitted to hospital and couldn't return home without a community carer being available to sit beside him all day. Mr T had a bed and chair sensor installed to eliminate the need for a full time carer. Instead, his carer now has a pager that receives an instant response if he tries to get out of his bed or chair and they can attend to him immediately to ensure he was okay.

Bed and chair sensors

4.2.6 Managing diabetes at home – Dallas

Dallas has Type 2 Diabetes and high blood pressure. Her condition has deteriorated over the last few years, resulting in an increase in daily injections of insulin. She sees her GP when she has problems and a specialist once a year. A recent hospital emergency admission was the result of extremely high blood pressure. Following this, Dallas' family encouraged her to have a telehealth monitor installed in her home. Dallas' vital signs are now monitored daily by a clinician who works closely with her and her husband to encourage her to exercise and maintain a good diet. Within three months of the system going in, she has lost 3kgs and her vital signs have stabilised. The transition to dietary changes has been much easier for her, with the involvement of the clinician and her being able to measure her vital signs herself. Dallas is able to keep a close eye on how the benefits of a change in diet have helped her condition.

Telehealth vital sign monitoring

Some time ago Dallas accidentally locked herself out of her house and was on her own, in the cold, on her back porch for more than 5 hours. She had to remain there until her husband arrived home to assist her. Following this incident an alarm was installed, along with a key safe. Dallas attested to feeling much safer when on her own, especially that her home has 13 stairs and she might fall. Dallas knows that if she has a problem she will be able to press her pendant and help will quickly be on the way. The combination of telehealth and telecare has led to improvements in her health, a greater confidence and independence and a sense of relief for her family and carers.

Telecare equipment and 24/7 support

4.2.7 Managing dementia at home – Jack

Jack has dementia and lives on his own in a retirement village. He is prone to walking about at night, sometimes becoming disoriented and disturbing other residents while searching for his own room. During the day he copes well, however he has left the sink running a couple of times, posing a threat to him and the property. Jack is still capable of living alone and does not want to move to a high care facility where he may be locked in his room at night and is not permitted to cook and clean for himself.

Assistive technology equipment was installed in Jack's living environment to help manage the risks and delay Jack having to go into a high care facility. With a door exit sensor, bed occupancy sensor and a flood detector Jack's movements and activities could be monitored by a 24 hour response centre. Whenever sensors were activated the centre could intervene to proactively support Jack and help him maintain his independence.

As memories fade and motor skills deteriorate, living with dementia can be increasingly frustrating. Moving people out of their own home can be distressing, as they are thrust into a completely unfamiliar environment. The pressure on carers can also be intense, feeling they need to be with them day and night to ensure their safety.

Environment and movement sensors

5 The Benefits of Trials

Many telehealthcare programs start off as trials or pilot studies which enable governments to identify how assistive technology and services can be integrated into current social welfare, community and health care systems. A trial program produces the necessary statistical evidence to evaluate the social benefits, clinical outcomes and economic benefits. Trials are a collaborative effort involving the relevant government departments, health and care providers, university researchers, industry experts, community groups, participants and their families and support networks. Trials as small as 50 participants through to 1,000 or more have proven to be manageable and successful in producing empirical evidence which provides governments with a base model for larger scale mainstream implementation.

6 Conclusion

While other countries have implemented a telecare and/or a telehealth program of some nature, the most successful are those that commenced with controlled trials which measured outcomes and provided the opportunity to develop new models of care. For Australia to move forward and develop a new health and community care strategy which integrates assistive technologies, trials or pilot programs will need to be conducted. These trial programs will reveal the evidence and outcomes which will form the basis from which assistive technology can become a more main stream service provision. Technology based services will compliment the government health care system and enhance community care by enabling Australians living with disabilities to improve their quality of life and enjoy the comfort and security of their own home environment.

Author Details

Name of Organisation	Tunstall Healthcare
Name of Contact Person	Lyn McFarlane
Position of Contact Person	General Manager, Business Development and Operations
Postal Address:	1/56 Lavarack Ave, Eagle Farm QLD, 4009 Australia
Telephone Number:	(07) 3637 2200
Facsimile Number	(07) 3637 2255
Email Address	lyn.mcfarlane@tunstallap.com