

# Irish Ageing Studies Review

## Seminar Proceedings

INDEPENDENT LIVING  
HOUSING, TRANSPORT AND TECHNOLOGY



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INDEPENDENT LIVING – HOUSING, TRANSPORT AND  
TECHNOLOGY

**Proceedings of a Seminar**

Organised by

THE IRISH GERONTOLOGICAL SOCIETY

Yvonne McGivern and Desmond O'Neill (Editors)



THE IRISH GERONTOLOGICAL SOCIETY

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## Foreword

On behalf of the Irish Gerontological Society, it gives me great pleasure to present the Proceedings of the Seminar, Independent Living – Housing Transport and Technology. This is the second in what we hope will be an annual series of Seminars aimed at establishing a high-quality dialogue on topics relevant to the science of ageing.

The Seminar took place on June 14, 2006 in the Royal Irish Academy, Dublin with an invited audience from across the statutory, voluntary and private sectors, and from a range of disciplines. The Seminar provided participants with the opportunity to learn about and to discuss the application of technology to the promotion of health, wellbeing and independent living, and to examine some of the challenges this presents.

I would like to thank our five guest speakers, each of whom contributed hugely to the success of the day: Professor Peter Lansley of the University of Reading and SPARC; Ms Kathy Freund, Executive Director of ITNAmerica; Dr Niamh Scannell of Intel Corporation; Dr Suzanne Cahill, Director of the Dementia Services Information and Development Centre; and Dr Rodd Bond of Dundalk Institute of Technology. I would also like to thank the Seminar participants for their questions and for their valuable contributions to the discussions.

It is very important that the messages of the seminar are conveyed to those with the authority and the responsibility to take practical action to improve the lives of older people from the point of view of mobility, transport and housing. To this end as well as publishing this report of the proceedings we plan to publish a newsletter summarising the key points from the day.

Finally, on behalf of the Society I would like to thank Ms Yvonne McGivern for her work in preparing this report of proceedings, and Professor Desmond O'Neill for additional editing.

Professor Cillian Twomey, President  
Irish Gerontological Society

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## Introduction to seminar proceedings

*Yvonne McGivern, Editor*

This is a report of the proceedings of the Second Annual Policy Seminar of the Irish Gerontological Society, entitled Independent Living - Housing Transport and Technology. The papers are presented in the order in which they were delivered at the Seminar.

The first paper, Assistive Technology and Older People: A Broad Perspective, was delivered by **Professor Peter Lansley**. Professor Lansley examines the contribution of design and technology in meeting the challenges we experience in our everyday living environments.

The focus of the second paper by **Kathy Freund** was transport. Kathy describes Independent Transportation Network (ITN), a comprehensive, national, non-traditional approach to transport for older people. Technology is an integral part of how ITN operates: its business model was created in the world of information system management and so technology has affected the way in which it was built. Kathy explains how ITN works, how it developed and how it will develop in the future.

In the final paper of the first session, Integrating IT in a Mature Society, **Dr Niamh Scannell** describes Intel Corporation's work in the area of health, ageing and technology, and how it is integrating IT and putting it to use to give people the supports and services that will empower them to take care of themselves and their family members.

A Question and Answer session with a Panel Discussion followed Dr Scannell's paper.

In the first paper of the second session, **Dr Suzanne Cahill** poses the question, Can Technology Improve Quality of Life in People with Dementia? She describes some of the early findings from the ENABLE study, a four-year, community-based, longitudinal study across five countries including Ireland. The overall aim of the study was to find out whether it is possible to help people with dementia to live independently and to promote their wellbeing by giving them access to assistive technology.

In the final paper, New Solutions for Housing for Older People, **Dr Rodd Bond** describes some solutions to housing for older people, or rather the search for solutions that will allow us to 'age in place', to live out our lives and to age in our own homes.

A Question and Answer session with a Panel Discussion followed Dr Bond's paper.

## Biographies of Contributors

**Professor Peter Lansley** is a Professor of Construction Management at the University of Reading. He has worked at the university for over twenty years in different capacities – he was head of the department of Construction Management and Engineering, a dean with the Faculty of Urban and Regional Studies, Director of Social Science Research and is currently a pro Vice Chancellor. He has been involved in setting up SPARC (Strategic Promotion of Ageing Research Capacity) which has particular aims of encouraging researchers to enter into ageing related areas, and to raise the profile of ageing research through public workshops which he has facilitated throughout the UK. He has been an advisor to many national and international companies and received a major innovation award for work on the Arousal Simulation System.

**Katherine (Kathy) Freund** is the founder of the Independent Transportation Network®(ITN), and President and Executive Director of ITNAmerica™. Katherine has a Master of Arts degree in Public Policy from the Edmund S. Muskie School of Public Service and a Bachelor of Arts degree in English Literature from the State University of New York at Buffalo. She is currently a member of the Advisory Committee for the 2005 White House Conference on Aging, a past National Transit Institute Fellow and she served for nine years on the Transportation Research Board's Committee on the Safe Mobility of Seniors where she chaired the Alternative Transportation Subcommittee. Currently, she Chairs TRB's Joint Subcommittee on Transportation Options for Seniors. She also chaired the Task Force to Study the Safe Mobility of Maine's Aging Population. She received the 2006 award for Leadership in Innovative Enterprise Ideas from the Social Enterprise Alliance, the 2004 Archstone Award for Excellence in Program Innovation, Gerontological Health Section, American Public Health Association and an award for Geriatric Best Practices 2004 from the South Carolina Hospital Association and the Duke Endowment.

**Dr Niamh Scannell** has worked for Intel Corporation for fourteen years, first as an engineering graduate and now with the Health Research and Innovation Team, part of the Digital Health Group within Intel.

**Dr Suzanne Cahill** is the Director of Dementia Services Information and Development Centre Dublin at St James Hospital. She is also a lecturer in Ageing and Social Policy at Trinity College Dublin and an Associate Professor (Adjunct) of Social Work and Social Policy at the University of Queensland in Brisbane. She is a graduate of University College Dublin, where she took her Bachelors Degree (1976) and later her Master's Degrees in Social Science, focusing on cardiac rehabilitation (1983). She wrote her PhD in Australia on the topic of Alzheimer's Disease,

family caregiving and Social Policy and graduated from the University of Queensland in 1997. She comes with a background in social work practice, teaching and research and has served on many different Advisory Boards and Committees, both locally and in Australia, promoting the rights of people with dementia. She currently sits on the Editorial Board of the journal – Dementia – the International Journal of Social Research and Practice. She also currently co-chairs the recently established HSE national Committee on dementia. Dr Cahill has published articles and book chapters nationally and internationally on age-related topics including cash benefits for older people living in the community, dementia and social policy and has more recently developed innovative training materials including two educational videos on dementia. Her current research interests include, dementia and quality standards, assistive technology, architectural design and dementia, family and professional caregiving, and the assessment of dementia in primary care.

**Dr Rodd Bond** is an architect with long experience in health care facility design together with an interest and expertise in ICT. He graduated from Oxford in the 1980s and has spent time since working on architectural problems in the primary care setting and on projects for people dying in hospital. He is currently working on a collaborative exercise with the Local Authority in the north-east, Dundalk Institute of Technology and the Health Service Executive on exploring ageing in place, fusion of innovative spatial technology health care delivery models. He is also working on a sheltered housing scheme and has worked with the National Council on Ageing and Older People with regard to falls prevention.

## **Assistive Technology and Older People: A Broad Perspective**

*Professor Peter Lansley*

### **Introduction**

The aim of this paper is to examine the contribution of design and technology to meeting the challenges experienced in everyday living environments.

#### **The situation: demographic change**

All are now familiar with the notion that the world is getting older. According to estimates by the United Nations (UN), in the next twenty years or so the population of Europe will shrink but the number of older people, especially very old people, will grow. It is predicted that the population of those aged over sixty in Ireland will grow by two and a half per cent a year; the population of those aged over eighty is predicted to grow by two per cent a year.

UN statistics also show that the ratio of the number of people aged between 15 and 65 to the number aged over 65 – what is sometimes termed the dependency ratio (a crude proxy for workers to retired people – is set to reduce dramatically over the next twenty years or so. Ireland currently has about six people aged between 15 and 65 for every person over 65; by 2020 there will be 2.4 people aged between 15 and 65 for everyone over 65.

#### **The implications**

These changes have major implications for society. The availability of state funds to pay for pensions and health care is one of them: traditionally these are paid from current taxes but arguably the funds ought to be accumulated today because of the falling dependency ratio. For most countries the total debt incurred is enormous, according to research by the European Union (Frederikson, 2003). For example in France, Germany, Spain, the Netherlands and Ireland these implicit social obligations have pushed net public debt to well over 200 per cent of Gross Domestic Product (GDP).

We know that with more people living longer, more people will have health problems. This poses challenges not just for medicine but for every aspect of the way we live.

Realising what this will mean in terms of health care budgets, it is conventional to ask, 'Who will pay for the increasing number of older people?' The challenge is, however, not just the need for better pensions and savings and more tax revenues to fund older people's services, it is one of

using resources more effectively, for example, through the greater use of technology. Can technology come to our rescue? In part, the answer is yes. We should be encouraged.

### **Support from technology**

There is evidence that most people who remain in their own homes and thus retain their independence, rather than be forced into residential care, fare better physically and mentally than those who are not able to do so.

Also, physicians are aware that despite the promise of medicine for improving the quality of life of older people, what happens in the home, in the street and on the buses is far more important. Technology is the key. The challenge is in the everyday tasks. For example, a person struggles to open a door: Is it because they are not strong enough to pull it open? Is the person disabled? Or is it that the door is disabling them? This leads to fundamental questions about the nature of dependency.

### **Designing for inclusion**

With these questions we can start to address the way in which our world is designed as the reason for some of the disability and handicap which are such a feature of old age. We can also start to think about technologies to help those who are genuinely disabled.

Let's look at some of the challenges of design. Think of the built environment – a railway station, for example - and the experience of that environment for those with poor eyesight. It can be bewildering for a person who has lost only a little of their sight. What can they see? Not the things they really need to see – signage for the ticket booth or the lavatories or the way out. What stand out are often signs for restaurants. The choice of colour, colour contrast and lighting on notices and displays can have a huge impact on the communication of important information for those with vision or hearing loss, and so on whether they venture from home, visit friends or the shops.

Think now of the design and management of care homes and how these can impact on feelings of well-being. Whilst much current design advice may produce safe and secure care homes it also produces environments which are depressing. The recent history of care home closures in the UK is a sharp incentive for new developments to be rigorous in business practice. Design to minimum regulatory standards, however, does have implications for the quality of life of residents and the job satisfaction of staff. The reduction in well-being for those who live in homes designed to current standards compared with earlier designs can be substantial. Homes built at different times reflect the values and aspirations of their time. From these we can judge how much or how little we value older people.

Older people should not be excluded from using transport systems and/or expected to endure a poor quality of life in care homes simply because of design.

I could also look at the trouble we have with the design of consumer products and the design of packaging – but there isn't time. Except to say that it is not acceptable for older people to be prevented from enjoying food because they cannot open the packaging. Here the challenge is not just for designers, it is a challenge for all of us – we should not accept designs which are awkward, painful and dangerous to use. Expressing our preferences and having higher expectations could work wonders. Standards and regulations often reflect what society thinks is acceptable or desirable. Once standards are in place a lot follows: witness, for example, the impact of the Disability Discrimination Act in the UK.

Despite good design some of us will need the assistance of wheelchairs, walking frames, adapted cutlery, a hearing aid and so on. That leads us to the natural complement to design – Assistive Technology (AT).

## **Assistive Technology**

Here we face the challenge of information - few people know what is available, where to obtain it and how much it will cost.

### **Adaptations and Fixed AT**

AT can be just redesigning the home – making adaptations. For example, putting intermediate steps on each stair for someone with a hip problem; removing a lower shelf in a cupboard to enable a wheelchair user to get to the contents; raising the level of plug sockets.

The classic items of fixed AT are the stairlift and the grab rail (on a staircase or hallway or around the bath, for example). There are others: for example, hinges which allow the door to swing right back, a boon when narrow doors impede a walking frame or wheelchair; and intercoms and alarms (at the entrance to flats, in a flat with a pull cord and a video entry phone). There are lots of small personal items, too: aids to help with dressing and preparing food, for example.

It is worth noting that AT is not just for older people or disabled people. Everyone would love to have a robotic vacuum cleaner, so intelligent that it will not fall down the stairs or run over the cat!

To repeat, the challenge here is that very few people know about the newer technologies and products, what is available, how to select them or how to use them. This is a major issue. The independence and health of many older people are being compromised by the limited knowledge of health and social services professionals. Even where that knowledge is good, however, the

supply system is often awful. There is little interest in the business of AT except from specialist suppliers and too much is too medicalised and too expensive. Some items could become part of the mainstream consumer products industry and subject to the proper rules of the market. Think, for example, of the hiking stick. Some older people tell me that these sticks are more comfortable, lighter and better designed than conventional walking sticks. The hiking stick is indeed a mobility aid but at what stage should we regard mountaineers as disabled people?

Many of the brightest, most valuable ideas stay on the shelf or are exploited in an inappropriate way, with no benefit to health. Nevertheless, it is worth looking at some of the new Assistive Technologies, especially those which could be used by large numbers of older people.

### **New Assistive Technologies**

The call alarm is one example. Quality of life and independence starts with being able to live comfortably in our own homes. For many people the advent of the community alarm has brought peace of mind and better safety and security; it has saved many lives. So, as one might expect that there has been a lot of work concerned with exploiting communications technology.

Some are aware of smart homes which use, for example, passive infra-red detectors, falls monitors, mat pressure switches and devices which sense whether a fridge has been opened recently. These devices gather data about whether an occupant is following their normal daily routine. The occupant is not directly monitored by some 'big brother' but by an in-house computer. If, after several tests, it senses that something may be wrong it will alert a carer.

These sensors do have drawbacks, however. So, many research groups are exploring the potential of technologies more familiar to the defence sector. This is basic research, developing methods to recognise in detail what an individual is doing, or not doing - if, for example, they have fainted and have not recovered. To be of any use these require great accuracy. Analysing video footage is not easy. Imagine, then, developing automatic methods for identifying whether something unexpected or potentially hazardous has occurred, and even whether someone's general demeanour has changed. Tracking individuals and then being able to map those individuals electronically for later analysis requires a blend of science, a command of technology and a good understanding of what constitutes normal behaviour.

Smart homes are being designed to enable a person with mild dementia to live independently. They have many safety and security devices: lights which switch on automatically, to guide an individual at night, say when they get out of bed (for further development of this theme, see Dr Suzanne Cahill's paper in this volume); bath taps which turn off if a bath is unattended and the water level too high; a device for locating items - spectacles, purse, keys - which have been mislaid; a cooker equipped with various sensors to sense whether the stove is being attended, to

monitor temperatures of pots, and a reminder unit to give messages to the user if, for example, they leave the stove unattended.

Telecare and telemedicine systems monitor the health of individuals in their own homes. The classic examples are Japanese - for example, small units in the home can analyse an individual's urine and alert them or the hospital of any change in their condition. Not only is remote monitoring possible but remote consultations become feasible: a doctor can consult with a patient through a video telephone with the patient's up-to-date records and early morning urine analysis immediately available. This could be a boon for routine consultations or when a patient is too distant or not sufficiently mobile or strong enough to be able to visit the surgery.

Through these developments more of us will be able to live in our own homes for longer. Eventually the technology will be simplified for the user – but only when the technologists are reminded that they are designing for other people rather than for themselves. When enlightened designers come on the scene much can happen.

There are success stories already: for example the large push button telephone designed for people with visual impairment but so well designed that it is one of the top ten best selling phones; in Japan there is strong competition to design simpler mobile phones to capture the older people's market. In the future mobile phones will be able to give the user a quick medical check up – pulse rate, blood pressure, early warnings of heart problems, even connect with the emergency services. Imagine how helpful that might be. They will also help us navigate in unfamiliar environments by allowing us to enter information about where we want to visit and giving us back information and advice on the best route, advice that takes account of our infirmities, mode of transport and any other relevant constraints.

It comes back to good design again – good design of everyday products. For many older people, especially women, life happens in the kitchen, with use and interaction with consumer and food products. The packaging of consumer goods can create problems for older people - opening a milk carton, a pack of bacon, drinks cans and bottles. Data from pinch and grip strength tests show very clearly how strength builds up during our teens, gradually falls off until our mid sixties then rapidly declines to that of a 12 year old by age eighty. Cost considerations and fear of hygiene infringements lead food manufacturers to use packaging which is more extreme than is required and pays little regard to the end user. These data are helping to give packaging manufacturers a new perspective on design, challenging yet helping them to develop better packaging for the products which all of us buy.

Last year in the West Indies, I fell into conversation with an expert on nutrition about the issues faced by many older people in the Caribbean. Many live in informal settlements, where the home is a shack with no running water or sanitation. They do not have the problems with packaging which we have - they have to prepare food for themselves from scratch and often they struggle

with nature's packaging. Imagine the difficulties in preparing fruit and vegetables for someone with arthritic hands. Imagine the impossibility of preparing a mango – they are cheap, often free, and they are nutritious, but for many they are a memory only.

So if the heart of the home is the kitchen, and certainly it is for many older people, we have a lot of work to do if more people are to maintain the pleasure and ensuing satisfaction of preparing food for themselves and for others. If we cannot afford the right foods or prepare food properly then our nutrition deteriorates accordingly.

This is where the designers, engineers and technologists have a part to play – in the design of jars, cans, packets and containers, the design of kitchen gadgets and the design of the kitchen. It is not just packaging. What about appliances?

Think of the kettle: because of the dexterity, vision, reach, stretch and intellectual demands about 18 per cent of people aged over 75 have difficulty with a conventional corded kettle. With a cordless kettle the number excluded is greatly reduced because the demands are much less. But cordless kettles can still be difficult to use. We need to think of a different approach. Why do we need to take the appliance to the water tap? Why not take the water to the appliance? A large, two-handled mug has been designed which is easy to fill at the tap and once filled can be placed into the kettle. The demands are a lot less and although not everyone is able to handle the mug only about four per cent of people aged over 75 are excluded from using this sort of kettle. In short, inclusive design is good design.

### **Getting going again**

AT has many uses in helping people recover and get going again. The early days following a stroke are critical to a patient's recovery. Stroke patients need frequent exercise but there are not enough physiotherapists to give all that a patient needs. Yet some of the exercises are simple. Many patients, for example, need to regain the ability to sit. Once they can do this they can carry out multiple tasks. Yet sitting can place such a demand on their systems that they cannot do anything else. Technology can help: a seat has been developed that allows the person to balance on it and tackle other tasks with confidence. The seat can also be linked to computer-generated virtual reality 'games' that allow the person, for example, to slalom between poles, helping them to regain balance and physical and visual coordination. Patients find these approaches enjoyable and encouraging and they speed up their recovery: the approach is far removed from having to spend 23 and half hours a day in a hospital bed waiting for half an hour's physiotherapy.

Another approach is concerned with providing exercise therapy, getting limbs moving again. Robots are used to monitor how well a patient can do the task. The robot can modify the task by, for example, offering more resistance to the movement to help strengthen the person's arm.

Finally, an example of some of the most advanced AT is the use of electrical implants in the brain to tackle Parkinson's Disease or uncontrollable muscle spasms. These can enable the person (young or old) to achieve greater mobility and improved quality of life.

## **Into the mainstream**

In this paper I have taken a very limited view of AT. AT is a much bigger field with much bigger implications – and not just for older people. For example, surveys have shown that a very large proportion of people of working age would benefit from inclusive design and AT in both the home and the workplace. For the workplace the arguments are persuasive. In the future industry will need to be more efficient – to enable workers to earn and save more for old age and to contribute to taxes and to pension funds to support old age. This will be achieved only if workplaces are better designed to include people of all ages so that they can work into later life and be more productive so as to benefit themselves, their firms and the nation.

So my initial concern for more efficient public services for older people is echoed by a concern for more productive industries. This is where we all have a part to play. We must get on our soapboxes to express our concerns about the way we live and the way we work, to champion inclusive design and to encourage the development of those technologies that will assist us both in our everyday lives and in our work. In that way AT will cease to be something associated with being old or disabled but will be accepted as a natural part of the mainstream of life. As a result AT will become better understood, and less stigmatised and less medical. It will be better designed and subject to the rules of the market. We must do everything possible to ensure that simple AT is readily available, cheap, and follows the normal rules of consumer markets – the market is certainly big enough and it is growing.

The research community is, I think, keeping its side of the bargain. Over the last few years I have had the privilege of working with a number of young university-based engineers and designers who, despite modest funding, have been undertaking pioneering research and development of AT and of Inclusive Design principles. Their work has had a major impact on standards and regulations in the UK, especially on design issues.

Without objective data, however, new standards cannot be developed. Recently a new British Standard (BS) on the Management of Inclusive Design has been produced based largely on evidence from recent research. Here I must mention the special role of Roger Coleman of the Royal College of Art who has provided not only the academic leadership to the BS committee but, with the backing of the Design Council, has produced a major business case for taking the older person seriously and designing with them in mind. The report, *Living Longer: The context for*

design ([www.designcouncil.info](http://www.designcouncil.info)), provides all the evidence that anyone would need to be convinced that designing for the whole population is the way forward.

It is one thing writing British Standards but it is another getting people to use them. Much of the output from design research has to take the form of best practice guides. An important example is the highly accessible website of information for designers developed by the Royal College of Art and the Royal Society of Arts (<http://www.inclusivedesign.org.uk/>). Another example is Judith Torrington's RIBA (Royal Institute of British Architects) endorsed book, *Upgrading Buildings for Older People* (2004). Dalke, Littlefair and Loe's 2004 report, *Lighting and Colour for Hospital Design* is the official guideline for the NHS in the UK (available from The Stationery Office, <http://www.tsoshop.co.uk/>).

Along with advice to the professions is advice to policy makers. Mitchell, Burton and Raman's (2004) *Neighbourhoods for Life: a checklist of recommendations for designing dementia-friendly outdoor environments* has had a major influence on the policies of a housing corporation in relation to the housing needs of those with early stages of dementia. It has become an almost mandatory guide for housing associations applying for grants. It serves to highlight how quickly some research on ageing has been incorporated into policy and practice - in this case almost before the ink was dry on the final report. (A copy of the report is available at <http://www.brookes.ac.uk/schools/be/oisd/sue/wise/index.html>!)

## **A new initiative: SPARC**

Because I believe in a bottom-up approach – that researchers, intermediaries and older people themselves have to bang the drum for older people because politicians are unlikely to - the campaign to encourage new faces into ageing research continues with an initiative begun in 2005 called SPARC: Strategic Promotion of Ageing Research Capacity (see <http://www.sparc.ac.uk/>).

In 2004, frustrated with the lack of interest in ageing research at strategic policy level, we - researchers backed by older people and some charities - lobbied the UK research councils for a different approach. Biologists and engineers bought into this proposal but medics and social scientists would not. We have nevertheless established a small but vibrant programme of design, engineering and biological ageing related research populated by new academics in fields ranging from cellular ageing to the use of cellular phones and from telecare to telomeres. We are developing approaches which will keep our future selves working better for much longer.

SPARC has now decided whom to support with pump-priming awards. We are running workshops throughout the UK to make sure that those at the sharp end of ageing are aware of what we are doing, and that we are aware of what is important to them. We are also lobbying ministers and other policy makers.

So when I think about Assistive Technology much of the time I am concerned with two questions:

- How do we ensure that older people get what they really deserve from the incredible power of science and technology?
- How can that power be harnessed to their advantage?

In all of these endeavours the aim is to ensure that every older person can enjoy life as much as any younger person. If we lose sight of that aim then our mission to develop really useful AT will fail.

## Independent Transportation Network<sup>®</sup> : Supporting Transportation in Later Life

*Katherine Freund, ITNAmerica<sup>®</sup>, Executive Director*

'Greater than the tread of mighty armies is an idea whose time has come.'

Victor Hugo

### Introduction

Independent Transportation Network (ITN) is a comprehensive, national, non-traditional approach to transport for older people. It brings together research, practice and policy into one coherent approach. It is entrepreneurial, business-like and sustainable. It is designed for consumers and it is grounded in the benefits and effects of consumer choice. In effect, it is a market-based solution and a charitable and non-profit solution.

Technology is an integral part of what we do. I had the idea for Independent Transportation Network before I knew what a database was, before there was an Internet and before there was e-mail. It is because of technology, however, that ITN has a life. The business model was created in the world of information system management: technology has affected the way we built the business model. We have not imposed technology after the fact; they fit hand in glove.

Independent Transportation Network is the name for the original, model programme set up in Portland, Maine. ITNAmerica is the name for the new national, non-profit organisation that we have created to help communities throughout the United States (US) replicate this model for participatory, sustainable mobility for older people.

The aim of this paper is to describe what ITN is, how it works, how it developed and what we are planning for the future.

### What it is and how it works: an overview

Older people join their community ITN, ITNPortland<sup>™</sup> or ITNOrlando<sup>™</sup>, for example. They open an account and they ride. A car driven by a volunteer or a paid driver picks them up from wherever they are.

The way the ITN model is based entirely on consumer choice. The person chooses how they want to ride: they can plan rides in advance or they can ride on demand; they can ride alone or they can share rides with others; and they can ride by the hour or by the mile. The basic charge is a pick-up charge plus a mileage charge; the minimum charge is currently \$5. We offer a 15 per cent discount for rideshare and a fifty per cent discount for advance planning of the rides.

People can have whatever they want, but the more demanding they are, the more they have to pay. We have found that when people are spending their own money they make very different

**Box 1 ITNPortland Operations Facts and Figures**

Current equipment: Donated furniture, computers, radios (some purchased)

Current fleet: 4 donated cars, rotated to minimize repairs

Current Staff: 1 Executive Director, 1 Community Outreach Director, 2 dispatchers, 3 Senior Corps, 2 VISTA, 6 part time drivers

*For the 12 month period July 2004 to end of June 2005*

- Total trips = 15,825
- Annual expense = \$240,608
- Ride revenue \$127,887
- Paid drivers = \$93,817
- Volunteer drivers = \$34,070
- Average cost per trip = \$15.20
- Average fare per trip = \$8.08
- Average subsidy per trip = \$7.12
- New dues-paying members = 131 (119 new customers)
- New volunteers = 17
- Current dues-paying members = 1,289

choices than when they are spending someone else's money. Many people complain if they have to schedule a ride in advance. If they know, however, that the fare will be cut in half if they do book in advance then ninety per cent of them book in advance. In eleven years, no one has complained! Box 1 below contains some facts and figures from ITNPortland to give an idea of the scale of the operation.

When people think about mobility for older people they tend to think that if an older person is too old to drive then someone can get them a ride to the doctor and get them some food. People outlive the decision to stop driving by ten years - that is a long time to go only to the doctor or to get food or to sit around waiting for someone to offer them a ride. All of life is

available when real mobility is available. These figures from the ITNPortland database the range of things that people do.

#### Box 2 ITN Rides by Purpose

15,825 ride segments for the 12 month period July 2004 to June 2005:

Medical: 3,883

Consumer: 1,715 (including 646 for hairdressing appointments)

Recreation 1,062 (including 693 for exercise)

Employment: 1,043 (1,015 paid work)

Social: 468

Church/Spiritual: 316

Educational: 165

Intermodal: 97 (connecting with other transport)

Professional Services: 13

Home/return: 7,292

### How do ITNAmerica do it?

At the core is an enterprise software program called ITNRides<sup>TM</sup> – ‘the marriage of grassroots and high tech’. It has six elements or functionalities:

- Centralized database management
- Routing and dispatching
- Finance and billing
- Volunteer management
- Community outreach
- Membership.

The system reads the requests for rides and dispatches the drivers. Algorithms built into the programme work out the logistics of matching the driver, the vehicle, the route and the needs of the older person requesting the ride.

The system also handles the work schedules of the drivers. It can be a complex task keeping track of who is on vacation and who is not; who has a four door vehicle, who has a two door vehicle; whose trunk can handle a wheelchair; who is allergic to dogs.

Once a month the system calculates and sends out a bill and a statement showing the member what rides they took and how much they spent on them (just like an itemised telephone bill).

## How ITN developed: an overview

How did we get to this solution? Looking back, it is clear that ITN developed through a number of stages. From 1990 to 1992, I worked on the idea as a graduate student. I spent a couple of years writing grant applications, trying to get people to listen to the idea and to fund it. Between 1992 and 2003 we received funding of around \$2.5 million (from a number of private and public funding sources – see Box 4 below). We used this funding to research and develop the ITN model.

### Box 4 ITN*America* Ten Years and \$2.5 million Research and Development Funding

#### Public sources of funding

- Federal Transit Administration
- National Highway Traffic Safety Administration
- Transportation Research Board (National Academies of Science)

#### Private sources of funding

- American Association for Retired People (AARP)
- The Atlantic Philanthropies
- The Archstone Foundation
- Winter Park Health Foundation
- Great Bay Foundation for Social Entrepreneurs
- Florence V. Burden Foundation
- Ziv Tzedakah
- New Jersey Foundation for Aging
- American Automobile Association
- Sam L. Cohen Foundation
- Numerous other private philanthropies and donors

From 2003 to 2005 we entered the second phase, the planning phase for taking the model developed in Portland, Maine and recreating it in other places in the US.

We are now in the third phase, the national rollout stage in the US. This stage has been marked by support from Atlantic Philanthropies as well as some exciting developments in public policy with a Bill on senior mobility currently in Congress and developments in several state legislatures.

#### Box 5 Summary of ITN development stages

##### Phase I:

1990 to 1992: problem analysis  
1992 to 2003: developing the sustainable model

Phase II: 2003 to 2005: business planning and the national rollout

##### Phase III:

2005 to present: replication begins and continues; the White House Conference on Ageing (WHCoA) rates mobility options number three (see <http://www.whcoa.gov/>)

2006: Atlantic Philanthropies funds the rollout and internet technology

Senator Susan Collins introduces the Older Americans Sustainable Mobility Act of 2006 (S2311)

Maine, New York, Connecticut, Rhode Island and Hawaii pass legislation.

Let's look at each of the stages in more detail.

## Phase I: The problem analysis stage

During the first ten years of the project we tried to understand the elements of the problem in order to design an effective solution. I believe that true solutions emerge from sound problem analysis. It is important to go into the problem solving stage with no preconceived ideas, allowing the data and the people to provide elements of the solution. This is how we approached the problem, and how we came up with the solution.

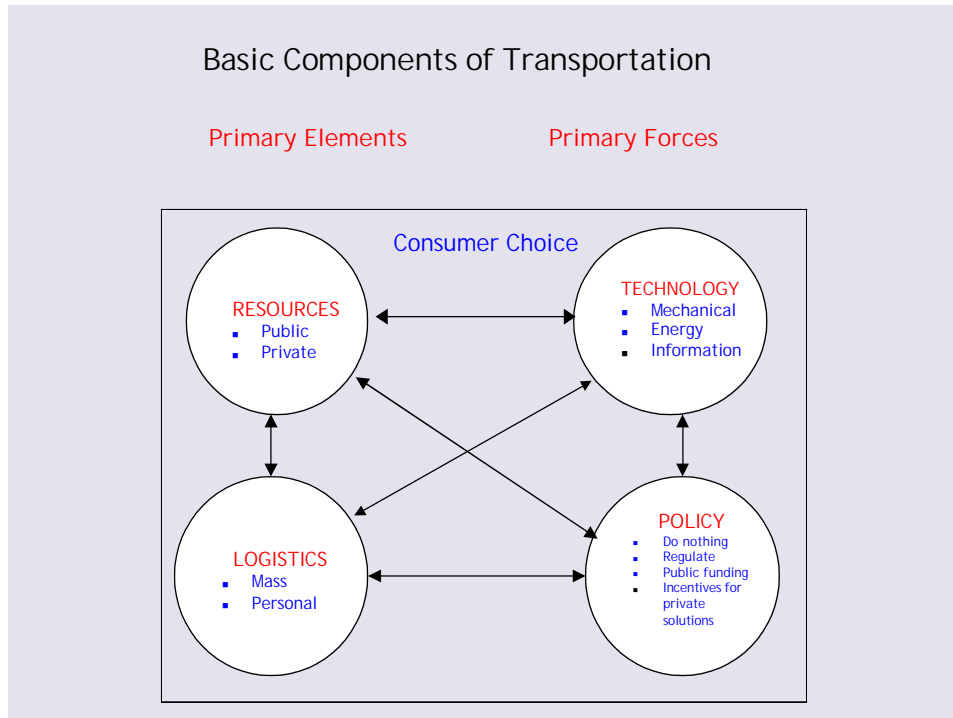
We identified four underlying problems that we had to solve:

- Resources—how to pay for rides
- Logistics—how to arrange rides
- Technology—how to achieve efficiency

- Policy—how to support solutions.

We identified and unpacked the basic components of a transportation solution (see Figure 1 below).

Figure 1 Basic Components of Transportation



### Resources – how to pay for rides

You can either pay for a solution with public resources or with private resources. In the US the private resources available to pay for transportation are infinitely greater than the public resources available. Independent Transportation Network, while it uses public money for start-up, relies on private resources for sustainability in the long term. In other words, ITN is designed to supplement but not replace - and certainly not compete with - public transport.

### Logistics – how to arrange rides

We typically think of transportation in terms of mass transportation - the person goes to where the vehicle is. Most older people in the US, however, live in rural and suburban areas where there is not a sufficiently high density of people to support traditional mass transportation. Indeed, half of those (54 per cent) over the age of sixty-five in the US live in a community with no public transport whatsoever, in contrast to most European countries. There is a reliance on the private car: ninety per cent of personal trips are in a private car, either as the driver or a passenger; eight per cent of trips are pedestrian trips; and only about 1.2 per cent of trips are in public transport.

A million older people a year in the US give up driving every year: people who stop driving because of age-related changes outlive their decision by six to ten years. What this means for a transportation solution for older people is that the vehicle must go to the person. This approach creates a very different financial picture and a very different set of logistics problems. There is a dynamic relationship between logistics and resources: the more difficult the logistics problem, the more expensive it is to solve.

### **Technology – how to achieve efficiency**

We looked at technological elements of the problem. There are the mechanical and the energy elements – in other words, the mode of transport (the vehicle) and the fuel; and the information technology element – the need for communication, the exchange of information. Once the importance of information management is recognized – and the role that technology can play in that – it opens up a great opportunity to revolutionise the way that transportation is provided. This is what we have done in our ITN model.

### **Policy – how to support solutions**

We know that policy can remove barriers and provide incentives to guide resources into place to be available for use. The classic approach to public policy has been to do nothing or to regulate (which is what testing and licensing of older drivers is about and merely defines the safety problem but does nothing to solve a mobility problem). The other dichotomy here is between public funding and incentives for private solutions. Why should we have to choose one or the other? Why can we not choose both? Public resources are an essential part of the funding solution. However, it is in the incentives for private resources and solutions that ITN has looked for ways to be innovative and to find new resources and to solve the problem in new ways. We see private resources as the larger, untapped pot of gold.

When guided into place through policy - and spent as consumer choices from personal transportation accounts - private resources have the capacity to infuse the senior transit world with billions of dollars. Using private resources means that the impact on the taxpayer is smaller and the degree of control for the consumer is greater than for other policy alternatives. Indeed, we believe that incentives for private solutions can fuel transportation options for today's older people and for the baby boomers who will follow them.

### **Spend on transportation**

In 1998, Americans spent about \$675 billion a year on transportation - five times more than the US government spent on transportation including highways, airports and transit. It is a huge amount of money. In fact, it is around twenty per cent of average household income. Most of

that expenditure goes on the private car - of the \$6,312 out-of-pocket annual transportation expenses per household, \$6,200 was for the private car (that's 98 per cent).

There comes a point in older people's lives where they can no longer operate that car. This gives us two problems: all of the resources that had been spent on transportation are no longer being spent on transportation; and there is no way of redirecting those resources to pay for another source of mobility - there is no mechanism to hold those resources any more.

What we did was to challenge this. We looked at the car as a transportation asset, a very valuable transportation asset that we as a society pour money into. We realized that resources take many forms and that to be useful these resources must be held in an appropriately accessible form.

So our solution is to allow people to trade their cars for rides. When we started doing this people told me I was crazy - nobody was going to give up a car for rides. Nevertheless, we implemented the programme. So many people traded their cars that we soon filled a parking lot. I then learned that if you try to sell more than five cars in a year in my state (Maine) they declare you to be a car dealer. This means that you must have a garage with two bays and a mechanic on duty. Here is an example of public policy designed to protect the consumer, but which prevents people using their own resources to pay for their own transportation. So I did some research: I found that they had made an exception to the law a few years earlier for non-profit organisations that fix up donated cars and sell them at cost to poor people who need cars to drive to work. So I asked the state legislature, if we can change this law for poor people, why can't we change it for old people? They changed it. Now we can take as many cars as we want in trade for rides. This means that taxpayers do not have to pay for those rides. This is a good example of using policy and legislation to remove a barrier to the use of private resources.

It is also an example of the broad approach we took to resources - and how to use private resources to pay for transportation: we make do with any kind of resource we can find. Making do is a good grassroots way to approach sustainability. We take the value of the traded or donated car and we store it (in our IT system) for future use for the person who donated it. We do the same with volunteer labour - we put a value on it and we store it. This we call our Transportation Social Security programme, in which volunteers may plan for their future transportation needs, or spend their volunteer credits to help others. This approach means that resources are accessible - they are held in a form that can be stored, allocated, debited and used.

Table I: Policies that Create Incentives for the Use of Private Resources to Fund Personal Transportation Accounts for Seniors, Ranked by Impact to Taxpayers (Policies in shaded area)

Policy Type & Taxpayer Impact		Parties Motivated to Participate			
		A) Seniors	B) Adult Children, Families	C) Businesses & Organizations	D) Volunteers
1) Maximum Impact	Public funds for programs	Public transportation (numerous federal, state & local policies)			
2) Moderate Impact	Tax Credit		Paying for parents' rides with pre-tax dollars		
3) Minimal Impact	Public start-up funds to seed sustainable private solutions			Planning funds to replicate the ITN <sup>®</sup> model for sustainable senior transportation (Connecticut, 2005)	
	Tax Expenditure	Once in a lifetime tax deduction for car trade			
4) No impact	Remove barriers			Exemption from car dealership laws for non-profit senior transit (Maine, 2005)	Insurance companies may not raise rates for volunteer drivers (Maine, PL 1995, Ch132, §1)

It is not just the value of cars and the value of labour that we hold in our system. Incorporated into it are a number of community outreach programmes that supplement the financing of the rides. Not only is Independent Transportation Network community-based, it is community-supported. Support from the community is an essential part of the business model. Box 6 below shows the source and nature of this community support.

**Box 6**

**ITNAmerica Community Outreach Programs: Turn Caring into Support and Dollars**

Individuals & Families – Membership, Gift Certificates

Vehicles & Gifts in Kind – CarTrade<sup>™</sup>, Car Donation, Gifts in Kind

Merchants, Health Care Providers & the Business Community – Ride & Shop, Healthy Miles, Healthy Smiles, Corporate Sponsorship  
 Community Organizations – Ride Services, Ride Sponsorship

Volunteers – Transportation Social Security<sup>™</sup>, Roads Scholarship Program<sup>™</sup>

Municipalities & Government Organizations – Community Roads Scholarship Program

Fundraising Events & Programs – March of the Members<sup>™</sup>, Annual Appeal, Adult Child

Membership Campaign, Planned Giving

Community support is also an essential part of the psychological model. The older people who use the service know that the car we pick them up in was either donated to us or traded; that the

person driving the car is either volunteering and using their own car, or working for a very reasonable salary and driving our donated or traded car; and they know that we are there for them because we believe that mobility for them is important, and that one day we will need someone to help us with our mobility. It is an holistic, integrated model: the finances are enmeshed in the sociological model and in the technology model.

## **Phase II: Recreating the model outside Maine**

ITNPortland is the original ITN. The first of the replicated projects are in Florida (Orlando), California (Santa Monica), South Carolina (Charleston, Trident) and New Jersey (Greater Mercer). We expect to have ten more communities setting up in 2006. By 2010 we expect to have between forty and seventy communities.

We call the new projects 'Learning Clusters', groups of communities, peer groups that are working on replication together. The entire project is connected through technology. We have a national website, [www.itnamerica.org](http://www.itnamerica.org) with links to the websites of each of the affiliate communities, for example ITNPortland™ Maine - <http://www.itnportland.org/> and ITNSantaMonica™ California - <http://www.itsantamonica.org>.

All ITN® affiliates are a replication of the original ITN system. They are independent, 501c3 corporations - charitable organisations under the 501c3 tax code. Each one is a membership organisation: we believe that it is important for older people to feel that they are a part of the transportation service, that they belong. Each affiliate uses our centralised technology - ITNRides enterprise software, the centralized database management system. Each one offers the same, consistent, car-based service, 24 hours a day, seven days a week service, with volunteers and paid drivers.

Each affiliate must be sustainable in five years after set up through fares and voluntary local community support (that is, without the use of public funds – taxpayer dollars – for operations or capital expense). Our definition of sustainability is a service that pays its bills through a combination of user fees, fares from the people who use the service and a diversified base of local community support (see Box 5 above).

To help affiliates achieve sustainability we use a collegiate model of support and training over a number of years until 'the chicks' hatch out and go off on their own. Each affiliate goes through a freshman, sophomore, junior and senior year before graduation into a sustainable life of its own. The Learning Cluster Tools we provide include:•Work plan and time line - site visits, training•ITNRides Technology - Community Outreach Module•Sustainability planning support - budget and staffing plan•Coaching and outreach - website, marketing materials, learning cluster, technical support.

Working on a national scale means that we can offer corporate benefits and connections to national organizations. We make sure through the use of technology and through the culture that we have engendered that there is rapid and open dissemination of knowledge via collaboration within the system and with the community that the affiliate serves.

### **Phase III: Now and into the future**

We are currently involved in three areas of work:

- building the new version of our IT system;
- bringing together other transportation providers in the US in order to ensure that our IT solution is useful to them; and
- setting up the infrastructure for research and analysis in order to learn more from the data we have.

#### **New IT**

With a grant provided by Atlantic Philanthropies we are now able to build the next version of our information technology system, an Internet-based version that will be broader and more inclusive. In effect, it will be a more robust version of what we have at present, a much bigger platform that will enable hundreds of communities to join and to participate. On each community affiliate's website there will be a door to a private area where they can connect to the technology that will support their system. The transportation solution for each community – the solution that every older person receives – will live on the Internet and be accessed through the Internet.

#### **Summit with other providers**

We are planning to bring transportation providers in the US together to better understand the information system needs of other models of transportation for older people. Our aim is to ensure that we can provide elements of our system to other organisations, whether or not they decide to be part of the ITNAmerica national system.

#### **ITNAmerica Research Group**

We have put together the ITNAmerica Research Group and what I call a Virtual Transportation Research Institute. The Institute includes gerontologists and geriatricians, transportation safety researchers and sociologists at universities around the US.

We have been careful and diligent about data collection and we now have a database – a naturally occurring, longitudinal database - detailing 175,000 rides. From the database we can tell, for example, the age and health status of the person taking the ride and purpose of the ride. We plan to use this database - to analyse the data in it - to gain a greater understanding of older people and their mobility.

## **Integrating IT in a Mature Society**

**Dr Niamh Scannell**

### **Introduction**

The aim of this paper is to give an introduction to the work of Intel Corporation in the area of health, ageing and technology, and to illustrate how it is integrating Information Technology and putting it to use to give people the supports and services that will empower them to take care of themselves and their family members. This paper will outline briefly where this work sits within Intel, and what the main focus of the work is.

### **The structure of Intel Corporation**

Intel is organised around five platforms:

- Products
- Solutions and Services
- Resource Centres
- Supports and Downloads
- Technology and Research.

The Health Research and Innovation Group and the recently formed Digital Health Platform Group belong within the Technology and Research platform.

### **The work of the Digital Health Platform Group**

The Digital Health Platform Group is itself divided into three parts:

- Healthcare IT
- Personal Health
- Biomedical Life Sciences.

The **Healthcare IT** team is mostly involved in work in hospitals (or as we call them, 'large enterprise systems'). One of the key issues in hospitals is getting these different, often very sophisticated technologies to work together – achieving what we call 'interoperability'. This is the focus of the work of the Healthcare IT team.

The work of the **Personal Health** team centres on home healthcare technologies. One of the key issues here is also interoperability – the ability to 'plug and play'. For instance, to deliver a presentation, all that is needed to is to plug a laptop PC with the presentation file on it into the projector, switch it on, open the presentation file and the presentation charts appear on the screen. This can be done because there is 'interoperability' between the laptop and its software

and that of the projector. Similar links or standards need to be developed for healthcare technology so that systems or technologies that work in hospitals can be plugged in for people to use at home. This would allow care that is currently provided in hospitals to be provided to people at home by health care providers (GPs, physiotherapists and so on) as well as by the person's own informal network of care.

The work of the **Biomedical and Life Sciences** team focuses on research in advanced diagnostics and preventative care.

Intel firmly believes that technology has a role to play in improving healthcare, and not just for older people but for everyone. The role of the Health Research and Innovation Group is to explore evidence-based technologies to help people (and their carers) be more proactive in managing their health and wellness needs.

The General Manager and Global Director of the Health Research and Innovation Group is Principal Research Scientist, Eric Dishman. Dr Dishman is also National Chair of the Center for Aging Services Technologies. He trained as a communication scholar and social scientist and has used qualitative research methods for many years to help technology companies understand and invent new market, business, and technology opportunities. He has been actively promoting assistive technologies for older people for many years. Intel has been involved in this sort of work since 1999 when it was known as 'People and Practices'. A small team within the People and Practices group formed to focus on health and older people. This small team evolved over the years to become part of the Digital Health Platform Group in 2005 with headquarters in Portland, Oregon. The recently formed Health Research and Innovation Group in Ireland reports to that main group. The research team in Ireland to which I belong is known as 'Assistive Technologies for Elders'.

### **The Assistive Technologies for Elders Team**

Although based in Dublin, the Assistive Technologies for Elders team has a European focus. This is particularly important to the group – as Peter Lansley noted in his paper, how to pay for healthcare in a society that is getting older is an important consideration for many governments in Europe. The team at Intel look upon the combination of care and provider as an opportunity to bring new paradigms – new ways of thinking and acting - into care. At Intel the focus is on the continuum of care – that is, care provided in the acute setting through to care provided at home. Much of healthcare activity at present happens in an acute setting: if you become ill, you invariably go a hospital to receive the care you need. The research teams at Intel believe that by using 'leveraging' technology the continuum can be shifted to the left. In other words, to shift care away from the acute care end of the continuum towards the other end, towards care that happens at home. The philosophy is that by using technology people can be given supports and

services that will empower them, that will help them take care of themselves, their family members and perhaps even other people in their community.

Much of the research of the group is about the user experience, taking the view that the technology itself is of little benefit unless the designer understands what the person wants to use it for, and what help it might be to that person – whether they are the patient, the caregiver or the service provider.

## The BUT Model

The research group uses a model called the BUT Model: business market driven innovation; user-centred innovation; and technology innovation. The starting point is user-centred innovation: describing what people's needs are - 'ground truth' - and working in iterative cycles, going back and forth within that ground truth, and liaising with the business sections and the technologists within the corporation. Put another way, the approach to in-house research and innovation is to understand people's daily practices, their routines, how they go about their lives, what is happening to them, what their needs are, what challenges they face and what challenges the people who support them face. The aim of the group is to build up an understanding from this research of how technology can support behaviour that helps prevent disease, fosters independence and improves quality of life. The understanding that arises from this ethnographic research is transmitted to those working in the technology labs.

Anthropological and other social scientific methods are used to interview, observe, and even live with thousands of people around the world at home, work, and play. The group is made up of social scientists (including ethnographers and anthropologists), biologists, designers, physicians, and engineers – usually working in multidisciplinary teams (although much of the innovation is lead by the ethnographers).

So ethnographic field research - conducted in people's homes to identify their needs, through observation and interviews – is typically the first stage of any project. The second stage is then to take these findings and use them to develop and test early prototypes of systems that could help to meet the health needs of the entire household. The third stage is to conduct an outcome study with a more developed prototype to find out whether or not the system leads to a positive outcome.

The process then is one of asking – well, what can be done with technology that would be supportive to either the person with Alzheimer's Disease or to the family member or person caring for them or to their physician? The solution must in some way be of help to the person or their care network. Once a prototype has been developed, the team go back to the person and

ask them how useful they think it would be if it were available to them. Using this information, further development can take place to the next stage.

Part of the team's work also involves looking at consumer innovation. Healthcare and consumer electronics for the home are beginning to merge - for example, people now buy their own blood pressure cuff or electronic weighing scales to help manage their diabetes. The research group keeps a log of all these disparate items and systems, in the belief that there is an opportunity to bring these technologies together in a way that is innovative and of greater benefit to the end user.

## Case studies

Three products or systems that have been developed the group illustrate the style of the work:

- context-aware medications prompting
- the Parkinson's Box
- a social connections system for people with Alzheimer's Disease.

### Context-aware medications prompting

The idea for this system came from talking to physicians and patients. It seems that most people forget to take their medication in exactly the way it is prescribed - at the right time, with the right food, for example. The team found that most people create systems to help them remember when they are supposed to take what. Many people leave their medication somewhere in the kitchen - because they have to take it with food; those who need to take theirs in the morning tend to leave it beside their bed the night before, with a glass of water. In other words, people leave their medications to suit their daily pattern and to help them remember.

The team found through its observational studies that using an ordinary alarm as an aide-memoire is not always effective: the alarm goes off at the pre-set time - say ten o'clock - but you happen to be out somewhere at that time and may not have the alarm with you. So the team looked at the relationship between the time a person needs to take the medication and where they are - their location - at that time, and the activity that they are engaged in at that time. Using all of this information the team work out when is the best time to prompt the person to take the medication. For example, they may need to take their medication around twelve o'clock. At twelve o'clock they are in the garden pruning they roses, and not wanting to be disturbed, return to the house at, say, twelve-thirty. It is now important that something reminds them or prompts them to think that they are near the kitchen and that they should take their medication now. The team believes that there is a greater chance of improving 'medication adherence' if use can be made of time and location - context factors.

The prompting system that is currently in design consists of sensors in the home, a medications box and a reminder activator (the telephone or a wristwatch or other activators in the house). To produce such a system requires a lot of software engineering: the team's aim is to gather unobtrusively a lot of information about the person's behaviour patterns and from that information infer the most appropriate time to remind them.

### **The Parkinson's Box**

The Parkinson's Box project is a collaboration with Kinetics Foundation in the US. People with Parkinson's Disease tend to see their physician on average once or twice a year. Based on examinations at these visits – in effect, two data collection points – the physician determines the progression of Parkinson's. Two data points a year, however, are not sufficient for either physician or patient. For example, it may be that on seeing the physician the patient tells him or her that they are doing much better than they actually are. Put simply, the information collected may not always be accurate.

To address this the team has created a device called the Parkinson's Box. The purpose of the Parkinson's Box is to deliver a gold standard Parkinson's test - the sort of test that a physician would carry out at a patient visit. The Box is about half the size of a standard laptop PC. It opens up like a laptop, and can be left in the patient's home. It is very easy to use: it was designed with input from people with Parkinson's Disease. The person completes the test on the Box and the data from the tests are downloaded to a server where they can be read by a physician.

As part of our initial product trial, the Box was given to five people with Parkinson's Disease. Each person takes the test two to three times a week. Each test takes about twenty minutes to complete. This initial trial was a success and the team is now manufacturing about ninety Boxes for further research, and plan to extend the trial to at least another sixty-five people, aiming to collect a continuous stream of objective data about people with Parkinson's Disease. Researchers at Stanford University in California will analyse this data in detail – looking for patterns of behaviour and trends – with a view to understanding more fully the day to day changes in people with Parkinson's. From this the team will be able to determine whether the algorithms currently used for measuring the progression of Parkinson's Disease are accurate, or whether they need to be changed.

### **Social connections system**

The third study in is investigating social connection among people with Alzheimer's Disease and those with early stage dementia. Once a person starts to lose their memory that they may lose confidence and become afraid to continue to participate in every day activities. They are afraid,

for example, of embarrassing themselves by failing to recognise who it is on the telephone or at the door, or they are afraid to go to a social engagement or to meet up with someone for fear of not being able to recall names or faces. This withdrawal from social life and social connection can lead to isolation.

The team decided to look at ways in which technology could help to support and continue social engagement. Via a combination of studies and with different sets of technologies the team began to observe and to collect social connection information - the use of the home phone and the mobile phone and the PC, and the extent to which people went out to meet others. People were also asked in these studies to keep a journal of their social life and social connections (which would remain private unless they gave permission for others to read it).

The participants were given a device called a 'caller ID assistant'. It works like this: the phone rings, the phone identifies the caller's telephone number, matches it with a picture of the caller and displays that picture to the person - the call recipient. In addition, the caller ID assistant can display some information about the last conversation or the last call that the person had with the caller. (a further aim is to embed even more data so that it will be possible for the person to get the phone to show them the name of the caller - should the picture not help.)

Another innovation tested was a social system display, known as the Solar System. It is a way of tracking and recording the contacts or connections that a person with Alzheimer's has with others. The person with Alzheimer's is placed in the middle of the display and dots lead to the names and details of those with whom they have contact. The more contact these people have with the person with Alzheimer's, the closer they appear to them on the display. The system also tracks contacts and connections over time so that it is possible to work out who it is within the family or within the person's social circle that is in contact with them on a regular basis, and who it is that is not. The display has been useful in alerting families to the scale of the caregiver burden - it becomes obvious from the pattern displayed on whom the burden of care is falling and so the family can take steps to relieve the carer.

Another device which has been tested is a device called the 'presence lamp', whereby a lamp is placed in the home of the older person and one in the home of their family member. Whenever the family member comes home from work the light goes on in the older person's home. It signals to them that their family member is at home; it does not signal anything else - but it allows the older person to decide whether or not they want to make contact, knowing that the person is there should they want to do so.

The aim is bring products such as the caller ID assistant and the Solar System together into an integrated system. By analysing the behavioural data collected via these systems it is hoped to develop algorithms that will enable us to infer (and so predict) patterns of behaviour. Data collected from observational studies and the data collected from use of the devices has enabled

the posing of new questions about people and their social engagement patterns and what technology can do to assist them.

## **Collaborative working**

The problems and issues that the team aims to address are beyond the capability of any one organisation to solve. So collaborate takes place with lots of other people, a research ecosystem that includes universities, industry laboratories and government agencies. Ideas and knowledge are shared with other university, industry, and government researchers through conferences, workshops, and articles.

One of the aims of the Centre for Aging Services Technologies set up and chaired by Eric Dishman is to work towards a more integrated view of all the needs of an older person. Another important collaboration is that between the Alzheimer's Association and Intel Corporation, Everyday Technologies for Alzheimer Care (ETAC). ETAC was formed to speed the development of home-based technologies to help people with Alzheimer's disease. It funds research to develop new models of care for Alzheimer's Disease based upon current and evolving technologies in computing, communications and home healthcare.

There are many different companies, providers and universities that are passionate about providing ageing services – and they are coming together to advocate for these services, and to influence the development of open standards so that technology can reach out to older people in their own homes.

# Panel Discussion 1

Dr Cillian Twomey

I would like to thank the speakers and open the discussion by inviting your comments and questions.

Helen Carty, Association of Occupational Therapists, Ireland

I found Kathy Freund's talk fascinating. Can you give me some idea of the cost of the average ride? You mentioned the \$5 pick up charge and the cost per mile or cost per hour.

Kathy Freund, Independent Transportation Network

The average cost or fare is approximately \$8 each way. That represents half the true cost of the ride: we charge about half and we fundraise the rest. In the United States, that's on the low end of what it costs for a door-to-door transit service.

Alice O'Connelly, Chief Executive, Human Rights Commission

I have two questions for Kathy Freund: You mentioned that you believe that the resourcing of the sort of service that you provide should be from both public and private resources, and that your services are privately funded. I was wondering, do you know what percentage of need you meet with your service in the localities that you serve?

Secondly, it struck me during your own presentation (and during that of Peter Lansley) that while the technology and the services are aimed at older persons they are in fact of benefit more widely – including to people who are physically disabled. I was wondering therefore, do you make your service available to the physically disabled?

Kathy Freund

In terms of the extent to which we are meeting the unmet need: I think that right now we are meeting only a very tiny fraction of the unmet need. One of the reasons for that is I think that we have spent so many years in researching and developing a model that would be economically sustainable and scaleable and that would have the potential to scale for the future need that we see coming. We know in the United States that by the time people get into their eighties only about half have drivers' licences and those who have drivers licences drive on a very limited scale. We know that only one per cent of the trips are in public transport so that leaves about fifty per cent of the population with some form of mobility need. I would say that that is the unmet need that we are striving to be available to meet.

I think your question touches upon a very interesting subject, which is how much of a need must we meet based on our determination of what that need is; and how much of the need must we meet based on the determination of the people who have the needs. So the approach philosophically that I have worked toward is one in which there are enough people in the community to support the availability of the service so that it is there for those who choose to use it, at a price that is affordable for them to pay (and if it is not affordable that there is a programme to help those who cannot pay). So availability and support for that availability is what I have been working toward.

Your second question - do we serve people with disabilities? The answer is probably not one that you might expect. When we began developing the service we went to the federal government for funding. There is a law in the US that supports the trade unions, in this case the transit union, and it says that you cannot have any federal money for any transport project unless the union approves it. So when the union approved my project - believe it or not - they forbade us from serving people with disabilities. The reason they gave was that by serving people with disabilities we would be competing with the jobs of the other publicly funded transit providers. So we are forbidden to serve people with disabilities and that is legal.

Professor Peter Lansley, SPARC and University of Reading

My presentation was in the context of the needs of older people but much of the research I described has had a much broader agenda. There is a big overlap between the needs of many older people who develop multiple impairments in later life and disabled people. I don't, however, like those labels so I much prefer to think in terms of social inclusion, design for all. Some of the greatest beneficiaries of urban design research and adaptations to streets and buses and so on are mums with kids and prams, not wheelchair users. If you ask a bus driver how many wheelchair users he has he might tell you that is only one or two a couple every week. If you ask how many mums with prams, bags of shopping, three or four children – the answer is many. So as I said somewhere in my presentation, designing inclusively - inclusive design - is good design. Everyone benefits. A good example is the Eurostar train from London Waterloo to Brussels. At Waterloo you notice that you can walk straight on to the trains – there are no steps. You get to Brussels, to a platform that has been designed for Eurostar, and they roll down three very steep steps. It is not just older and disabled people who suffer, it is everyone with their baggage. Why should it be like that? The station was designed specifically for the Eurostar trains.

Tony Regan, Transport and Mobility Consultants Ireland

At Transport and Mobility Consultants Ireland we evaluate and assess whether people who are elderly can continue to drive. My question to Kathy is about the idea of people with disabilities using your service. You pointed out that when someone can no longer drive the issue is how to

get them mobile. I just wanted to add to what you said. We have a number of systems here in Ireland and particularly in Dublin that provide transport for people who are elderly and for people who use wheelchairs. One of these is called 'Vantastic'. It started here in Dublin (where they now have twenty or so vehicles and thirteen of them are new, wheelchair accessible minibuses) and has just recently started in Cork and I believe it is soon to start in Galway. It is a system similar to your own - it is a club, a membership organisation, funded by central government. People can book a ride when they need it. On the south side of Dublin there is an organisation called ACTS, Accessible Community Transport Southside. It is also a membership organisation. People call and book a cab as it were - they use a variety of vehicles, some private cars, some people carriers. In rural areas, we have the Rural Transport Initiative, another membership organisation. It is operating in almost every county in the country.

Dr Cillian Twomey, Chair

Do you know what the uptake is on Vantastic? How many people are using the service?

Tony Reagan

Vantastic have twenty-odd vehicles in the north Dublin area alone, exclusively for this purpose, and ACTS on the south side has seven or eight vehicles.

Kathy Freund

I had the opportunity to meet several of the rural transport providers yesterday at a meeting that Professor O'Neill set up at Tallaght Hospital. Some of the providers have also visited us at ITN in Maine. It was interesting to talk to those providers about the data they are collecting from their projects - data that helps them understand how much of a need they are meeting, what the purpose of the trips are and how they could evaluate their successes and share the learning from them with each other, and how they could use information technology to support what they are doing. I was impressed with the community-based process you have here for rural transit.

Dr Cillian Twomey

The Rural Transport Initiative is locally based and is meeting the need locally. Initially they tried to make it a more uniform service but it didn't work. In fact, it works very differently in say Clare and Kerry and Cork than it does in Donegal or Monaghan, for example.

Maurice O'Connell, The Alzheimer Society of Ireland

If I may direct my comments to Niamh Scannell and to Peter Lansley. One of the great struggles we have in terms of elder care and more especially with care of people with dementia is trying to move away from the whole approach of custodial care and the basic, 'keep them safe and clean'.

We need to balance that against the freedom of the individual to live in their own home with a level of quality of life that would be acceptable to all. The thing we struggle with here is to maintain that personal freedom and yet develop the kind of technologies that will enable people to live that quality of life – in other words without Big Brother overseeing everything. I think that that could eventually become as custodial as the struggle that we are trying to prevent. Could you comment on that?

Dr Niamh Scannell, Intel Corporation

Yes, I suppose I understand your perspective. Our research with Alzheimer's did not have that custodial element. The aim was to understand how you can use existing technology – how to use it and how to put it together. A lot of the technology innovation now is more of a systems integration effort rather than designing entirely new pieces of technology. Our research looked at ways of using the technology that exists and trying to put it together in a way that was assistive in terms of helping people with Alzheimer's maintain their social connection and preventing them from becoming isolated. The research looked at ways of offering them something with technology that would help them to manage their own social engagement. The system that we designed collected information from lots of different data points.

It presented it to them in their own journal, which they secured and to which they had access. They could decide to allow someone else to view their journal or not. We found that they would usually allow one or two other family members to look at the journal. We found that this reassured the family member that that he or she didn't need to adopt a custodial role: they could see from some of the information in the journal that mum or dad are doing just fine today and I will leave them be. On the other hand, if they are having a quiet day, the family member can decide to give them a call. They sometimes found that the person was having a quiet day because they had just had three busy days. That was the approach that we took: to offer the person something that would support their independence and give them a sense of empowerment, and a sense that they can remain connected, removing the fear of answering the door or answering the phone.

Professor Peter Lansley

I understand the concerns and there is a danger of looking at some of the smart home IT type work as having a Big Brother element. A lot of it, however, can be emancipating for people with dementia. Some of the most interesting work I have come across is how emancipating IT is for the carers in enabling them to relax, knowing that if there is an emergency or if something happens that they know that they will be called. I was talking recently to designers working with people with dementia and I think this provides a good example of how we can maintain independence for a lot longer. One had redesigned a radio so that it was very simple to use and

found that people with quite severe dementia were able to switch it on and tune into the programmes they liked in their own home. They didn't need any intervention from anybody to put the radio on. Another example is an IT-based reminiscence system that proved useful to both the person with dementia and the carer. Reminiscence therapy is well established in dementia care and often uses photographs say of a town or city or area from the person's childhood. This was an electronic version of that sort of – an electronic box with snippets of the music of Elvis Presley and the Beatles (which makes us realise that we are all getting older). The device was easy to operate – it had just three simple buttons on it. It was emancipating for the individual but it was also emancipating for the carer because the carer discovered something that the person with dementia found interesting in, something that stimulated them and it gave them something meaningful to discuss. So I think in a sense those examples are pushing back the custodial bit and providing a little bit more of independence for a bit longer.

Addressing the design within care homes - where people are in a custodial setting – is very important. Just redesigning corridors, painting doors different colours for each of the residents, putting a photograph by the door or some memento which the person with dementia recognises can reduce the need for that person to be guided back to their room: they are more likely to find it for themselves. A lot of the research that is currently being done is recognising that we just haven't got the carers and we don't want the carers fussing around all of the time, it isn't necessary. Good design will help us go a long way.

*Peter Rothwell, President of National Federation of Pensioners Association*

In many ways I am listening to futuristic discussions. For myself and others like me, we are in the departure lounge in life and are ready to go if the call comes. Nevertheless the information you have presented is very useful and it is nice to know that so many young people are devoting their time and energies to gerontology.

I would to note that the work that we do is not selfish - in the sense that anything we get through our own efforts is passed on to coming generations. In that sense everything that we do is intergenerational.

*Professor Eamon O'Shea, Irish Centre for Social Gerontology*

It strikes me that there are users and there are providers but there is also the way that this technology gets wholly integrated into the policy process. I am not sure whether that step has been given enough attention. In the papers and the discussions we heard today it strikes me that with respect to some technologies there is a danger that by focusing on autonomy we may be undermining social connectivity and the social context of people's lives, for example. In relation to transport, there may be interesting cultural relations between people's ability or want to use

particular transport networks. I know some older people who wouldn't dream of taking a lift from anybody - people in rural communities - despite it being what they need. My question is, how does this information get back to policymakers and how can policymakers impact on that?

A final related question about the danger that technology may lead to all sorts of dualities in terms of care. For example, if we rely on income to access technology there is the danger that people without income are left out of the virtuous circle of technology. There is also the danger in welfare state societies that if you do have resources then the state may assume that those in need have the technology, that they seem to be part of some network therefore the state doesn't really have to do very much.

We can acknowledge that technology has the potential to be a huge force but I think that the relationship between technology and the policy process, and the embeddedness of that technology into mainstream policy process, is absolutely critical if we are to get maximum from it.

Dr Cillian Twomey

Professor O'Shea, you have stimulated a wider debate and I will allow each of the speakers an opportunity to comment as they will.

Professor Peter Lansley

I can only tackle part of this: how do we get policymakers to take the technology on board, and the issue of social connectivity.

There is a danger of thinking that technology can be used to replace the human factor in care. It may replace part of it but looking at the way in which the care system works, often care is delivered in packages that are a combination of personal care provided by social services or health services and technology. The older person wants to live in their own home and will perhaps need some adaptations to their home. It is the older person who will benefit from this technology but to do so still require visits from social services workers - be it shoppers, someone to clean the house, someone to provide health care. I think the reality is that we are not going to get to a situation where technology can replace all of that. But I think that generally older people will prefer the independence that technology will give them. They don't want someone getting them out of bed every morning and someone bathing them rather than them having a level access shower so they can bathe themselves whenever they want. So I think the social connectivity is still there. One of the big issues at the moment in the UK is that there are not enough carers. People aren't getting the care they need. So it may be a question not of substituting one for the other but providing care via technology because there is no other way.

Affecting the right policy makers is hard work. One of the difficulties I have lobbying government policy makers is that they are afraid of science and technology. They are social policy people who don't realise the implications of technology and either fall in love with it without understanding it or - more often - run away from it. It is hard work getting an understanding of what technology can provide and what it can't provide into the thinking of the policy makers.

Kathy Freund

I think that person choice and technology is very important. As long as technology provides opportunities for people and they are free to avail or not, whichever they decide. I think that as a society in many ways that is not only the most we can do, that is all we should do. To give you an example: my father is ninety and has such a bad hearing impairment that you have to face him, speak slowly and repeat yourself to communicate with him yet he will not wear any hearing aid whatsoever. He did, however, find a device through AARP (the American Association of Retired People) that he enables him to hear the television better and he uses that - and that is his choice. The technology is there that has the potential to make his life better if he so chooses but I think that that personal balance in choice and technology are always important.

Policy makers are not particularly concerned about technology - they are concerned about constituents; they are concerned about social issues as those social issues affect the people they serve; they are concerned about votes; they are concerned about resources and taxes and how they are going to pay for things. I think that the effect of technology is more embedded and less overt and is a part of all of those other issues. If a policy maker has a large number of people who come to him and say, we want such and such technology - it will help our lives and make it better - then that is the technology that is going to get the attention.

You were saying how technology might force everybody to be the same in certain ways. I think that again we don't need to choose between being the same and being different. I think that we are all the same in many ways and we are all different in other ways, and both are good. The example I use is people's faces. Everybody's face is absolutely different and unique, and everybody's use of technology is going to be absolutely different and unique according to their personal desires. But everybody has two eyes, a nose and a mouth, which means that everybody's face is exactly the same. I think that to the extent that we can use technology and gear it toward those things that are the same - to make things simple and unified and supportive - and balance that with consumer choice and allowing people to do what they want, then we have I think a healthy use of technology in society.

Professor Davis Coakley, Professor of Geriatric Medicine, St James's Hospital

Could Dr Scannell tell us whether Intel intend to develop all aspects of research that she mentioned in her paper - the Healthcare IT, the Personal Health and the Biomedical Life Sciences?

Dr Niamh Scannell

No: we intend to develop the first two – Healthcare It and Personal Health - for the clinical setting and the home setting. We are starting with the home setting and older people. And if I could come back to a point made earlier, one of our reasons for focusing on older people is because they usually have a range of challenges. If you start with older people and you are able to solve any of those challenges usually the solutions can permeate to and be of benefit to people of other age groups, including younger people with a cognitive disability as well as those with physical disability. So our primary focus is on the older person. We want to do more work for the clinical setting and it is unlikely at this time, although things are always changing, that we will do any work on the Biomedical and Life Sciences here, at least in the short term.

Dr Cillian Twomey

Just to follow up on that, when would you expect to have some outcomes which might lead to changes at policy level?

Dr Niamh Scannell

We already do that in a way. Our group, the Digital Health Group, has within it a standards and policy group. We interact with them and we work with them. Once we get to the outcomes stage in our research we publish our results internally and examine them to determine where there are opportunities to take some of those research outputs forward. Some of the research that we do is in collaboration with others - we don't work in isolation. This means that sometimes we get so far in the research cycle and we stop and hand over – give the work -to somebody else to take forward. It could be somebody else within our group or it could be someone external with whom we collaborate.

Professor Desmond O'Neill, Honorary Secretary, IGS

I would firstly like to thank the three speakers who have really opened up new vistas and horizons.

We have a demographic bounty, with the extraordinary success of generations of fitter, healthier older people and disability dropping at a rate of 1.5 per cent a year among eighty-five year olds. All of these older people bring enormous wisdom and skills and indeed bring a large part of the solution with them. Can I ask, as part of this demographic bounty, about the industrial and

commercial possibilities that arise out of this new technology? I get a sense that apart from perhaps leaders like Intel that much of industry has not woken up to the fact that older people are the major market, and that design for all is a huge opportunity. We are in a country that has put information technology at the core of its development strategy. By marrying information technology and ageing how much extra can we all expect to benefit in terms of the economies of the developed world?

Professor Peter Lansley

It is just so frustrating convincing industry about older people and the markets that are there. There is a major cultural shift required in industry. I was looking at the age profile of marketing executives and members of one of the marketing professional bodies: the proportion aged over forty is tiny. Marketing executives are young and have a young view. What are we doing about it? Well, particularly through the initiatives in which I am involved, we are working very hard to ensure that all designers in their formative education are introduced to the notions of inclusive design, design for the needs of older and disabled people. At the moment there is no requirement for there to be anything on this in the curriculum for designers. We spend a lot of time lobbying organisations and showing them that the way in which they segment people by age – grouping together everyone aged fifty plus – they lose out on understanding the aspirations of older people, and so they lose out on their buying power. There is also the argument about the richness of older people as workers. That is being slowly discovered but there is still much to be done. We live in a very ageist world at the moment.

# Can Technology Improve Quality of Life in People with Dementia?

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## Introduction

The aim of this paper is to report on ENABLE, a European study, in which the DSIDC was an Irish partner. The paper describes some of the study's key findings.

ENABLE was a four-year, community-based, longitudinal study which took place across five countries: Norway, Ireland, Finland, Lithuania<sup>2</sup> and the United Kingdom (England). The study was financed by the European Commission's Fifth Framework, specifically, the Programme on Quality of Life and Management of Living Resources. The study ran from 2000 to 2004. Fieldwork in Ireland took place between June 2002 and December 2003.

## Study objectives

The overall aim of ENABLE was to investigate whether it was possible to help people with dementia to live more independently and to promote their well-being by giving them access to enabling technological products.

The objectives of the study were therefore as follows:

- To assess if enabling technologies can solve or reduce practical difficulties experienced by people with dementia and their carers
- To examine if enabling technologies can support independent living and reduce caregiver burden
- To explore the socio-economic costs and benefits of the enabling technologies
- To look at quality of life of persons with dementia who have technologies installed in their homes and to assess the extent to which technology may impact on quality of life.

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<sup>1</sup> The research team on this project was Jura Macijauskiene, Jon-Paul Faulkner, Inger Hagen, Emer Begley, Paivi Topo, Torhild Holthe, Sidsel Bjerneby and Suzanne Cahill.

<sup>2</sup> Lithuania joined the study in its final year (when Lithuania joined the EU).

## Research design and methods

The research was exploratory and descriptive. A longitudinal design was used and participants were interviewed at four points in time.

- A non-random sample was drawn. The inclusion criteria were:
- People who live in their own home with a diagnosis of mild or moderate dementia
- Aged over fifty
- People with an MMSE<sup>3</sup> score greater than 12
- People with good general health and mobility
- People with a primary caregiver able and willing to take part who either lives with the person or has frequent contact with him/her.

Local service providers were contacted to help recruit the sample, including the Alzheimer Society of Ireland and the Memory Clinic and the Department of Medicine for the Elderly at St James's Hospital, Dublin. A similar approach was used in the 4 other partner countries.

### The test products

In total, seven products were tested in the study - five of them were tested across all countries with each country choosing one additional optional products:

An Item Locator - a device that aims to support memory, reduce anxiety and save time

An Automatic Night Light - a light that helps with orientation, prevents falls and reduces anxiety

An Automatic Gas-Cooker Switch - aimed at preventing fire, reducing worries and supporting memory

An Automatic Night and Day Calendar - to help with orientation and to support memory

A Picture Telephone - to help improve communication and reduce anxiety

A Picture Gramophone – to help improve communication and facilitate memory

A Medicine Carousel – to improve safety and reliability of drug taking.

The Picture Gramophone was tested in day centres rather than in the home. The medicine carousel was not tested in Ireland.

To choose which products to test in which countries, and which products to place with which people, we commissioned focus groups. We invited carers, health service professionals and other experts in the area of dementia care, including representatives of The Alzheimer's Society of Ireland, to participate in focus groups. The aim of the focus group was to determine which

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<sup>3</sup> MMSE – the Mini-Mental-State Examination (Folstein et al, 1975) is a cognitive test for screening for and assessing the degree of dementia. It comprises twenty questions designed to measure short-term memory, orientation in time and place, speech praxis, and cognitive and motor functions.

products would be most effective for which people. A criteria of the study was that only one product would be assigned to any one family member. This presented some dilemmas, as occasionally some people needed more than one product. Therefore, with family members and health professionals, we had to determine the most serious problem encountered for the individual and the family caregiver.

### Fieldwork

The main purpose of the first home visit (Baseline visit) (T0) - with participant and caregiver- was to demonstrate product use. The researcher telephoned the respondent one week later (T1) and a home visit took place after three weeks (T2), with further visits at three monthly intervals (T3, T4 and T5), up to one year. In this paper both baseline and data collected at three months follow-up is presented.

Table 1 shows the number of participants from each of the countries who were involved in the study after three months and the number who had dropped out.

Table 1: Number of completers and drop-outs at three months

<i>Country</i>	<i>Participants N= 80</i>		
	<i>Baseline</i>	<i>Drop-outs</i>	<i>Completers</i>
<i>England</i>	32	19	13
<i>Finland</i>	26	9	17
<i>Ireland</i>	34	14	20
<i>Lithuania</i>	12	2	10
<i>Norway</i>	25	5	20
<i>Total</i>	129	49	80

There was a relatively high drop out rate over the period of the study. England had the largest 'drop out' rate followed by Ireland and Finland. It is important to remember that this was not a clinical trial, where test circumstances can be controlled, but rather an in-home trial. There were two main causes for drop-out: (i) people's circumstances changed, which meant that they could no longer take part; and (ii) the test products - which were prototypes - broke down or failed to work.

Table 2 shows the age and gender profile of participants, their MMSE scores and whether or not they lived alone or co-habitated.

## Data collected

We collected both quantitative and qualitative data from participants using a semi-structured questionnaire. The quantitative measures included validated scales (for example, the DqoL, the Dementia Quality of Life Scale<sup>4</sup>, and the Relative's Stress Scale<sup>5</sup>). We used SPSS to analyse the quantitative data and content analysis to analyse the qualitative data.

Table 2: Characteristics of completers by the country

<i>Country</i>	<i>Age in years (range)</i>	<i>Gender (men/women)</i>	<i>MMSE Score (range)</i>	<i>Living Alone</i>
<i>England</i>	81 (69-91)	3 /10	21 (19-24)	38.5%
<i>Finland</i>	69 (61-87)	8 /9	21 (12-28)	25%
<i>Ireland</i>	76 (61-97)	7 /13	22 (12-29)	40%
<i>Lithuania</i>	77.5 (54-82)	3 /7	17.5 (14-24)	30%
<i>Norway</i>	79 (65-91)	5 /15	22.5 (12-28)	47.7%
<i>Total</i>	78 (54-97)	26 / 54	21 (12-29)	37.2%

**Research questions addressed** The questions which will be examined today include;

- To what extent were assistive technologies used and considered useful by people with a mild to moderate dementia?
- To what extent were assistive technologies used by family caregivers? How did family caregivers' perceptions of the use of technology compare with the individual's perceptions?
- Did assistive technologies impact on quality of life?

<sup>4</sup> The Dementia Quality of Life Instrument or DqoL (Brod et al, 1999) is a 29-item scale relating to domains identified as important to people with dementia: (i) physical functioning; (ii) daily activities; (iii) discretionary activities; (iv) mobility; (v) social interaction; (vi) interaction capacity; (vii) bodily well-being; (viii) sense of wellbeing; (ix) sense of aesthetics; and (x) overall perceptions of quality of life. Responses are given on a five-point Likert scale from 'never' to 'very often'. The items are scored under five sub-scales: (i) *self-esteem*; (ii) *positive affect*; (iii) *negative affect*; (iv) *feeling of belonging*; and (v) *sense of aesthetics*. The scale has three test questions. If people do not understand the test questions the interviewer does not proceed with the main part of the scale.

<sup>5</sup>The Relative's Stress Scale (Greene et al) is a 15-item questionnaire administered to the primary caregiver. It aims to measure the stress experienced by the carer.

## An overview of the findings

Findings show that at three months, about ninety percent of participants said that they used the devices. However only about two thirds (13/18) of those who were allocated the Item Locator used it (see Table 3 below). The Item Locator worked as follows: a tag is placed on the item that might need to be found - your spectacles or your keys or your pension book. When you need to find the item you press the button for 'spectacles' on the Locator handset, and the tag on the spectacles beeps. Some people with dementia found the tags stigmatising - they wanted to hide their tagged spectacles or pension book and felt that the tag reminded them or others of their disability. One person wanted to hide the locator box. This raises an interesting point about design.

Table 3: Device use by person with dementia (PWD) after three months

<i>Device</i>	<i>Person with dementia used device</i>		
	Yes	No	Total
<i>Calendar</i>	32	2	34
<i>Medicine reminder</i>	4	1	5
<i>Lamp</i>	4	-	4
<i>Locator</i>	13	5	18
<i>Gas cooker monitor</i>	1	-	1
<i>Picture phone</i>	11	1	12
<i>Total</i>	65	9	74

In terms of carers' views about these products and bearing in mind, of course, that the products were designed for the person with dementia, not for the carer, Table 4 shows that the Item Locator was well used by the carer. Indeed it seems that it may have had more application for carers than for people with dementia since twelve out of eighteen carers reported they used it.

Table 4: Device use by caregiver after three months

<i>Device</i>	<i>Caregiver used device</i>		
	Yes	No	Total
<i>Calendar</i>	16	19	34
<i>Medicine reminder</i>	4	1	5
<i>Lamp</i>	1	4	5
<i>Locator</i>	12	6	18
<i>Gas cooker monitor</i>	1	-	1
<i>Picture phone</i>	11	1	12
<i>Total</i>	43	31	74

The research also explored carers' opinion of their relatives' use of the product (Table 5 below). Table 5 shows that, with the exception of the UK sample, the carer's opinion of product-use correlated well with the individual's perception. In other words, a positive relationship was found between the carer's perception and the person's use of the product.

Table 5: Device use across five countries after three months

<i>Country</i>	<i>PWD used device</i>		<i>Carer used device</i>
	<i>PWD opinion</i>	<i>Carer opinion</i>	<i>Carer opinion</i>
<i>England</i>	9 (75%)	5 (41.7%)	4 (33.8%)
<i>Finland</i>	15 (88.2%)	14 (87.5%)	11 (64.7%)
<i>Ireland</i>	17 (89.5%)	14 (73.7%)	12 (63.2%)
<i>Lithuania</i>	9 (90%)	9 (90%)	4 (40%)
<i>Norway</i>	15 (83.3%)	16 (89.9%)	11 (61.1%)
<i>Total</i>	65 (85.5%)	58 (77.3%)	42 (53.3%)

### **Usefulness**

In Ireland (as in most of the countries involved in the study) people with dementia claimed that the product they had was very useful 3 months after its installation. Perception of product usefulness was not quite as positive amongst carers and there was a drop off in both carers and people with dementia perceptions of the usefulness of the product over time.

### **Quality of life**

Across the study and in all countries - we successfully used an assessment scale, the Dementia Quality of Life Instrument (DqoL), developed in the United States by Brod and colleagues (1999) to investigate quality of life in people with dementia.

The main finding here was that people with dementia had plenty to say about their quality of life, and that quality of life scores increased moderately over time. In Ireland, people reported that they enjoyed a very good quality of life. This is in contrast to the sample of people with dementia from Lithuania who reported experiencing only a fair or bad quality of life at baseline. Further analysis revealed that there was a statistically significant difference in DqoL scores between the countries in the study, both at baseline and at follow-up. We were keen to understand what factors might explain these differences. We tested, therefore, various variables (for example, the characteristics of the person with dementia and their caregivers). We found no correlation between any of these independent variables and the dependent variable quality of life. In other

words, none of these variables appeared to explain the differences in DQoL scores observed. The only variables emerging from analysis shown to be significantly related to DQoL scores at baseline were (i) Do you have a memory problem?; and (ii) Does the person with dementia have a time orientation problem? A negative association was found between the variable memory problem awareness and quality of life. In other words, those who were not aware that they had a memory problem rated their quality of life higher than those who were aware that they had a memory problem. We also found an association between the presence of a time orientation problem and quality of life. Those who had a time orientation problem (as reported by the caregiver) also had a lower quality of life score than those not manifesting this problem (as reported by the caregiver).

We have also taken a preliminary look at factors associated with changes in quality of life scores over time and the products use. What we have found (and we plan to investigate this further) is that people with dementia who used the products reported an increase in quality of life over time and those who reported they did not use the products reported a decrease in quality of life over time. There may be a diverse range of factors explaining these changes. A multivariate analysis will be undertaken to investigate this issue further.

## Conclusions

There are several conclusions we can draw from this research. The first is that people with mild to moderate dementia can competently take part in longitudinal research. We found that the people in the Irish sample enjoyed the contact with the researcher and were very happy to talk about their experience of using the products supplied, both during the planned visits to their homes and on their own initiative when they telephoned the Dementia Services Information and Development Centre. By far the majority of those with dementia who had the technological products installed in their homes used them and found them useful. A strong correlation was also found in general between the caregivers' and the relatives' perceptions of the use of assistive technologies.

There appears to be support for the potential of using assistive technologies to promote an improved quality of life for people with mild to moderate dementia who live in the community. I say this cautiously, however, as we have still to complete our data analysis. Finally our results showed that the people with dementia who took part in the study reported a more positive appraisal of their lives, roles and relationships than their family carers or health service professionals might have expected.

## **Acknowledgements**

I would like to acknowledge the work and the support of all ENABLE partners, and the study participants and their carers, all of whom contributed to this study enormously. I would also like to acknowledge the funding received from the EU to conduct this study.

## **Reference**

Brod M, Stewart AL, Sands L, Walton P: (1999) Conceptualization and Measurement of Quality of Life in Dementia: The Dementia Quality of Life Instrument (DQoL), *The Gerontologist*, vol. 39, No.1.

## **New Solutions for Housing for Older People**

*Dr Rodd Bond*

### **Introduction**

The aim of this paper is to describe some new solutions to housing for older people or, to put it more accurately, to outline a personal search for solutions for housing for older people.

The situation is that with an ageing population is that we need to find alternatives to institutional care. We need to develop options for independent living, options that allow us to 'age in place', to live out our lives and to age in our own homes. I believe that the key to this is being able to reinforce older people's confidence.

### **The Nestling Project**

Our project is a collaboration between the Dundalk Town Council, the Health Service Executive in Dublin/Northeast and the Dundalk Institute of Technology. When we set out on our project in Dundalk, County Louth we identified the following as key elements:

- A life enriching home environment (the physical environment of the home is critically important)
- Access to a range of services.

We asked ourselves, what can inclusive technologies do to bridge or fuse these two issues - the environment and the care model?

At the start of the Nestling project the focus was on the technologies themselves. As we progressed, however, it became clearer that we had to go back and look at the home environment and at the caring services model, too. We realised that it is in effect all part of the one thing – it is holistic and requires an holistic approach and an holistic solution. I started this exploration at the beginning of 2005. I was new to the area of older people and new to the area of assisted technologies for older people. So I started with a reference diagram to help me phrase some initial questions (see Figure 1 below).

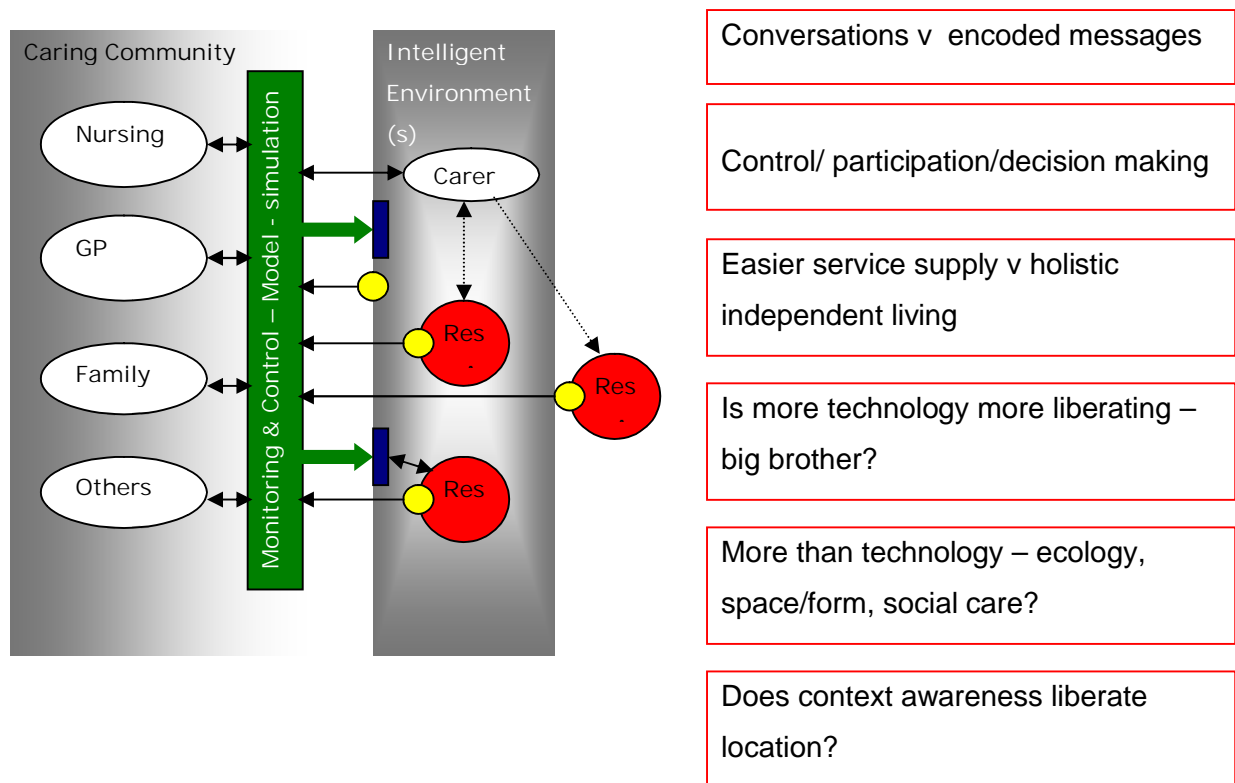


Figure 1. Initial questions

We have this idea of an intelligent environment with residents in it, and outside of that environment we have the caring community (nurses, GPs, the family and others). The question we asked was, what are the technologies, and what communications are going on between these two environments? More specifically, we asked:

- What is the nature of the communications or dialogue - conversations, heavily encoded messages that only computers are going to understand?
- Who is in control?
- What is the level of participation in bringing these things into place?
- Where is the decision making being made – and who is making the decisions?
- What is the motivation? Is it from the service provider? Is it a drive to find easier service provision models or is it about trying to create more holistic environments for independent living from the client side?
- Is the technology more liberating or is there a problem of Big Brother and observation?
- What are the technologies that we have to be concerned with? Is it really about information technologies and pure assistive technologies or is there a whole issue around ecology - technologies in the environment and technologies and appliances that we have in our homes and the whole issue of space and form and social care?
- What happens if a resident wanders outside of our intelligent environment? Does context awareness liberate location? Are we constrained to these kinds of environments - working

only within the home or within controlled environments or is this a service that is going to be available to us as we move around the community?

In the next section of the paper I would like to describe some of the smart houses and assisted living environments that I visited in Europe as part of this problem-seeking journey. I will draw out some of the themes that emerge from these case studies before looking briefly at some comparative frameworks. I will finish with a brief overview of World Health Organisation initiative on age friendly environments.

## Case studies

When I first went to look at some of these examples my focus was on the technologies – on the smart house aspect – and on their application to older people. Some of the challenges that older people face are the same as the challenges that people with disabilities face, and the same as some of those faced by younger people with cognitive disabilities. There has been a convergence of sorts – rather than being developed only for older people these environments are applicable to a broader range.

Although there is still much to do, technologies are beginning to converge, – in particular, communications technologies, information technologies and broadcast technologies. Convergence – and eventual integration – will mean for example that if we put a sensor into a house it can gather information that can support a range of applications, not just one.

Having seen examples of the technology in action in smart homes I wanted to look at the environment and the care models. So I chose case studies that took more client centric models and a community orientation. Some of the main themes in these models include environmental sustainability.

### Case study 1: Portsmouth

The Portsmouth project began in 1999 and was a joint venture between the Portsmouth City Council and the John Grooms Housing Association. The project comprises six apartments, three on the ground floor and three on the top floor, with a range of smart infrastructure costing from around £3,000 to £25,000 per house, depending on the ability levels of the occupants of the houses. The occupants pay a rental through income support and housing benefit.

The apartments are based on design standards from the Joseph Rowntree Foundation and its Lifetime Homes Project, which sets broad standards for homes that will support people throughout their lifetimes. Examples of design standards used here include sliding doors (to make it easier for residents to move them); power-controlled windows (and to make this system easy to control, the windows are single panelled: power units push the windows back and forth);

wheelchair access for the ground floor flats; and covered carports to protect the person from the weather.

In planning these smart homes, the Portsmouth group wondered whether to cluster them together or separate them out – that is, to put one smart home at the end of each terrace. They chose to group them together into a small cluster within a housing estate. They have differentiated them from other houses using colour: they are built with yellow brick while other houses are built with red brick.

The motivation behind some elements of the design was ecological – an attempt to minimise running costs. The decision to make the main rooms in the apartments (the bedroom, the living room) south-facing was to maximise passive solar gain (for heat and light) and to make the environment more comfortable and easier to live in. The living rooms open out onto gardens.

The project managers faced several challenges bringing these homes into existence:

- They consulted with the people for whom the homes were planned. By the time the consultation process was complete, however, the target residents – who needed somewhere to live - had to move into other homes because these ones had not yet been completed.
- During the course of the building work they lost control of the project and so compromises had to be made and some of things planned could not be fully achieved.
- They found it difficult to find specialists who could design and install the infrastructure technologies.
- In deciding what technologies should form the backbone of the apartments one of the key decisions was whether to use US standards or European standards. They decided on the US standards.

The choice of technology and standards raised important questions about redundancy of technology, its reliability and the failsafe measures needed should any of the technologies fail. These issues will become more important the more we begin to use (and embed) more critical technologies in the home.

The Portsmouth project team are currently doing an occupancy evaluation of the homes to help them determine the impact of the design and the technologies on residents' quality of life. No data are available yet. One question that has arisen, however, is the question of who supports and maintains the technologies once they are installed.

### **Case study 2: The Netherlands: Smarthomes NL**

We visited a demonstration house in the Netherlands built to show what assistive technologies and smart home technologies can do. It was developed as part of a European Union Fourth Framework project.

The house is about two hundred square metres in size and has an open plan layout. As with the Portsmouth apartments it has a strong ecological aspect to it: there are solar panels on the roof, a wind turbine in the garden to harness wind energy and a geothermal heat source – all used to provide power to the house.

Access to the house is via electronic keypads (which also add to the security of the house). Next to the main entrance door is what looks like another door to the house but is in fact a fridge in which to store perishable foods delivered by the supermarket, for example. Sensors embedded with the power supply in the skirting throughout the house pick up movement. If, for example, you get out of bed at night the sensor detects the movement and triggers the light. A system interface panel allows the resident to control and reconfigure how the system works to suit his or her needs.

The house is designed not only as a home for supporting independent living but also as a place for tele-working and home working (an important element given the likelihood that we will be working longer).

It is interesting to know that in this house – despite progress in wireless telecommunication systems – they have not managed to get rid of all the cabling. A large cupboard, a utility room really, contains a vast array of control devices for all the technologies in the house including air conditioning units, controllers and batteries for the windmill and so on. It is likely that it would take an engineer to maintain all of this – certainly it would be beyond the scope of the average resident.

### **Case study 3: Brussels, Belgium**

The Living Tomorrow project in Brussels is both an exploration and a demonstration environment for technologies. It consists of a conference centre and a separate demonstration house.

The house comprises a living space, kitchen space and huge utility and service facility on the ground floor; the bedrooms are on the upper floor. Again the issue of environmental sustainability is addressed by the use of alternative heat sources - solar panels in the roof mean that the house is a net contributor of electricity to the national grid, it gives back more energy than it consumes.

The convergence of the television and the computer in the home mean that the TV is not just an entertainment centre it is the access point for a whole range of services including the Internet and the control of home automation.

The layout of the kitchen and the dining area make it accessible for older people and people with disabilities. The kitchen units and storage cupboards are power controlled - you press a button

and panels open, drawers and shelves and counter tops come up or drop down. This design means that the kitchen can adapt to meet the needs of different people with different sets of abilities and disabilities – perhaps even living in the same home.

The utility room has space to accommodate waste management and the process of separating out all categories of domestic waste for recycling purposes and space to house the control system for the technologies embedded in the house – in effect it is the house network monitoring centre. As with the previous example, most residents would find it difficult to maintain this control system. This raises questions about how to make the technologies we want to use useable, manageable and maintainable.

#### **Case study 4: Grenoble, France**

In a project in Grenoble, France, sensors are not only embedded in the home but they are worn in the clothing to support communication as you move around in the community.

#### **Case study 5: Centre for Future Health, Rochester, New York**

This is a project in which Intel Corporation is involved. One of its aims is to determine what to measure, what sensors can pick up or monitor in the home. We have the opportunity to monitor 'vital signs' and pass that information on to healthcare providers. There are, however, opportunities to measure other things such as gait, sleeping patterns, food consumption and so on, which might provide us with information to predict – or at least detect earlier and so be able to intervene earlier – the signs of illness or disease.

#### **Case study 6: Georgia Tech.**

This is an interesting project on 'aware homes' – homes with smart technologies that can build an awareness of what is happening in the home. These applications are of great assistance to people with dementia as they can provide reminders and prompts.

Researchers at Massachusetts Institute of Technology are looking at ways in which these technologies might be integrated into the buildability of the home – so that the cabling infrastructure is built into the house.

### **What do these case studies tell us?**

The key thing that is apparent from these examples is the desire to support the wellbeing of the person via independent living. To some extent the smart home is there to choreograph care provision by making use of assistive technologies and home adaptation.

There is still much to be done (as Niamh Scannell noted in here paper) in terms of interoperability and connectivity of systems and technologies. Essentially what we want to create

is environments in which any device in the home can be connected to any other device in the home, and that you get a range of control options for things such building security, exit and entry control, opening and closing of doors and windows and control of appliances (including TV, video, home computer, phone) – and that all these devices and systems are sharing a similar information bus. For now this remains a dream rather than a reality - there has not yet been that final convergence but we are getting close.

When you get into the smart house world it is easy to get sucked into a technology- centric perspective and to lose sight of the individual and, in particular, the ageing person. It is necessary from time to time to do some checking and rebalancing of your perspective. When you spend time looking at which objects can connect with which others - and how that connectivity works – you are in danger of losing the sense of how a real community connects and how achieve quality of life, or at least address some of the issues of quality of life issues.

It is important to build an evidence base. While there are lots of pilot projects we are not collecting comparative data that can be aggregated into building a larger evidence base. Furthermore, many projects are being done without any reference to control groups. This makes it difficult to examine outcomes and to apply learning from case to the next.

So we move on to look at another set of case studies, case studies with that allow us to look at the community aspects of smart homes and assisted living.

### **Case study 7: Trynwalden, Netherlands**

Trynwalden, in the northern Netherlands, is an area made up of seven villages about six or seven kilometres apart. In recent years the area and the villages have suffered social erosion. When the local nursing home was in need of rebuilding in 2001 it was decided instead - to make a real commitment to ageing in place – that sheltered housing with service centres and a combination of environments and new social care structures would be developed in its place. The aim was to be able to support older people in that eroding community – to support them to remain in the community. As a result of developing Trynwalden in this way lots of younger people are coming back to the area to start up the services.

One of the key things the planners in Trynwalden did was to look the issue in an holistic way, and to get the care model and the environment in balance. The core components of the project are based around the client, enabling the client - through an independent service broker, a single point of contact - to access to a range of services (including housing and home care). The other key element is that Trynwalden has a range of teams made up of home helps, home carers, nurses and social workers in a very flat organisational structure, thus breaking down professional barriers in how care teams work. The teams operate in the community and in the sheltered housing

scheme. Supporting all of this is a range of on-call and other services available in the on-site service centre.

The service centre has meeting rooms, a care 'hotel', therapy rooms (with independent therapists – physiotherapists and occupational therapists), libraries, day centres, pharmacies, shops and restaurants (privately run).

The technologies installed included those for safety and security, control of comfort, heat and energy, communications and applications around information services, e-chatting and e-commerce and care services (everyone has access to the services broker).

The sheltered housing is built over the social service centre. The design reflects the desire to use natural materials as much as possible. The living units in the sheltered housing scheme range from around eight hundred square feet up to around one hundred and twenty square feet in size. Each one has a kitchen, a dining space, a living space, a balcony and a large bedroom area.

Trynwalden also had good transport links, which encourage an intergenerational aspect to the project with people bringing their children to the on-site crèche.

Should anyone have to leave to go to hospital the care team aims to pull them back into the community as fast as possible. To this end they have a 'step down' facility where the community healthcare team aims to rehabilitate the person, getting them back into the community within as short a time as possible. This is very much a case of the community taking ownership of its citizens.

The challenge in Trynwalden, as we saw in other models, is who supports the technology? Experimental projects such as these have difficulties working through these issues. In fact, in Trynwalden they are currently pulling out the technology and replacing it to reflect a shift in standards.

As Niamh Scannell pointed out in her paper, there is a continuum of care from the acute setting through to residential settings. One of the challenges we face is accommodating in a home setting those people who are 'high dependency'. In places where there is clustered housing it is possible to bring together a ranges of services, and so the distinction between clustered sheltered housing and residential units - in terms of their shape, how the care is organised and what levels of independence and privacy are afforded - may be slight.

### **Case study 8: Ros Anders Gard, Hanniga, Sweden**

Hanniga is a community of about 100,000 people about ten kilometres south of Stockholm. The Ros Anders Gard assisted living centre aims to accommodate people with dementia.

What I found interesting about Ros Anders Gard was how they had clustered the housing units together and maintained the balance between providing independence and independent living and the kind of community setting that would support people with higher levels of dependency.

The accommodation, set in grounds with a rose garden, is spread over two floors in a building that is light and spacious. The building has two wings, in each of which there are ten relatively self-sufficient living units that share a kitchen and a dining area as well as sitting rooms and rehabilitation spaces.

The kitchen was a good example of what a kitchen should be - it is the hub of the community and the layout and design (there are no nursing stations there) gives it a sense of homeliness. The use of natural materials in the design, however, does pose challenges for health and safety yet these are the sort of materials that we would want to see in our own homes. Adding to the sense of homeliness is that people living in Ros Anders Gard bring their own furniture – only the bed is provided.

Another challenge to health and safety is the hearth with an open fire. Many of us are attached to open fires and yet we are pressed to get rid of them because of the health and safety risk. This raises questions of how we perceive and manage risk.

An aspect of Ros Anders Gard that I found interesting, bearing in mind that some of the people living there were people with dementia, was that they had through nutrition and the timing of meals drastically reduced the amount of medication needed to control night wandering.

### **Case study 9: Wilhelmiina, Finland (Wilhelmiina)**

The Wilhelmiina Centre in downtown Helsinki is a series of housing units spread across several buildings in a dense, urban area. Besides the housing units there is an eight-storey service department. The block that I was most interested in was a four-storey block of sheltered housing for people with high dependency needs. Another block contains a whole range of rehabilitation services, restaurants, space for shared activities, special units for people with dementia and specialised rehabilitation units. In total there are around sixty dwelling units on four floors (fifteen on each of floor). They are grouped into smaller clusters and have access to a whole range of shared services including therapy services and restaurants.

From what we could ascertain funding for the project is derived from a range of sources both private and public and including grants from the Miina Foundation, the Lottery, social insurance contributions and the municipality itself.

The cluster unit itself is made up of five independent living units arranged around a common 'family' space. The five unit grouping offers residents a sense of security.

The design is as open as possible with vertical spatial links so that there is no feeling of being enclosed. The living units have balcony areas again adding to the sense that you are not enclosed in space and that you have your freedom. Windows have been put in interesting locations: in some living units they have been placed at lower levels so that those who are bed bound or who spend time in a wheelchair can see out of the window.

The dining area, the hearth with an open fire bringing in warmth into the environment. The living area is designed to gather and focus light - which I gather is a very valuable therapy for people with sundowner syndrome. A swimming pool and other therapeutic services and spaces are housed in the basement, where they have also been able to steal natural light via clear storey spaces - in all areas they have tried to maximise the constraints imposed on them from working in an urban setting.

## What do all these examples have in common?

It is useful to pull out some of the commonalities - or learning points - across these case studies:

- How through design and planning we can achieve a level of self containment and independence in living
- The importance of light (and the placement of windows) in fostering a sense of visual connectedness
- The use of natural materials and colour
- The importance of the hearth
- The importance of the kitchen (more than just a matter of nutrition)
- The use of inside outside transitions
- The value of a garden (as a shared space, for leisure and for healing)
- The role of the environment or setting in social and therapeutic aspects of living.
- The role of transport in staying connected and in encouraging multigenerational living
- The balance between universal design (design for all) and adapted design.

This last point is interesting. People sometimes question the notion of 'fitness for purpose'. It is important to remember that the purpose sometimes changes and so there are times when it is appropriate to design for all and there are times when it is appropriate to look at design that can adapt and evolve as need changes.

## Frameworks

The question now is, how do you prioritise or even gather this information and make it useful? A book that I found useful is *Design for Assisted Living Guidelines for Housing the Physically and Mentally Frail* by [Victor Regnier](#) (1993). In it Regnier examines a range of frameworks that help

identify priority areas such as maximising privacy, maximising the opportunity for choice and autonomy and independence, personalisation and individuality.

Many of these frameworks for the design of smart homes and assisted living were developed around 1999 to 2002. They have come from the social care provider, the house provider and the architect but what stunned me was that there was so little about technology in them. I think that there is huge value in bringing together all of these perspectives, including the technology, that have been kept apart for too long. Up to now we have tended to look at technology as something that goes in afterwards, a sort of bolt-on. The challenge now is to bring technology in at the very start, at the planning and design stages. We need to think about whether technology will replace and change how we do things or whether it will become a means to enable and reinforce some of our older, more traditional, community-based models.

We also need to think about privacy and safety and what it is that contributes to quality of life. Should we be changing our priorities – moving away from a focus on providing for our physiological needs (heat, safety) – and thinking about how technology can address our need for self fulfilment and self esteem and the creative aspects that support our wellbeing?

## **WHO Ageing and Life Force Programme**

To close I will introduce you to a WHO project from the Ageing and Life Force Programme. The aim of the project is to get an idea of what are the indicators in environments that might contribute towards making cities friendlier for ageing people, - picking up on the theme of evolution and development. Fifteen cities are contributing to the project and Dundalk is the Irish participant.

Over the coming months we will be running a series of focus groups with older people and their carers and with service providers to get a sense of what people think are the positive and negative aspects of the city environment. We will be looking, for example, at the outdoor spaces, the buildings, transport, housing, respect, social inclusion and social participation, communication, information and the roles of the technologies, civic participation and employment and, finally, community support and health services. It will be interesting to see what are the commonalities and what are the variations in view from the different cities (the different cultures) around the world.

## **Conclusion**

I think there is an emerging shared vision that ageing in place is the answer, and that we have therefore to find sustainable approaches to deliver it. There are challenges in agreeing some core principles about the level of client centeredness. We have seen some service centre models; we

will soon start looking at client centred models that enable and that are based on choice for the individual.

To date there has been a lot of experiments and there needs to be a lot more. We tend to be afraid to do some of these things. There is a real need for us to do more design, to be more innovative and not to be afraid to make mistakes. We can learn from mistakes. Policy often takes time to shift and I am not sure that we have the time to wait for policy.

## Panel Discussion 2

Dr Cillian Twomey

I have a question for Suzanne Cahill. Suzanne, you mentioned that the drop out rate was fairly high. Do you know why that was?

Dr Suzanne Cahill

Yes, about a third of the sample had dropped out by three months into the study. It was primarily because these products were prototypes, they hadn't been fully pre-tested on a similar sample. For instance, the night lamp had to be returned to the manufacturers because of technical difficulties with. So that was one reason. Another reason was that people's circumstances changed. Some people moved into long-term care (even though that had been an exclusion criteria for selecting our sample). We couldn't anticipate what would happen to certain people. Caregiver situations changed, too.

Brendan Hagens, Department of Computer Science and Statistics, Trinity College Dublin

I would to pick up on what Rodd Bond about the need to engage with technologists much earlier in the process than we are doing at the moment. What I suppose I would like to say to the panel and to others here, I am a technologist, so does anyone want to engage with me?

Dr Rodd Bond

It is a huge challenge just at the moment, bearing in mind the flux that is going on in relation to standards and technologies. The specifiers of these homes don't know what the final applications are going to be. Engaging with technologists creates the opportunity of defining requirements and looking at design and working through those processes. But we have some core challenges in that - making sure that the base infrastructure that we put in the home is able to accommodate ranges of applications that we can't conceive of today. In the acute hospital setting there is the ICT mantra of 'everything over IP and IP over everything'. We need to create an infrastructure that allows medical devices and patient record systems and all the other things that you put in an infrastructure to communicate. We to future-proof these projects - as we've seen in some of the case studies they are ripping out things that they put in place only a few years ago.

Dr Suzanne Cahill

I think that there is also a need to engage with architects very early on in the process, too. We provide a consultancy service at the Dementia Services Centre at St James's Hospital in designing

for dementia. Often the requests and enquiries come in too late - the building is already in place. There is a real need to bring together different groups of professionals - architects, engineers, technologists, health professionals, lawyers - people working collectively, designing for older people and designing for dementia, in particular.

Sheila Simmons, The Irish Association of Older People

We are delighted to be here today to hear what is happening although we probably won't live long enough to benefit from these new innovations. Just last week one of our members pointed out how many people are living alone in family houses that were built around 1938, just before the Second World War. Maintaining these houses has become quite a burden for them. They would be very interested in the state of art projects that we have just seen in Rodd Bond's presentation. But there older people have a real fear that they may have to face the frailty and vulnerability of old age in a project like that with perhaps diminishing mental and physical faculties.

Is there a market for this new design of house for active older people, one that can reassure them that there will be a continuum of care for them that means that they won't have to move again? Also, it is important that these places are not exclusively for older people - older people want to remain integrated within the community.

Dr Cillian Twomey

You are talking about a continuum of support...

Sheila Simmons

Exactly, and also the continuity that Eamon O'Shea spoke about this morning. I was wondering if anybody has any views on that?

Dr Rodd Bond

In terms of the intergenerational environment - we are building sheltered housing specifically for older people and therefore to some extent these sheltered houses are being clustered into communities of older people. In fairness, the providers are concerned about things like security. But it is important to think about how that housing stock evolves over time. Other family members might be able to come in and start to rebuild communities as a result of that.

Dr Cillian Twomey

I suppose traditionally there has been the sort of feeling in Ireland that you are either at home or you are in long-term care. There is no graded development of need in between. Everybody knows that nobody wants to be in long-term care. Nobody. Even those who are utterly

dependent and need to be there - they still do not want to be there, it isn't their preference. So it seems that we need to have in our development plans something that accommodates independent living and very dependent living in the same complex. This is not beyond the bounds of planning and design. It would mean that the person would be fairly certain of being looked after in that particular geographical base for their entire older age, without having to move elsewhere. It would be nice to think that the discussion we are having today would prompt departmental governmental bodies and others to do something about this.

Professor Peter Lansley

At a more general level one way in which this is being addressed in the UK is through the lifetime homes concept: homes are designed which people can live in throughout their lives. This should lead to more sustainable communities. The UK government looked as though it might adopt the full lifetime homes concept developed and refined by the Joseph Rowntree Foundation but unfortunately it seems to be backtracking on that. Those communities that have been built to the lifetime home standards, and these are very new, have a great deal of potential and very interesting. They do not go as far as some of the examples Rodd Bond presented but they do go some way towards that.

Dr Emma Stokes, Department of Physiotherapy, Trinity College Dublin

I would like to ask Peter to comment on something (I think it is something he talked about in another talk). In terms of the continuum of care that we have talked about today, what do we do with existing houses? And what do we do in the future? Both Niamh and Rodd talked about some very interesting concepts but they tend to be a bit more future-focused. How do we equip the places where people live now to support the types of technologies that you are talking about? There is a whole set of housing being built in Ireland now where people will grow old mainly because they won't be able to afford to live anywhere else. Peter, I think you commented on a piece of work that examined how you change current housing stock in the UK to enable older people to stay in their houses longer.

Professor Peter Lansley

The vast majority of people live in homes built some time ago, and they will continue to live in them. It is impossible to replace the stock and provide new homes, and not everybody wants a new home - they want to live in their existing homes. There is a lot of attention being paid at the moment to the question of what we do with the existing stock and how can we adapt it so that people can stay where they are.

This is an important and interesting issue. Whilst a lot of attention is currently being paid to smart homes and what electronic technology can provide at the end of the day the cost of that

will be a relatively small proportion of the cost of adapting a home for someone. It costs to put in ramps and rails, and to take out baths and replace them with showers, to put in stair lifts and through-floor lifts. I have been very impressed at the ingenuity of local housing association building departments who can make very difficult houses liveable for older people. But the cost is astronomical. The issue is how do we spread existing budgets across the many more people who will need these adaptations?

One of the difficulties at present is that the lack of information and advice available to people. Occupational therapists, in particular, understand what can be done with those homes - they are the front line troops in keeping people in their own homes. There is a huge need for training in both old and new technology so that the right things are provided to the older person. And this brings us to another important ingredient. It is not good enough to expect professionals to be able to prescribe what is required. In the end it comes down to what the older person wants. So it is important to get the right combination of professional advice and an understanding of what the real needs of the older person are. We can go a long way with modern technologies but it is important to realise that they are not going to solve a lot of problems for the existing housing stock. The answer there is to find a builder who can do the adaptations – who can fit the rails and the ramps – and do it quickly so that people can enjoy their adapted home for the rest of their lives.

**Dr Rodd Bond**

If I could add a little bit to that. We may have the chance with things like changes to energy ratings to invest in our existing housing stock to get the energy profiles right to be able to sell them on. When we start looking at those there may be some opportunities to do other improvements that go beyond the energy issue – we may be able to address some of the accessibility issues at the same time.

**Fionnuala Rogersons, Architects' Institute**

I am an architect working mainly in social housing. I am doing a housing project for elderly people at the moment. I would like to make a few points. In relation to your comment on the lifetime homes principle developed by Rowntree in the early 1990s. I feel that we have moved from there. In the early 1990s Rowntree had to make a case to get level access, and covered entrances and to improve on the basic minimum standards within a very minimum sized house. A lot of the Rowntree work was based on sixty, seventy and seventy five square metre units. In Ireland our general housing stock is on the whole quite a lot bigger than that (in fact our housing stock had the second highest average floor area in Europe whereas England had the lowest). So whilst I would have been promoting the Joseph Rowntree Foundation lifetime homes standards for a long time I do think that we need now in Ireland to look beyond them. In fact, our

minimum building regulation standards are higher than those in the UK. This means that we already have some room for adaptability in current housing. But it is not nearly enough.

I'd like to come back to Rodd Bond's presentation. It is so encouraging to see what is happening elsewhere in Europe – encouraging to see that others are taking an holistic approach. To be here today I had to drag myself away, not very reluctantly, from redesigning a sheltered housing scheme. We are at the post tender stage and the client wants us to omit the arts and crafts areas, the technology area, all the environmental controls that we had incorporated in the scheme, the guest bedrooms, and on and on. Why? To bring the costs down. Why? Because the project is being financed by the Department of the Environment. The Department is financing the housing providers and the housing providers are there principally to provide housing. They are not thinking laterally, they are not making the links, they are not thinking holistically. There is a lack of coordination: you are working with housing, you are working with health, you are working with something else and something else. It is this lack of joined up thinking that makes it really difficult. I'll give you another example. We had a children's play facilities in the scheme. We were asked, why would you have children's play areas, this is a scheme for older people! It is very, very dispiriting when you are trying to push things. We are designing the kitchens but the query came back - we are not going to be providing meals, who is going to be providing the meals? If the people who come to live in this scheme are sixty years of age or maybe even fifty-five, what happens in five, ten, fifteen years' time? Nobody is thinking that far ahead. I just wondered if there was anybody who would comment on this lack of joined up thinking, and the lack of cooperation between different government departments and housing providers?

Dr Cillian Twomey

It is frustrating and it is totally at odds with everything that we have been listening to here today.

Dr Rodd Bond

There is a lot of variation in the level of joining up thinking throughout the country. At the moment we don't have organisational structures in place to make that happen at a systemic level so it is largely up to individuals the extent to which they take it up. We are getting an opportunity to do some of these things on the project I'm working on in Dundalk. My main role is as a programme manager, dealing with the collaboration between the local authority and the Health Service Executive and the Institute of Technology. The level of collaboration and the level of cooperation I have there between individuals is a major asset. I realise that that they are sticking their necks out to make these things happen because the institutional support isn't there yet.

Dr Suzanne Cahill

I think that in this country there is a culture of not wanting to change the system and a feeling that people are very restricted in what they do. I know this from spending a day recently with a group of practitioners, mostly nurse professionals, in Cork. We spent the day looking at the whole environment in the context of dementia, making suggestions on how the environment could be better adapted to compensate for the needs of people with dementia. There was a very strong feeling that to make any of the changes that are being recommended is to be against health and safety. For example, suggestions such as having the person bring their own bed to the residential home. I think that we really need to work with the HSE and to work with those involved in inspections of nursing homes to address this.

Maurice O'Connell, The Alzheimer Society of Ireland

The struggle is trying to respond innovatively to design in terms of providing even just ordinary small day care facilities that are not going to be frightening places for people with dementia. We want to develop a project up in Sligo, a supported living project for people with dementia. The struggle we have is to get people to understand that this client group can look after themselves quite well in a supportive environment, and for much longer than we believe they can. But people are hung up on the whole notion of taking any risk, and this closes many options down. People are afraid that the person with dementia will wander, will get lost and what will they do when half a dozen people are wandering in ten different directions? Design and training within that environment will help and the more we begin to have that discussion and argument with all concerned the more likely we will be to change people's opinion and get something done.

Dr Suzanne Cahill

There are some very encouraging examples in Ireland - projects like the one in Clonakilty, County Cork, where they have developed a beautiful unit on a very small budget. It was good leadership - someone determined to rock the system and change things - that got it done.

Jim Cuddy, Enterprise Ireland

I just want to pick up on Professor O'Neill's point in the earlier discussion about industrial opportunity. There is certainly an industrial opportunity for those technologies that we have heard about today. Enterprise Ireland is very willing to support projects in this area, industrial projects that we call 'High Potential Start Ups', and also the licensing of devices to existing companies.

To go back to a point that Peter Lansley mentioned earlier: a couple of years ago we had a proposal from a product designer to set up a Designer In Residence programme. The idea was

that graduate designers from say the National College of Art and Design would be placed in say a hospital or a nursing home or a care home for a period of six months to a year to work on a design project. The aim would be to design something that would aid the recovery or improve the quality of life of the people within that institution. Unfortunately the idea did not get beyond the proposal stage but I think it would be a shame to forget the idea. It seems to me that we have great opportunities for the development of product designers here in Ireland and to get them to design something that contribute to the recovery and wellbeing of people in hospital is a great idea. Perhaps there is scope for a senior designer in say Dublin Institute of Technology or University College Dublin to take a graduate under their wing and to develop such a project. Not only might it advance the welfare of patients but it might also advance design skills in Ireland.

## **Delegate List**

Ms Maja Barker	IGS Executive Committee
Mr Rodd Bond	Speaker
Mr John Brennan	IASW
Prof Vinny Cahill	Computer Science TCD
Ms Suzanne Cahill	Speaker
Mr Bob Carroll	NCAOP
Dr Miriam Casey	St James Hospital
Prof Davis Coakley	St James Hospital
Mr Kevin Connell	CPN St Itas
Dr Alpha Connell	Human Rights Commission
Mr Des Coppins	Dept of Transport
Dr Catriona Crowe	St Lukes Hospital, Clonmel
Mr Jim Cuddy	Enterprise Ireland
Mr Phil de Chazal	Nova UCD
Ms Antoinette Doocey	HSE
Ms Mary Doyle	Peamount Hospital
Mr Pat Durcan	Federation of Irish Nursing Homes
Dr Fiona Fenton	Mater Hospital
Ms Yvonne Finn-Orde	AOTI
Prof Paul Finucane	Director of Medical School Developments
Ms Katherine Freund	Speaker
Dr Aideen Freyne	St Vincents Hospital
Ms Ursula Gallagher	Letterkenny General Hospital
Mr John Graby	Director, RIAI
Ms Emer Hally	Irish Association of Older People
Mr John Hartigan	Nat. Fed of Pensioners Assc.
Mr Conor Henegan	Nova, UCD
Ms Patricia Hollohan	The Alzheimer Society
Ms Marian Hughes	IGS Scientific Cttee
Prof Peter Lansley	Speaker
Ms Teresa Lavin	Institute of Public Health
Ms Rosemary Lennon	AOTI
Ms Jane Liddy	Human Rights Commission

Dr Jean Manahan	Atlantic Philanthropies
Mr Shay Manton	St Itas Hospital
Ms Sarah Marsh	IASW
Dr. Geraldine Mc Carthy	St Columbas Hospital
Ms Olga McDaid	NCAOP
Mr June McEnroe	Irish Examiner
Ms Sinead McEvoy	Dept of Health & Children
Judge Catherine Mc Guinness	Law Reform Commission
Ms Bernie McNally	Dept of Health & Children
Ms Sylvia Meehan	Age & Opportunity
Dr Eamon Mulkerrin	IGS Scientific Cttee
Dr Ken Mulpeter	Letterkenny General Hospital
Ms Mary Nally	Senior Helpline
Dr David Ngo	National Rehabilitation Hospital
Ms Dearbhil Nic Giolla Mhicil	Dept of Social & Family Affairs
Ms Imelda Noone	IGS Executive Cttee.
Mr Maurice O'Connell	The Alzheimer Society
Dr Kieran O'Connor	Our Lady of Lourdes Hospital
Ms Orla O'Hanlon	Atlantic Philanthropies
Dr Tom O'Malley	Mayo General Hospital
Prof. Desmond O'Neill	IGS Executive Cttee.
Prof Eamon O'Shea	IGS Scientific Cttee
Mr Tony Regan	Transport & Mobility Consultant
Comm Patricia Rickard Clarke	Law Reform Commission
Ms Fionnuala Rogerson	Rogerson Architects
Ms Ann Marie Ross	Services for Older People
Mr Bill Rothwell	Nat. Fed of Pensioners Assc.
Ms Niamh Scannell	Speaker
Ms Sheila Simmons	Irish Assc. of Older People
Dr Emma Stokes	IGS Executive Cttee
Mr Brendan Tangney	Computer Science TCD
Dr Cillian Twomey	President IGS
Prof JB Walsh	St James Hospital
Dr Mike Watts	IGS Executive Cttee