

Personal Assistant: Dementia

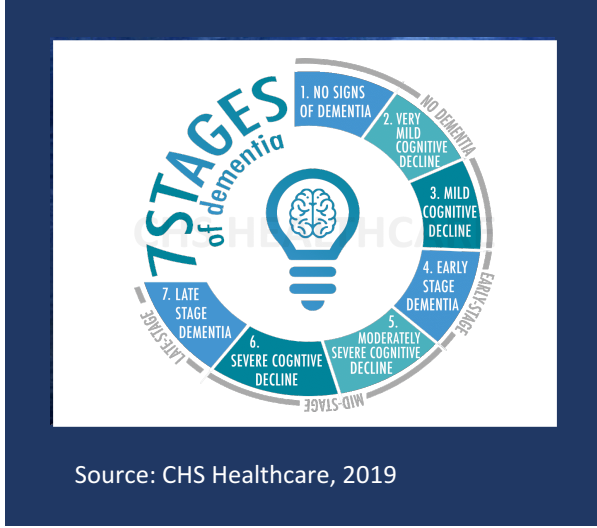
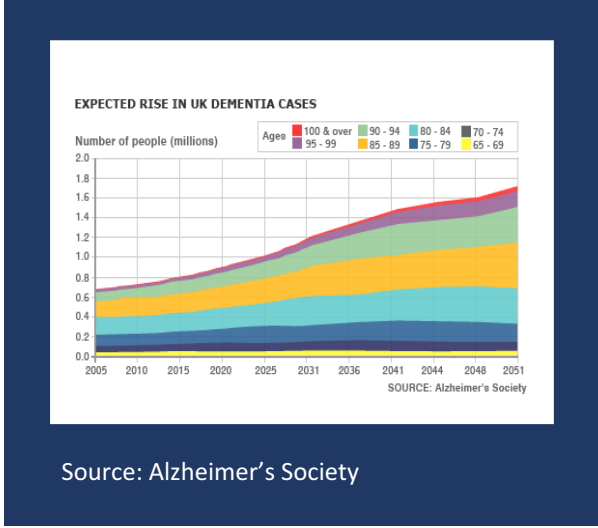
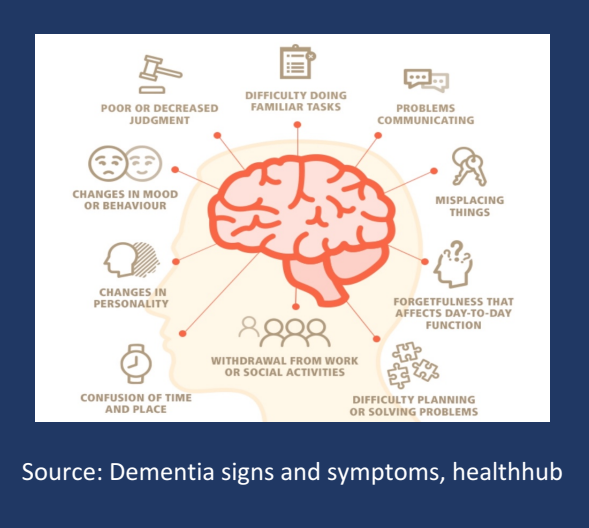
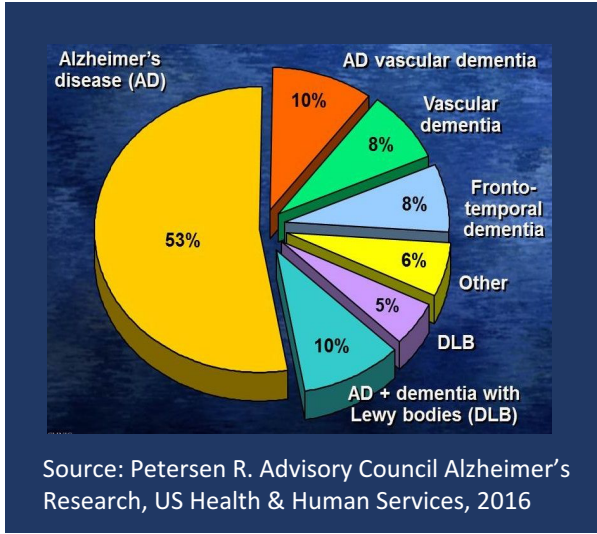
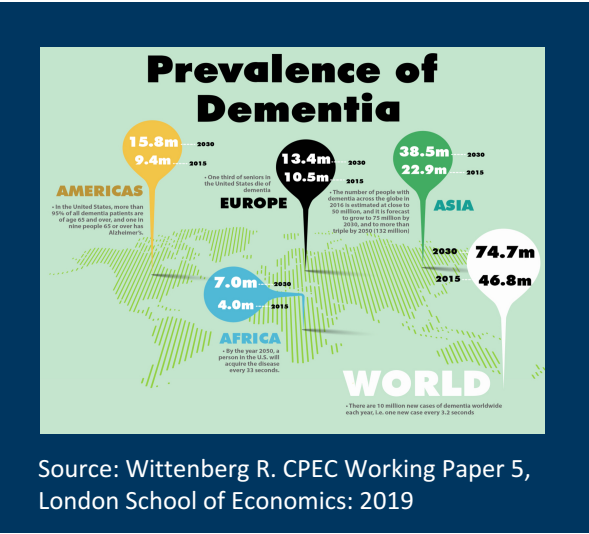
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Summary

Dementia is a progressive, largely irreversible, clinical condition, characterised by global deterioration in intellectual function, behaviour and personality¹. It affects almost one million people in the United Kingdom² and by 2050, 152 million global cases are expected³. Dementia is both devastating and costly, with current UK healthcare costs of £26 billion annually⁴ and expected global costs of \$2 trillion by 2030⁵. 66% of these are individual care costs⁶. My personal assistant for dementia (PAD), a smartphone or iPad digital application, provides a useful tool for individuals with early-stage dementia enhancing their positivity, wellbeing, confidence and independence.

Research Aims

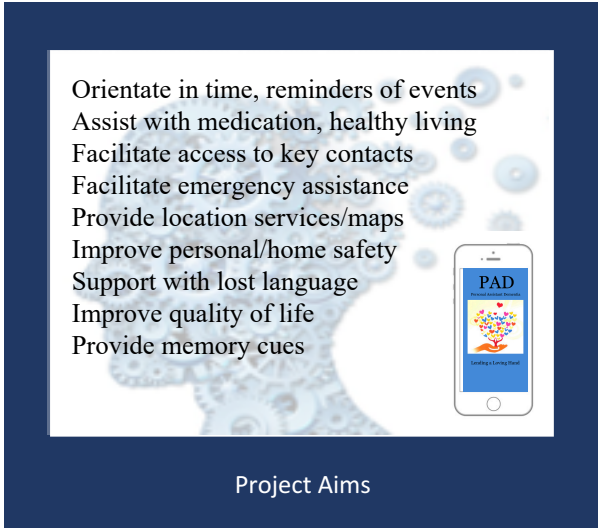
This study aims to explore the potential benefits and disadvantages of a digital smartphone or iPad personal assistant application for people with early-stage dementia. It explores the use of orientation screens, daily reminders, medication prompts, healthy eating, active living, well-being activities, brain training, lost language aids, map functions and memory screens on positivity, wellbeing, confidence and independence in individuals with early-stage dementia.



Epidemiology, Subtypes, Stages and Clinical Presentations of Dementia

Background Information

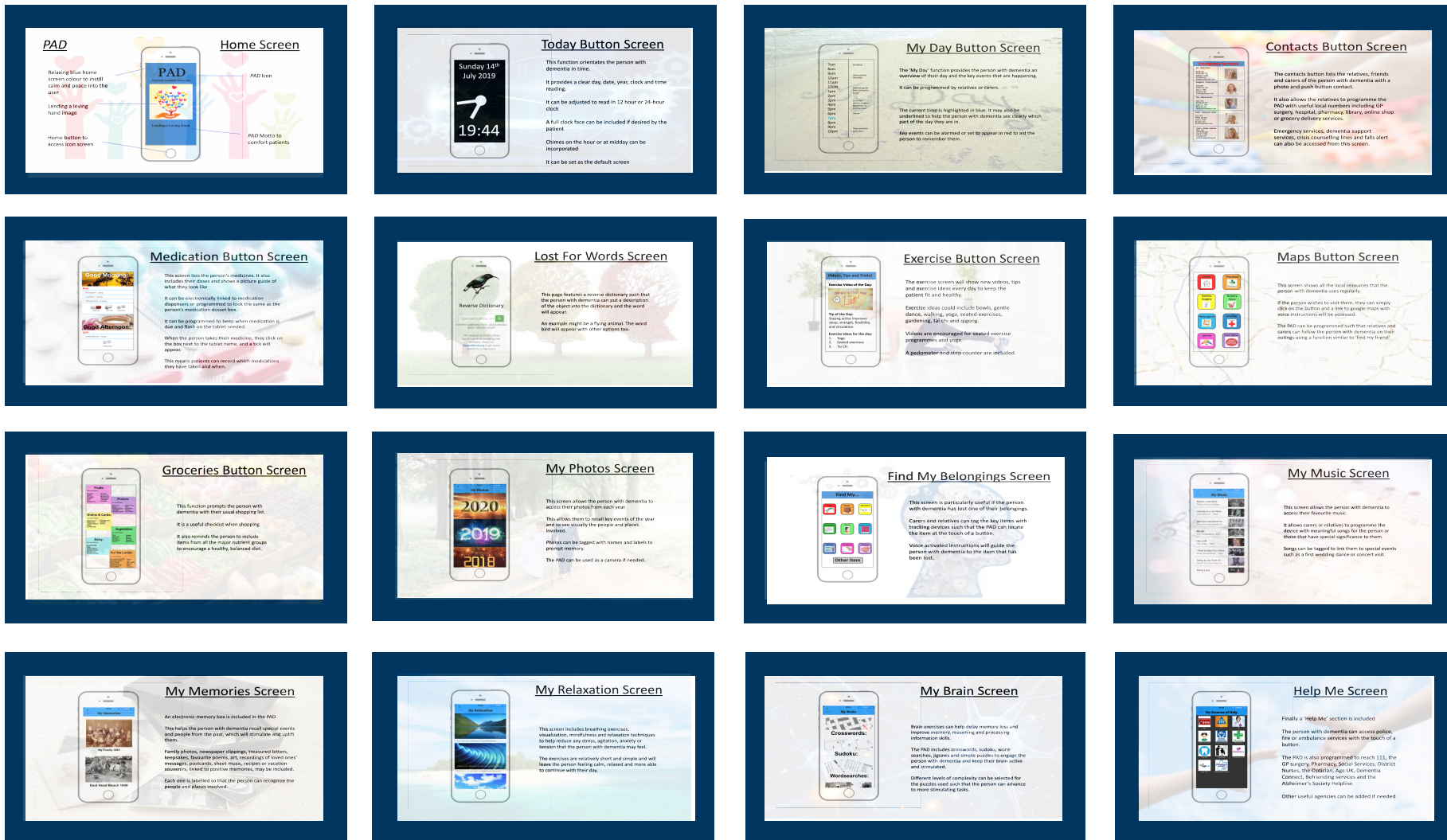
Dementia defines over one hundred conditions that impair memory, behaviour and thinking, disrupting independent living⁷. Common dementia subtypes include Alzheimer's, vascular, Lewy body and frontotemporal dementia. Dementia progresses from mild cognitive decline with memory issues and impaired speed of thought, language or behaviour, to late dementia, with frailty and dependence. Difficulty with orientation, expression, memory, judgement, planning and higher cognitive functioning, repetitive questioning, neglect, sleep disturbance, psychiatric symptoms and challenging behaviours occur⁸. Modifiable risk factors include lifestyle factors (alcohol, obesity, smoking), hypertension and hyperlipidaemia, whilst non-modifiable risk factors are advancing age, learning disabilities, gender and genetic factors. Whilst research studies have explored the use of digital health solutions in chronic disease, less evidence for their use in dementia exists.



Project Aims, Planning and Methodology

Project Planning

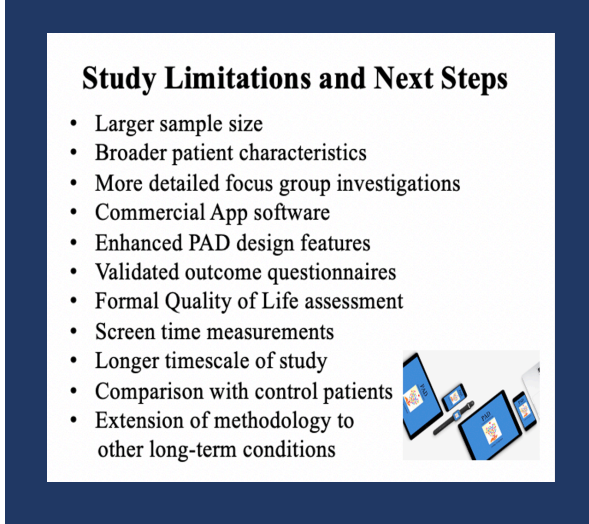
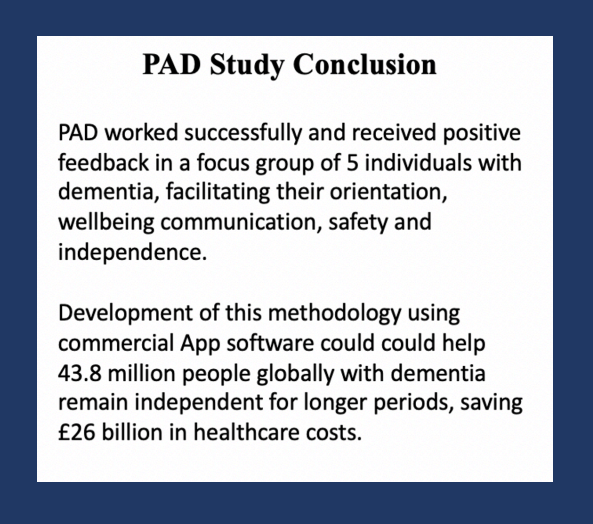
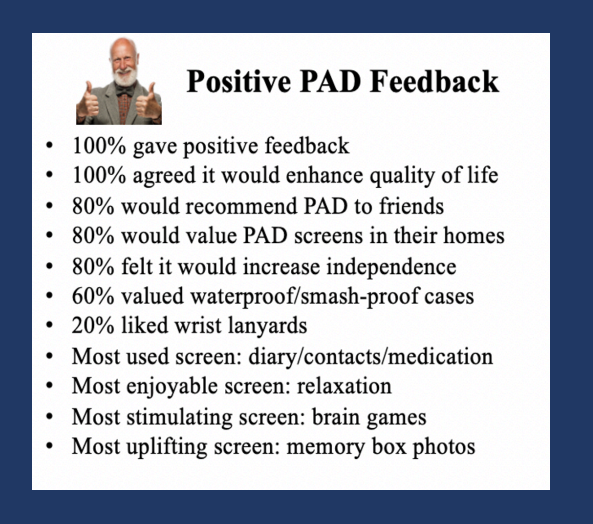
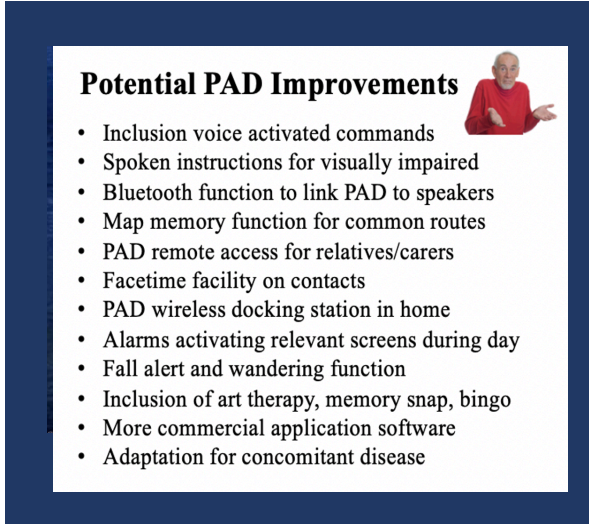
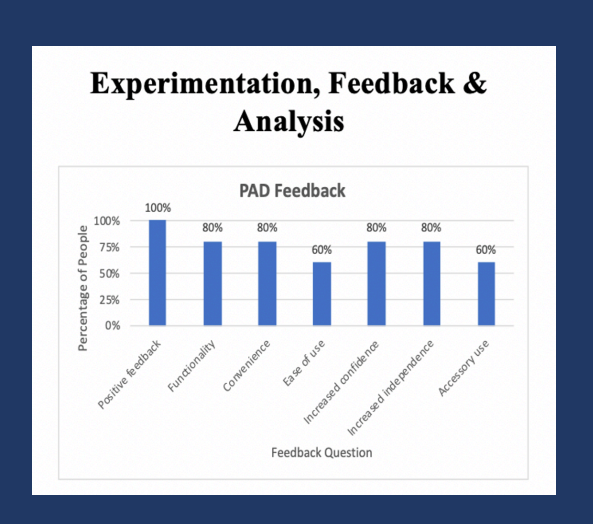
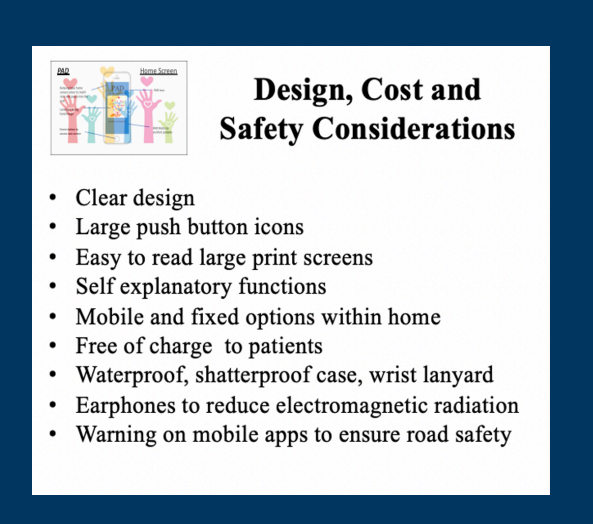
Using information from detailed literature reviews of dementia and digital health solutions⁹⁻¹¹, dementia expert bodies, existing dementia support materials and time with individuals with dementia and carers, I explored the principal issues faced by those with early-stage dementia and mapped these challenges to digital solutions on my personal assistant. I held focus group discussions with individuals with early-stage dementia and carers to explore my PAD design, functionality, safety and practicality, and used their experimentation feedback to refine design.



A Screen Selection from the Personal Assistant: Dementia

Product Design and Methodology

Orientation to day, date, year and time are included on the 'Today' screen, daily reminders and alarms on the 'My Day' screen and key contacts with photos, name, relationship and birthday on the 'My contacts' page. This screen also allows the person to record their own individual data including age, date of birth, address, email, phone number and NHS/NI numbers. A digital medication aid is included together with seated exercise, tai chi, pedometer and gentle dance functions. Maps and location services assist access to key destinations whilst 'Groceries' helps meal-preparation. A reverse dictionary facilitates lost language and a find my belongings screen traces misplaced items. 'My Relaxation' has breathing, mindfulness and visualisation exercises and 'My Brain' provides dementia appropriate crosswords, sudoku, jigsaws and brain training games. Finally photos, music and a memory box provides access to special events from the past with family photos, treasured letters, keepsakes, poems or memories. Ethical, cost and safety issues were considered when designing PAD, including confidentiality and autonomy with remote carer access, safety accessories, home, road safety and emergency access.



Personal Assistant: Dementia Experimentation, Feedback and Analysis

Results

My personal assistant for dementia appears to be a valuable tool which was positively received by those with early-stage dementia. A home screen was favoured over mobile app technology by one individual with concomitant disease, limited vision and dexterity. All individuals with early-stage dementia valued the orientation, diary, contacts, medication and exercise screens and all enjoyed brain training, relaxation, music and memory functions. 20% made use of the safety lanyards and 60% valued the waterproof, smash-proof casing. All those who used PAD reported a greater sense of orientation, well-being and confidence.

Analysis & Conclusions

The impact of digital health on patient care is accelerating rapidly with increased use of mobile health apps and wearable sensors. This study shows that a personal assistant for dementia is a valuable tool for people with early dementia, facilitating wellbeing, orientation, confidence and independence. Proposed PAD extensions included art, zoom, remote access to GP, pharmacy, volunteer and dementia specialists, cultural event virtual links, wandering alarms and falls alerts together with links to electronic medication aids and physical health monitoring aids. Inclusion of voice activated commands and spoken instructions, Bluetooth facility, increased remote access, map memory function for common routes and increased alarms were suggested. It would be useful to extend my PAD design to commercial app software and repeat this study in a larger sample size of individuals with broader characteristics over a longer time period. Validated quality of life questionnaires, screen time measurements and inclusion of a control study group would be helpful.

References: 1. Dementia UK. 2020. Understanding Dementia, Including Sources of Support | Dementia UK. [online]. Available at: <https://www.dementiauk.org/understanding-dementia/>. 2. Prince, M et al (2014) Dementia UK: Update Second Edition report produced by King's College London and the London School of Economics for the Alzheimer's Society 3-6 Wittenberg, R., 2019. Projections of Older People Living with Dementia and Costs of Dementia Care in The United Kingdom, 2019-2040. [online]. Available at: <https://www.lse.ac.uk/healthcare/working-paper-5-Wittenberg-et-al-dementia.pdf>. 3. Coast, S, Tonia, P, and Scott, A, 2019. Overview of The UK Population. August 2019. [online]. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationandmigration/articles/overviewoftheukpopulation/august2019>. 4. Alzheimer's Society, n.d. The Brain and Dementia. [online]. Available at: <https://www.alzheimersociety.org.uk/about-dementia/symptoms-and-diagnosis/how-dementia-progresses/brain-dementia>. 5. Socio, J, 2018. Overview | Dementia: Assessment, Management and Support for People Living with Dementia and their Carers. [online]. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationandmigration/articles/overviewoftheukpopulation/august2019>. 6. Petersen, R, 2016. Advisory Council Alzheimer's Research, US Health & Human Services, 2016. 7. Alzheimer's Society, n.d. The Brain and Dementia. [online]. Available at: <https://www.alzheimersociety.org.uk/about-dementia/symptoms-and-diagnosis/how-dementia-progresses/brain-dementia>. 8. Socio, J, 2018. Overview | Dementia: Assessment, Management and Support for People Living with Dementia and their Carers. [online]. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationandmigration/articles/overviewoftheukpopulation/august2019>. 9. Prince, M et al (2014) Dementia UK: Update Second Edition report produced by King's College London and the London School of Economics for the Alzheimer's Society 3-6 Wittenberg, R., 2019. Projections of Older People Living with Dementia and Costs of Dementia Care in The United Kingdom, 2019-2040. [online]. Available at: <https://www.lse.ac.uk/healthcare/working-paper-5-Wittenberg-et-al-dementia.pdf>. 10. Coast, S, Tonia, P, and Scott, A, 2019. Overview of The UK Population. August 2019. [online]. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationandmigration/articles/overviewoftheukpopulation/august2019>. 11. Alzheimer's Society, n.d. The Brain and Dementia. [online]. Available at: <https://www.alzheimersociety.org.uk/about-dementia/symptoms-and-diagnosis/how-dementia-progresses/brain-dementia>.