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Doughty, Kevin (2017) Silver surfing home on the seven waves: technology enabled care and wellbeing @ home. In: Open Lecture, 1 March 2017, University of Cumbria, Carlisle, UK. (Unpublished)

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Technology Enabled Care and Wellbeing @ Home

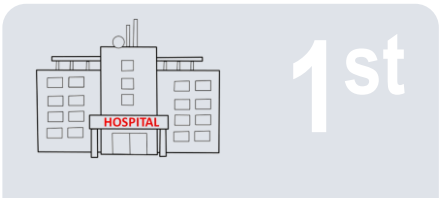
"Silver Surfing Home on the Seven Waves"

Kevin Doughty

University of Cumbria, Carlisle

Wednesday, 1st. March, 2017

The Four Eras of Care



Institutional focus (1st Era)
Geriatric hospitals replacing the Workhouse and Public Assistance Institutions

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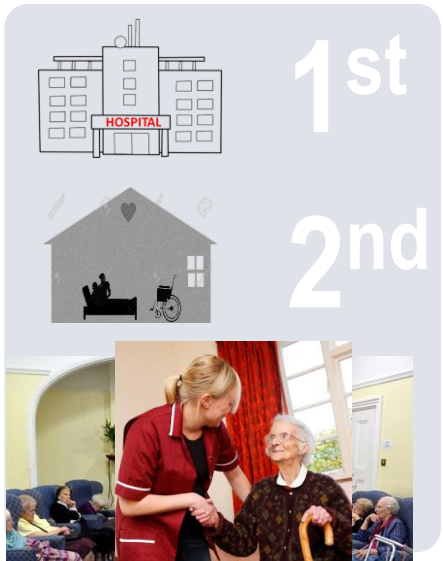
The Four Eras of Care

Community focus (2nd Era)
Sheltered housing, residential care homes, home helps and domiciliary care in the home, and personal assistants



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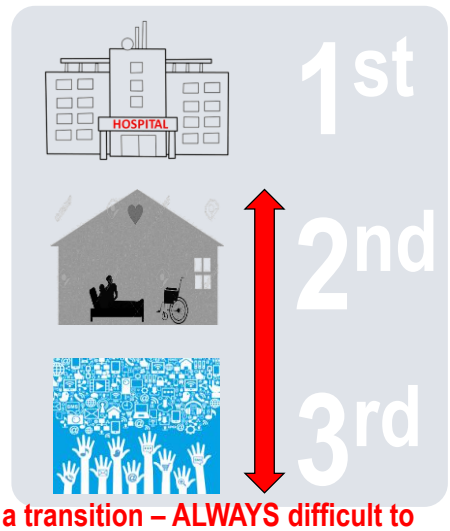
Person focussed (3rd Era)
Use of **technology** to support health, well-being and independence, and to avoid the need for long-term care



This is a transition – ALWAYS difficult to achieve – it involves a change in culture

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Person-Centred Care

is…	is not…
Person-centred	Practitioner-based
Stren	
Sk	
C	
C	
Qu	
Comm	
Empowerment	& respect
Least restrictive	Episodic
Preventive	Reactive

This can help answer the question:
"What matters to you?"

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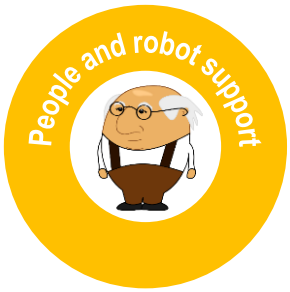
The Four Eras of Care



Cybercare (4th. Era)

Use of new intelligent systems and data to support self-care and DIY healthcare; to improve Quality of Life and well-being

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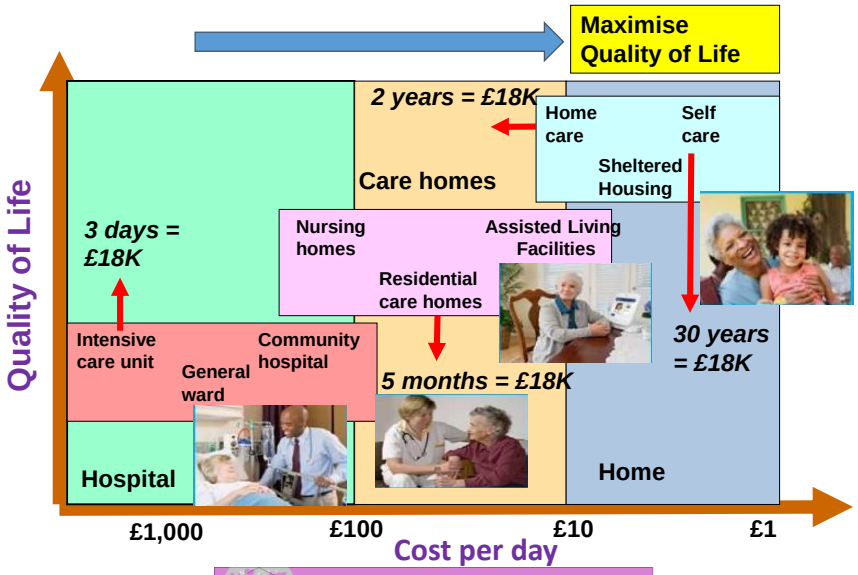
The Cost of Care



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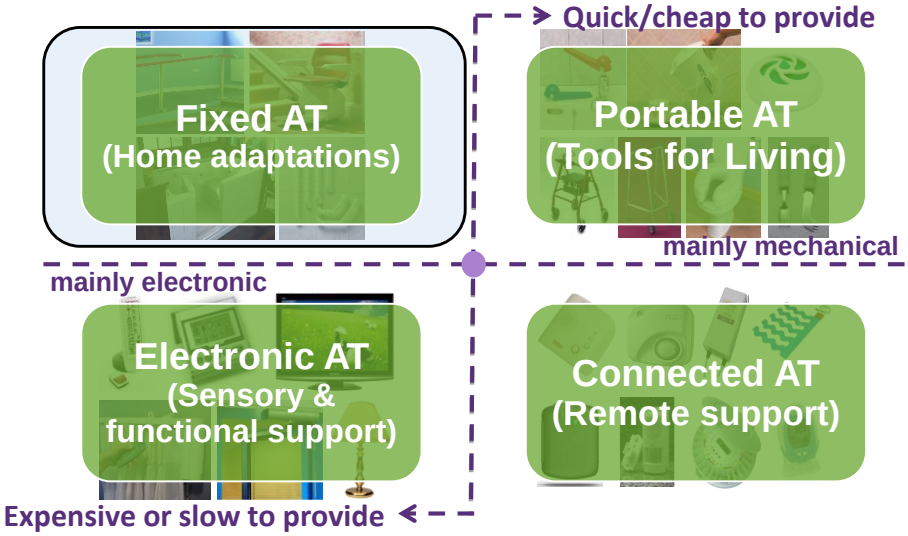
Assistive Technologies



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Fixed Assistive Technologies

The focus is on the property – make it fit for the person

Many installations funded by LAs through Disabled Facility Grants

Av. cost to buy & install - £2000
Av. cost to remove - £1000

Big role for Home Improvement organisations

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Assistive Technologies

Fixed AT
(Home adaptations)

Portable AT
(Tools for Living)

Electronic AT
(Sensory & functional support)

Connected AT
(Remote support)

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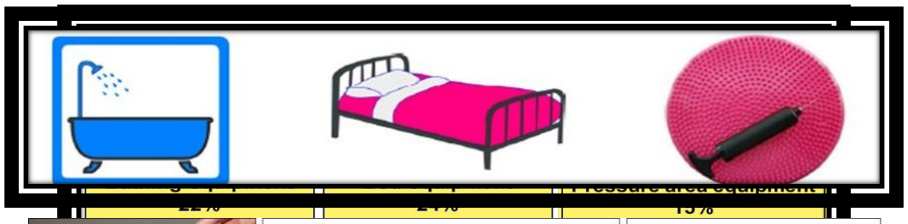
Tools 4 Living & Equipment Stores



Instant water boiler
£39.99

Video intercom
£99.99

Glass-sided toaster
£49.99

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Assistive Technologies

Fixed AT
(Home adaptations)

Portable AT
(Tools for Living)

Electronic AT
(Sensory & functional support)

Connected AT
(Remote support)

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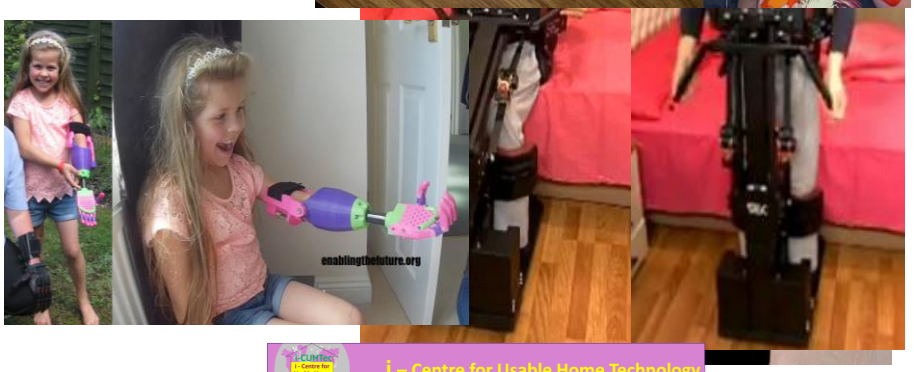
Sensory & Functional A.T.

- Activity support
- Prosthetics



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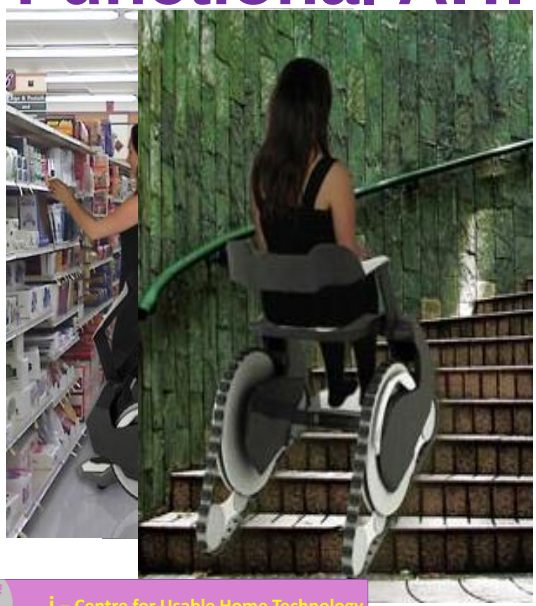
Sensory & Functional A.T.

- Activity support
- Prosthetics
- Speech deficits
- Environmental controllers
- Mobility devices
- Sensory aids



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eSight – A Vision Amplifier

This is effectively an electronic "seeing aid" which amplifies the levels of light which fall on the eyes. It works particularly well in cases where visual acuity has been reduced through age, and is suited to use at night.
User can control contrast, zoom and colour display.

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Sensory & Functional A.T.

- **Activity support**
- **Prosthetics**
- **Speech deficits**
- **Environmental controllers**
- **Mobility devices**
- **Sensory aids**
- **Muscle control and amplification**

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Wearable Solutions to a Lack of Mobility

The Honda Assist system straps on over the hips and legs, giving a mechanical boost to frail people who have reduced muscle strength. It can help someone to get upstairs without relying on a stairlift

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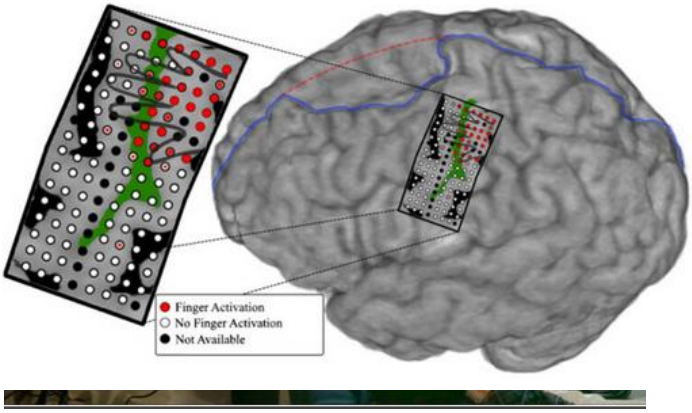
Mind-controlled Prosthetic Allows Movement of Individual Fingers



The fingers of a prosthetic limb could be controlled by thought with 76% accuracy. This could be boosted to 88% by grouping the ring and pinkie fingers together

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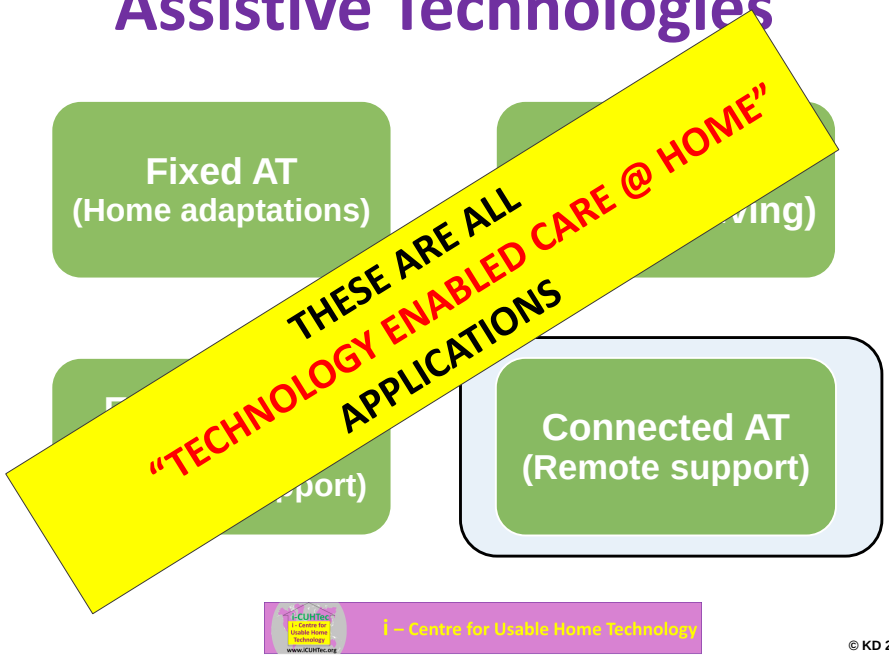
Assistive Technologies



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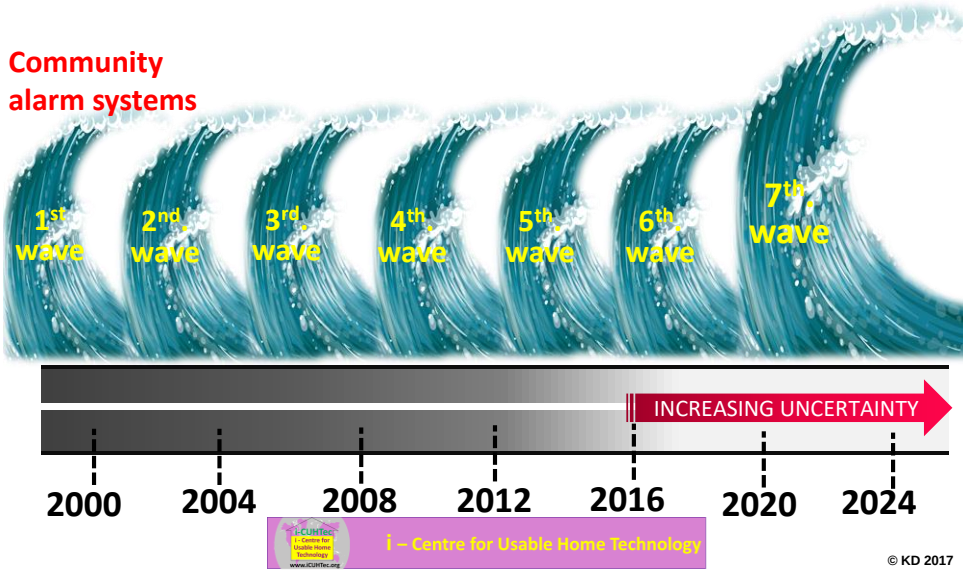

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Community Alarm Systems

Sometimes known as a 'button & a box' approach

Active devices - press or pull in emergency

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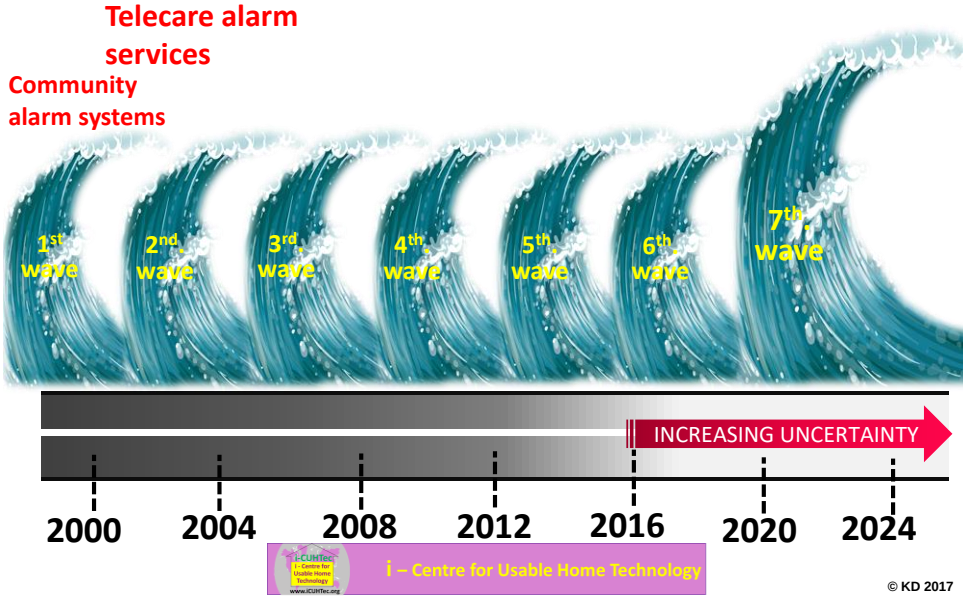

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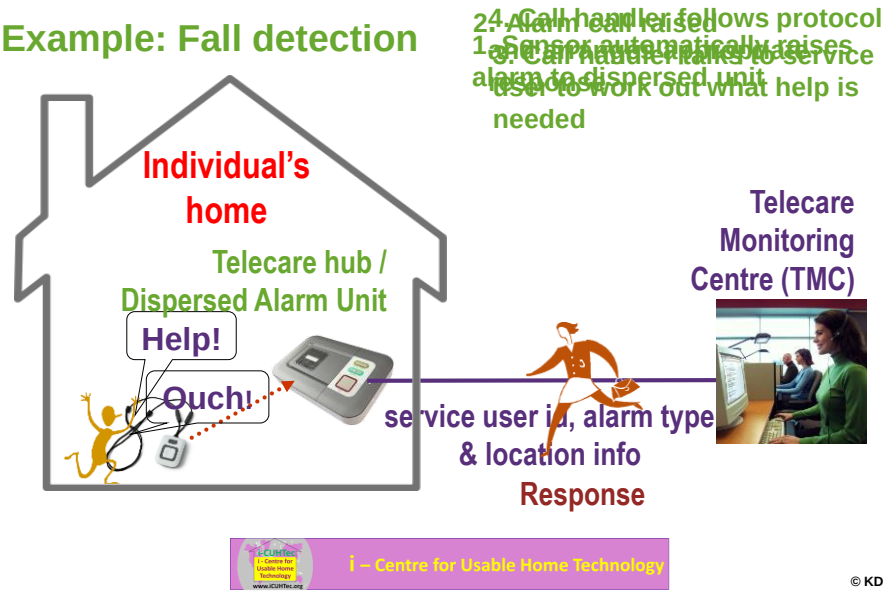
How alarm-based telecare works

Example: Fall detection



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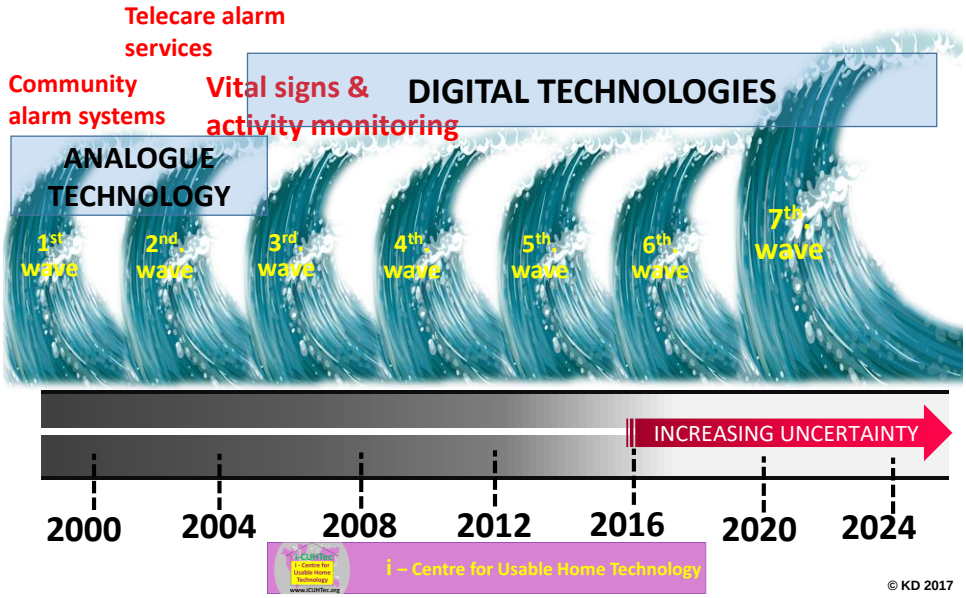

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Telemonitoring of Vital Signs

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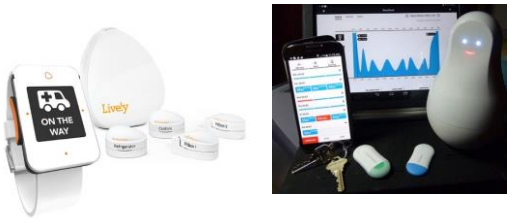
Activity Monitoring Systems

- Systems such as Just Checking and Canary can be installed in minutes to enable room and door activities to be recorded and viewed remotely over the Internet.
- Other systems such as Lively, Sense and 3 Rings use smaller sensors that can detect specific actions enabling alerts to be generated if routine tasks are not performed on time.



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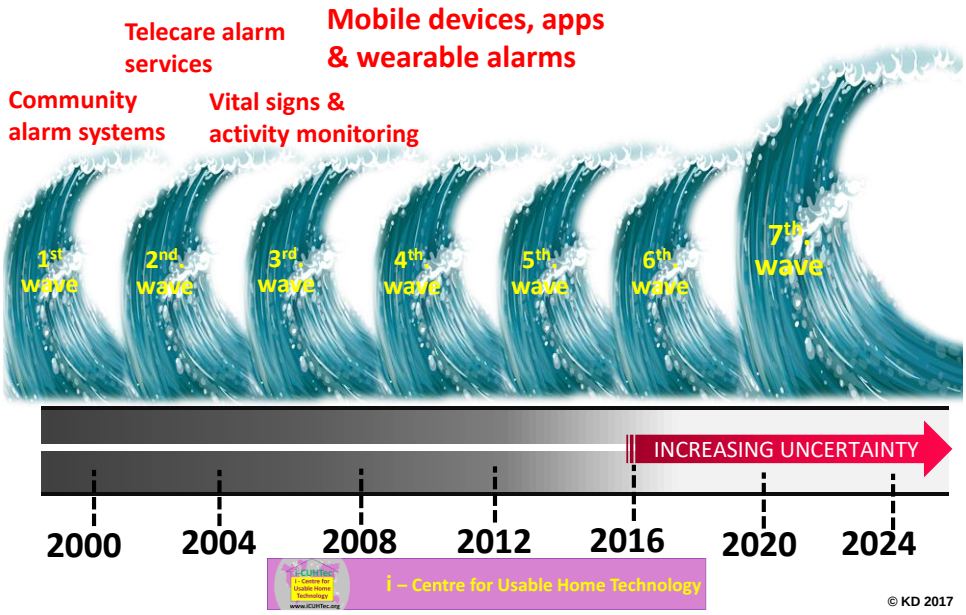

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GPS Devices to Find People

- Latest GPS devices also provide:
  - Fall detection alerts
  - Geofence breach alerts
  - High speed travel alerts
  - Lack of movement alerts
- They can be used by:
  - Children, lone workers, people at risk of getting lost & care staff
    - People who carry a phone
    - People who wear a watch
    - People who carry a key ring or bag (or in pocket)

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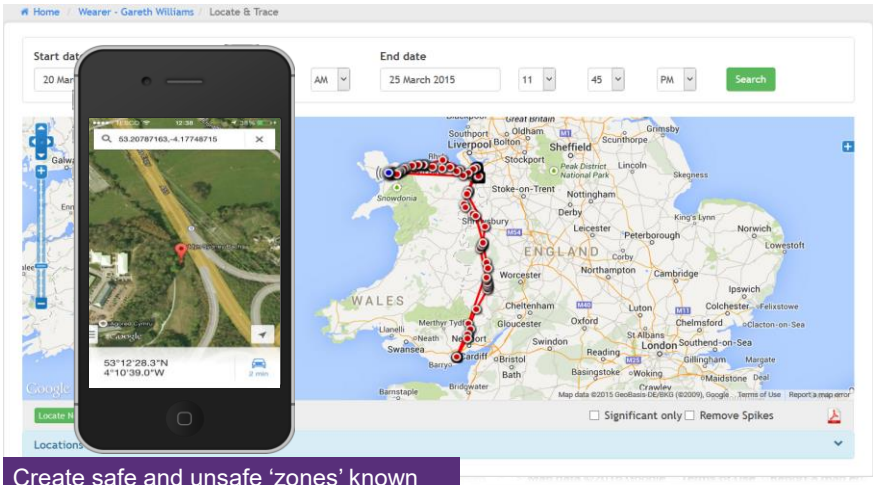
GPS in Practice



Create safe and unsafe 'zones' known as 'geofences'

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Other GPS Wearables

- Invisible: the discreet and comfortable insoles cannot be spotted or interfered with.
- Discrete monitoring: the person is only tracked when they leave a pre-defined geo-zone that is deemed to be safe, such as the garden or street.
- Personalised updates: choose the alert frequency (e.g., 5-min, 10-min, 1 hour), share the monitoring portal with multiple family members or carers and generate reports as and when you need them.

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Smartphones – We will all have one!

Features	Sensors, actuators and connectivity
Powerful processors	Microphone
Large touch-screen colour display	High quality audio
Large memory and storage capacity	Accelerometers
Telephone and text-messaging	GPS and GSM location
Versatile apps	Magnetometer
In-App notifications and messaging	Temperature
Familiar interface options	Camera(s)
Lightweight and always available	Vibration unit
Battery life improving	Bluetooth and Wi-Fi for connectivity
Contactless and touch ID	NFC and proximity sensor

Ideal platform for mCare and mHealth applications

Vulnerable people can now go out and feel protected!

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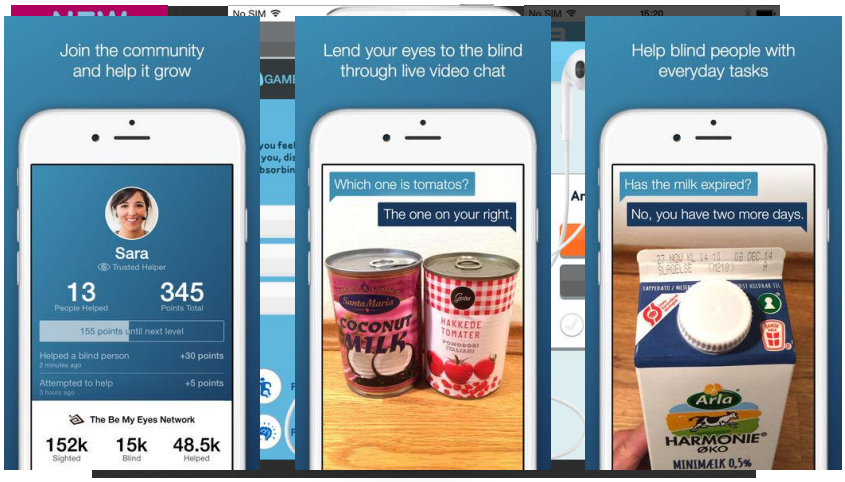
Health and well-being apps



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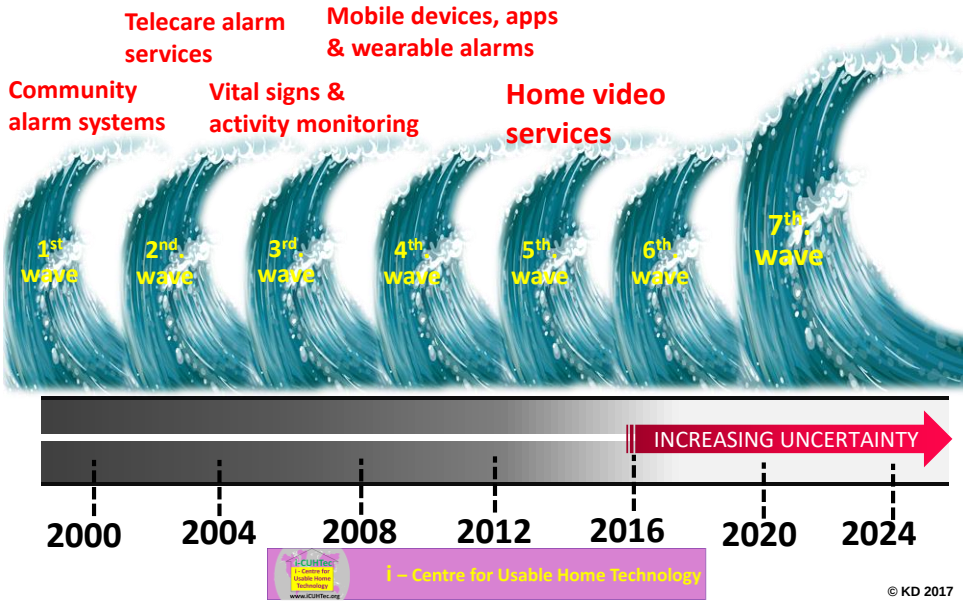

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The 5th wave – Video-based Services

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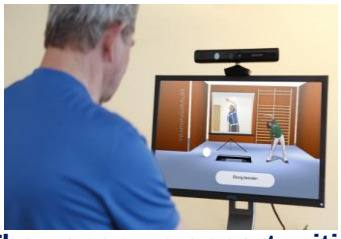
Home & Virtual Therapy Services



Gaming platforms such as Microsoft Xbox & Kinect, Nintendo Wii and Playstation

They open up opportunities for people who need physiotherapy, occupational or speech & language therapy to perform exercises and participate in observed competitions in their own homes

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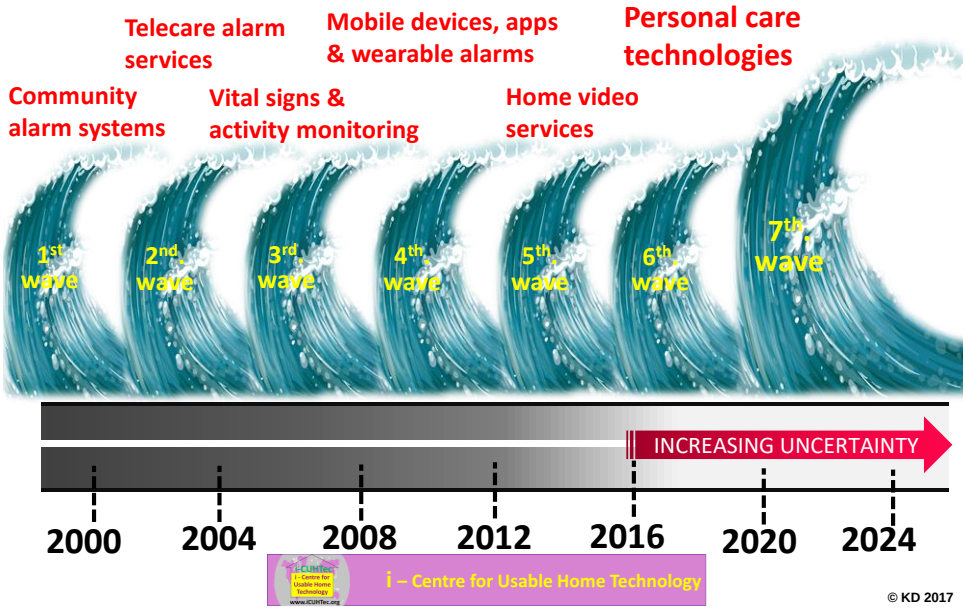

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Collecting Health & Well-being Data

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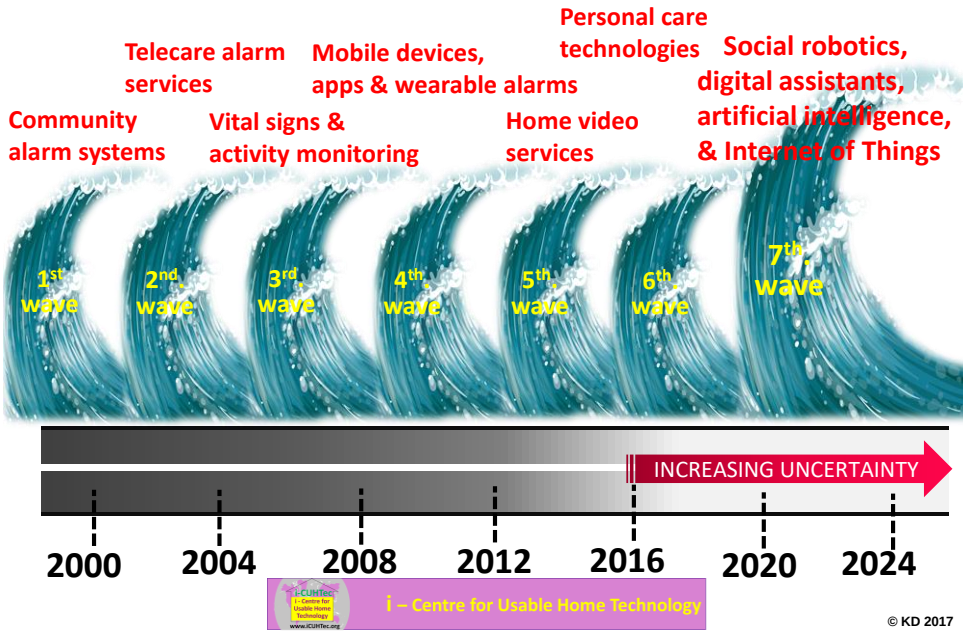

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Robotic Devices
- From Companions to Butlers!

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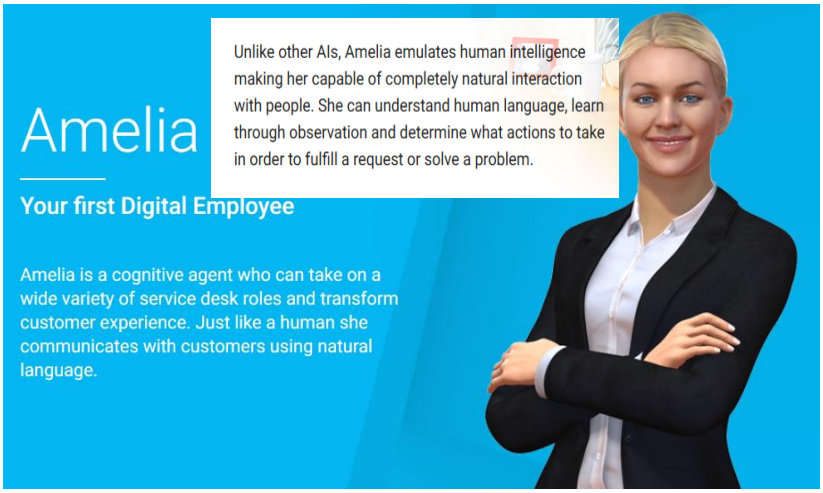
Personal Assistants & Chatbots



Amelia works for Enfield Council, answering telephone questions.
She can answers many calls at the same time – so no capacity issues.

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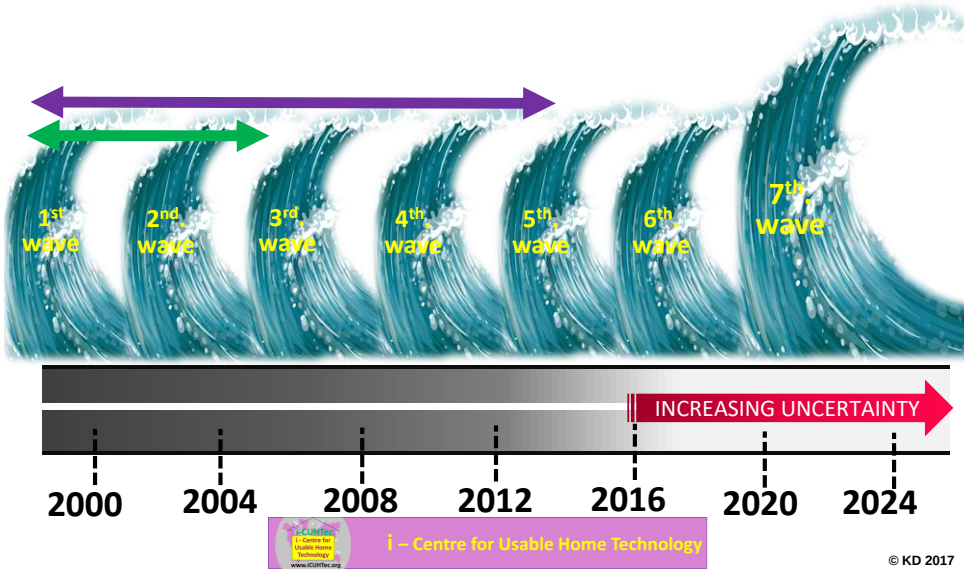
Where Are We on the Journey?

HOUSING



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WISER Homes

Smart assistive technologies can make a home WISER:

- **W**atchful – able to monitor activities & well-being of individual
- **I**ntelligent (and Informed) – able to recognise problems & take action
- **S**afe (and Secure) – able to prevent accidents and crime
- **E**mpowering – support individual to participate in events & tasks
- **R**esponsive – quick to react sympathetically to changing circumstances or need.

All properties for older or disabled people in Cumbria could become WISER Homes (but when?)

A big IoT application?

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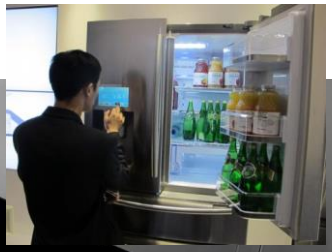
WISER Homes



Personalised menu suggestion based on activity levels and bio data

Cooking suggestions and recipes from celebrity chefs online using ingredients in the smart fridge

All food is automatically ordered by the smart fridge, using local sources

Smart Kitchen – Technology all interconnected

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WISER Homes

- Prompts on medication
- Remote urine analysis
- Monitoring of pallor and skin blemishes
- Display of vital signs and hydration advice for the weather
- Messages for the day

Smart Bathroom – Technology all interconnected

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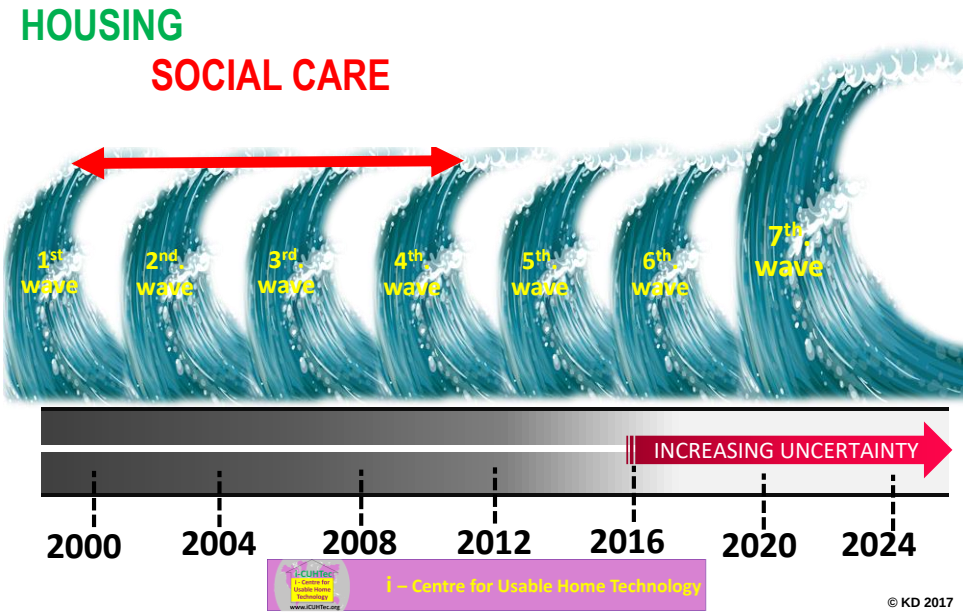
Where Are We on the Journey?



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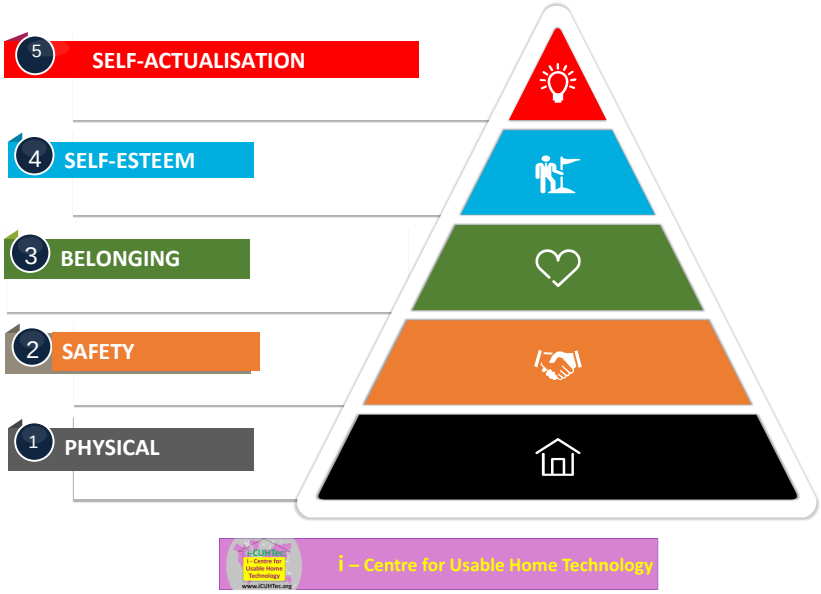
Maslow's Hierarchy of Needs



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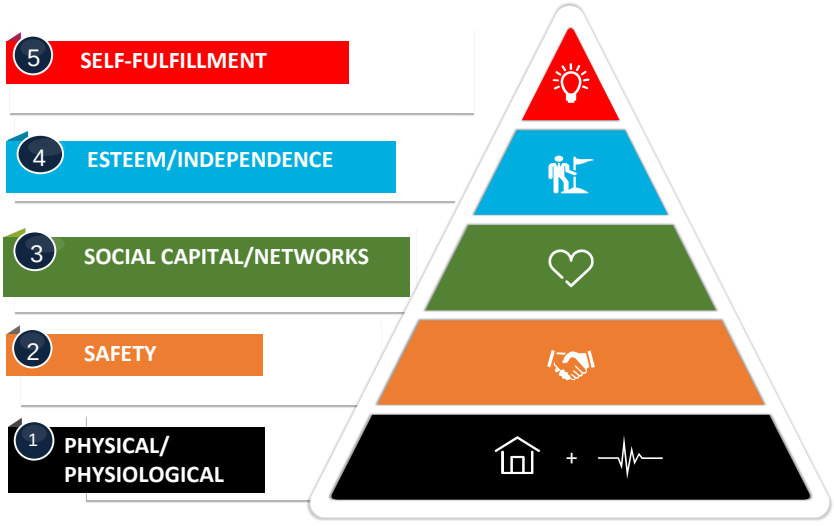
Hierarchy of TEC@Home Needs



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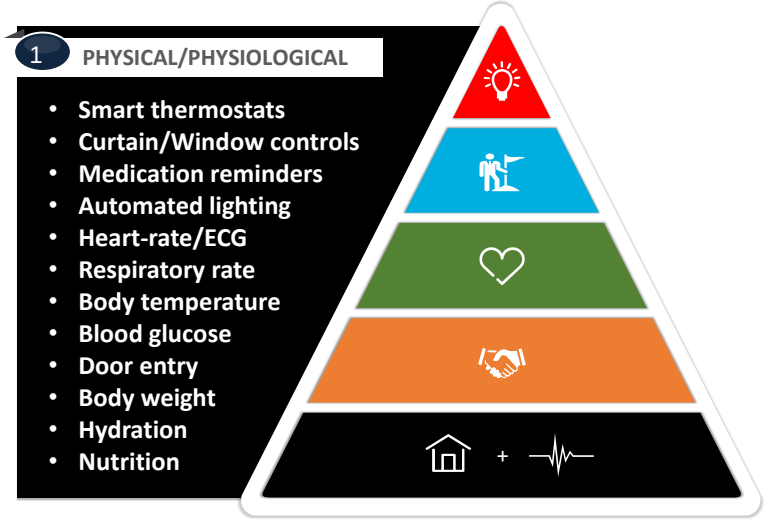

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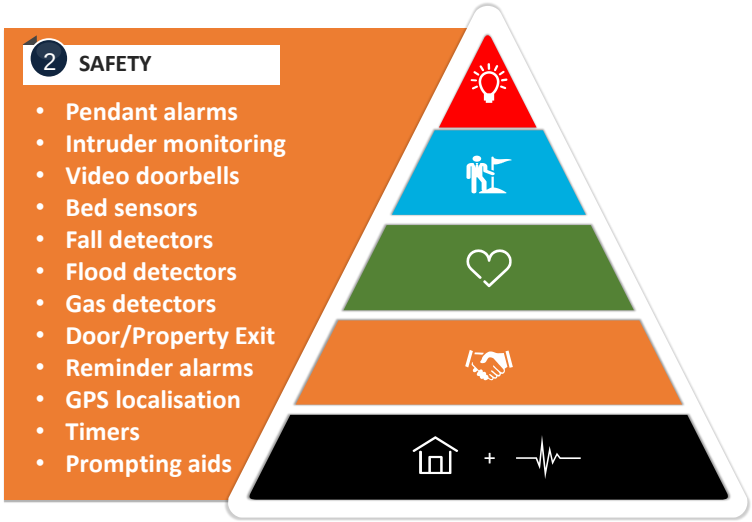
Hierarchy of TEC@Home Needs



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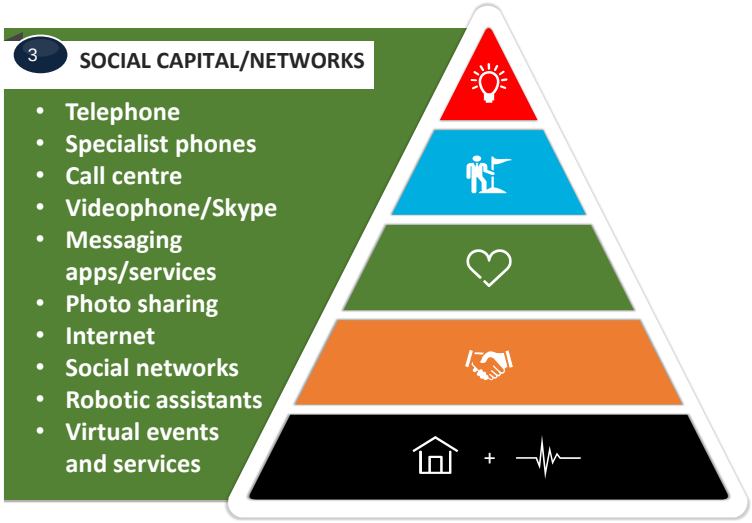
Hierarchy of TEC@Home Needs



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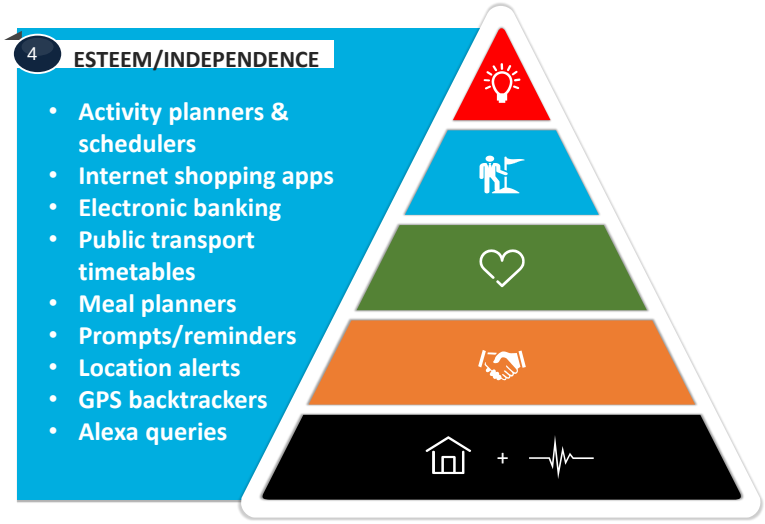

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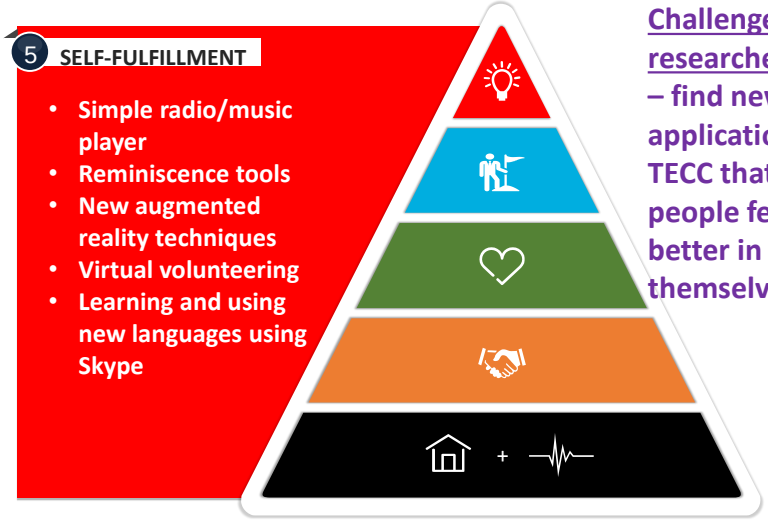

Challenge for researchers – find new applications of TECC that make people feel better in themselves

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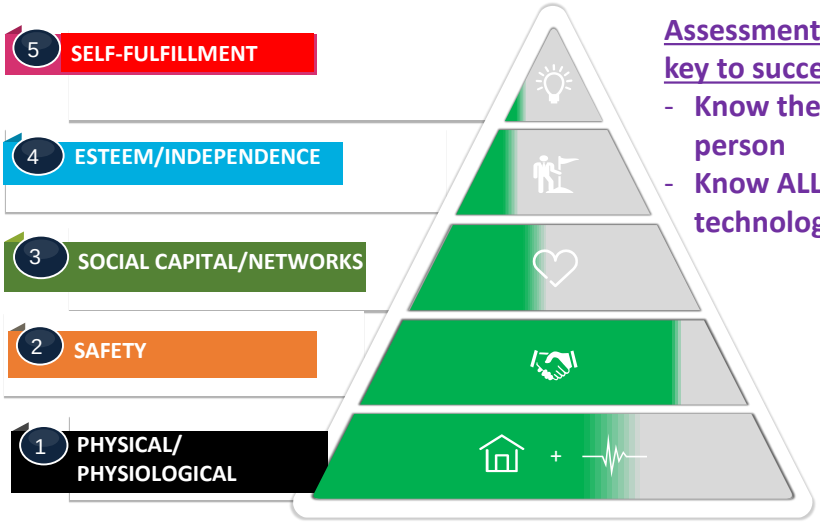
Hierarchy of TEC@Home Needs



Assessment is key to success

- Know the person
- Know ALL the technology

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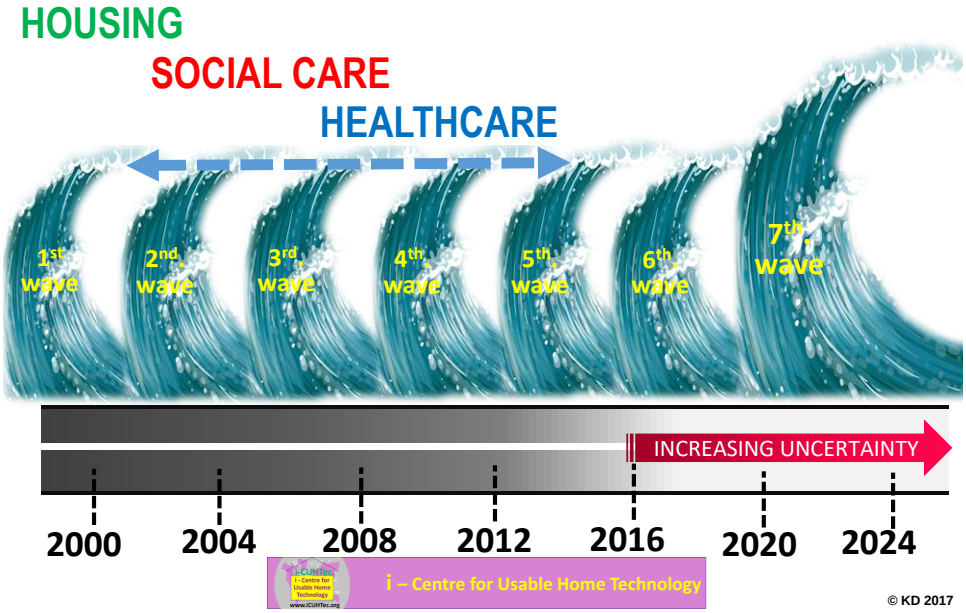
Where Are We on the Journey?



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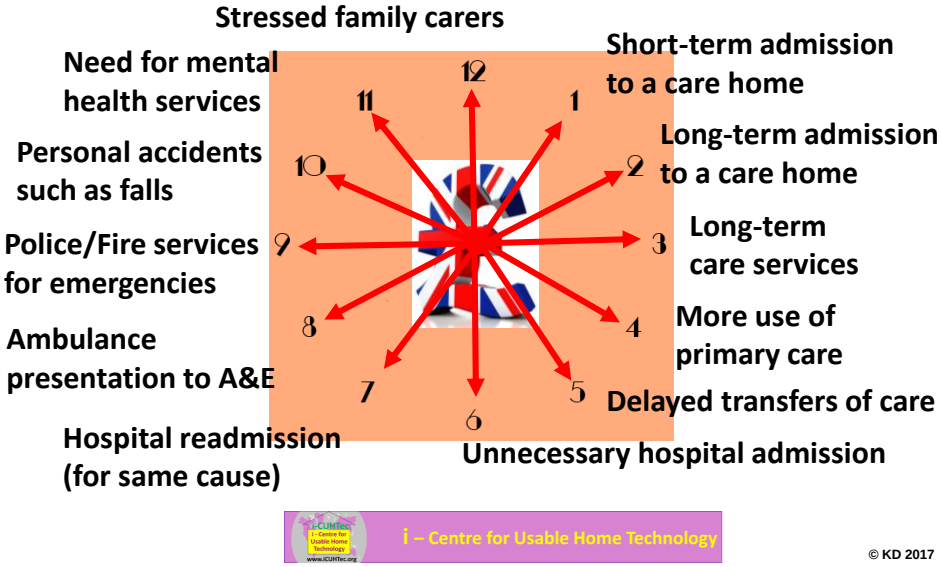
The Better Care Fund, and the TEC@Home Savings Clock – Avoidance Objectives



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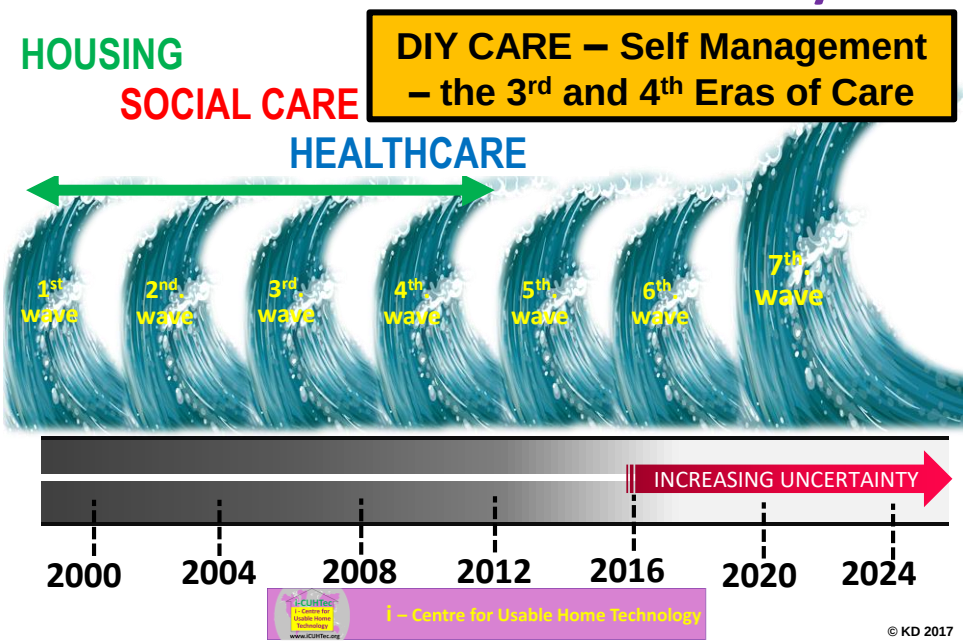

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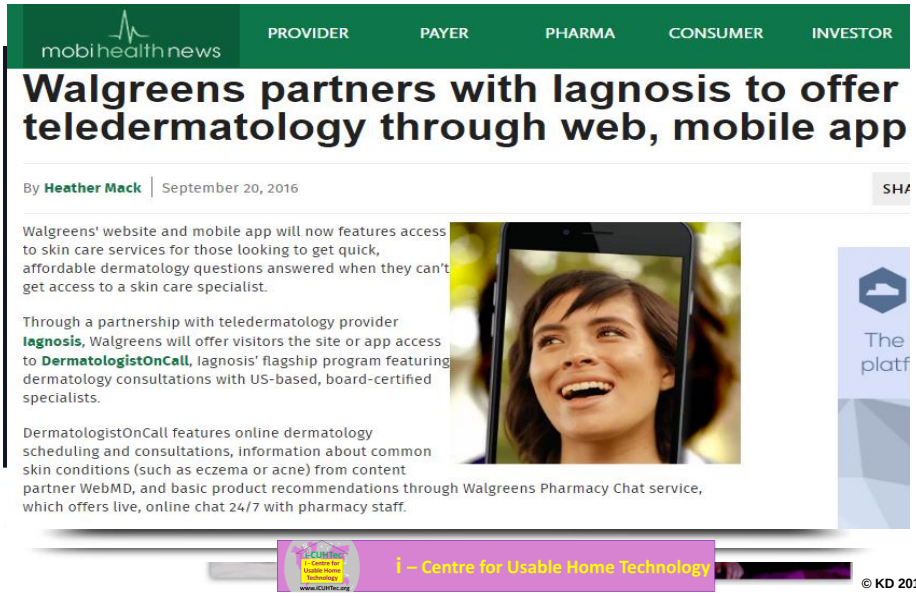
The DIY Care & Support Market
– Personal Budgets



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Independent TEC@Home Information

- The Vivo Guide from the Liverpool *dallas* project supports users to find their own TEC@Home solutions (and services)
- Vivo Pro helps health & social care staff to find tried and test products to advise patients to buy and use, sharing opinions of solutions
- It provides the basis of self-assessment using the principles of the New Care Act

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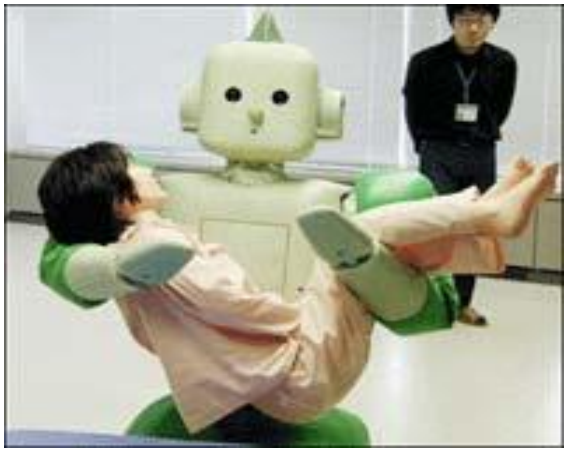
Finally - Where Do We Draw the Line?

Japanese bathing system for older people



RI-MAN robot is equipped with sensors that show a body's weight, position smell!

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Thank you for your attention

For more information, or for copies of slides or other papers on which this presentation has been based, please contact me:

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icuhtec.org