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Outputs from the project

The project will run for three years but these outputs are for the first year only.

Sensors: existing sensors from partner BeWell Innovations that are already in commercial use for people at home have data automatically input to GRaCE-AGE (2016).

GRaCE-AGE web-based software system that connects older adults to family/friends/clinical services with an enhanced interface for older adults and their carers.

Discharge planning: provide validated risk predictions at the point of discharge with automated alerts if risks go beyond predetermined thresholds after discharge.

Risk and safety ontology: current GRiST ontology extended to encapsulate generic community health and lifestyle information relevant to GRaCE-AGE.

Health informatics and care in the community module specified.

ATHENS (Advanced Technology Higher Education Network/SOCRATES) session specified and advertised.

Internships and placements: Internships and placements for students with industrial collaborators of GRaCE-AGE.

Continuing Professional Development training for health professionals.

GRaCE-AGE EIT Health Project is up and running

The natural ageing process means independent daily living may become more difficult as mental and physical health problems arise. Increasing life expectancies inevitably mean this situation is becoming more common and GRaCE-AGE was proposed specifically to address it. The aim is to keep people at home, where they belong, in familiar surroundings and with the people they know.



GRaCE-AGE is a project running within the EIT Health Knowledge Innovation Community (KIC) funded by the European Union. It will develop the Galatean Risk and Safety Tool (GRiST) into an enhanced and extended system called GRaCE (Galatean Risk and Care Environment), with a version for older adults, GRaCE-AGE. It will be a sophisticated software system providing expertise directly to the older adults and their network of carers to ensure they are safe, secure, and thriving.

GRaCE-AGE will collate data supplied to it directly from the older adults or automatically from sensors they may be carrying or that are in their home environment. Its inbuilt expertise will help the older adults know whether any health or safety problems need addressing, what they need to do about them, and connect them to their care network to elicit help if this is the most appropriate course of action. Both the older adults and their carers will feel more confident about them living independently because any problems will come to light immediately and trigger the necessary responses.

GRaCE-AGE creates a Canopy of Care

GRaCE-AGE will be the nexus of a canopy of care that is not just about risks and health problems but will be a rewarding experience in itself, by helping people understand their circumstances better. Older adults will build up a valuable diary or body of knowledge that can be explored and presented in many different ways to help themselves and others know what things work and what should be avoided. It will be created from the interactive graphical “journeys” they can choose each day, each one exploring particular aspects of their lives that they feel are most relevant at that time. These journeys will detect problems that may need to be addressed and provide possible solutions that will gradually become tuned to the particular person’s situation as GRaCE-AGE learns what works and why.



The older adults will not be passive recipients of advice but will directly engage in generating and shaping it: the key is full participation and responsibility in maintaining mental, social, and physical health. GRaCE-AGE will be a life-enhancing and creative activity that is completely under the control of the older adults but also enables them to work collaboratively with people in their care network.

How can GRaCE-AGE improve older adult's mental health and wellbeing?

GRaCE-AGE is based on GRiST, a computer program containing mental-health risk and safety expertise that has been developed with clinicians and patients over a period of fifteen years. GRiST's cloud-computing service hosted by Aston University makes data securely available for online consultations at any time of the day or night from wherever the patient or doctor has internet access.

GRiST's expertise is grounded in the way it structures mental-health risk and safety knowledge to point people towards those issues of concern that relate to a particular individual's profile. GRaCE-AGE will build on the one million encapsulated clinical judgements covering suicide, self-harm, harm to others, vulnerability, and self neglect to provide its own accurate clinical evaluations and identify the most appropriate help. This will be used to connect people in the community to expert advice so that they are able to live safely and with

peace of mind. It also means clinical services can be more confident of providing the necessary care without having to remove people from their own homes, which is expensive and often unwelcome.

BeWell+
innovations

Sensors are on the market and being developed to pick up many types of

data in the home. The research strategy is to investigate how their outputs can be mapped to the GRaCE-AGE input questions and answers. The aim is to analyse data from one or more sensors, interpret them in the light of the questions used by assessors for evaluating safety and wellbeing, and generate functions that will simulate the answers assessors would give if they directly observed the person's behaviour.

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Sensors and their data

BeWell Innovations is supplying the project with medically validated sensors and Maastricht Instruments is helping develop new types of sensor.

1. KU Leuven have been researching audio sensors and are able to detect activities of daily living such as taps running, toilets flushing, cooking, cleaning, personal hygiene (baths or showers running) etc.
2. Movement sensors can detect how quickly a person is moving, which rooms are being used, whether a person is inactive for long periods of time.
3. Sleep sensors can detect the length of time a person is spending asleep, whether the patterns are changing, or how disturbed the sleep is.
4. Physiological sensors can detect blood pressure, heart rate, skin sweating, respiration, etc.

The idea is to pass data from sensors to functions that will convert them into GRaCE-AGE answers, which are currently supplied by human assessors:

1. there will be several sources of data for each answer;
2. the answers will simulate the judgement human assessors would make;
3. the expertise built into GRaCE-AGE will interpret the sensor data;
4. the system will provide round-the-clock monitoring of a person's mental health and wellbeing;
5. appropriate resources can be invoked automatically from the care network, but only when wanted and needed.

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GRaCE-AGE partners

1. *West Midlands Academic Health Science Network*, which includes:
 - (a) Aston University, which hosts the servers and will develop the software for GRaCE-AGE;
 - (b) Worcester Health and Care NHS Trust, who will be using the clinicians version of GRaCE throughout the trust;
 - (c) Coventry and Warwickshire Partnership NHS Trust, which will be piloting how well myGRaCE supports collaborative care for patients in the community;
2. *University of Leuven* has expertise in hardware and data processing, which enables the development of integrated sensing systems for enabling people to remain independent in their own homes. It also has a specialised "e-Media Lab" for research on interaction design, serious games, persuasive systems, gamification and physical interaction.
3. *BeWell Innovations* has expertise in diagnostic testing and tele-monitoring as well as providing software platforms that share information between providers and patients, as is the intention of GRaCE-AGE.
4. *Maastricht Instruments* has a more hardware orientation, with expertise in helping researchers design and deliver their ideas within products that can be commercialised.
5. *Galassify* is a small, very new company that will use its experience with end users and the current GRiST system to develop the requirements and support the pilots for GRaCE-AGE.

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