



i – Centre for Usable Home Technology

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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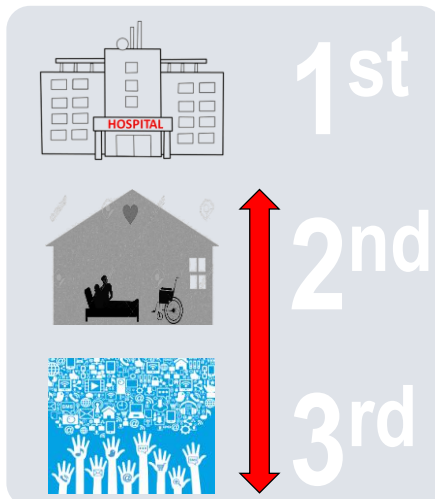


Person focussed (3rd Era)

Use of technology to support health, well-being and independence, and to avoid the need for long-term care



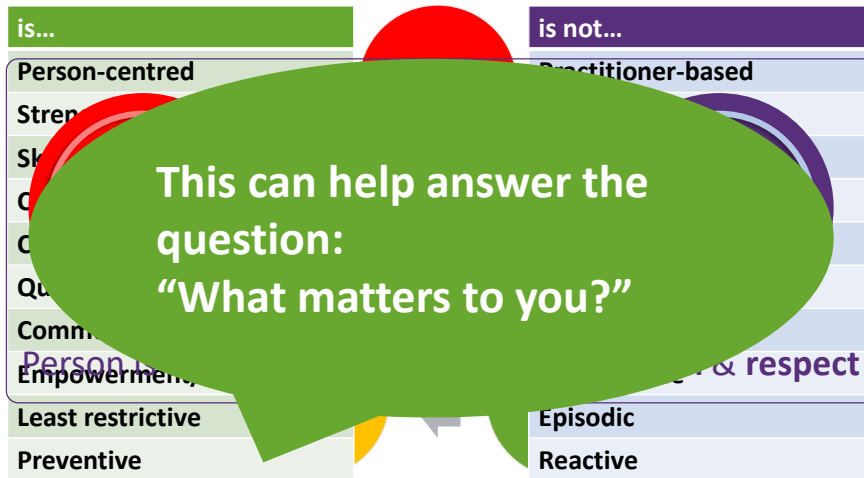
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This is a transition – ALWAYS difficult to achieve – it involves a change in culture

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Person-Centred Care



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Cybercare (4th. Era)

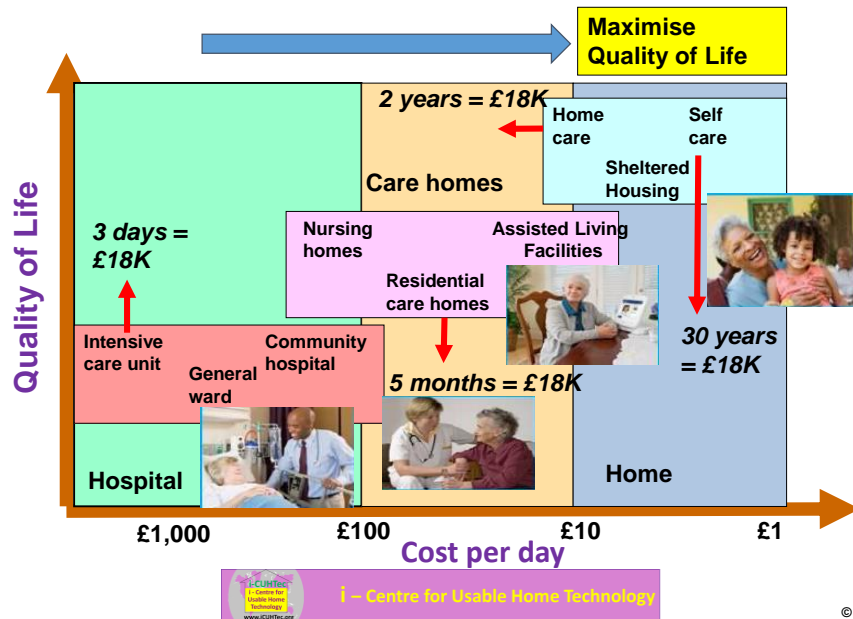
Use of new intelligent systems and data to support self-care and DIY healthcare; to improve Quality of Life and well-being



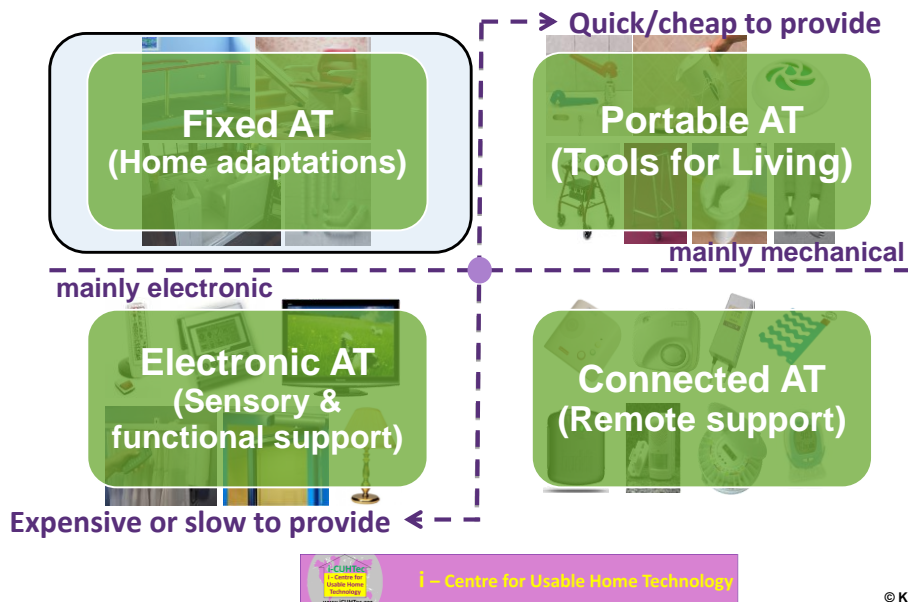
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The Cost of Care



Assistive Technologies



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

		
22%	24%	15%
		
Instant water boiler £39.99	Video intercom £99.99	Glass-sided toaster £49.99



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Assistive Technologies

Fixed AT
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Sensory & Functional A.T.

- Activity support
- Prosthetics



Sensory & Functional A.T.

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



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



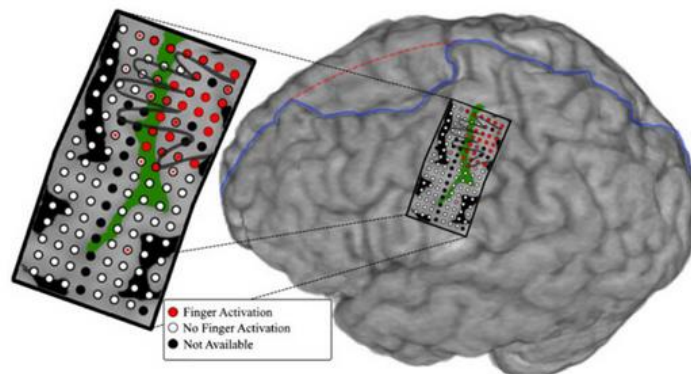
The Honda Assist system straps on over the hips and legs, giving a mechanical boost to frail people who have reduced muscle strength. It can help someone to get upstairs without relying on a stairlift



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Mind-controlled Prosthetic Allows Movement of Individual Fingers



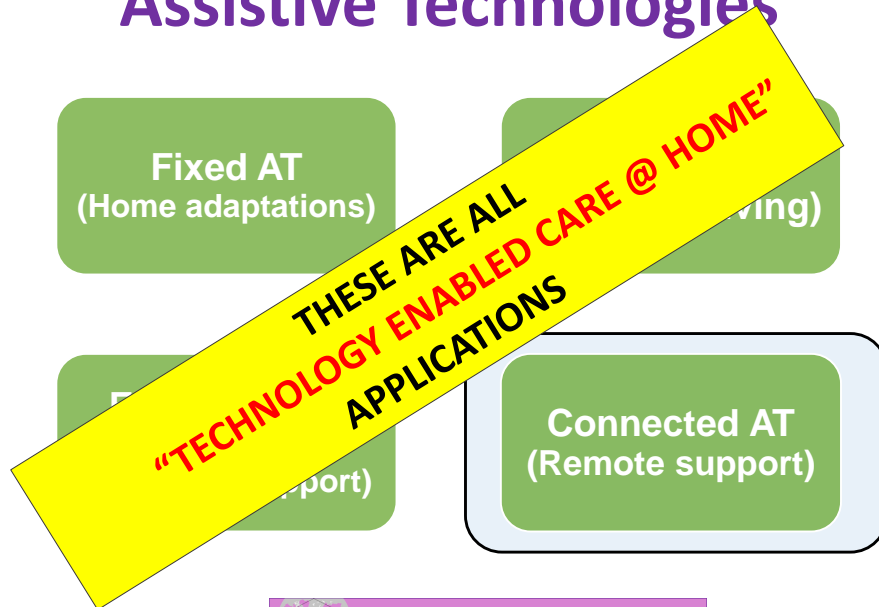
The fingers of a prosthetic limb could be controlled by thought with 76% accuracy. This could be boosted to 88% by grouping the ring and pinkie fingers together



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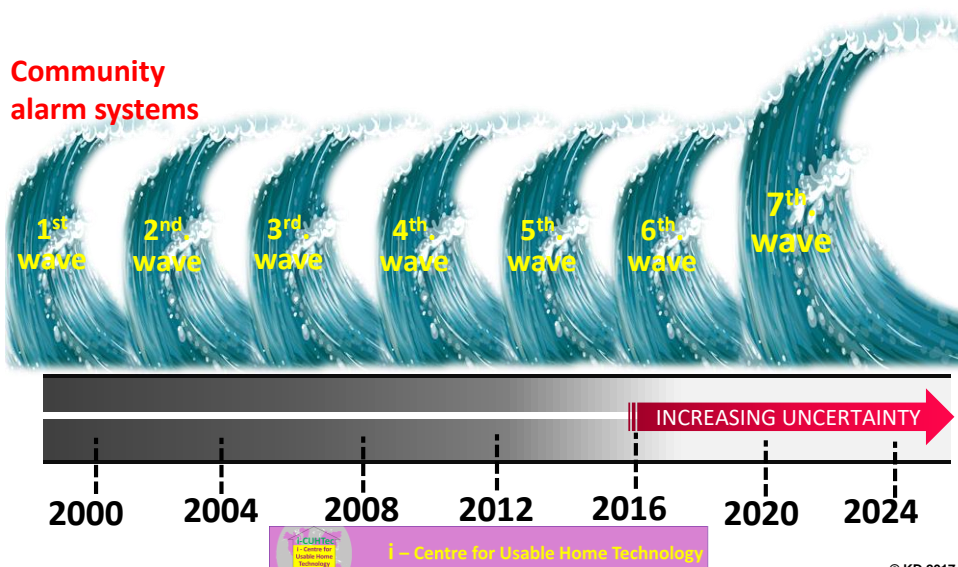
Assistive Technologies



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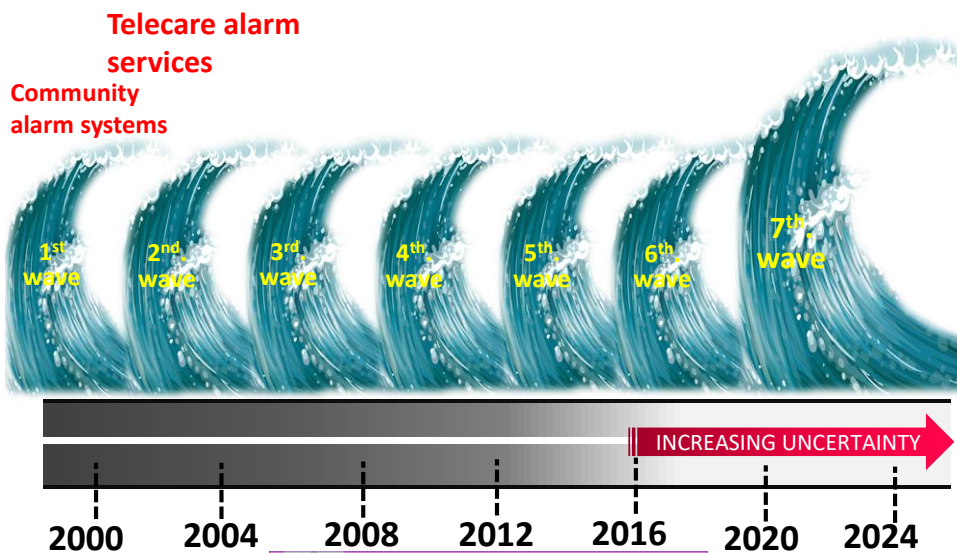
Community Alarm Systems

Sometimes known as a 'button & a box' approach



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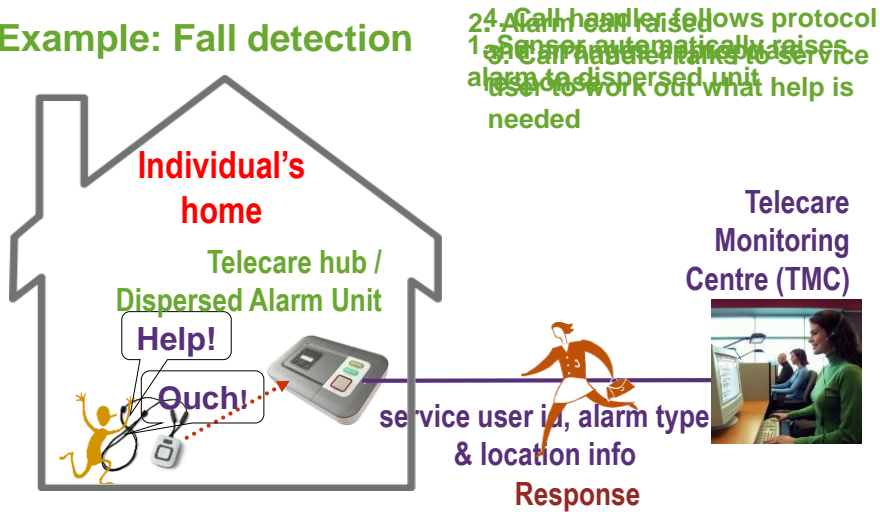
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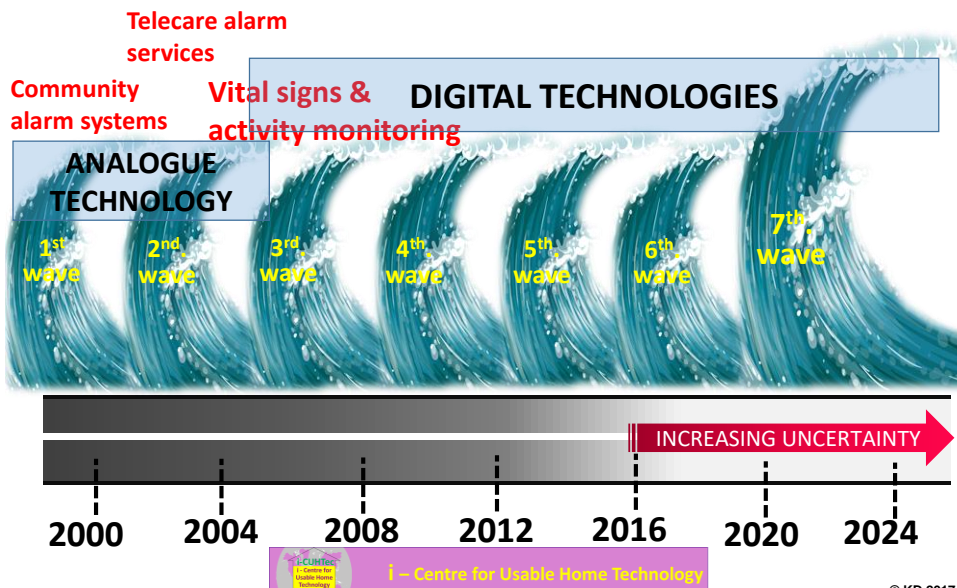
How alarm-based telecare works

Example: Fall detection



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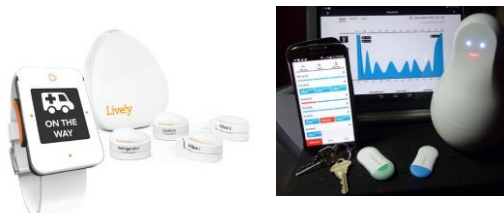
Telemonitoring of Vital Signs



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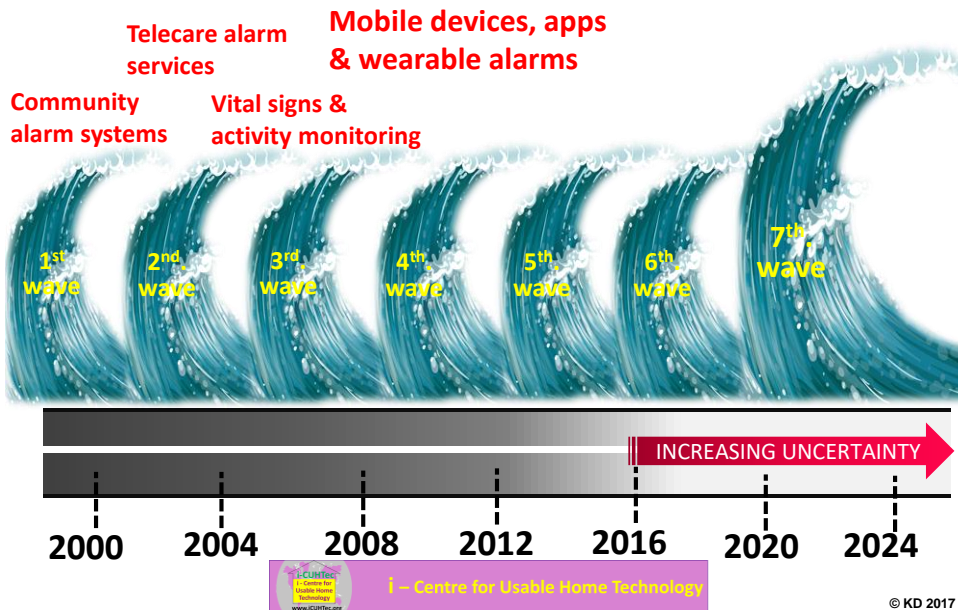
Activity Monitoring Systems

- 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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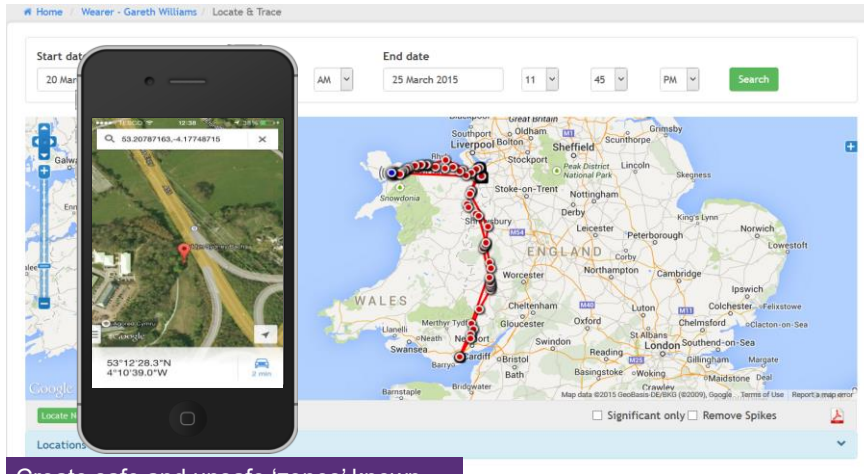


GPS Devices to Find People

- 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



GPS in Practice



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



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Other GPS Wearables

GPS Smart Sole
satellite monitoring and real-time tracking



- **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!

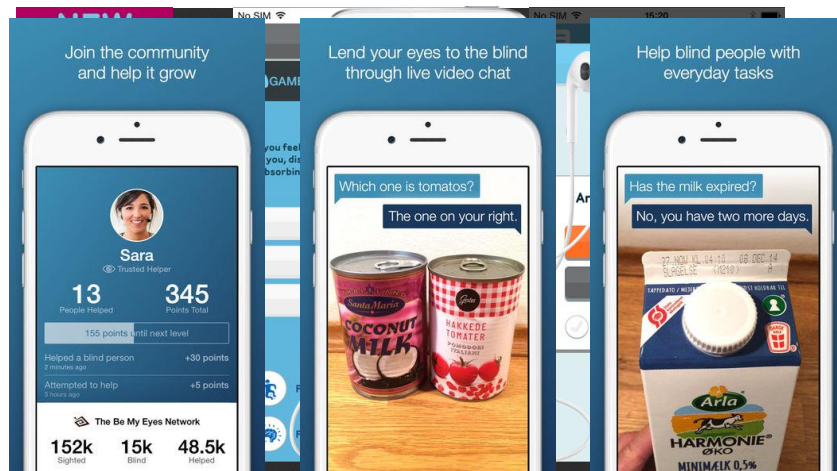
Features	Sensors, actuators and connectivity
Powerful processors	Microphone
Large touch-screen colour display	High quality audio
Large memory and storage capacity	Accelerometers
Telephone and text-messaging	GPS and GSM location
Versatile apps	Magnetometer
In-App notifications and messaging	Temperature
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!



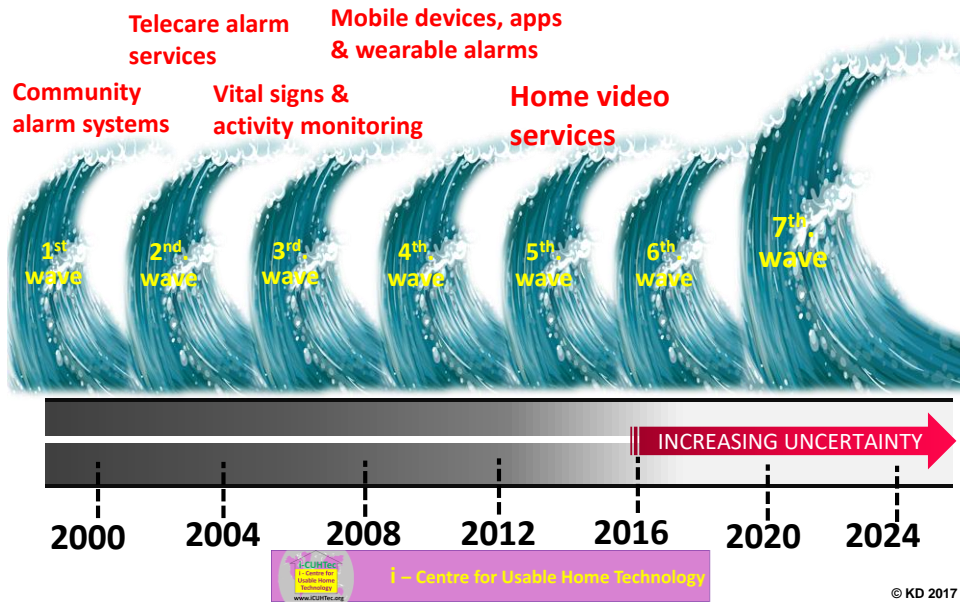
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Health and well-being apps



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The 5th wave – Video-based Services



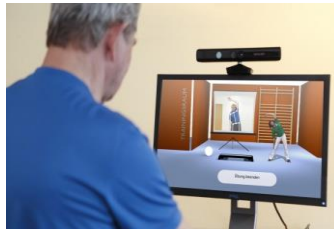
Home & Virtual Therapy Services



San Diego-based Reflexion Health is developing physical therapy rehabilitation tools that can be used by patients to do their physical therapy at home, and receive guidance between physical therapy visits.



Kinect App



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

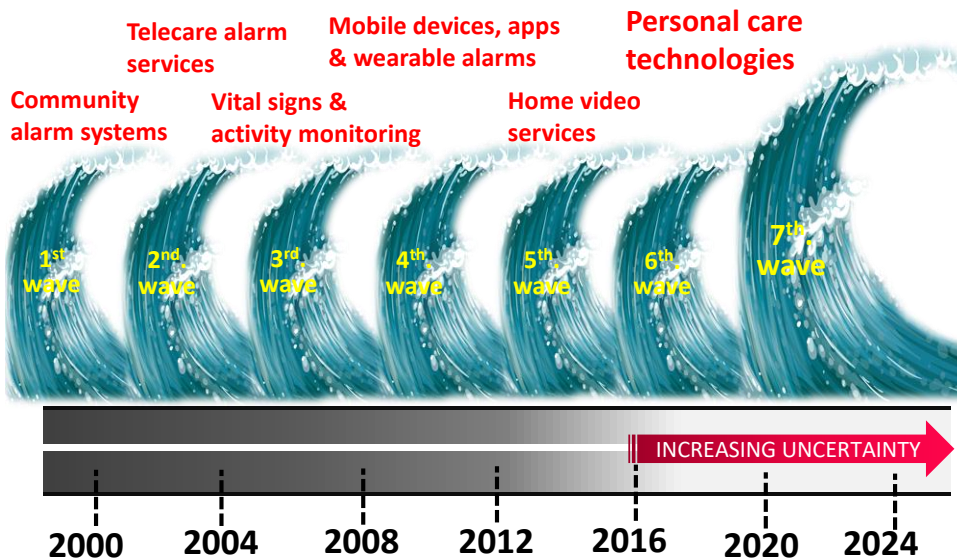
They open up opportunities for people who need physiotherapy, occupational or speech & language therapy to perform exercises and participate in observed competitions in their own homes



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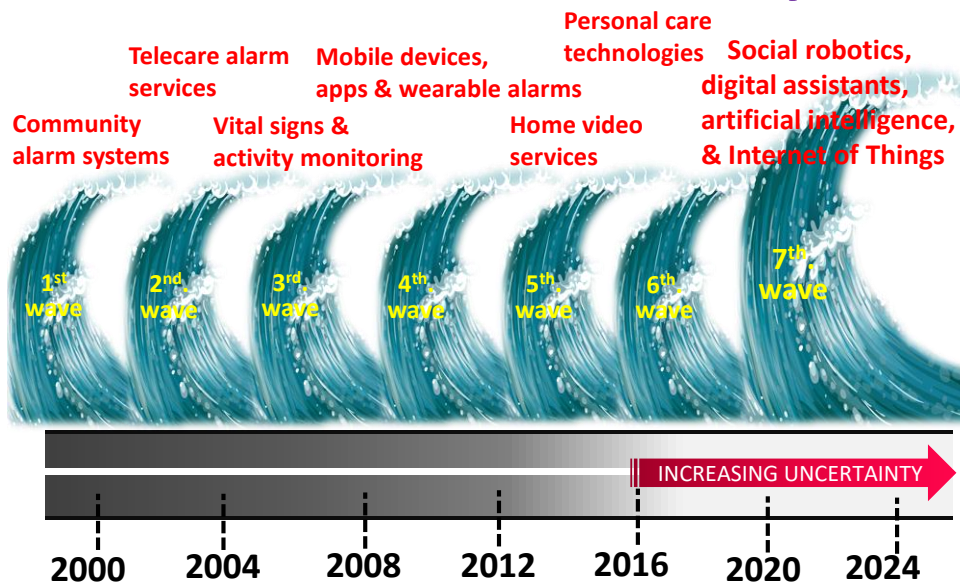
Collecting Health & Well-being Data



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Robotic Devices

- From Companions to Butlers!



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Personal Assistants & Chatbots

Amelia

Your first Digital Employee

Amelia is a cognitive agent who can take on a wide variety of service desk roles and transform customer experience. Just like a human she communicates with customers using natural language.

Unlike other AIs, Amelia emulates human intelligence making her capable of completely natural interaction with people. She can understand human language, learn through observation and determine what actions to take in order to fulfill a request or solve a problem.

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

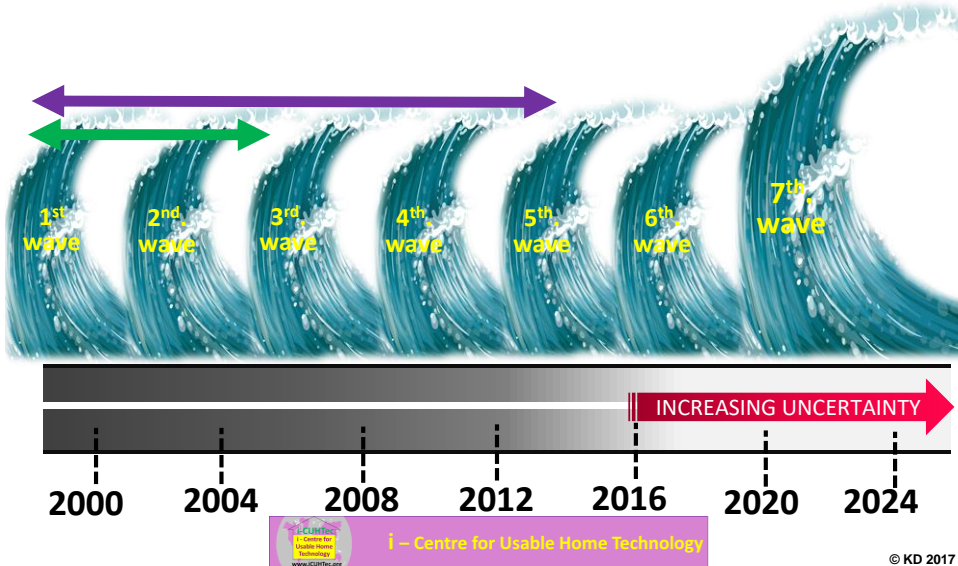


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Where Are We on the Journey?

HOUSING



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



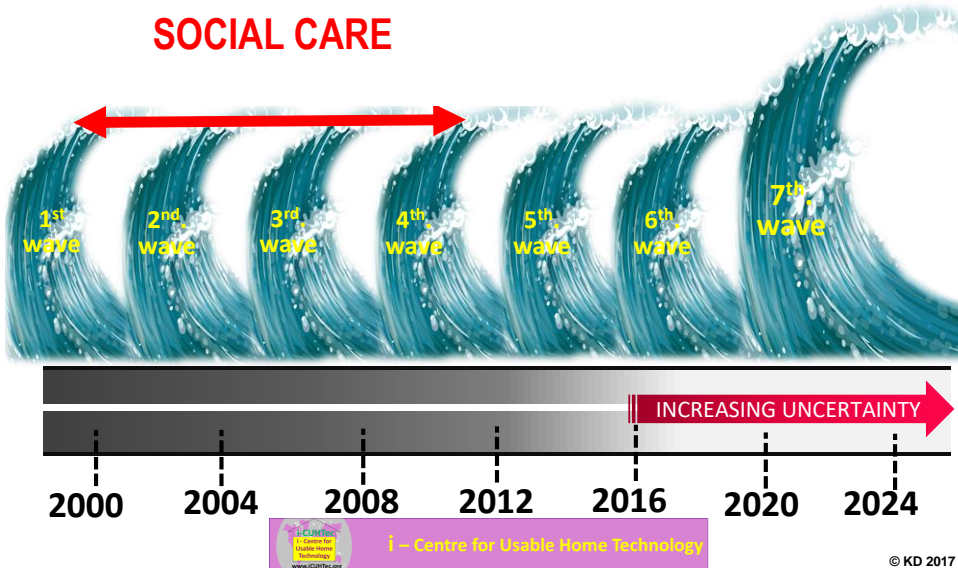
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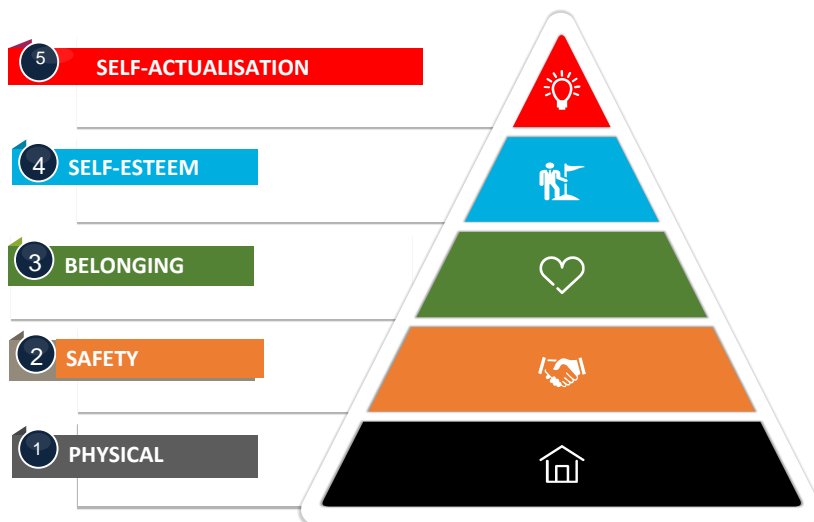
Where Are We on the Journey?

HOUSING

SOCIAL CARE



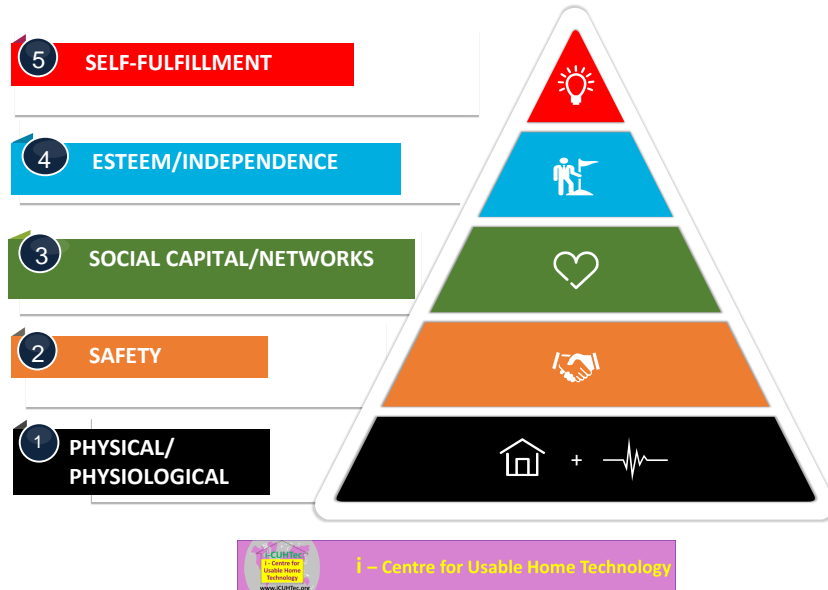
Maslow's Hierarchy of Needs



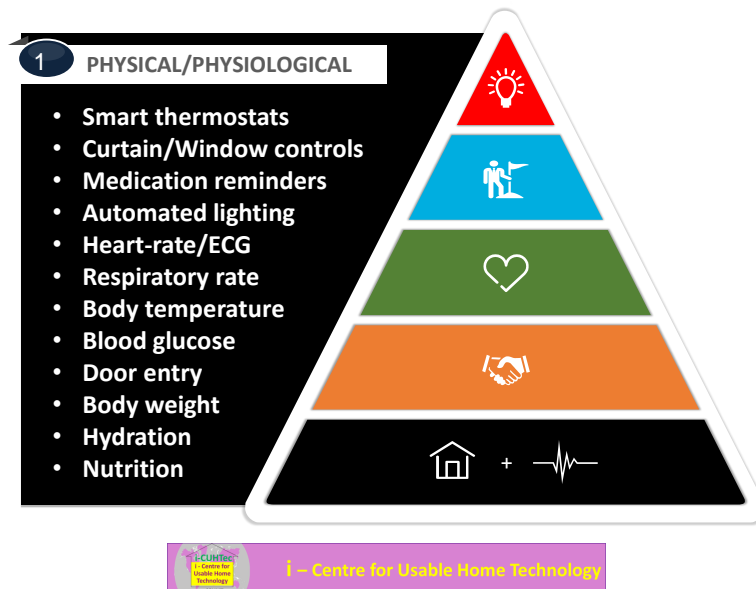
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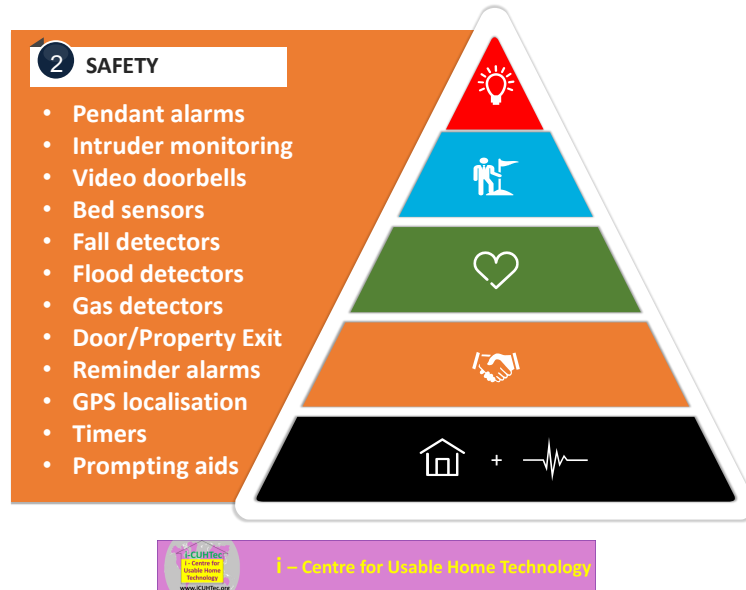
Hierarchy of TEC@Home Needs



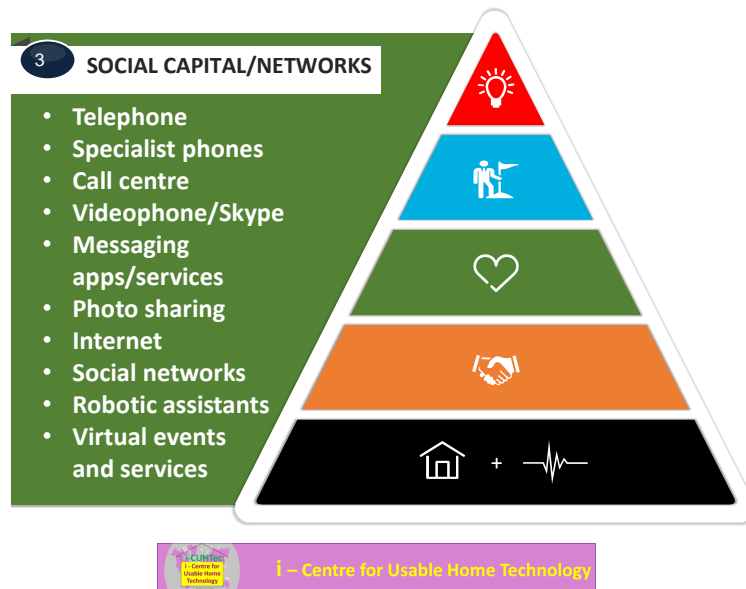
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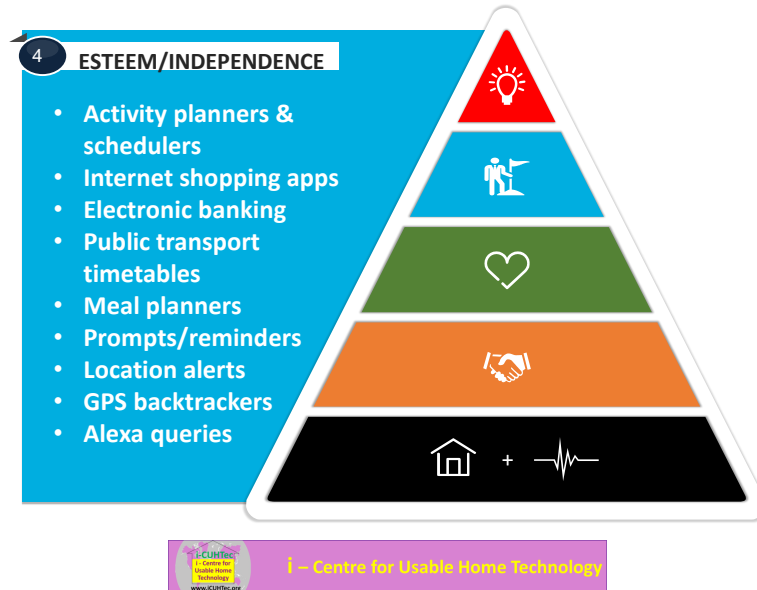
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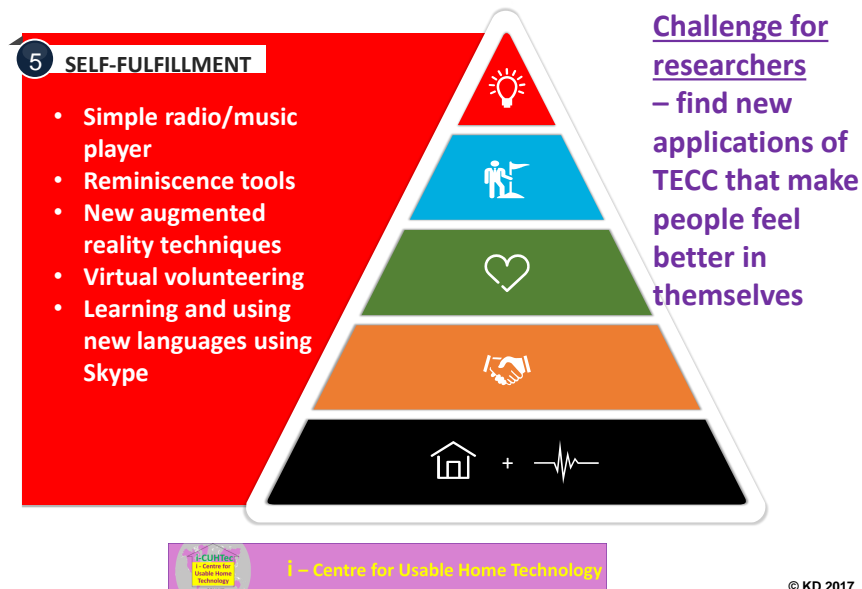
Hierarchy of TEC@Home Needs



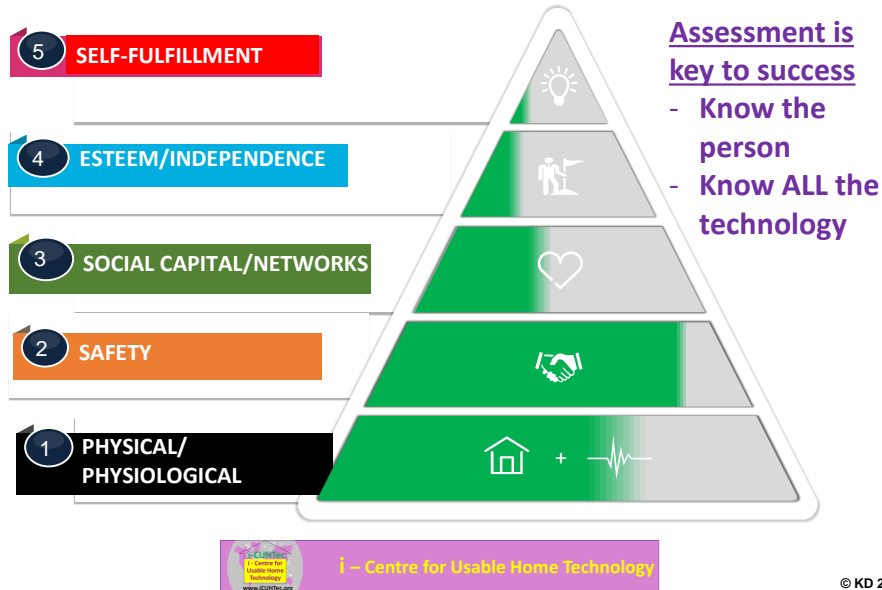
Hierarchy of TEC@Home Needs



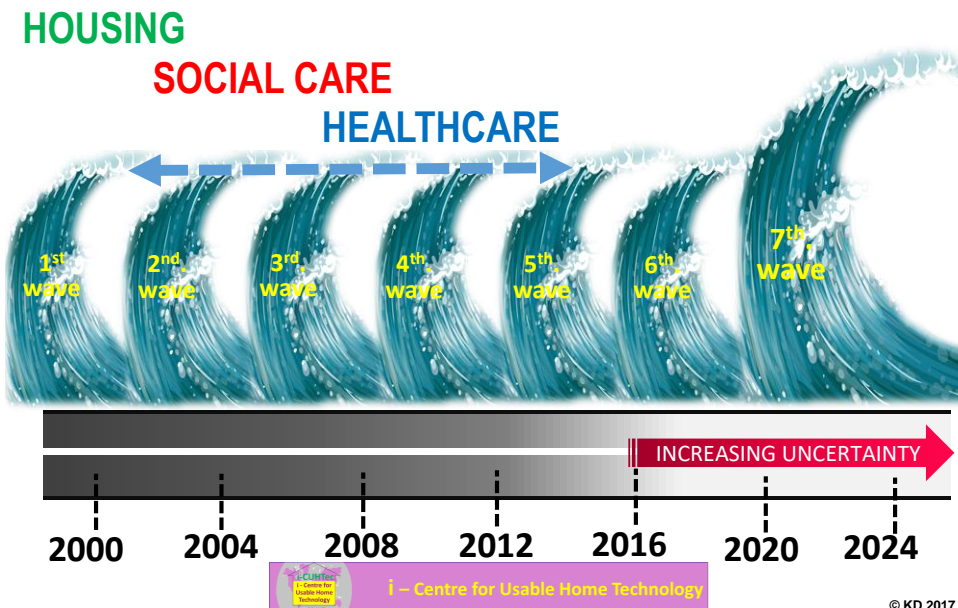
Hierarchy of TEC@Home Needs



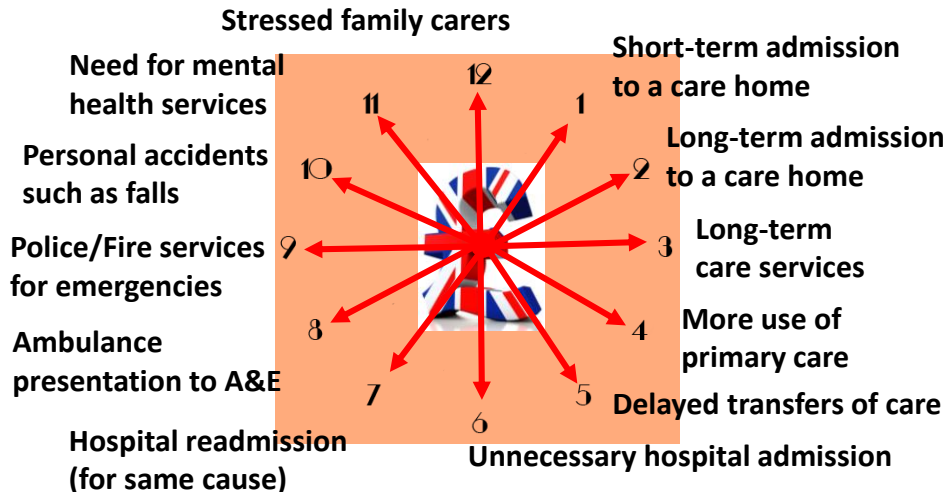
Hierarchy of TEC@Home Needs



Where Are We on the Journey?



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



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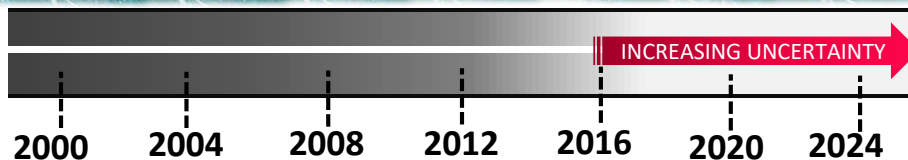
Where Are We on the Journey?

HOUSING

SOCIAL CARE

HEALTHCARE

DIY CARE – Self Management
– the 3rd and 4th Eras of Care



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The DIY Care & Support Market – Personal Budgets

mobihealthnews PROVIDER PAYER PHARMA CONSUMER INVESTOR

Walgreens partners with Iagnosis to offer teledermatology through web, mobile app

By **Heather Mack** | September 20, 2016

Walgreens' website and mobile app will now features access to skin care services for those looking to get quick, affordable dermatology questions answered when they can't get access to a skin care specialist.

Through a partnership with teledermatology provider **Iagnosis**, Walgreens will offer visitors the site or app access to **DermatologistOnCall**, Iagnosis' flagship program featuring dermatology consultations with US-based, board-certified specialists.

DermatologistOnCall features online dermatology scheduling and consultations, information about common skin conditions (such as eczema or acne) from content partner WebMD, and basic product recommendations through Walgreens Pharmacy Chat service, which offers live, online chat 24/7 with pharmacy staff.

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Independent TEC@Home Information

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Find your CONDITIONS
Dementia, Learning Difficulties, Diabetes, Stroke, Physical Difficulties

Browse by ISSUES
Home Security, Getting Lost, Poor Balance, Medication, Poor Memory, Management

View all PRODUCTS

- 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

Clippasafe Socket Protector by Clippasafe

iVi Fall Detector Pendant by Tunstall

Pill Dispenser by Chubb

Cooker Guard by STT Condis

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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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