Institution: Aston University

Unit of Assessment: 3 Allied Health Professions, Dentistry, Nursing and Pharmacy

Title of case study: 5. Understanding polypharmacy: improving multiple medication regimes for older people.

Period when the underpinning research was undertaken: February 2012 to July 2020

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Dr Ian Maidment	**Reader**	**Feb 2012-date**

Period when the claimed impact occurred: Jan 2016-date

Is this case study continued from a case study submitted in 2014? No

1. Summary of the impact

Medication-related "adverse events" cause up to 5,700 deaths and cost the UK £750 million annually. Aston research into helping older people to get the right combination of medication - so called "medication management" has led to impacts for older people, family carers and clinicians as follows:

- **Impact on Public Policy, Law and Services:** changes to national and international prescribing guidelines
- **Impact on Health and Well-Being:** improving quality of life for older people
- **Impact on Practitioners and Delivery of Professional Services:** changing practice via education & training
- **Impact on Understanding, Learning and Participation:** Inspiring public debate on polypharmacy, anticholinergic burden and antipsychotics

2. Underpinning research

Background: Polypharmacy is the concurrent use of multiple medicines. The more medicines that someone takes, the greater the risk of drug interactions, side-effects and/or errors, all of which can lead to "adverse events". Medication-related adverse events cause ~5,700 deaths annually in the UK and are also the fifth most common cause of death in the USA.

Older people are the major users of prescribed medication and are particularly impacted by polypharmacy. Maidment and colleagues' research revealed that over a 20-year period, the number of older people (65+) taking at least 5 different medicines daily increased from 12% to ~50% (**S3.1**). There is increasing evidence that medicines are often prescribed inappropriately for older people and that between 1/3 and 1/2 of all medicines are taken incorrectly; a phenomenon that increases with the number of medicines prescribed. Collectively, adverse events and non-adherence to prescription medication cost the NHS >£1 billion p/a. Aston's body of research comprises three linked areas to improve medication management in older people.

1. The anticholinergic cognitive burden scale: assessing risk versus benefit of anti-cholinergic medication for older people with dementia. Anti-cholinergic medicines are commonplace: they include anti-histamines, anti-depressants, blood pressure medication, pain killers and medicines used for bladder problems. Maidment was part of an international, interdisciplinary consortium that developed the anticholinergic cognitive burden scale, which enables doctors to assess the side-effects of anti-cholinergic medications when used in combination (**S3.2**). More recently, Maidment and colleagues found the use of anti-cholinergic

medication was associated with the development of dementia (**S3.3**), clearly demonstrating the ongoing need to monitor anti-cholinergic burden.

2. MEDREV: Potential to reduce anti-psychotic medication in care homes by managing "behavioural problems" in people with dementia. Anti-psychotics are associated with 1,800 deaths annually in the UK in people living with dementia. Led by Maidment, this study aimed to determine whether it is feasible to implement and measure the effectiveness of a combined pharmacy/health psychology intervention to reduce the use of psychotropics, including anti-psychotics, to manage behaviour that challenges in care home residents with dementia. Medication used to treat "behaviour that challenges" was reviewed by a specialist pharmacist, in collaboration with the general practitioner, person with dementia (when possible) and the carer. The behavioural intervention consisted of a training package for care home staff and GPs, promoting person-centred care and treating behaviours that challenge as an expression of unmet need. The principle of combining psycho-social interventions with medication review in reducing or eliminating psychotropic medication was demonstrated (**S3.4**).

3. PRUK/MEMORABLE: Understanding the issues relating to medication management for older people. Led by Maidment, these two projects aimed to define the key challenges relating to managing polypharmacy in the community. Specifically, the Pharmacy Research UK (PRUK) study established the complexity of the community-based medicines management for people living with dementia (**S3.5**). This led to the broader NIHR-funded MEMORABLE study (**S3.6**), which identified the challenges for all older people and their family carers to manage their medication. Recommendations resulting from these findings were made to clinicians and patients accordingly.

3. References to the research

S3.1 Gao L, **Maidment ID**, Matthews FE, Robinson L, Brayne C, on behalf of the Medical Research Council Cognitive Function and Ageing Study (2018). Medication usage change in older people (65+) in England over 20 years: Findings from CFAS I and CFAS II. *Age and Ageing* **47**, 220–225. https://doi.org/10.1093/ageing/afx158.

S3.2 Campbell N, **Maidment ID,** Fox C, Khan B, Boustani M. (2013). The 2012 update to the anticholinergic cognitive burden scale. *J. Am. Geriatrics Soc.* **61**, S142-3. https://onlinelibrary.wiley.com/doi/epdf/10.1111/jgs.12263.

S3.3 Richardson K, Fox C, **Maidment I**, Steel N, Loke YK, Arthur A, Myint PK, Grossi CM, Mattishent K, Bennett K, Campbell NL, Boustani M, Robinson L, Brayne C, Matthews FE, Savva GM. (2018). Anticholinergic drugs and risk of dementia: case-control study. *BMJ* **361**, article k1315. https://doi.org/10.1136/bmj.k1315.

S3.4 **Maidment ID**, Damery S, Campbell N, Seare N, Fox C, Iliffe S, Hilton A, Brown G, Barnes N, Wilcock J, Randle E, Gillespie S, Barton G, Shaw R. (2018). Medication review plus person-centred care: a feasibility study of a pharmacy-health psychology dual intervention to improve care for people living with dementia (MEDREV). *BMC Psychiatry* **18**, article 340. https://doi.org/10.1186/s12888-018-1907-4.

S3.5 **Maidment ID**, Aston L, Moutela T, Fox CG, Hilton A. (2017). A qualitative study exploring medication management in people with dementia living in the community and the potential role of the community pharmacist. *Health Expectations* **20**, 929–942. https://doi.org/10.1111/hex.12534.

S3.6 **Maidment ID**, Lawson S, Wong G, Booth A, Watson A, McKeown J, Zaman H, Mullan J, Bailey S. MEdication Management in Older people: Realist Approaches Based on Literature and Evaluation (MEMORABLE): a realist synthesis. *Health Services and Delivery Research* **8**, 26 (whole issue) https://doi.org/10.3310/hsdr08260.

The quality of this research is evidenced by papers **S3.1-S3.6** published in high-ranking, international, peer-reviewed journals and by the following competitively-awarded research grants: **PRUK £54,000*** A qualitative exploration of the role of community pharmacists in limiting the use of antipsychotics (2014-2016); **Alzheimers Society AS-PG-2013-017 £318,000**, ABCD study to

establish whether anticholinergic medications, benzodiazepines and z-hypnotics increase the risk of dementia (2014-2018); **NIHR £200,435 PB-PG-0613-31071*** Introduction of a pharmacy and psychosocial intervention in residential and nursing homes to limit the use of psychotropic medication to treat BPSD – a mixed methods feasibility study (2015-2018); **NIHR £291,000 14/221/02**, Estimating the benefits and harms of Z-drugs for people with dementia and sleep disorders (2016-2018,); **NIHR £195,000 15/137/01***, Developing a framework for a novel multi-disciplinary, multi-agency intervention(s), to improve medication management in older people on complex medication regimens resident in the community (2017-2019). *Maidment, PI.

4. Details of the impact

By reducing harm (or potential for harm) arising from inappropriate medication, the research described above has made the following impacts:

1. Impact on Public Policy, Law and Services: changes to national and international prescribing guidelines (2017-date)

The **A**nti-cholinergic **C**ognitive **B**urden **S**cale (ACBS) was first developed as an international collaboration between the USA and UK, with Maidment as the lead UK pharmacist. It was updated to its present form in 2012 at an international consensus summit in Indiana **(S3.2)**, where Maidment's contribution was described as "*key and critical*" (University of Indiana/Purdue University; **S5.1**) and "*both unique and essential to the greater project…to summarise, Aston University leads on the essential pharmacy aspects of this project*" (UEA) **(S5.2)**. As a consequence of publishing that revised ACBS:

- In 2017, NHS England published "Medicines Optimisation Polypharmacy Prescribing Comparators 2017" which recommends the anticholinergic cognitive burden scale to all CCGs (Clinical Commissioning Groups - primary care) specifically to: *"see the variation in prescribing across GP practices within a CCG and across CCGs, identify if polypharmacy is an area to be investigated, help prioritise potential areas of activity" and "demonstrate the impact of initiatives to address polypharmacy"* **(S5.3).**
- In 2018, NICE updated their guidelines from 2006 (which did not recommend assessment of anticholinergic burden) to the most recent NICE guidelines **(S5.4)** which highlight the ACBS to assess side effects of medications commonly used in older people.
- The ACBS is now used internationally across 13 countries including 14 US states with over one million participants in over 50 published studies **(S5.1)**. For example, in just a single US state more than 10,000 patients have benefited from this work (*"Contribution of Maidment…has been critical to international impact on improving patient care":* **S5.1**).

MEDREV **(S3.4)** was featured in an NIHR Review on Advancing Care in care homes **(S5.5)** and based on that work**,** Maidment was invited as an "*expert member of the Irish Clinical Guideline Development for Appropriate Antipsychotic Prescribing in People with Dementia*" project group. The resulting national guidelines **(S5.6)** are the first to be produced in this field in Ireland.

2. Impact on Health and Well-Being: improving quality of life for older people Anti-cholinergic burden

: resulting from NICE guidance (Impact 1), the ACBS has been implemented nationally by NHS England, who subsequently stated *"these medicines are very widely used across the NHS. Based on NHS ePACT data, between 1.5 to 2.0 million people in England are likely to be taking one of the medicines implicated in your study…..your work has had a direct impact on improving patient's quality of life"* (S5.7).

Anti-psychotic usage: Conducted in five West Midlands care homes, MEDREV **(S3.4)** sought to eliminate or reduce psychotropic medication for behavioural problems in people living with dementia by training staff in psycho-social interventions to find the cause of behavioural problems, rather than over-medicating residents. Subsequent evidence from care homes suggests a substantial benefit. For example, "*Because staff acted in a more patient centred way, residents became more settled and less reliant on prescribed medication*" and "*The medication review also provided a means to stop inappropriate medications for a number of residents, directly improving the quality of life of a significant number of care home residents with dementia across the West*

Midlands" **(S5.8).** MEDREV also has wider reach. For example, Kent and Medway NHS Trust (who serve over 1,860,000 people) stated: *"The MEDREV study has directly impacted patient care, improving the quality of life of people living with dementia by limiting the inappropriate use of potentially toxic psychotropics "* **(S5.9).**

3. Impact on Practitioners and Delivery of Professional Services: changing practice via education & training: MEDREV trained 142 care home and 22 primary care staff in the West Midlands. Subsequent evidence from care home managers demonstrates a lasting change in practice e.g. "*I really do think they've embraced it….they understand now the importance of not approaching someone from behind, not standing, whispering in the corner and causing someone to be paranoid….it's definitely a lot better." and "The most constructive bit for me, is the thinking more about the individual and what we can do as opposed to what [medication] I can reach for to give."* **(S5.8)**.

4. Impact on Understanding, Learning and Participation: Maidment has also disseminated his research in multiple public arenas including the BBC, The Conversation and Choice magazine, causing substantial public and media interest. E.g. his "Conversation" article has 8,004 reads (83% outside UK), 150 social media comments & 8 re-publishers, his BBC interview has 1,392 views on Youtube and Altimetrics for his BMJ research article **(S3.3)** include attention score=821. Additionally, 62 news stories from 50 outlets and 655 tweets have reached 1,916,430 followers **(S5.10)**.

5. Sources to corroborate the impact

S5.1 Joint letter from the University of Illinois and Purdue University outlining Maidment's role in development of the ACBS.

S5.2 Letter from UEA outlining Maidment's role in development of the ACBS.

S5.3 NHS Business Services document: Medicines Optimisation Polypharmacy Prescribing Comparators (July 2017). https://www.nhsbsa.nhs.uk/sites/default/files/2018-02/PolyPharmacy%20Specification%20v1%200%20July%202017_0.pdf.

S5.4 NICE guideline 97 (NG97) https://www.nice.org.uk/guidance/ng97 Dementia: assessment, management and support for people living with dementia and their carers. June (re. ACBS, see pp 25 & 41) and previous guidelines for comparison (NICE clinical guideline 42, 2006).

S5.5 NIHR Themed Review: Advancing Care. Research with Care Homes. July 2017 https://content.nihr.ac.uk/nihrdc/themedreview-001931-AC/Advancing-Care-Final.pdf (see pp 20 & 37, study 27).

S5.6 Irish Government Department of Health National Clinical Guideline 21 (December 2019) https://www.gov.ie/en/collection/ac0046-appropriate-prescribing-of-psychotropic-medication-for-non-cognitive/ and letter inviting Maidment to become "*invited expert member for the advisory group*" which produced this guideline.

S5.7 Evidence of national impact of ACBS: Letter from NHS England Mental Health Team.

S5.8 (see also S3.4) Evidence of regional impact of MEDREV: Four letters re. impact of the MEDREV study on staff and residents at five care homes in the West Midlands.

S5.9 Evidence of impact on practitioners – letter from Kent and Medway NHS Trust

S5.10 Exemplar public information articles (BBC, https://www.bbc.co.uk/news/health-43881209, https://www.youtube.com/watch?v=rz5UZ3mWx3o&feature=youtu.be); (The Conversation, https://theconversation.com/medication-nation-new-research-shows-nearly-half-of-all-older-people-now-taking-at-least-five-medicines-84879), and summary usage statistics.