UTS UNIVERSITY OF TECHNOLOGY SYDNEY

Improving Quality Use of Medicines for People with Advanced Dementia in Long-term Care

By

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Doctor of Philosophy: Health

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Certificate of original authorship

I, Domenica Disalvo, declare that this thesis, is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Faculty of Health at the University of Technology Sydney. This thesis is wholly my own work unless otherwise reference or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis. This document has not been submitted for qualifications at any other academic institution.

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Signature of Student

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Statement indicating the format of the thesis

This doctoral thesis follows a conventional format. Published works arising from this dissertation and permission statements for reproduction are provided in the Appendix, and referred to within relevant chapters of the thesis.

Anthology of publications and presentations associated with this thesis

Peer-reviewed journal publications

1. **Disalvo D,** Luckett T, Agar M, Bennett A, Davidson PM. Systems to identify potentially inappropriate prescribing in people with advanced dementia: a systematic review. BMC geriatrics. 2016;16(1):114.
2. **Disalvo D,** Luckett T, Luscombe G, Bennett A, Davidson P, Chenoweth L, Mitchell G, Pond D, Phillips J, Beattie E, Goodall S, Agar M. Potentially inappropriate prescribing in Australian nursing home residents with advanced dementia: A substudy of the IDEAL study. Journal of Palliative Medicine. 2018;21(10):1472-9.
3. **Disalvo D,** Luckett T, Bennett A, Davidson P, Agar M. Pharmacists' perspectives on medication reviews for long-term care residents with advanced dementia: a qualitative study. International Journal of Clinical Pharmacy. 2019:1-13.
4. **Disalvo D**, Luckett T, Bennett A, Davidson P, Agar M. Multidisciplinary perspectives on medication-related decision-making for people with advanced dementia living in long-term care: a critical incident analysis. European Journal of Clinical Pharmacology. 2020: 1-12.

Conference presentations

1. **Disalvo D**. Improving prescribing in aged care residents with advanced dementia. Society of Hospital Pharmacists of Australia (SHPA) Symposium – Oral presentation. Sydney, Australia. June 2014

2. **Disalvo D,** Luckett T, Agar M, Bennett A, Davidson PM. Improving the safety and quality of prescribing in aged care residents with advanced dementia. Alzheimer's Dementia International (ADI) – Oral presentation. Perth, Australia, April 2015.
3. **Disalvo D**, Luckett T, Luscombe G, Bennett A, Davidson PM, Chenoweth L, Mitchell G, Pond D, Phillips J, Beattie E, Goodall S, Agar M. Potentially inappropriate prescribing in Australian nursing home residents with advanced dementia. Australian Palliative Care Conference, Adelaide, Australia – Poster presentation. September 2017
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Radio interviews

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Abstract

Background: Quality use of medicines is a phrase that is used to describe best possible medicines use that maximises the benefits of treatment while minimising medication-related harm. It includes selecting management options wisely, choosing appropriate medicines if a medicine is considered necessary, and using medicines safely and effectively. Best practice prescribing for frail older adults in long-term care should carefully balance benefits and harms. In the context of advanced dementia, this means aligning use of medications with a palliative approach. Potentially inappropriate prescribing is a term used to describe prescribing practices that are likely to be suboptimal and include overprescribing, under-prescribing, or poor choice of medications. Much research has focused on reducing use of potentially inappropriate prescribing of psychotropic agents but less so on other medications where risk of harm may similarly outweigh benefits. Medications of concern include not only those prescribed for non-palliative purposes but also those intended to manage symptoms that have risks arising from the pathophysiological changes associated with dementia.

Aim and objectives: The aim of this PhD programme was to explore current practice regarding quality use of medicines (QUM) for long-term care (LTC) residents with advanced dementia and identify ways in which it might be improved. Three research questions were posed: 1) what systems exist for identifying potentially inappropriate prescribing (PIP) in the context of advanced dementia? 2) what is the prevalence of potentially inappropriate medications (PIMs) in Australian LTC residents with advanced dementia? and, 3) how can QUM be improved for people in this group?

Methods: This PhD programme used a multiple methods approach to answer these individual questions. To answer research question one, a systematic review was

conducted to identify and synthesise published systems for identifying PIP in the context of advanced dementia. To answer research question two, a retrospective chart audit was conducted of medication charts from 20 LTC facilities in Sydney and Brisbane, Australia to estimate the proportion of residents with advanced dementia receiving PIMs, identify those most commonly prescribed, and explore LTC facility and resident characteristics associated with their use. To answer research question three, two qualitative methods were used. First, in-depth interviews with pharmacists were conducted to explore barriers and facilitators to the national Residential Medication Management Review (RMMR) programme for improving QUM for LTC residents with advanced dementia. A model of interdisciplinary collaboration was used to inform the interpretative stage of analysis. Secondly, focus groups were used to explore medication-related decision-making by health professionals from different disciplines and specialties relevant to care for LTC residents with advanced dementia, with a special focus on dilemmas associated with medications commonly regarded as potentially inappropriate (acetylcholinesterase inhibitors, lipid-lowering agents, antibiotics and opioid analgesics).

Findings: The systematic review identified only one system for identifying PIP in the context of advanced dementia - criteria developed by the Palliative Excellence in Alzheimer Care Efforts (PEACE) Program. The chart review (N=218) found that nearly a third (n=65, 30%) of residents were receiving at least one medication classed as 'never appropriate' by the PEACE criteria, the most common being lipid-lowering agents (n=38, 17.4%), antiplatelet agents (n=18, 8.3%) and acetylcholinesterase inhibitors (n=16, 7.3%). Residents who had been at the LTC facility for ≤10 months (odds ratio [OR] 5.60, 95% confidence intervals [CI] 1.74-18.06), and 11 to 21 months (OR 5.41,

CI 1.67-17.75) had a significantly greater likelihood of receiving a 'never' appropriate medication compared to those with a residence of >5 years.

Findings from in-depth interviews with pharmacists (N=15) suggested that motivation, trust and effective communication between pharmacists, GPs, LTC facilities and families can increase RMMR's capacity to improve QUM for LTC residents with advanced dementia. A lack of formal processes and limited remuneration for interdisciplinary collaboration were identified as key barriers.

Findings from four focus groups with health professionals (N=16) highlighted the need to individualise medication-related decisions, taking into account each resident's history, clinical status and resident/family preferences and values. Informants identified a large range of competing considerations that may need to be weighed in deciding the appropriateness of starting, continuing or deprescribing medications. A dialectical approach to decision-making and regular review were identified as important in ensuring high-quality therapeutic decisions.

Conclusion: QUM for LTC residents with advanced dementia requires an interdisciplinary team to work in collaboration with residents/families to regularly review medications in line with each individual's changing context and goals of care. Systems level initiatives should recognise and support an environment that enables optimal assessment and partnerships between interdisciplinary health professionals, residents and families in order to reach appropriate medication-related decisions.

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List of abbreviations

AACP	Australian Association of Consultant Pharmacy
ABS	Australian Bureau of Statistics
ACAT	Aged Care Assessment Team
ACFI	Aged Care Funding Instrument
ACSQHC	Australian Commission of Safety and Quality in Health Care
ADeN	Australian Deprescribing Network
ADI	Alzheimer's Disease International
ADL	Activity of daily living
ADR	Adverse drug reaction
AIHW	Australian Institute of Health and Welfare
AITCS	Assessment of Interprofessional Team Collaboration Scale
AKPS	Australia-modified Karnofsky Performance Status
AMH	Australian Medicines Handbook
APAC	Australian Pharmaceutical Advisory Council
ARMOR	Assess, Review, Minimise, Optimise, Reassess
ARS	Anticholinergic Risk Scale
ATC	Anatomical Therapeutic Chemical (Classification System)
BMJ	British Medical Journal
BPSD	Behavioural and psychological symptoms of dementia
CaDeN	Canadian Deprescribing Network
CEASE	Current medications, Elevated risk, Assess, Sort, Eliminate
CI	Confidence interval
CIT	Critical incident technique
CPS	Cognitive Performance Scale
COPD	Chronic obstructive pulmonary disease

COREQ	Consolidated Criteria for Reporting Qualitative research
DBMAS	Dementia Behaviour Management Advisory Service
DRP	Drug related problem
DNR	Do not resuscitate
DUE	Drug use evaluation
EAPC	European Association for Palliative Care
EN	Enrolled nurse
FAST	Functional Assessment Staging Tool
FORTA	Fit for Aged Criteria
FWC	Fair Work Commission
GI	Gastrointestinal
GLMM	Generalised linear mixed model
GP	General practitioner
GP-GP	Good Palliative – Geriatric Practice
Guild	Pharmacy Guild of Australia
HALT	Halting Antipsychotic use in Long-Term care
HMR	Home Medicines Review
HREC	Human Research Ethics Committee
IDEAL	Implementing Dementia End-of-life Care At Local aged care facilities
IPET	Improved Prescribing in the Elderly Tool
IQR	Interquartile range
LOS	Length of stay
LTC	Long-term care
MAI	Medication Appropriateness Index
MAC	Medication Advisory Committee
MATCH – D	Medication Appropriateness Tool for Comorbid Health conditions in Dementia
MBS	Medicare Benefits Schedule
MeSH	Medical Subject Headings
MIMS	Monthly Index of Medical Specialties

MMSE	Mini Mental State Examination
NICE	National Institute for Health and Clinical Excellence
NHMRC	National Health and Medical Research Council
NPS	National Prescribing Service Ltd.
NSAID	Non-steroidal anti-inflammatory drug
OR	Odds ratio
PBS	Pharmaceutical Benefits Scheme
PCA	Palliative Care Australia
PCC	Person-centred care
PCPC	Physician-community pharmacist collaboration
PEACE	Palliative Excellence in Alzheimer Care Efforts Program
PIM	Potentially inappropriate medication
PIP	Potentially inappropriate prescribing
PPI	Proton-pump inhibitor
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRN	'Pro re nata'
PSA	Pharmaceutical Society of Australia
QOL	Quality of life
QUM	Quality use of medicines
RedUSe	Reducing Use of Sedatives programme
RACF	Residential aged care facility
RCT	Randomised controlled trial
RMMR	Residential Medication Management Review
RN	Registered nurse
SD	Standard deviation
SHPA	Society of Hospital Pharmacists of Australia
START	Screening Tool to Alert doctors to Right Treatment
STOPP	Screening Tool of Older Persons' potentially inappropriate Prescriptions

STOPPFrail	Screening Tool of Older Persons Prescriptions in Frail adults with limited life expectancy
STROBE	Strengthening The Reporting of Observational studies in Epidemiology
UK	United Kingdom
US	United States
UTS	University of Technology Sydney
VIPS	Very important persons
WHO	World Health Organization

Glossary of terms

Advance Care Planning: The process of exploring and communicating someone's beliefs, values and preferences in order to guide future care in the event that the person is unable to make decisions or communicate for themselves. Advance Care Planning helps ensure that an individual's choices are respected for future medical treatment.[1]

Adverse drug reaction: *"A harmful, unintended reaction to medicines that occurs at doses normally used for treatment"* (Australian Commission on Safety and Quality in Health Care 2012, p.5).[2]

Antipsychotic medication: Medications that affect the action of a number of brain chemicals (neurotransmitters) and were initially developed to manage psychosis. Antipsychotics fall into two classes: typical and atypical. Typical antipsychotics were first developed in the 1950s to treat psychosis. They tend to be associated with more Parkinson's disease-like adverse effects (e.g. tremor, rigidity) and a syndrome of abnormal involuntary movements called tardive dyskinesia than the newer, atypical antipsychotics.[3]

Autonomy: The principle of respect for autonomy is associated with allowing or enabling patients to make their own decisions about which health care interventions they will or will not receive.[4]

Behavioural and psychological symptoms of dementia: Behavioural and psychological symptoms of dementia (BPSD) are symptoms of disturbed perception, thought content, mood and behaviour occurring in people with dementia.[5] They include agitation, aggression, calling out/screaming, intrusive behaviours, disinhibition (sexual), wandering, night time disturbance, shadowing, swearing, depression, anxiety, apathy, delusions, hallucinations, irritability and elation/euphoria.[3]

Carer (informal): Informal carers provide help, support or supervision to family members, friends or neighbours with a range of physical, mental and end-of-life health conditions, and disability. Informal carers are defined as those who provide care within the context of a pre-existing relationship, with demands that go beyond those that would normally be expected of such a relationship.[6]

Critical Incident Technique: A set of procedures for systematically identifying behaviours that contribute to the success or failure of individuals or organisations in specific situations.[7]

Dementia: Dementia is an umbrella term for a group of illnesses affecting the brain causing memory loss, changes in emotions, social interactions and behaviour, reduced problem solving abilities, and a progressive decline in functioning.[8]

Deprescribing: *"The systematic process of identifying and discontinuing drugs in instances in which existing or potential harms outweigh existing or potential benefits within the context of an individual patient's care goals, current level of functioning, life expectancy, values, and preferences."* (Scott et al. 2015, p. 827)[9]

Drug related problem: An event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes.[10]

Enrolled nurse: A person who has completed the accredited education and training, demonstrated competence for practice, and is registered by the Nursing and Midwifery Board of Australia as an Enrolled Nurse, under the *Health Practitioner Regulation National Law Act 2009*, and its Regulations.[11]

Interdisciplinary collaboration: Synergistic and interdependent interaction of team members who each possess particular expertise. Team members work closely together, actively communicating and sharing information.[12, 13]

Interdisciplinary care: A partnership between a team of health professionals and a client/patient in a participatory, collaborative and coordinated approach to shared decision-making around health issues.[14]

Long-term care facility: An institution providing accommodation, meals, 24-hour staffing, and in most cases 24-hour nursing care.

Medication: A medicine or other substance, used to improve a particular condition or illness.

Medication Advisory Committee: A group of advisors to a long-term care facility who provide medication management leadership and governance, and assist in the development, promotion, monitoring, review and evaluation of medication management policies and procedures that will have a positive impact on the quality of life of residents.[11]

Medication review: A critical review of all prescribed, over-the-counter and complementary medications undertaken to optimise therapy and minimise medication-related problems.[2]

Medicine: *"A chemical substance given with the intension of preventing, diagnosing, curing, controlling or alleviating disease, or otherwise enhancing the physical or mental welfare of people. Prescription, non-prescription and complementary medicines irrespective of their administered route are included"* (Australian Commission on Safety and Quality in Health Care 2012, p.6).[2] Sometimes this term is used interchangeably with 'drug' especially within certain contexts e.g. drug- or drug-disease interaction.

Palliative care: "*An approach that aims to improve the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by mean of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual"* (World Health Organization 2002, p.84).[15]

Polypharmacy: The use of multiple medications in a single patient (usually greater than five medications).[16]

Potentially inappropriate medication: A medication type that is likely to have an unfavourable balance between the benefit and harm they cause for a person.[17]

Potentially inappropriate prescribing: A term used to describe prescribing practices that are likely to be suboptimal and include overprescribing, under-prescribing, or poor choice of medications.[18, 19] Prescribing is considered potentially inappropriate if; 1) evidence of the drug(s)' efficacy is insufficient; 2) the potential adverse drug effects are likely to outweigh the potential benefits of the drug(s); or 3) a safer alternative is likely to be available.[20]

PRN *pro re nata*: The use of a medication on an 'as required' basis, usually in response to symptoms.

Psychotropic medication: Medicines that act on the central nervous system affecting perception, mood, consciousness, cognition and behaviour. Psychotropic medications include antidepressants, antipsychotics, sedatives, and anticonvulsants.[3]

Quality Use of Medicines: A phrase that is used to describe best possible medicines use that maximises the benefits of treatment while minimising medication-related harm. It includes selecting management options wisely, choosing appropriate medicines if a medicine is considered necessary, and using medicines safely and effectively.[21, 22]

Residential Medication Management Review: A structured collaborative review of a long-term care resident's medications to optimise the benefits from use, reduce harm from use, and enhance quality of life. Comprehensive information on the resident is collated and reviewed to identify and meet medication-related needs and to identify and prevent medication-related problems.[23]

Shared decision-making: Involves discussion and collaboration between the consumer and their healthcare provider. It integrates a person's values, goals and preferences with the best available evidence about the benefits, risks and uncertainties of treatment in order to reach the most appropriate healthcare decisions for that person.[24]

Supported decision-making: The process of enabling a person who requires decision-making support to make, and/or communicate, decisions about their own life. The decision-making is supported, but the decision is theirs.[25]

Transdisciplinary collaboration: A team-based perspective which incorporates each discipline's most important skills and knowledge, and attempts to address remaining deficiencies, transcending traditional discipline boundaries.[26, 27]

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Chapter 1: Introduction

Chapter 1 provides an introduction to key concepts and issues relevant to the PhD programme and an overview of the thesis, including its scope and structure.

1.1 The National Strategy for Quality Use of Medicines

Australia's National Medicines Policy,[1] formally launched in 1999, was motivated by the World Health Organization (WHO)[2] encouraging countries to implement drug policies that promote access to essential, affordable drugs of acceptable quality, safety and efficacy.

The National Strategy for Quality Use of Medicines (QUM) framework[3] is a core feature of Australia's National Medicines Policy and defines QUM as:

- *"Selecting management options wisely by:*
  - *considering the place of medicines in treating illness and maintaining health, and*
  - *recognising that there may be better ways than medicine to manage many disorders.*
- *Choosing suitable medicines if a medicine is considered necessary so that the best available option is selected by taking into account:*
  - *the individual*
  - *the clinical condition*
  - *risks and benefits*
  - *dosage and length of treatment*
  - *any co-existing conditions*
  - *other therapies*
  - *monitoring considerations*
  - *costs for the individual, the community and the health system as a whole.*
- *Using medicines safely and effectively to get the best possible results by:*

- *monitoring outcomes,*
- *minimising misuse, over-use and under-use, and*

▪ *improving people's ability to solve problems related to medication, such as negative effects or managing multiple medications"* (Commonwealth of Australia 2002, p. 1).[3]

1.2 Potentially inappropriate prescribing

Potentially inappropriate prescribing (PIP) is used to refer to prescribing practices that may be suboptimal.[4, 5] Prescribing is considered potentially inappropriate if: 1) evidence of the medication's efficacy is insufficient; 2) the potential adverse drug effects outweigh the potential benefits of the, medication; or 3) a safer alternative is available.[6] PIP also includes inappropriate dosing or duration, the prescription of medicines with clinically significant drug-drug and drug-disease interactions that may cause harm, and importantly, the under-use of potentially beneficial medications.[4]

In the field of geriatrics, specific guidance identifies potentially inappropriate medications (PIMs) as medications that should generally be avoided in persons 65 years or older because they are either ineffective or they pose an unnecessarily high risk of harm in older persons outweighing their potential benefits. The implication is that a safer alternative and therapeutic strategy is usually available.[7]

1.2.1 Polypharmacy

Polypharmacy is used to describe the use of multiple medications.[8] While there is no consensus on the number of medications required to constitute polypharmacy, the term is usually used to refer to five or more medications.[9, 10] Regardless of the way polypharmacy is defined, many studies have associated polypharmacy with PIP in older adults.[11]

Addressing polypharmacy is important as it is associated with significant negative clinical outcomes for patients such as frailty, disability, cognitive impairment, falls and mortality.[12]

The combination of multiple medications may lead to cumulative adverse effects and antagonistic drug-drug interactions where a new adverse effect is produced that neither drug alone could have caused.[13] Adverse effects may in turn lead to prescribing of additional agents to counteract them - the 'prescribing cascade' – that further exacerbates harm from polypharmacy and leads to decreases in functional status and quality of life (QOL).[14] However, polypharmacy may not always be a clear indicator of inappropriate prescribing, as multiple medications are sometimes justified.

1.3 Long-term care as a focus for improving quality use of medicines

The National Strategy for QUM framework identifies long-term care (LTC) as a focal setting for improvement. People in LTC are prescribed significantly more medicines than people living independently.[15] The transition to LTC from the community is also associated with an increased risk of receiving multiple medications leading to adverse events,[16] often complicated by a change of primary care provider on entry to the facility. The use of multiple medications in LTC is partly explicable in terms of the high number of comorbidities older people face. However over-prescribing of medications and continuation of drug therapies beyond the time for which they have been beneficial to the resident also play a part.[17]

Adverse effects associated with PIP in older adults are associated with increased hospitalisation and mortality[18, 19] and involve extensive costs to healthcare systems.[20, 21] A systematic review evaluating the prevalence of PIP internationally in LTC (North

America, European countries, and other countries including Australia) documented an average prevalence of 43.2%, ranging from 5.4% to 95%.[11] Similarly, an Australian study documented 43.8% of residents who were receiving PIP, leading to a heavy burden of adverse drug reactions, hospital admissions and deaths.[22] Possible explanations include the high dependency and limited role many LTC residents play in self-management and the risk that medical care is sometimes received from multiple providers without proper coordination.

Older people in LTC are particularly vulnerable to adverse effects not only because of drug-drug interactions from multiple medications but also because physiological changes associated with ageing alter the pharmacological and pharmacokinetic parameters of many medications,[20, 23-25] resulting in medications having longer durations of action, greater risk of toxicity, and increased frequencies of preventable adverse effects.[24 3]

The Department of Health and Ageing recommends that LTC facilities should establish or have access to a Medication Advisory Committee (MAC) to support the QUM in the facility.[26] These committees are typically comprised of LTC managers, nurses, medical practitioners, pharmacists, residents, and families, who assist in the development, promotion, monitoring, review and evaluation of medication management policies and procedures that should promote QUM and have a positive impact on health and QOL for residents.[26, 27]

An additional QUM service for LTC is the national Residential Medication Management Review (RMMR) programme, which is funded by the Australian government.[28] This initiative provides a framework and resources for conducting structured reviews of LTC residents' medications to identify PIP and other opportunities for optimising benefits and

minimising harms. RMMRs are intended to be conducted as a collaboration between pharmacists, general practitioners (GPs) and nursing staff at the LTC facility.

Improving QUM in LTC is an increasing priority given that the Australian population is ageing, with 15% of Australians aged 65 years and over (currently 3.7 million). This proportion is projected to steadily increase over the coming decades. By 2056, it is projected there will be 8.7 million Australians in this age group (22% of the population).[29]

1.4 Dementia

Dementia is an umbrella term for several progressive diseases that affect the brain and interfere with thinking, behaviour and the ability to perform everyday tasks.[30] Alzheimer disease is the most common form of dementia and contributes to around 70% of all cases.[30] Other forms of dementia include vascular dementia, dementia with Lewy bodies, and a number of diseases that are collectively termed frontotemporal dementia.

Globally, there are 47 million people living with dementia, which is projected to increase to more than 131 million by 2050 as the population ages. The total estimated worldwide cost of dementia is US$818 billion, posing an increasing challenge to health care systems and economies worldwide.[31, 32] In Australia, dementia is now the second leading cause of death (30,900 deaths in total) after coronary heart disease (53,900 deaths),[33] and is the leading cause of death for women (11%).[33] Recent figures show the annual cost of dementia in Australia is $14.25 billion, which equates to an average cost of $35,550 per person with dementia.[34]

1.4.1 Person-centred care is important in people with dementia

Over recent years, the philosophy of care for people with dementia has increasingly emphasised the need for person-centred care.[35] The concept of person-centredness in long-term care originated with Tom Kitwood who adopted the term from Rogerian psychotherapy and applied its meaning to the care of people with dementia.[35, 36] Using Kitwood's writings as a backbone, Brooker et al. (2003) outlined four key components integral to a person-centred care approach for people with dementia, under the acronym VIPS. These components are: (a) **V**aluing and respecting persons with dementia and those who care for them; (b) treating people with dementia as **I**ndividuals with unique needs; (c) seeing the world from the **P**erspective of the person with dementia, so as to understand the person's behaviour and what is being communicated, and validating the subjective experience that is being perceived as the reality of the individual; and (d) creating a positive **S**ocial environment in which the person with dementia can experience relative well-being through care that promotes the building of relationships.[37]

Supported decision-making is a person-centred model that empowers an individual to make choices with guidance and advice. Greater efforts have been made to support people with advanced dementia in making decisions on their care in whatever capacity they are able, in line with United Nations Convention on the Rights of Persons with Disabilities.[38] A new policy guide, "Supporting Decision-Making in Aged Care Providers in Australia" has been provided to help LTC providers to develop policy and processes that guide staff to involve and respect the views of each resident.[39] Supported decision-making for people with dementia respects their dignity and autonomy, and protects their right to be involved in making decisions to the optimal extent allowed by their cognitive capacity.[40]

1.4.2 The need for a palliative approach during the advanced stages of dementia

In people with advanced dementia, the final year of life is characterised by a trajectory of chronic and severe disability. Terms used to describe a more progressed stage of dementia include 'severe', 'late', 'terminal' and 'advanced'. The term 'advanced' will be used throughout this thesis because it best highlights the progressive nature of dementia and is used by Dementia Australia,[41] perhaps because it sounds less biomedical than the alternatives. The term 'advanced' is also perhaps the most widely used in the palliative care literature.[42, 43]

Advanced dementia is marked by profound memory deficits (e.g., inability to recognise family members), minimal verbal abilities, inability to ambulate independently, inability to perform any activities of daily living, and urinary and faecal incontinence.[44] There is widespread agreement that best practice care for people with advanced dementia requires a palliative approach.[45-48] According to the World Health Organization (WHO), palliative care should *"improve the quality of life of individuals and their families…by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial, cultural and spiritual needs"* (World Health Organization, 2019).[49] This holistic approach seeks neither to shorten nor extend life; its focus is to enhance quality of life.[50]

Figure 1.1 highlights how the focus of care should move from life prolongation to maximising comfort when people reach the advanced ('severe') stage of dementia. A palliative approach may need to continue for many months in the lead-up to death.[51]

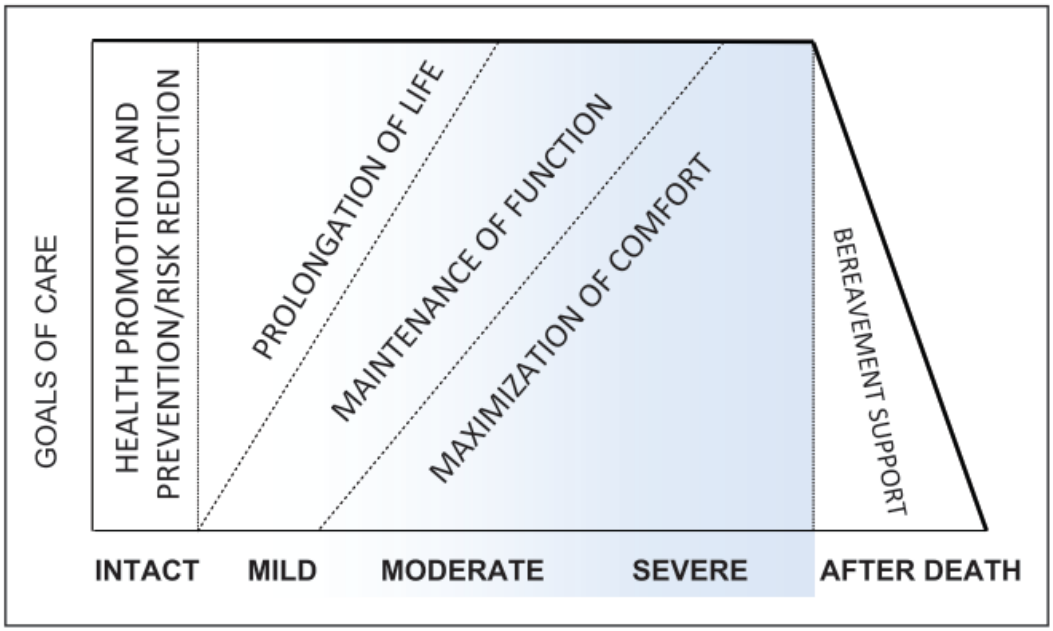

Figure 1.1 Dementia progression and prioritising of care goals (sourced from Van Der Steen et al. 2014[43])

As dementia progresses to the advanced stage and the goals of care become palliative, it is important to reassess medications with a view to deprescribe any for which the potential or actual harms likely outweigh the benefits, especially when the time needed for the drug to be beneficial is more than the life expectancy of the person.[52]

Whilst some medications should be discontinued in the palliative phase, new medications may be indicated to control symptoms such as breathlessness, nausea and pain.[52] Unfortunately, research on symptom management suggests that medications such as analgesics are likely to be under-prescribed in the context of advanced dementia because carers and clinicians fail to recognise that the individual is in pain.[53-55] This is despite the availability of validated assessments for pain in people with cognitive impairment (e.g. Abbey Pain Scale[56]) which help carers identify pain through behavioural observation.

In 2014, the European Association for Palliative Care (EAPC) published a position paper outlining the palliative care needs of people with dementia as distinct from those of other groups, an important milestone.[43] The EAPC's recommendations around medication use are limited but include that medications for comorbid conditions should be regularly reviewed in light of goals of care, estimated life expectancy, and the effects and side effects of treatment. Antibiotic use is recommended only if focused on increasing comfort by alleviating symptoms of infection. The EAPC's final recommendation in relation to medications was that both pharmacological and non-pharmacological treatment of physical symptoms, challenging behaviour or discomfort should be pursued as needed.

While a palliative approach is considered best practice for people with advanced dementia, a person-centred approach to care acknowledges that dementia is experienced and progresses in ways that vary from person to person, requiring decision-making to be focused on the individual rather than diagnosis.

1.4.3 Advanced dementia as a unique context for potentially inappropriate prescribing

People with advanced dementia may be at special risk of medication harm due to pathophysiological changes associated with the disease.[57] Frailty is a geriatric syndrome with the main features of age-related decline in multi-system physiological reserve and reduction in the ability to tolerate external and internal stressors, leading to vulnerability to adverse health outcomes. A systematic review and meta-analysis demonstrated that baseline physical frailty is a statistically significant predictor of dementia.[58] Additionally, people with advanced dementia experience an exaggerated decrease in total body water and muscle and an increase in relative adipose tissue.[59] These changes have a direct and variable impact on absorption and bioavailability, distribution, binding,

biotransformation and elimination of drugs that are additional to changes due to ageing.[60] This means that people with advanced dementia may be more prone to adverse drug reactions and drug-drug interactions than other older people.[61]

The cognitive impairments associated with advanced dementia also mean that affected people are less able to identify adverse effects and participate in shared decision-making about prescribing than their typically ageing counterparts or people with early stage dementia. These challenges mean that a proactive and specialised approach may be needed to identifying PIP for people with advanced dementia, and that surrogate decision-makers – usually family – are likely to be involved in medication-related decisions.

Few studies have explored PIP in the context of advanced dementia who are nearing the end of life, despite the potential to improve quality of care.[60]

1.4.4 Potentially inappropriate prescribing in long-term care residents with advanced dementia

More than half (52%) of all Australians in LTC have a dementia diagnosis,[62] and almost half (49%) of people with dementia live in LTC.[63] People with dementia were more likely to require a high level of assistance in activities of daily living, behaviour support and complex healthcare needs compared to LTC residents without dementia.[63]

Unfortunately, care for LTC residents with advanced dementia is often suboptimal due to inadequate support and training for staff, a shortage of resources, understaffing and high staff turnover.[31, 50, 64] Staff often fail to understand that a palliative approach to care is needed, with the result that residents with advanced dementia are frequently admitted to hospital and subject to distressing and invasive treatments that will adversely affect their quality of life.[60] They also may not be given the same level of symptom relief as other

residents facing illnesses that are more immediately identified as requiring terminal care, such as cancer.[65]

It has been found that LTC residents with advanced dementia are often maintained on medications for other chronic conditions that fail to take into account the resident's global condition.[66] Their complex medical profile with additional comorbidities and burdensome medication regimens, the unpredictable nature of dementia progression, and their diminished ability to communicate their needs due to decreased cognitive abilities make it difficult to monitor and maintain appropriate medication management. Further research is therefore needed that more specifically explores PIP in the context of LTC residents with advanced dementia.

Two studies have compared PIP in LTC residents with dementia versus those without, both of which have found few differences.[67, 68] After adjusting for number of prescriptions, socio-demographic factors, and multiple comorbid conditions, Zuckerman et al (2005) found residents with dementia to be more likely than residents without dementia to receive a PIM before but not after admission to LTC.[67] A further study by Raivio et al (2006) found that neither the proportions nor types of PIMs varied between LTC residents with and without dementia.[68] However, neither study looked specifically at PIP in advanced dementia.

1.4.1 Interventions to improve quality use of medicines in long-term care

A Cochrane review investigating the effect of interventions to optimise QUM in LTC found four different intervention styles within 12 included studies.[69] Interventions were diverse and often multifaceted. Ten studies reported the effect of medication review, four studies evaluated the use of interdisciplinary case-conferencing, five studies involved

education to health and care professionals, and one study evaluated the use of a clinical decision support technology. Authors were unable to draw conclusions on which intervention style was most effective, however they found that such interventions may lead to reduced days in hospital, slower decline in quality of life measures, identification of medication related problems and improvement in medication appropriateness.

1.4.2 Deprescribing

In the recent literature on pharmaceutical care, the term 'deprescribing' has emerged. Deprescribing has been defined as "the systematic process of identifying and discontinuing drugs in instances in which existing or potential harms outweigh existing or potential benefits within the context of an individual patient's care goals, current level of functioning, life expectancy, values, and preferences" (Scott et al. 2015, p. 827).[70] The goal of deprescribing is to reduce medication burden, harm and costs, while maintaining QOL. Although the choice of medication treatment may have been inappropriate when first prescribed, the more common scenario is that the changing context of a patient's health, goals of treatment and situation may mean ongoing medication use becomes inappropriate. Hence the importance of regular review of a patient's medication regimen so that those medications no longer necessary or posing unacceptable risk of harm should be considered for deprescribing.[71] Increasing recognition of PIP and polypharmacy has led to a commensurate emphasis on deprescribing to improve QUM in older adults.

A systematic review found that the most prominent barriers to deprescribing for people with life-limiting diseases like dementia were shortages in staff in LTC facilities and the perceived difficulty or resistance of the nursing home resident's family – or the resident themselves. [72] While these barriers exist, enablers to deprescribing were organisational support (e.g. for standardized medication review), involvement of multidisciplinary teams

in medication review and the perception of the importance of coming to a joint decision regarding deprescribing, which highlighted the need for interdisciplinary collaboration and involving the patient and their family in the decision-making process. [72] Further research is required to determine if patient-centred deprescribing processes will result in improved patient outcomes.Qualitative studies have also explored GP perspectives on what influences their medication-related decision-making, particularly deprescribing in the LTC setting. [73, 74] A qualitative study undertaken in New Zealand using semi-structured interviews found that GPs perceived the uncertainty of research evidence in older people and social factors such as specialists' and nurses' influences were among the major challenges.[73] Deprescribing enablers encompassed support for GPs awareness and knowledge, improvement in communication between multiple prescribers, adequate reimbursement, and pharmacists being involved in the multidisciplinary team.[73] Additionally, an Australian qualitative study called the RELEASE study sought to explore perceptions of medication use and the concept of deprescribing in LTC. GPs saw a willingness to initiate and accept medication change was dependent on the GP,[74] who emerged as a central trusted figure. GPs preferred 'the path of least resistance,' signalling systems barriers (poor uniformity of LTCF medical records, limited trained LTCF personnel); time constraints (resident consultations, follow-up with specialists and family); and the organisation of care (collaborating with LTC staff, pharmacists and prescribing specialists) as obstacles to deprescribing.[74] Further research looking at health professional perspectives is needed to identify any additional barriers and enablers to deprescribing specific to LTC residents with advanced dementia. Recent intervention trials to reduce inappropriate psychotropic use in Australian long-term care residents with dementia of all stages.

The agents most commonly used to provide chemical restraint in LTC are antipsychotics (risperidone, quetiapine and olanzapine) and benzodiazepines (oxazepam and temazepam). Other psychotropics, such as sedating antidepressants (such as mirtazapine) and anti-epileptics, are also used to restrain residents.

A 2014 report from Dementia Australia estimated that about half of all LTC residents, and up to 80% of residents with dementia were receiving at least one psychotropic medication (i.e. antipsychotic or benzodiazepine).[75] Analgesic medication has been shown to be as effective as antipsychotics in treating agitation in dementia, suggesting that apparent behavioural and psychological symptoms of dementia (BPSD) are sometimes expressions of pain that abates when the underlying cause is managed.[76] The extent of suboptimal psychotropic prescribing in Australian LTC has gained significant attention, with large intervention trials developed to reduce their use.[77] In particular, the Reducing Use of Sedatives (RedUSe) programme,[78, 79] and Halting Antipsychotic use in Long Term Care (HALT) study[80, 81] funded by the Department of Health demonstrated the importance of shared decision-making and the value of pharmacists in reducing inappropriate use of psychotropic agents.

In the RedUSE programme, 150 LTC facilities participated, including 12,157 residents. Pharmacists conducted audits on psychotropic medications, provided education to LTC staff, and undertook two reviews at three and six month stages of the study. The intervention reduced the use of antipsychotics by 13%, and regularly prescribed benzodiazepines by 21%.

The HALT study aimed to identify the reasons that antipsychotics were inappropriately prescribed for LTC residents with dementia and to determine the feasibility of an interdisciplinary approach to reduce antipsychotic use. The study involved educating

nurses, pharmacists, GPs and psychologists about managing BPSD and reducing antipsychotic use.[81] Residents taking a regular antipsychotic for three or more months without a psychotic illness or severe BPSD were recruited into the study. The intervention included nurse 'champions' at the facilities who were trained in how to manage BPSD symptoms using person-centred, non-pharmacological approaches, and to pass learnt knowledge onto other nurses. GPs reviewed antipsychotic use and followed an individualised deprescribing protocol established by pharmacists to reduce the dose or deprescribe where appropriate. Of the total sample of 133 residents taking regular antipsychotics, 105 were no longer using an antipsychotic at their final assessment.

Additionally, a systematic review evaluated the effectiveness of interventions to reduce PIP of antipsychotics in people with dementia in LTC.[82] Twenty-two studies evaluating the effectiveness of education programs, in-reach services, medication review and multicomponent interventions were included. Beneficial effects were seen in nine of the eleven studies, the most robust studies reaching reductions in antipsychotic prescribing levels between 12% and 20%.

1.4.3 Australian long-term care context at the time this thesis was written

An independent Review of National Aged Care Quality Regulatory Processes undertaken in October 2017[83] examined the effectiveness of LTC frameworks and regulatory processes at ensuring vulnerable older Australians receive quality care, in light of care failures at the Makk and McLeay wards providing care to people with a dementia diagnosis at the Oakden Older Persons Mental Health Facility and LTC facility in South Australia.[84] The review examined Commonwealth aged care accreditation, monitoring, review, investigation, complaints and compliance processes. Ten recommendations were

provided, with the Australian Government immediately implementing recommendation eight - unannounced audit visits.

In the Australian government system, a royal commission is the highest form of inquiry on matters of public importance. The Royal Commission into Aged Care Quality and Safety opened in January 2019 and will run for approximately 18 months, with a final report and recommendations due by April 2020. The Royal Commission is now inquiring into the quality of care provided in LTC, following consultation with the LTC sector and the community. One area of particular interest is the challenge of supporting the increasing number of people entering LTC with a dementia diagnosis, and whether the healthcare system is addressing their specific care needs.

From 1 July 2019, organisations providing Commonwealth subsidised LTC services are required to comply with the newly developed Aged Care Quality Standards. Organisations will be assessed and must be able to provide evidence of compliance with and performance against these standards.[85] In particular, Standard 3 promotes the application of best practice in care and services to reach the needs, goals and preferences of consumers nearing the end of life, maximising comfort and dignity. Effectively managing medications safely to prevent medication errors and adverse events is stated among the Standard requirements. The need to reduce inappropriate use of psychotropics as a chemical restraint is also featured.

Shortly before submitting this thesis, The Royal Commission into Aged Care Quality and Safety released its Interim Report,[86] which identified three areas requiring immediate action, including a need to reduce an over-reliance on chemical restraint (i.e. psychotropic use) in LTC. The Commission found that 90% of cases of psychotropic use were not clearly justified. This finding represents a culmination of attention given to over-

prescribing of psychotropics for people with dementia in LTC over the last decade or more, and highlights a need to also consider the influence of LTC systemic issues on PIP relating to other types of medication that have hitherto received less atteneeetion, especially within the context of dementia at the advanced stage.

1.5 Current thesis

1.5.1 Research aim

The aim of this PhD programme was to explore current practice regarding QUM for LTC residents with advanced dementia and identify ways in which it might be improved.

1.5.2 Research questions

Three research questions were posed to guide this study:

1. What systems exist for identifying potentially PIP in the context of advanced dementia? *(Chapter 2)*
2. What is the prevalence of PIMs in Australian LTC residents with advanced dementia? (*Chapter 3)*
3. How can QUM be improved for people in this group? *(Chapters 4, 5 and 6)*

1.5.3 Research design

A multiple methods design was considered the ideal methodology to answer the research questions. A multiple methods design involves the conduct of two or more research methods, each conducted rigorously and complete in itself, in one project.[87, 88] Each study used a quantitative or qualitative approach. However, the programme's design cannot be described as mixed methods because quantitative and qualitative studies answered different research questions and no methods were used to formally integrate findings.[89,

[90] Table 1.1 summarises the thesis programme, including research questions, methods, the chapters in which corresponding reports can be found, and research outputs.

Table 1.1 Overview of studies conducted as part of this thesis programme

Research Questions	Study and methods	Chapter	Publication output
1. What systems are there to define and identify PIP in the context of advanced dementia?	Study 1: Systematic review	Chapter 2	Disalvo et al (2016)[91]
2. What is the prevalence of PIMs in Australian LTC residents with advanced dementia?	Study 2: Cross-sectional medication chart audit	Chapter 3	Disalvo et al (2018)[92]
3. How can QUM be improved for people in this group?	Study 3: In-depth interviews with pharmacists	Chapter 4	Disalvo et al (2019)[93]
	Study 4: Focus groups with health professionals from different specialties and disciplines	Chapter 5	(Recently accepted for publication in European Journal of Clinical Pharmacology) [accepted 9 December 2019]

1.5.4 Thesis outline

Chapter 1 introduces the purpose and significance of the doctoral programme. It provides an introduction to QUM within the context of the medical care of LTC residents with advanced dementia, who require a palliative approach to care. Chapter 1 also provides a summary of the doctoral thesis structure and significance.

Chapter 2 reports a systematic review of the literature aimed at identifying systems used to identify PIP in the context of LTC residents with advanced dementia.

Chapter 3 reports on a retrospective cross-sectional medication chart audit of medication charts to explore the prevalence of PIMs in Australian LTC residents with advanced dementia living in 20 LTC facilities in Sydney and Brisbane.

Chapter 4 reports on in-depth interviews with community pharmacists regarding strengths and weaknesses of the RMMR and how it might be better utilised to improve QUM for LTC residents with advanced dementia.

Chapter 5 reports on focus groups with health professionals from different specialities and disciplines exploring the decision-making process around initiation, continuation and deprescribing of medicines for LTC residents with advanced dementia.

Chapter 6 discusses recommendations for policy and healthcare practice arising from a synthesis of findings from the interviews and focus groups with other research and Australian initiatives, as well as foci for future research.

1.5.5 Significance

Avoidance of PIP should be a fundamental principal in LTC. This doctoral programme highlights broader problems regarding suboptimal medication use for LTC residents with advanced dementia. Minimising adverse events arising from PIP for LTC residents with advanced dementia is critically important not only from the perspective of the residents and families involved but also the healthcare system.

As highlighted above, the final year of life for people with advanced dementia is characterised by a trajectory of chronic and severe disability. Their complex medical profile with additional comorbidities and burdensome medication regimens, the unpredictable nature of dementia progression, and their diminished ability to communicate their needs due to decreased cognitive abilities makes it imperative that a proactive approach to medication management is undertaken.

The reported series of studies undertaken as part of this doctoral programme highlights the extent of PIP for LTC residents with advanced dementia in Australian LTC as well as

the complex factors involved in optimising medication-related decisions, and the systemic barriers that have contributed to suboptimal QUM for our most vulnerable citizens. The final chapter of this thesis highlights the need for policies and models of practice to improve QUM via interdisciplinary collaboration in order to meet complex needs of LTC residents with advanced dementia, as well as areas for future research.

1.6 Timeline of thesis mapped against changes in relevant policy and research

During the six years over which this doctoral programme was undertaken part-time, the quality of care in Australian LTC became a growing concern. To elucidate this context, a timeline is presented below (Table 1.2) that highlights key changes in policy and advances in research over this period mapped against progression of the doctoral programme.

Table 1.2. Timeline of policy changes and advances in research over the course of the doctoral programme.

Year	Policy	Research	PhD programme
2014			*January 2014* Cross-sectional medication audit: Data collection continues as part of IDEAL study (Chapter 3)
		March 2014 The Use of Restraints and Psychotropic Medications in People with Dementia: A Report For Alzheimer's Australia[75]	
		4 July 2014 White paper defining optimal palliative care in older people with dementia: a Delphi study and recommendations from the European Association for Palliative Care[43]	
2015	*1 July 2015* Sixth Community Pharmacy Agreement between the Commonwealth Government of Australia and the Pharmacy Guild of Australia[94] - Changes to RMMR rules - reviews to be undertaken biannually instead of annually per resident.		*November 2015 – July 2016* Pharmacist interviews: Data collection and facilitation (Chapter 4)

2016		*February 2016* Clinical Practice Guidelines and Principles of Care for people with Dementia[64]	
			31 May 2016 Publication: "Systems to identify potentially inappropriate prescribing in people with advanced dementia: a systematic review"[91] (Chapter 2)
		13 July 2016 Medication Appropriateness Tool for Comorbid Health conditions during Dementia (MATCH-D) tool[95]	
			September 2016 – February 2017 Focus groups: Recruitment and facilitation (Chapter 5)
2017		*15 January 2017* Halting Antipsychotic use in Long Term Care (HALT) project[80, 81] - Australian government funded project to reduce the use of sedative and antipsychotic medications in LTC.	
	October 2017 Review of National Aged Care Quality Regulatory Processes[83]		
2018	*February 2018* Evidence-based Clinical Practice Guidelines for Deprescribing Cholinesterase Inhibitors and Memantine in People with Dementia[96]		
		14 May 2018 Reducing Use of Sedatives (RedUSe) project[78] Australian government funded project achieved a significant reduction in sedative prevalence and a decrease in average sedative dose in LTC.	
	21 June 2018 Quality Use of Medicines to Optimise Ageing in Older Australians: Recommendations for a National Strategic Action Plan to Reduce Inappropriate Polypharmacy[97]		

		29 August 2018 Psychotropic medicines use in Residents and Culture: Influencing Clinical Excellence (PRACTICE) tool[98]	
	16 September 2018 The Royal Commission into Aged Care Quality and Safety is established to look at the quality of care provided in LTC for senior Australians.		*10 November 2018* Publication: "Potentially inappropriate prescribing in Australian nursing home residents with advanced dementia: A substudy of the IDEAL study"[92] (Chapter 3)
2019	*17 January 2019* Aged Care Restraint Regulation to Protect Senior Australians – Media Release[99] - Australian Government's new Aged Care Quality Standards – the first upgrade of standards in 20 years – also stipulate best-practice clinical care to minimise the use of chemical and physical restraint. The new Standards will come into full force 1 July 2019. *February 2019* Pharmacists in 2023: For patients, for our profession, for Australia's health system[100] *10 April 2019* The Oakden Report[84] *July 2019* Australian Aged Care Quality Standards[101]		*23 May 2019* Publication: "Pharmacists' perspectives on medication reviews for long-term care residents with advanced dementia: a qualitative study"[93] (Chapter 4)

	August 2019 Pharmacists in 2023: Roles and Remuneration - valuing the contribution pharmacists make to patient care[102] *September 2019* Guidance and Resources for Providers to support the Aged Care Quality Standards[85]	*15 October 2019* Fading Away: How Aged Care Facilities in Australia Chemically Restrain Older People with Dementia[103]	*9 December 2019* Accepted for publication: "Multidisciplinary perspectives on medication-related decision-making for people with advanced dementia living in long-term care: a critical incident analysis" (Chapter 5) *December 2019* Thesis submission
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Chapter 2: Systems to identify potentially inappropriate prescribing in people with advanced dementia: a systematic review

Chapter 1 provided an introduction of the quality use of medicines (QUM), the need to improve care for long-term care (LTC) residents with advanced dementia, and overview of the research topic and design. This chapter reports on a systematic review that aimed to identify and synthesise published systems for identifying potentially inappropriate prescribing (PIP) for people with advanced dementia.

This systematic review was published in 2015 in *BMC Geriatrics*, an open access peer-reviewed scholarly journal with an impact factor of 2.818.

> **Disalvo D,** Luckett T, Agar M, Bennett A, Davidson PM. Systems to identify potentially inappropriate prescribing in people with advanced dementia: a systematic review. BMC geriatrics. 2016;16(1):114.

This journal targets all aspects of the health and healthcare of older people including the effects of healthcare systems and policies.

This chapter contains an edited version of the published systematic review to conform to thesis guidelines (Appendix 1).

2.1 Introduction

As detailed in Chapter 1, a palliative approach focusing care on comfort and minimising suffering is considered best practice for people with advanced dementia.[1, 2] Integral to a palliative approach, is the use of medications to relieve symptoms where no non-

pharmacological alternative is available. In the palliative context medications are prescribed when adverse effects are outweighed by the likelihood of benefits that fall within the individual's life expectancy.[3] People with advanced dementia are particularly vulnerable to adverse drugs reactions as they undergo extreme physiological changes (in addition to those of normal ageing) that affect the way medications are metabolised in the body.[4-6]

Several systems including frameworks, guidance, criteria and recommendations for identifying PIP in older adults have been developed to operationally define the harm/benefit risk in clinical practice and research.[7, 8] Clinicians are encouraged to use these criteria to help determine whether medications are appropriate for older adults. These criteria include the Beers criteria,[7] START (Screening Tool to Alert doctors to the Right Treatment),[9] STOPP (Screening Tool of Older Persons' potentially inappropriate Prescriptions),[9] Drug Burden Index (DBI),[10] and Medication Appropriateness Index (MAI).[11] These criteria can inform medication reviews and medication-related decisions. These systems have been applied in early but not advanced dementia.[12, 13] Generalisability to people with advanced dementia is limited by pathophysiological changes as dementia progresses and the fact that systems have not been developed for use where goals of care are palliative.

A review by Parsons et al. (2010) summarised literature on specific medication types proposed to be potentially inappropriate for people with dementia nearing the end of life, and examined decision-making regarding deprescribing.[4] Use of potentially inappropriate medications (PIMs) was identified to include the use of acetylcholinesterase inhibitors, memantine, antipsychotics, lipid-lowering agents, antibacterials, antihypertensive agents, antihyperglycaemic agents, anticoagulants and medications to manage osteoporosis.

Parsons et al. highlighted the lack of guidance on identifying PIP in this population, and on when and how to safely discontinue medications at the end of life.[4]

2.2 Aim

To update the review by Parsons et al. using a systematic methodology to identify and synthesise studies using systems for identifying PIP for people with advanced dementia.

2.3 Methods

The methods and results are reported according to criteria laid out in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist.[14]

2.3.1 Eligibility criteria

To be included, articles needed to be published in an English language peer-reviewed journal and report on a study using a system for identifying the appropriateness or otherwise of medications for people with advanced dementia or with dementia in the palliative care context. The latter criterion was included to allow for the possibility that stage of dementia was not reported. 'System' was defined broadly to include any framework, guidance, criteria or recommendations, however formulated. No limitation was placed on study methodology. PIP was defined as a prescribing practice considered to be suboptimal with regard to overprescribing, under-prescribing, or poor choice of medication. This includes if: 1) evidence of the medications efficacy is insufficient; 2) the potential adverse drug effects are likely to outweigh the potential benefits of the medication; or 3) a safer alternative is likely to be available.[15] PIMs was considered to be a subset of PIP whereby a medication type is likely to have an unfavourable balance between the benefit and harm they cause for a person.[16]

2.3.2 Information sources

Electronic databases were searched in October 2014, including Medline (OVID), CINAHL, the Cochrane Database of Systematic Reviews and AMED. Reference lists of the review by Parsons et al. (2010) and included articles were searched by hand.

2.3.3 Searches

Database searches used keyword searches and medical subject headings (MeSH) based on terms used by Parsons et al. with further terms recommended by the Australian online palliative care knowledge network, CareSearch (see Table 2.1). The Medline (Ovid) search strategy is provided in Appendix 2.

Table 2.1 Electronic database search terms used to find articles reporting on systems to identify potentially inappropriate prescribing for people with advanced dementia

Parsons et al. (2010)[4] search terms:	
medication(s) medicine(s)' discontinue, discontinuation withhold(ing) withheld withdraw	withdraw(al) dementia severe dementia end of life palliative care nursing home
Terms recommended by the Australian online palliative care knowledge network, CareSearch were further included [17]:	
Inappropriate prescri* inappropriate med* medication management medication review medic* of risk terminal care	hospices hospice patients hospice care deprescrib* prescribing patterns polypharmacy

*Truncation used to ensure all variations and different spelling of words were retrieved.

2.3.4 Study selection

The student and one supervisor independently applied the eligibility criteria to 10% of search results and checked inter-rater reliability. After finding 100% agreement, a single investigator rated the remaining 90% articles alone. Full-texts were reviewed where a decision could not be made on abstract and title alone.

2.3.5 Data collection and items

Data were extracted from eligible studies by the student using a standardised template. Data items extracted included: study design, aims, setting, sample size and characteristics, details of the approach taken to identifying PIP, and outcome variables related to inappropriate prescribing.

2.4 Risk of bias in individual studies

The comprehensiveness of reporting in studies was assessed using the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) checklist.[18] Any disagreements were resolved via discussion.

2.5 Synthesis

Expected heterogeneity among designs and methods meant that synthesis needed to be narrative rather than via meta-analysis. Methods for narrative synthesis were based on techniques described by Popay et al. (2006) and included tabulation and textual summation.[19]

2.6 Results

2.6.1 Study selection

Database searches identified 882 records once duplicates were removed. Five articles were included for analysis from electronic database searches,[20-24] and a further three articles were additionally identified through hand searching.[25-27] See Figure 2.1 for more details.

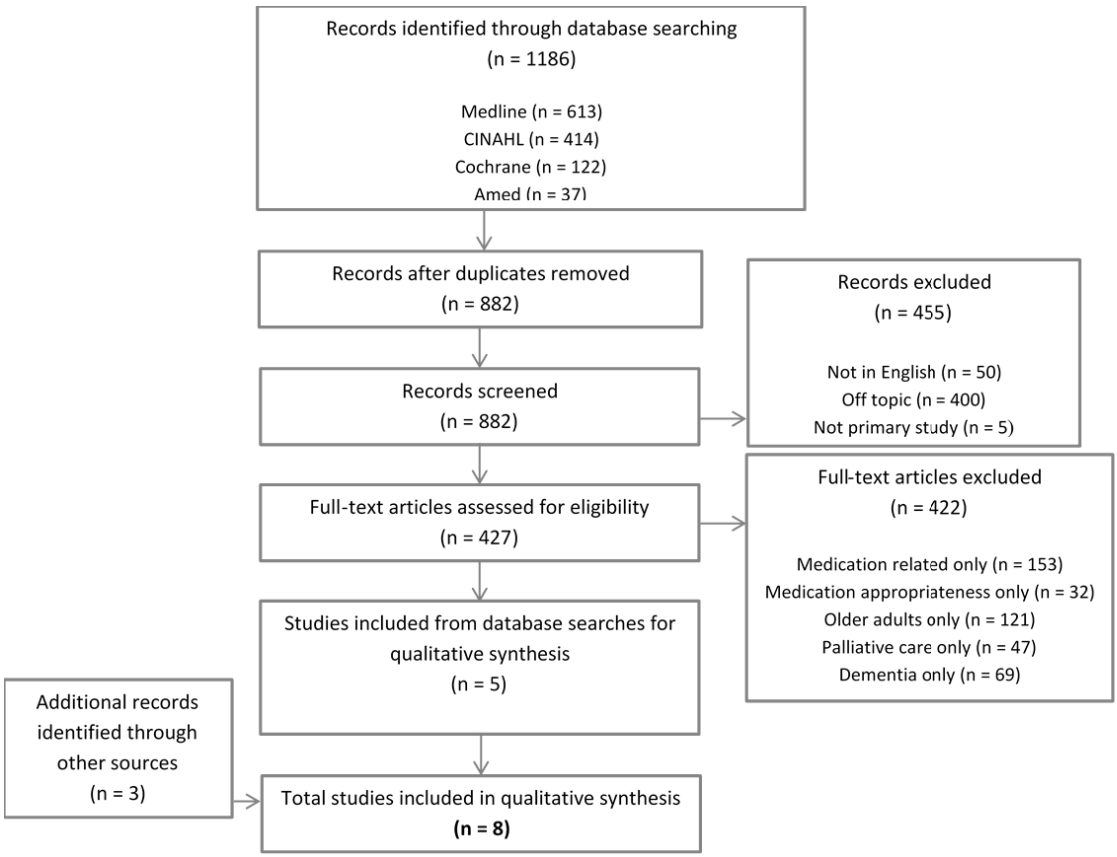

Figure 2.1 Flowchart of article screening

2.6.2 Study characteristics

Characteristics of the eight studies included in this review are summarised in Table 2.3. The studies variously aimed to: 1) determine the prevalence of PIP for LTC residents with advanced dementia,[20-23, 25, 27] 2) identify the factors associated with likelihood of PIP,[21-

[23, 25, 27] and 3) explore the perceptions of healthcare professionals regarding factors determining medication-related decision-making in this population.[24, 26]

Five studies were undertaken in the USA,[20-22, 24, 27] and three were undertaken in European countries.[23, 25, 26] Study designs included two cross-sectional surveys,[24, 26] three prospective cohort studies,[20, 22, 23] one of which reported the cross-sectional results of medication data collected at baseline,[23] two retrospective clinical record audits,[25, 27] and one combining a retrospective clinical record audit with a consensus panel component.[21]

Six studies analysed medication data from a total of 7,457 participants with advanced dementia, their age ranging from 57 to 100 years of age and the majority being female, ranging from 55.2%[20] to 87.5%[22] of their samples. Of these, four studies focused solely on LTC facilities,[20-22, 25, 27] while two also included people with advanced dementia receiving home care.[23, 25]

Table 2.2 Summary of eight studies included in the systematic review which used a system to identify potentially inappropriate prescribing for people with advanced dementia or dementia receiving palliative care

First Author, Year	Country	Aim(s)	Design	N at baseline	Setting	Approach to identify inappropriate medications	Medication variables	Results
Studies which use number of medications as indication of potentially inappropriate prescribing i.e. polypharmacy								
Blass et al. 2008[20]	USA (Baltimore)	Identify how medication use changed over time as residents approach death. Identify correlates of increased medication use.	Prospective cohort study (longitudinal)	125	3 LTC facilities	Number of medications prescribed i.e. polypharmacy.	Number of medications prescribed (regular + prn) at baseline, and factors associated with total number of medications.	Residents prescribed 14.6 medications each. Increase in opioid use and decrease in antibiotics, anti-dementia agents, cardiovascular agents and psychotropics as death approaches. No change in number of medications over time.
Studies using explicit criteria to identify potentially inappropriate prescribing								
Holmes et al. 2008[21]	USA	Feasibility of developing consensus recommendations for appropriate prescribing for residents with advanced dementia.	Modified Delphi consensus panel, and medication record audit (cross-sectional)	12 geriatricians; 34 residents	3 LTC facilities	Geriatricians categorised medications into levels of appropriateness (i.e. never, rarely, sometimes and always).	Determine frequency of inappropriate prescribing using developed explicit criteria.	Residents taking 6.5 medications each. Six residents taking ten or more medications daily. 29% of patients taking a never appropriate medication.

First Author, Year	Country	Aim(s)	Design	N at baseline	Setting	Approach to identify inappropriate medications	Medication variables	Results
Tjia et al. 2010[22]	USA (Chicago)	Describe pattern and factors associated with daily medication use.	Prospective cohort study (longitudinal)	323	22 LTC facilities	Use of medications classified as never appropriate by Holmes et al. (2008) criteria	Resident characteristics associated with the use of daily medications and drugs deemed inappropriate.	Male, shorter length of stay at facility (<1 year), higher functional status and diabetes independently associated with inappropriate drug use. Having a DNR order independently associated with lower likelihood of inappropriate drug use.
Colloca et al. 2012[25]	7 EU countries (Czech Republic, England, Finland, France, Germany, Italy, The Netherlands) and Israel	Identify prevalence and factors associated with use of inappropriate drugs.	Medication chart audit (cross-sectional)	1449	57 LTC facilities	Use of medications classified as rarely or never appropriate by Holmes et al. (2008).	Inappropriate drug use defined as rarely or never appropriate in patients with severe cognitive impairment based on the Holmes et al. (2008).	Inappropriate drug use in 44.9% of residents. Most commonly prescribed inappropriate drugs were lipid-lowering agents (9.9%), antiplatelet agents (9.9%), Acetylcholinesterase inhibitors (7.2%) and antispasmodics (6.9%). Inappropriate drug use associated with diabetes, HF, stroke, recent hospitalisation. An inverse relationship between inappropriate drug use and geriatrician at facility.
Toscani et al. 2013[23]	Italy	Assess and compare medication use between residents in LTC compared to home care.	Baseline data from multicentre prospective observational cohort study	245	LTC facilities	Used Holmes et al. (2008) criteria.	The appropriateness of each prescription assessed according to Holmes et al. (2008).	Patients received 4.1 medications on average (range 0 – 13). Laxatives, antipsychotics, and anxiolytics were the most frequently prescribed in LTC. 8.1% of residents receiving at least one analgesic.

First Author, Year	Country	Aim(s)	Design	N at baseline	Setting	Approach to identify inappropriate medications	Medication variables	Results
Tjia et al. 2014[27]	USA	Estimate prevalence of medications with questionable benefit.	Medication record audit (cross-sectional)	5406	LTC facilities	Medications classified as never appropriate by Holmes et al. (2008)	Use of PIM using Holmes et al. (2008) classification.	53.9% of residents receiving at least one medication with questionable benefit. Acetylcholinesterase inhibitors (36.4%), memantine (25.2%) and lipid-lowering agents (22.4%) most commonly prescribed never appropriate medications.
Other approaches to identify inappropriate prescribing								
Shega et al. 2009[24]	USA	Describe hospice medical directors practice patterns and experiences in the use and discontinuation Of acetylcholinesterase inhibitors and memantine in hospice patients with dementia.	Mail survey (cross-sectional)	152 (hospital medical directors)	Hospice care	NA	Analysing physician recommendations on medication discontinuation based upon reported clinical benefit of acetylcholinesterase inhibitors and memantine.	Of respondents, 75% and 33% reported at least 20% of patients were taking acetylcholinesterase inhibitors or memantine at hospice admission. 80% of respondents would recommend discontinuation of both agents. A subset would continue their use believing they stabilise cognition (22%), decrease challenging behaviours (28%), maintain patient function (22%,) reduce caregiver burden (20%) and improve caregiver quality of life (20%).

First Author, Year	Country	Aim(s)	Design	N at baseline	Setting	Approach to identify inappropriate medications	Medication variables	Results
Parsons et al. 2014[26]	NI (Northern Ireland), RoI (Republic of Ireland)	Evaluate the extent to which patient-related factors and physicians' country of practice influence decision-making regarding medication use in patients with end-stage dementia.	Factorial survey design	662 (health professionals)	Community, LTC facilities, hospital	Medications selected due to contradictory evidence available to guide practice or because they have been identified in the limited literature as potentially inappropriate in the context of advanced dementia i,e. antibiotics, acetylcholinesterase inhibitors, memantine, lipid-lowering agents and antipsychotics.	Assess physician decision-making regarding continuation/ discontinuation of key medications in end-stage dementia.	Considerable variability found regarding initiating/withholding antibiotics and continuing/discontinuing acetylcholinesterase inhibitors and memantine. Less variability found in decision-making regarding lipid-lowering agents and antipsychotics. Patient place of residence and physician country of practice had the strongest and most consistent effects on decision-making.

DNR, do not resuscitate; HF, heart failure; LTC, long-term care; N, number; NA, not applicable; PIM, potentially inappropriate medication; prn, pro re nata

2.6.3 Risk of bias within studies

The eight studies were generally of high quality as rated by the STROBE checklist,[18] complying with 76%[21] to 100%[22, 27] of criteria. One study did not indicate the design in the title or abstract,[23] and another did not sufficiently explain a larger study's design from which their data were drawn.[25] Four studies did not give a rationale for sample size.[20, 21, 25, 26] Three studies did not attempt to address potential sources of bias.[20, 21, 26] These same three studies also provided limited descriptions of statistical methods or how they dealt with missing data. Three studies did not provide unadjusted results for their multivariate analyses,[21, 23, 25] and one controlled only for gender and age rather than other socio-demographic, clinical and LTC facility variables.[23] Two studies did not discuss the generalisability of their results.[23, 24]

2.6.4 Synthesis of results

Five of the eight studies[21-23, 25, 27] used the same system for identifying PIP – one developed by the Palliative Excellence in Alzheimer Care Efforts (PEACE) Program reported by Holmes et al. (2008).[21] In the PEACE program, medications were audited for 34 patients with advanced dementia where a palliative approach was deemed appropriate. In a three-round modified Delphi process, 12 geriatricians rated each medication identified via the audit as 'never', 'rarely', 'sometimes' or 'always' appropriate. Consensus for a medication or medication class was defined as agreement on categorisation by >50% (i.e. at least 7/12) participants. See Table 2.4 for drug classes in each category according to the final consensus.

Table 2.3 Appropriateness of medications as defined by the Palliative Excellence in Alzheimer Care Efforts consensus panel

Always appropriate		
Antidiarrheals	Antiepileptic drugs	Expectorants
Laxatives	Anxiolytics	Lubricating eye drops
Antiemetics	Narcotic analgesics	Pressure ulcer products
Inhaled bronchodilators	Nonnarcotic analgesics	Lidoderm
Sometimes appropriate		
Proton pump inhibitors	Antidepressants	Insulin
Histamine-2 receptor blockers	Tricyclic antidepressants	Antihistamines
Beta-blockers	Antibacterials	Decongestants
Calcium channel blockers	Antivirals	Electrolytes
Diuretics	Antiparasitic agents	Nutritional supplements
Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers	Antifungal creams	Antiglaucoma drops
Nitroglycerin	Oral hypoglycaemics	Anti-inflammatory eye drops
Mucolytics	Thyroid hormones	Capsaicin
Inhaled corticosteroids	Antithyroid medications	Allopurinol
Antipsychotics	Corticosteroids	Colchicine
Rarely appropriate		
Alpha blockers	Antiandrogens	Appetite stimulants
Digoxin	Bisphosphonates	Bladder relaxants
Clonidine	Mineralocorticoids	Tamsulosin
Antiarrhythmics	Heparin and low molecular-weight heparins	Antispasmodics
Hydralazine	Warfarin	
Never appropriate		
Lipid-lowering medications	Memantine	Cytotoxic chemotherapy
Antiplatelet agents, excluding aspirin	Antiestrogens	Hormone antagonists
Leukotriene receptor antagonists	Sex hormones	Immunomodulators
Acetylcholinesterase inhibitors		
No consensus		
Aspirin	Meclizine	Bladder stimulants
Sedatives and hypnotics	Vitamins	Iron
Central nervous system stimulants	Mineral supplements	Finasteride
Muscle relaxants	Calcitonin	Red blood cell colony stimulating factors

Sourced from Holmes et al. (2008)[21]

Following Holmes and colleagues' preliminary study,[21] four other international studies utilised [22, 23, 25, 27] the PEACE criteria to rate the appropriateness of medications taken by large cohorts of LTC residents with advanced dementia and examine predictors of taking

'never' appropriate medications among socio-demographic and clinical variables. See Table 2.5 for a summary of these studies' samples and results.

Blass et al. (2008) used a more rudimentary index of PIP for people with advanced dementia based purely on number of medications.[20] This study identified that LTC residents with advanced dementia received a mean of 14.6 medications (±7.4) and that, as residents approached death, the type but not number of medications altered. The study identified an increase in medications for symptom control (i.e. opioid analgesics and laxatives) and a decrease in medications for comorbid conditions (i.e. antibiotics, anti-dementia drugs, cardiovascular agents and psychotropics).

Two studies by Shega et al. (2009) and Parsons et al. (2014) explored factors influencing medication-related decisions by physicians (hospital medical directors,[24] general practitioners and hospital physicians[26]), specifically their continuation or discontinuation in dying patients with dementia.[24, 26] These two studies were considered relevant as they both provided a system by which physicians used to inform their decision-making process in relation to the appropriateness of prescribing, continuing or deprescribing acetylcholinesterase inhibitors and memantine. Physicians from both studies recommended discontinuation of acetylcholinesterase inhibitors and memantine because of perceived lack of clinical benefit during end-stage of illness,[26] but were less likely to recommend this if there was any indication that they stabilised cognition, reduced challenging behaviours or maintained patient function.[24] Physicians also recommended discontinuing quetiapine and simvastatin because of a perceived lack of indication and/or risk of adverse effects such as confusion,[26] Emphasis was placed on ensuring patient comfort and symptom management and reducing polypharmacy and preventative treatments.

Table 2.4 Results from studies utilising Palliative Excellence in Alzheimer Care Efforts criteria to determine potentially inappropriate prescribing for long-term care residents with advanced dementia

Authors	Country	N at baseline	Mean (SD) medications per resident at baseline	N (%) using 'never' appropriate medications[a]	Most common 'never' appropriate medications	Factors associated with using 'never' appropriate medications	Factors measured but did not show an association with using 'never' appropriate medications
Holmes et al. 2008[21]	USA	34	6.5 (2.7)	10 (29%)	Cardiovascular agents	*Not measured*	*Not measured*
Tjia et al. 2010[22]	USA	323	6.2 (3.33)	121 (37.5%)	Lipid-lowering agents Acetylcholinesterase inhibitors	Male Shorter length of stay[b] Higher functional ability[c] Diabetes mellitus DNH order (inverse)	Age Ethnicity (non-white race vs white) In special care dementia unit Dementia due to Alzheimer's disease Test for Severe Impairment score > 0[d] Cardiovascular disease[e] Cancer Acute illness in prior 90 days[f] Recent hospitalisation[g] Recent physician/nurse professional visits in prior 90 days No feeding tube No hospice referral
Colloca et al. 2012[25]	7 EU countries (Czech Republic, England, Finland, France, Germany, Italy, The Netherlands) and Israel	1449	4 *(not reported)*	388 (26.8%)	Lipid-lowering agents Antiplatelet agents Acetylcholinesterase inhibitors	Stroke	Age Gender Shorter length of stay[b] Ethnicity (non-white vs white) ADL Hierarchy Scale score[h] Behavioural symptoms Falls Number of diseases Ischaemic heart disease Diabetes Heart failure Cancer Parkinson's disease Urinary tract infections

Authors	Country	N at baseline	Mean (SD) medications per resident at baseline	N (%) using 'never' appropriate medications[a]	Most common 'never' appropriate medications	Factors associated with using 'never' appropriate medications	Factors measured but did not show an association with using 'never' appropriate medications
							Pneumonia Fractures Recent hospitalisation[g] Presence of a geriatrician Presence of a pharmacist
Toscani et al. 2013[23]	Italy	245	*Not reported*	9 (2.2%)	Antihypertensive agents Antiplatelet agents	*Not measured*	*Not measured*
Tjia et al. 2014[27]	USA	5406	7.33 (3.5)	2911 (53.9%)	Lipid-lowering agents Memantine Acetylcholinesterase inhibitors	High facility use of feeding tubes	Age Gender Ethnicity (non-white vs white) DNR order Hospice enrolment Whether Medicaid is primary payor In special care dementia unit Recent hospitalisation[g] Recent physician visit (last 14 days) Diabetes mellitus Heart Failure Hypertension Stroke Osteoporosis Depression Nutritional problems Oral problems Behavioural issues Functional status

ADL, activities of daily living; DNH, do not hospitalise; DNR, do not resuscitate; N, number; PEACE, Palliative Excellence in Alzheimer Care Efforts criteria; SD, standard deviation
[a]as defined by the Palliative Excellence in Alzheimer Care Efforts (PEACE) criteria reported by Holmes et al. (2008)[21]
[b]Less than 1 year in long-term care facility
[c]Bedford Alzheimer Nursing Scale – Severity Subscale, possible range 7–28, higher scores indicate greater functional disability
[d]possible range 0–24, lower scores indicate greater cognitive impairment
[e]Cardiovascular disease includes history of coronary artery disease and cerebrovascular accident
[f]Acute illnesses include infectious episodes myocardial infarction, stroke, any bone fracture, gastrointestinal bleed, and seizure
[g]any hospitalisation occurring in the last 90 days
[h]ADL hierarchical scale score ranges from 0 (no impairment) to 6 (total dependence in self-care)

2.7 Discussion

This systematic review identified only one system for identifying use of PIP in the context of advanced dementia that had any degree of validation – the PEACE criteria developed by Holmes et al. (2008).[21] Two other studies have sought to understand the decision-making process of health professionals when determining the appropriateness of medications in end-stage dementia.[24, 26] One study utilised number of medications as a crude indicator of PIP.[20]

Whilst providing a useful foundation, the PEACE criteria are limited in a number of ways. These criteria focus only on identifying PIMs rather than other aspects of PIP such as drug-drug interactions or problems with dosing or mode of administration. Even accepting the focus on PIMs, Holmes et al. (2008) themselves identified a need for further validation by means of a larger sample of medication data and a more representative expert panel of health professionals.

Studies using the PEACE criteria suggest insights into how this system might be refined and validated in the future. Percentages of residents taking 'never' appropriate medications varied between studies. In addition to differences in prescribing cultures between countries and organisations included in these studies, differences in rates of 'never' appropriate medications may have resulted in part from variability in the methods used to define advanced dementia and code medications. Three studies used the Cognitive Performance Scale (CPS)[22, 25, 27] to define advanced dementia while two others used the Functional Assessment Staging Tool (FAST).[21, 23] With regard to coding medications, two studies used the Anatomical Therapeutic Classification (ATC) System[23, 25] and two used the British National Formulary.[22, 27] Both these approaches differed from the original study, which utilised the British National Formulary, United States Pharmacopeia and

National Formulary and the Lexi-Comp Alphabetical Drug Index.[21] While Colloca et al. did not provide a list of ATC codes they included, Toscani et al. indicated that ATC codes (beginning with N06DA) for anti-dementia drugs (rivastigmine, donepezil and galantamine) were allocated to 'central nervous system stimulants' thereby placing these medications under the PEACE category 'no consensus.' However Colloca et al. may have allocated the same ATC codes to 'acetylcholinesterase inhibitors' placing them under the PEACE category 'never' appropriate, and may explain the difference in proportions of residents receiving 'never' appropriate medications between studies.

The authors of several studies in our review interpreted their results as indicating that people with advanced dementia undergo excessive pharmacological treatment.[20, 21, 25, 27] The reasons speculated included a lack of evidence-based guidance for clinicians,[20, 25-27] a hesitancy among health professionals to take patients off medications where the impact has not been formally evaluated in advanced dementia,[20, 24, 26] and the possibility that prescribers may not have recognised advanced dementia as a terminal illness needing to be treated with a palliative approach.[23] It may also be that discussions about reducing medications are sometimes avoided by health professionals because they require acknowledgement that the person with dementia is nearing the end of life.[28] This particular challenge has been identified in other palliative populations across a range of settings. Collier et al. (2013) have created the BUILD model to provide a systematic framework for hospice clinicians to have difficult conversations with patients, families and interdisciplinary clinical colleagues about the need to change prescribing when clinical decline occurs.[28] Components of the model are: (a) **B**uild a foundation of trust and respect; (b) **U**nderstand what the patient knows about the medication; (c) **I**nform the patient of evidence-based information regarding the medication; (d) **L**isten to the patient's goals and expectations; and (e) **D**evelop a plan of care in collaboration with the

patient, family, and interdisciplinary team. While broadly developed for individuals receiving end of life care, it may be applied to individuals with advanced dementia in order to facilitate discussion and improve care.

A second system identified relied on number of medications alone, and intended to measure polypharmacy.[20] As defined in Chapter 1, polypharmacy refers to the combination of more than one medication that may lead to cumulative adverse effects and antagonistic drug-drug interactions where an adverse effect is produced or worsened compared to that which either drug could have caused alone.[29] Polypharmacy can lead to worse side effects in the same domain (e.g. if receiving several psychoactive medications) or more side effects across different domains (e.g. if receiving a psychotropic medication and a blood pressure medication). Each of the medications involved may or may not be deemed potentially inappropriate on their own.

The widely held view that polypharmacy is undesirable within the context of advanced dementia and end of life care is consistent with evidence that number of medications is related to adverse outcomes such as delirium, cognitive decline and loss of appetite.[30] However, when used in isolation (as by Blass et al. [2008][20]), number of medications is too simplistic to be a useful index of the safety and quality of prescribing in the context of advanced dementia. Both Blass et al. themselves and Tjia et al. found that the type but not number of medications changed over time as individuals with advanced dementia approached death, and a cross-sectional study has found that patients taking fewer than eight medications were more likely to be underusing a potentially useful medication.[31] As explained in Chapter 1, the aim of palliative prescribing is to support comfort and quality of life, and in many cases, medications may need to be added to mitigate symptoms.[28]

Reducing numbers of medications at the end of life also requires due attention to complexities inherent in deprescribing. While medications can be withdrawn safely, there is a risk of withdrawal reactions, symptom recurrence or reactivation of underlying disease.[32] While evidence is lacking in advanced dementia, there is a growing body of research on the potential benefits of deprescribing in older people more generally,[32] with evidence showing medication classes for secondary prevention such as lipid-lowering agents, antibiotics, antihypertensive and psychotropic agents can be withdrawn in older patients without causing harm. A system has been developed to inform deprescribing in disabled older adults in the form of an algorithm for decision-making.[33] Drug discontinuation based on this algorithm has been found not to increase significant adverse events, and only 10% of the drugs ceased had to be readministered because of the return of the original indication for the drug. The same authors also tested their deprescribing algorithm in older adult community dwellers and were able to successfully deprescribe medications in 81% of their sample with no significant adverse events or deaths attributable to discontinuation.[34] Future work is needed to examine the applicability of such algorithms to people with advanced dementia specifically and adapt as necessary.

2.7.1 Strengths and limitations

This systematic review provides important implications for identifying PIP in LTC residents with advanced dementia. First and foremost, although we used a carefully designed and systematic search strategy, the review is limited by the small pool of studies found that have focused on identifying PIP for people with advanced dementia, limiting the scope for synthesis and conclusions. In particular, the absence of any studies validating systems against clinical outcomes necessarily limits the evidence base for improving QUM for people with advanced dementia. Methodological limitations of the

review included the possibility that it may not have identified all relevant research in the field, only studies in English were included, and only comprehensiveness of reporting (not risk of bias) was assessed.

2.8 Conclusion

While there are well-accepted criteria available for PIP in older adults, these cannot be readily applied to the case of advanced dementia, where there are disease-specific concerns and a palliative approach is needed. The PEACE criteria show promise for further development. Further studies are also needed to identify PIP with reference to empirical data on adverse events and other negative outcomes, rather than solely relying on the perceptions of health professionals, and data and theory relating to standard pharmacological theory. Finally, studies are needed to test the ability of systems to identify PIP to improve QUM for people with advanced dementia.

2.9 Summary

This systematic review found only one explicit criteria for identifying PIP for LTC residents with advanced dementia, the PEACE criteria. The following chapter (Chapter 3) reports on a retrospective medication chart audit aimed at estimating the prevalence of PIP for LTC residents with advanced dementia in Australia.

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Chapter 3: Potentially inappropriate prescribing in Australian long-term care residents with advanced dementia: a sub-study of the IDEAL study

Chapter 2 documented the results of a systematic review focused on findings systems or tools for identifying potentially inappropriate prescribing (PIP) for long-term care (LTC) residents with advanced dementia. This chapter reports a retrospective medication chart audit aimed at estimating the prevalence of PIP for LTC residents with advanced dementia in Australia.

This chapter is derived from a study published in 2018 in the *Journal of Palliative Medicine,* a peer-reviewed journal with impact factor: 2.477 which focuses on medical, psychosocial, policy, and legal issues in end of life care (Appendix 3). Formatting and changes in wording have been made to conform to thesis guidelines.

> **Disalvo D,** Luckett T, Luscombe G, Bennett A, Davidson P, Chenoweth L, Mitchell G, Pond D, Phillips J, Beattie E, Goodall S, Agar M. Potentially inappropriate prescribing in Australian nursing home residents with advanced dementia: A substudy of the IDEAL study. Journal of Palliative Medicine. 2018;21(10):1472-9.

3.1 Introduction

As explained in Chapter 1, advanced dementia confers a range of physical and psychosocial needs[1] and a palliative approach that maximises comfort is considered best practice.[2] Medication use should be focused on symptom relief and quality of life rather than treating secondary conditions where burden is likely to outweigh clinical benefit.[2]

There is an increased risk of adverse effects for people with dementia compared to the elderly population more generally due to metabolic changes and reduced cognitive capacity.[3, 4]

The systematic review presented in Chapter 2 identified only one currently available dementia-specific criteria for identifying PIP, which were developed through the Palliative Excellence in Alzheimer Care Efforts Program (PEACE)[5] and classify medications as 'never', 'rarely', 'sometimes' or 'always' appropriate based on a Delphi process carried out with 12 geriatricians.[6]

As summarised in Chapter 2, six international studies have used these criteria to examine the prevalence of PIP for LTC residents with advanced dementia and associated factors.[7-12] These studies were undertaken in European countries,[9-11] the USA[7, 8] and Canada,[12] and found that proportions of LTC residents with advanced dementia receiving 'never' appropriate medications ranged from 3%[9] to 45%[12] of study populations. Lipid-lowering agents,[7, 8, 10, 12] antiplatelet agents,[9, 10, 12] antihypertensives,[9] and anti-dementia drugs, specifically acetylcholinesterase inhibitors[7, 8, 10, 12] and memantine,[7] were found to be the most commonly prescribed 'never' appropriate medications. Predictors found to be associated with receiving 'never' appropriate medications included male gender,[8] a higher functional status,[8] earlier stage dementia,[8, 12] a shorter length of stay at the facility,[8] diabetes,[8, 12] having had a stroke,[10, 12] living in a LTC facility with frequent use of feeding tubes,[7] and receiving high numbers of medications.[12]

To date, there have been two studies estimating the prevalence of PIP for Australian LTC residents with dementia.[13, 14] Bosboom et al. (2012) included residents at varying stages of dementia progression and used general-elderly measures of PIP [Beers criteria, Drug Burden Index (>0) and polypharmacy (≥5 medications)] rather than dementia-specific or

palliative-specific criteria.[13] Somers et al. (2010) also used the Beers criteria to determine appropriateness of medications for their sample of residents with dementia.[14]

The current project aimed to estimate the prevalence of PIP in the context of Australian LTC residents with advanced dementia, using the disease- and stage-specific PEACE criteria. Specific objectives were to identify: 1) the proportion of residents taking 'never' appropriate medications, 2) the most commonly prescribed 'never' appropriate medications, and 3) factors associated with an increased likelihood of residents receiving 'never' appropriate medications.

3.2 Methods

3.2.1 Study design

This research formed a sub-study of a cluster randomised controlled trial (RCT) of facilitated case conferencing for LTC residents with advanced dementia living in 20 LTC facilities in Sydney and Brisbane, Australia (the 'IDEAL Study').[15, 16] The sub-study used a retrospective medication chart audit.

3.2.2 Ethics approval

Approval to undertake this research was obtained from the University of New South Wales Human Research Ethics Committee (approval number HC12455) (Appendix 15). Because individuals with advanced dementia lack capacity to provide informed consent, ethics approval was gained for proxy consent by a family member. Medication data were collected from June 2013 to December 2014.

3.2.3 Study population

3.2.3.1 Long-term care facilities

LTC facilities were eligible to participate in the IDEAL Study if they were located in the greater metropolitan areas of Sydney or Brisbane and met the following criteria: 1) ≥100 high care beds and 2) ≥50% residents with dementia (or equivalent number of residents with dementia achieved by a higher proportion or residents with dementia but lower number of beds).

To minimise selection bias, eligible LTC facilities were identified via the Aged Care Australia website (recently superseded by http://www.myagedcare.gov.au/) and approached in random order until the target sample size of 20 was achieved.

3.2.3.2 Residents

To be eligible for the IDEAL Project, residents needed to have: 1) dementia status reported in their progress notes and level of cognitive impairment stable for ≤1 month according to LTC staff; 2) advanced dementia as determined by screening using the Functional Assessment Staging Tool (FAST)[17] of ≥6a; and an Australia–modified Karnofsky Performance Status (AKPS)[18] score of ≤50; 3) availability of a person legally responsible to give consent on their behalf; and 4) informed consent from a family member or other who knew the resident well and was willing to participate in IDEAL to report their perception of quality of care. Criterion 2 was chosen because dementia stage and functioning are predictive of <6 months survival[19] and the IDEAL Project's primary endpoint related to end-of-life care.

3.2.4 Data collection

3.2.4.1 Socio-demographic and clinical data

Wherever available and relevant to the Australian setting, data for the current analyses used variables found by previous studies to be significantly predictive of 'never' appropriate prescribing as defined by the PEACE criteria.[7-10] These included gender,[8] length of stay at the LTC facility,[8] functional status,[8] dementia status,[8] diabetes[8] and stroke.[10]

Significant predictors found in two studies[11, 12] utilising similar approaches to Holmes et al. (2008) were excluded from analysis for the following reasons. Differences in the way Parsons et al. (2015) categorised medications from Holmes et al. include reaching consensus for aspirin, iron, vitamins, mineral supplements and finasteride, and placing them under the 'never' appropriate category.[11] Parsons et al's criteria also deviated from Holmes et al. by placing acetylcholinesterase inhibitors under 'rarely' appropriate and memantine under 'sometimes' appropriate, both of which were under 'never' appropriate in the PEACE criteria. Parsons et al. was not used as a source study because of these medication classification differences, and because the authors used a small sample of only 15 residents. Matlow et al. (2017) focused their analysis on the last week of life, making their sample incomparable to the one reported in this chapter.[12]

Data on dementia stage and functional status collected at baseline were used for this sub-study's analysis and were collected using the FAST and AKPS respectively. All other data were collected from administrative and nursing records kept at each LTC facility.

The FAST divides progression of dementia into seven distinct stages based on observable cognitive and behavioural symptoms. The observational nature of the FAST enables it to

be used to assess moderate-severe stages of dementia when cognitive tests such as the Mini Mental State Examination (MMSE)[20] no longer provide useful information.

The AKPS assigns a single score between 0 (dead) and 100 (normal; no complaints; no evidence of disease) based on observation of functional independence. A score of 50, the maximum at which a resident was deemed eligible for the current study, indicates that a person 'requires considerable assistance and frequent medical care'.

Resident variables found to be predictive of 'never' appropriate prescribing by previous studies but either not relevant to the Australian setting or unavailable in the IDEAL Study dataset were African-American ethnicity,[7] and hospitalisations in the last 90 days[7] respectively. Use of feeding tubes was found predictive in one previous study.[7] However, none of the residents participating in the IDEAL Study was using a feeding tube. LTC variables found predictive that similarly had no variability in the IDEAL Study sample were facility-level use of feeding tubes,[7] dementia specificity,[7] metropolitan status;[7] all LTC facilities participating in the IDEAL Study included equally low proportions of residents using feeding tubes, high proportions of residents with dementia, and were metropolitan.

3.2.4.2 Medication charts

To increase reliability, data collection and coding was undertaken via a standardised approach maintained for all residents in all LTC facilities, leaving little room for error or variation in investigator interpretation.[21] Medication charts were reviewed for each resident, with names extracted as written. This sub-study focused on regularly prescribed medications because of the difficulty in deducing burden from pro re nata (PRN) and short-term medications.

Medication chart data were entered into Microsoft Excel version 10 (Microsoft Corporation, Seattle) using study numbers to identify each resident. Medications were then coded according to the Anatomical Therapeutic Chemical (ATC) Classification System, an international standard for drug utilisation studies recognised by the World Health Organisation[22] and used extensively in literature to categorise medications.

Once ATC codes had been allocated to each medication, these were then classified according to PEACE criteria for 'never' appropriate prescribing, adopting the codes reported by Toscani et al. (2013)[9] (see Table 3.1).

Table 3.1 Medications defined as 'never' appropriate for people with advanced dementia based on a consensus process and with ATC codes allocated by Toscani et al. (2013)[9]

Medication type	ATC code
Antiplatelet agents, excluding Aspirin	B01AC excluding B01AC06
Lipid-lowering medications	C10
Sex hormones	G03H
Cytotoxic chemotherapy	L01
Hormone antagonists	L02B
Antiestrogens	L02BA; L02BB
Immunomodulators	L03
Memantine	N06DX01
Acetylcholinesterase inhibitors	N07AA
Leucotriene receptor antagonists	R03DC

Medications with ATC code N06D were included to this study's classification of 'never' appropriate acetylcholinesterase inhibitors.

While the same ATC codes previously selected by Toscani et al. were used by this study, there was one exception. Acetylcholinesterase inhibitors were placed into the 'always' appropriate category (NO6D), possibly due to the recent evidence showing effectiveness in 'severe' dementia. For this study, these medications were placed under the 'never' appropriate category, as the safety and benefit of these medications for individuals receiving palliative care is still contentious.

3.2.5 Statistical analyses

Descriptive analyses were conducted to provide summary characteristics for residents. Medications were analysed in relation to whether residents were prescribed a 'never' appropriate medication or not, as well as providing the total number of 'never' appropriate prescriptions taken overall at the service level. A chi-square analysis was conducted to test whether there was a significant difference in the percentages of residents taking a 'never' appropriate medication between intervention and control groups. Where no significant difference was observed, it was considered appropriate to combine the arms for all further analyses.

Generalized Linear Mixed Models (GLMM) with a logit link function were used to determine predictors of receiving a 'never' appropriate medication (binomial distribution). GLMMs allow for the inclusion of fixed and random effects in the model, and allow for nested sources of variability in data. In these models, the LTC facility was included as a random effect, to account for the intra cluster-correlations in the sample and produce better fixed-effect estimates.

A preliminary GLMM included all variables found in previous studies as predictors for residents with advanced dementia receiving a 'never' appropriate medication; these variables included gender, length of stay at the LTC facility (categorised into quintiles), functional status (AKPS score), dementia status (FAST score 7 vs 6), diabetes and stroke. The final model included only factors significant ($p<0.05$) or approaching significance ($p<0.2$) in the first analysis. For each model, p-values were provided for each estimate of fixed effects, and odds ratio (OR) and 95% confidence interval (95%CI) were provided for each fixed coefficient.

All analyses were conducted using SPSS (version 24) and p-values <0.05 considered to indicate statistical significance.

3.3 Results

The IDEAL project recruited 13 LTC facilities in Sydney and 7 in Brisbane. LTC facilities had a median of 115 beds (IQR 100 – 135), and 12 were private and 8 not for profit. Of the 286 residents recruited to the IDEAL project, complete medication data, socio-demographic and clinical data was collected for 218 residents, 110 residents from intervention facilities and 108 from facilities allocated to the control group. See Table 3.2 for sample characteristics. A chi-square analysis found no significant difference in the percentages of residents taking a 'never' appropriate medication between intervention and control groups (p=0.183), so the groups were combined for all further analyses.

Table 3.2 Characteristics for 218 residents with advanced dementia

Characteristics	**Whole sample (n = 218)**	**At least one 'never' appropriate medication (n = 65)**	**All medications appropriate (n = 153)**
	n (%)	**n (%)**	**n (%)**
Gender, female	135 (61.9)	34 (52.3)	101 (66.0)
Length of stay at facility			
≤10 months	47 (21.6)	21 (32.3)	26 (17.0)
11-21 months	43 (19.7)	18 (27.7)	25 (16.3)
22-37 months	44 (20.2)	11 (16.9)	33 (21.6)
38-60 months	41 (18.8)	10 (15.4)	31 (20.3)
> 5 years	43 (19.7)	5 (7.7)	38 (24.8)
AKPS			
20 (totally bedfast)	40 (18.3)	6 (9.2)	34 (22.2)
30	42 (19.3)	13 (20.0)	29 (19.0)
40	49 (22.5)	13 (20.0)	36 (23.5)
50 (considerable assistance)	87 (39.9)	33 (50.8)	54 (35.3)
FAST			
6 (severe cognitive decline)	51 (23.4)	17 (26.2)	34 (22.2)
7 (very severe cognitive decline)	167 (76.6)	48 (73.8)	119 (77.8)
Comorbidities			

Stroke	27 (12.4)	6 (9.2)	21 (13.7)
Diabetes	29 (13.3)	12 (18.5)	17 (11.1)

AKPS, Australia-modified Karnofsky Performance Status [18]; FAST, Functional Assessment Staging Tool[17]

3.3.1 Prevalence of medication types

Residents with advanced dementia were receiving an average of 7.3 (median 7.0, SD 3.5, range 0 - 21) regularly prescribed medications each. The most commonly prescribed medications types overall were laxatives (64.7%, n=141/218), simple analgesics (58.3%, n=127/218), vitamins (51.8%, n=113/218) and antipsychotics (46.8%, n=102/218). Of the 218 residents included in the study, 65 (29.8%) were receiving at least one medication rated 'never' appropriate by the PEACE criteria, with 11 (5.0%) receiving more than one. The most commonly prescribed 'never' appropriate medications were lipid-lowering agents, antiplatelet agents and acetylcholinesterase inhibitors (see Table 3.3).

Table 3.3 Summary of residents receiving 'never' appropriate medications, N=218 residents

Medication type	Number of residents receiving (% of total residents)
	n (%)
Lipid-lowering medications	38 (17.4)
Antiplatelet agents	18 (8.3)
Acetylcholinesterase inhibitors	16 (7.3)
Memantine	6 (2.8)
Cytotoxic chemotherapy	1 (0.5)
Antiestrogens	1 (0.5)
Hormone antagonists	1 (0.5)

N, number

3.3.2 Predictors of 'never' appropriate medications

Of factors associated with 'never' appropriate medications in previous studies, only shorter length of stay was found predictive in the current sample ($F(4,206) = 2.61$, $p=0.037$; see Table 3.4). Residents who had been at the LTC facility less than or equal to 10 months, or between 11 and 21 months, had 5 times greater odds of receiving a 'never'

appropriate medication than residents who had been at the LTC facility for 61+ months (>5 years).

While functional status (AKPS) as an overall fixed effect was not found to be significant (F(3,206) = 1.75, p=0.16), residents with AKPS 20 had significantly lower odds of receiving a 'never' appropriate medication compared to those with AKPS 50 (OR 0.33, 95%CI 0.11-0.98; see Table 3.4).

Table 3.4 Preliminary model of associations of potential risk of receiving 'never' appropriate medications (N=218)

Variable	Categories	OR	95% CI	P Value
Sex	Male	1.102	0.729, 2.813	0.295
	Female	-		
Length of Stay				**0.037**
	≤ 10 months	5.349	1.600, 17.879	**0.007**
	11-21 months	5.624	1.673, 18.911	**0.005**
	22-37 months	2.866	0.826, 9.937	0.097
	38-60 months	2.459	0.705, 8.582	0.157
	> 5 years	-		
AKPS				0.158
	20	0.329	0.110, 0.980	**0.046**
	30	1.088	0.423, 2.797	0.861
	40	0.625	0.253, 1.545	0.308
	50	-		
FAST	Score 6	1.015	0.296, 1.483	0.315
	Score 7	-		
Stroke	No	1.218	0.418, 3.547	0.716
	Yes	-		
Diabetes	No	0.482	0.191, 1.214	0.121
	Yes	-		

AKPS, Australia-modified Karnofsky Performance Status[18] (lower scores indicate greater assistance required); FAST, Functional Assessment Staging Tool[17] (higher scores indicate greater functional deterioration); CI, confidence interval; OR, odds ratio. Reference categories indicated by '-'. The p-values correspond to the fixed effects F statistics. The results are based on the generalized linear mixed effect model (GLMM) analysis with long-term care (LTC) facility as a random effect. Statistically significant odds ratios are in bold (P<0.05)

Table 3.5 shows the results of the final GLMM model which included length of stay, functional status (AKPS) and diabetes. Length of stay continued to be the only significant predictor of receiving a 'never' appropriate medication (F(4,209) = 2.84, p = 0.025).

Table 3.5 Final model of associations of potential risk of receiving 'never' appropriate medications (N=218)

Variable	Categories	OR	95% CI	P Value
Length of Stay				**0.025**
	≤ 10 months	5.599	1.736, 18.055	**0.004**
	11-21 months	5.411	1.666, 17.750	**0.005**
	22-37 months	2.836	0.838, 9.592	0.093
	38-60 months	2.415	0.708, 8.242	0.158
	> 5 years	-		
AKPS				0.221
	20	0.375	0.132, 1.067	0.066
	30	1.101	0.454, 2.667	0.831
	40	0.662	0.285, 1.538	0.335
	50	-		
Diabetes	No	0.445	0.181, 1.093	0.077
	Yes	-		

AKPS, Australia-modified Karnofsky Performance Status[18] (lower scores indicate greater assistance required); FAST, Functional Assessment Staging Tool[17] (higher scores indicate greater functional deterioration); CI, confidence interval; OR, odds ratio. The p-values correspond to the fixed effects F statistics. The results are based on the generalized linear mixed effect model (GLMM) analysis with long-term care (LTC) facility as a random effect. Statistically significant odds ratios are in bold (P<0.05)

3.4 Discussion

This study is the first to estimate prevalence of PIP for Australian LTC residents with advanced dementia using the PEACE criteria, an explicit disease- and stage-specific criteria. LTC residents in the current study were taking an average of seven medications, with nearly one third receiving at least one medication rated 'never' appropriate. Similar to previous studies, lipid-lowering agents,[7, 8, 10] antiplatelet agents[7, 9, 10] and acetylcholinesterase inhibitors[7, 8, 10] were the most commonly prescribed 'never' appropriate medications. Results also replicate previous findings that a shorter length of stay[8, 10] is a significant predictor for receiving one or more 'never' appropriate medications, highlighting the need for medication review shortly after a resident's admission to ensure medications are consistent with a palliative approach where appropriate.

An association between PIP and higher functional status has been identified in the literature.[7] While an overall association between functional status (AKPS score) and receiving 'never' appropriate medications was not found, results trended towards the same direction, with residents who had a lower functional status (AKPS 20, totally bedfast) significantly less likely than those with a highest functional status (AKPS 50, requiring considerable assistance and frequent medical care) to receive a 'never' appropriate medication.

The finding that a shorter length of stay increases the odds of receiving 'never' appropriate medications in the context of residents with advanced dementia may suggest that a longer stay allows for more time for conversations to be had with substitute decision-makers regarding goals of care, and a rationale developed for stopping medications where applicable. This finding may also highlight the need for medication review early on or even at the time of a resident's admission to ensure medications are consistent with a palliative approach.

No significant change in odds of receiving inappropriate medications between residents with higher and lower cognitive and functional status is troubling as it suggests recommended monitoring, review and deprescribing of unnecessary medications as end of life approaches may not yet be a common practice of medication management for residents with advanced dementia.

The proportion of residents (29.8%) taking 'never' appropriate medications in the current study was lower than those in similar studies undertaken in the US (37%, 54%),[7, 8] similar to that found in a pan-European study (27%),[10] and higher than that reported in a study exclusively undertaken in Italy (3%).[9] These inconsistencies may be due to differences in

prescribing cultures between countries or differences in the ways studies sampled LTC facilities and residents.

Rationalising the use of 'never' appropriate medications like lipid-lowering agents and antiplatelet agents is difficult. Their therapeutic goal to reduce vascular events and mortality becomes irrelevant in a population where maintaining comfort rather than extending life is the focus, and time to benefit almost certainly exceeds the person's life span. Both pose risks of adverse effects, including abdominal pain, constipation and nausea for lipid-lowering agents,[23, 24] and haemorrhage of the gastrointestinal tract for antiplatelet agents.[25]

Other potential reasons residents with advanced dementia may be on inappropriate medications may be because GPs may be continuing these treatments in order to stabilise symptoms or it may reflect the hesitancy of GPs to cease medications where there is a lack of guidance for clinicians to do so safely.[26, 27] A concerted effort to develop, test and disseminate guidelines for deprescribing is underway.[28-30] GPs may also be hesitant to modify therapies like lipid lowering agents, antiplatelet agents and acetylcholinesterase inhibitors, as they may have been prescribed by other specialists or the resident's previous GP, who residents may have transitioned from on admission to the LTC facility.[9] Deprescribing may also require 'difficult conversations' with family members, addressing new goals of care and prognosis. Some LTC facilities may lack a process for observing over an extended follow-up period to monitor any adverse effects a resident experiences from withdrawal.

Australian Clinical Practice Guidelines[31] provide recommendations on the rational use and deprescribing of acetylcholinesterase inhibitors and memantine. While these medications may be appropriate for people with advanced dementia under some

circumstances, evidence of their benefits is limited[32, 33] and has been met with criticism.[34] They also have side-effects including nausea, vomiting, diarrhoea and muscle cramps.[35]

The high rates of residents prescribed antipsychotics (47%) is much higher than previously reported in studies in other countries[7-9] which range from 27%[8] to 30%.[9] Whilst classed as 'sometimes' rather than 'never' appropriate by the PEACE criteria, a report by Alzheimer's Australia (2014) recommended the use of antipsychotics should be time limited and reviewed regularly with multidisciplinary input from pharmacists, behaviour management experts, GPs and psychiatrists.[36]

As well as identifying high rates of medicines of concern, laxatives (65%) and simple analgesics (58%) were the most commonly prescribed medications overall. Rates of analgesic use were similar to results from US studies 58%[8] and 59%[7] and substantially higher than rates in the Italian study (8.1%).[9] While analysis did not examine the reasons for prescription, higher rates of analgesic and laxative use are generally encouraging given evidence that symptoms often go unrecognised and under-treated in this population.[37-39]

3.5 Strengths and limitations

The limitations of this study arise from data being collected via retrospective chart audit, its dependence on a single method (the PEACE criteria) to identify PIP, and its status as an RCT sub-study. Problems relating to retrospective chart audits identified in the literature include a lack of standardisation in chart formats utilised, incomplete records and illegibility.[40] The current study sought to minimise these problems by using residents' medication chart as the primary source of data – charts that are required to be up-to-date and legible for regular use and surveillance. However, an exclusive focus on medication

charts meant the study lacked information on the reasons 'never' appropriate medications had been prescribed and had not been withdrawn. Even a detailed review of progress notes and clinical assessments would have been unlikely to inform understanding of appropriateness for each resident given variability in the quality of reporting and long duration of prescription in many cases, for some residents even prior to admission.

The PEACE criteria categories offer a 'one size fits all' approach to identifying inappropriate medications and do not take into account clinical factors and context that may be at play in individual cases. Their expert informants were all geriatricians from the University of Chicago. Moreover, Holmes et al. (2008) did not report informants' rationale for medication classification within the system. Additionally, the PEACE criteria are limited in that its identification on PIP focuses only on medication type and disregards the importance of dosage and duration of use. Holmes et al. (2008) identified a need for future research focusing on larger sample populations which can better showcase the relationship between comorbidities and medication use, as well as identify distinct medication classes that may be overused.[6]

Dependence on IDEAL Study data meant that some variables found predictive by previous studies (especially those at the facility level) could not be included in the current analyses. Also, the facilities involved in the RCT may have been more aware of issues relating to inappropriate prescribing than the industry average. Twenty two percent of residents in the intervention arm (11% of the total sample) had their medication charts collected after the intervention commenced at their LTC facility, raising the possibility that the intervention may have influenced prescribing, even though this was not of a magnitude that led to a significant difference in the number of residents taking 'never' appropriate medications in each arm. These factors mean that results may have

underestimated the prevalence of inappropriate prescribing in Australian LTC more generally. Finally, this study shares a limitation with those previous in not exploring the risk and seriousness of adverse effects from being prescribed a never appropriate medication. More research is needed to establish the clinical outcomes of such prescriptions for LTC residents with advanced dementia.

3.6 Conclusion

This was the first Australian study to estimate the prevalence of PIP for LTC residents with advanced dementia using a disease- and stage- specific tool. Results indicate that a significant minority of residents may be taking inappropriate medications including lipid-lowering medications, antiplatelet agents and acetylcholinesterase inhibitors. These findings are limited by use of only one set of criteria for identifying inappropriate medications and the lack of detailed clinical data to contextualise prescribing for each individual resident. More research is needed to guide deprescribing of these medications, and the associated negative outcomes of their use in the context of advanced dementia.

3.7 Summary

This chapter highlighted that LTC residents with advanced dementia were receiving inappropriate medications.. Further research is needed to determine why LTC residents with advanced dementia are exposed to PIP and what avenues may be utilised to prevent this, and the associated negative outcomes on their use. Chapter 4 provides the results on in-depth interviews with accredited pharmacists who provide Residential Medication Management Reviews (RMMR), a government funded service catered to LTC residents. These interviews provided insight into this reviewing process, perceptions on its limitations as a service model, and how it may be better utilised to reduce PIP for LTC residents with advanced dementia.

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Chapter 4: Pharmacists' perspectives on the Australian Residential Medication Management Review as a system for improving quality and safety of prescribing for long-term care residents with advanced dementia

Chapters 3 highlighted that a substantial minority of long-term care (LTC) residents with advanced dementia may be exposed to potentially inappropriate prescribing (PIP) through a cross-sectional medication audit of 218 residents. The findings from Chapter 3 highlight that further research is needed to determine by LTC residents with advanced dementia are receiving suboptimal medication management, and what organisational processes could be better utilised to identify PIP, and reduce associated negative health outcomes. This chapter provides the findings of in-depth interviews with pharmacists who provide Residential Medication Management Reviews (RMMRs) to LTC residents, their perceptions on its limitations as a model, and how this government funded service may be improved to better target the complex needs of residents with advanced dementia.

This chapter is derived from a study published in 2019 in *International Journal of Clinical Pharmacy,* a peer-reviewed scholarly journal with an Impact Factor of 1.692, which focuses on pharmacotherapy and outcome research, clinical pharmacy, the clinical use of medicines, information on medicines and medical devices information, pharmacy services research, medication management, and other clinical aspects of pharmacy. Formatting and changes in wording have been made to conform to thesis guidelines.

> **Disalvo D,** Luckett T, Bennett A, Davidson P, Agar M. Pharmacists' perspectives on medication reviews for long-term care residents with advanced dementia: a qualitative study. International Journal of Clinical Pharmacy. 2019:1-13.

4.1 Introduction

Medication reviews is an approach employed internationally to improve quality use of medicines (QUM) in the elderly,[1-3] reduce polypharmacy and the associated unnecessary health care costs.[4] Pharmacist-led medication reviews may have a special role to play in LTC,[5, 6] especially for residents with advanced dementia who are especially vulnerable to adverse effects from PIP and less able to advocate for themselves.

Recent studies have highlighted the success of pharmacist-led medication reviews for reducing the number of medicines prescribed and identifying and addressing PIP.[4, 7-9] Interdisciplinary collaboration is a process that integrates the specialised knowledge of multiple disciplines to enhance the quality of care and improve outcomes.[10] There is growing evidence of the importance of interdisciplinary teamwork and collaboration as the main driver of success of medication review services in LTC facilities, especially for complex residents.[11, 12] However, the effects of medication reviews on patient health outcomes such as quality of life, hospital admissions and mortality is less clear.[13]

As noted in Chapter 1, the RMMR is the Australian Government-funded medication review service provided to permanent residents of government funded LTC facilities.[14, 15] The RMMR programme is a key component of the Australian Medicines Policy to achieve QUM in LTC[16] to prevent adverse effects associated with PIP, with a focus on general practitioner (GP) and pharmacist collaboration to reach these goals. Pharmacists providing RMMRs must be accredited to provide this service with the Society of Hospital Pharmacists of Australia (SHPA) or the Australian Association of Consultant Pharmacists (AACP).

The key steps of the RMMR programme are: 1) referral of the LTC resident, based on need or biennially; 2) accredited pharmacist gathers resident information from resident, family and/or carer, LTC staff, and/or case notes, 4) pharmacist provides medication review findings and recommendations in a written report for the GP within a reasonable time-frame of no more than four weeks from being initiated, and 5) post-RMMR discussion between pharmacist and GP.[17]

Retrospective audits of recommendations made by pharmacists following RMMRs have found that these identify PIP[5, 18, 19] and can reduce the median drug burden index by 12% from baseline if implemented by a GP.[20] Their results demonstrate that medication review as a collaborative process – in this case GP cooperation – is essential to reach positive medication management outcomes. Pharmacists play a critical role in RMMRs. However, their perspectives of how RMMRs could be optimised to deliver improved medication quality and safety had not been explored at the time of this study, especially for residents with advanced dementia.

4.2 Aim

This study aimed to explore pharmacist perspectives on barriers and facilitators to the RMMR's potential for improving QUM, with particular reference to residents with advanced dementia.

4.3 Ethics approval

The study was approved by the Human Research Ethics Committee (HREC) at the University of Technology Sydney (see Appendix 16). All participants gave written informed consent (see Appendix 9).

4.4 Method

The consolidated criteria for reporting qualitative research (COREQ-32) was used to structure reporting of the research team, study methods, context of the study, analysis and findings.[21]

4.4.1 Participants

Participants were eligible for the study if they were accredited pharmacists who currently or had previously conducted RMMRs. Perspectives of pharmacists who had moved onto management or policy roles as well as those currently conducting RMMRs was of particular interest.

Recruitment used two methods. First, pharmacists were contacted via the AACP website,[22] which provides contact details of accredited pharmacists and indicates those who provide the RMMR service. Pharmacists listed as providing RMMRs were contacted consecutively in alphabetical order. Secondly, recruitment used a snowball method. An email invitation with contact details was circulated to the team's established networks (See Appendix 7). Recruitment occurred from November 2015 to July 2017.

4.4.2 Data collection

Semi-structured interviews were undertaken with pharmacists over the telephone or face-to face. Field notes were taken during and immediately after interviews. The PhD student (female, with a background in medical science and no previous qualitative research experience) conducted all interviews. There was no prior relationship between the interviewer and participants at the time of the interviews. Participants were told about the interviewer's background and that she was conducting this study as part of her doctoral

programme. Twelve out of the fifteen participants knew one investigator (supervisor) prior to the study through pharmacy associations and established networks.

The interview method was used in preference over focus groups to avoid social desirability bias and encourage frank speech.[23, 24] Participants were reassured that data would be reported in a way that did not identify them. All interviews were audio-recorded and transcribed verbatim.

The interview topic guide (see Table 4.1) focused on experience of conducting RMMRs and aspects of the process perceived to be working well or needing improvement, using residents with advanced dementia as a case study.

The interview questions were developed from an anonymous survey distributed at The Society of Hospital Pharmacists of Australia End of Life Symposium, held on 14th June 2014 in Sydney, NSW. Survey questions aimed to explore pharmacist perspectives on barriers and facilitators to the RMMR, and its potential for improving quality use of medicines (QUM), with particular reference to long-term care (LTC) residents with advanced dementia. The survey response rate was 43 (26%) pharmacists out of a possible 162 pharmacists who attended the Symposium. Responses highlighted the most common recommendations stated by pharmacists regarding medication management for individuals with advanced dementia were ceasing a medication, followed by a need to review or monitor certain medications. Other recommendations provided included reducing dosage, standardising processes for prescribing and determining whether medications with difficult administration could be ceased. Many pharmacists expressed a need for further information with regard to preventing inappropriate prescribing in advanced dementia, including indications for use of medications and the best time to consider withdrawing medications for additional chronic illnesses.

Table 4.1 Interview topic guide questions and prompts

1. Can you please talk about your experience with the RMMR initiative?
2. Have you conducted RMMRs yourself, and if so, roughly how many?
3. Are there ways in which you think the RMMR process could be improved? For example, would you prefer there to be a national standard RMMR template? Why/why not?
4. How is the decision-making in an RMMR shared between the pharmacist and other health professionals?
5. What (if any) challenges do pharmacists face when dealing with other health professionals when preparing for, conducting or reporting an RMMR and knowing whether your recommendations have been acted on?
6. Do you have any ideas on how communication between pharmacists and other health professionals may be improved?
7. What information might be used when making decisions in the RMMR?
8. What (if any) information would be helpful to complete an RMMR but is difficult to source?
9. What (if any) special considerations are there when conducting an RMMR for an individual with advanced dementia requiring a palliative approach?
10. Are there any other QUM activities in LTC facilities apart from RMMRs that you think are important? (E.g. Medication Advisory Committee)
11. Is there anything else you want to mention that hasn't been covered?

LTC, long-term care; QUM, quality use of medicines; RMMR, Residential Medication Management Review

4.4.3 Analysis

Transcripts underwent qualitative data analysis using an integrative approach.[25] Each interview transcript was inductively coded independently by two investigators (the student and one supervisor) to form emerging initial descriptive codes. Descriptive codes were then compared and discussed to reach consensus and grouped into categories.[26] When moving to interpretive themes, codes were initially compared and allocated to sections of a model for interdisciplinary collaboration.[27] This initial model allowed for a broader understanding of interdisciplinary collaboration within the context of the RMMR process. Emergent themes were tested in subsequent interviews. NVivo version 11 software (QSR International) was used to manage data.

A meta-model of physician-community pharmacist collaboration (PCPC) was then adopted to refine themes.[28] The PCPC model proposed by Bardet et al. (2015) conceptualises trust and interdependence as core determinants of successful collaboration between physicians and community pharmacists. The forming of these core determinants depends on four processual determinants; perceptions, expectations, skills, and interest for collaborative practice. Finally, role definition and communication were conceptualised as tools to develop PCPC.[28] This model was used to classify main themes within the context of collaboration and medication management for people with advanced dementia in LTC. Sample size was determined by saturation of themes against components of the PCPC model.

A one page summary of themes derived from the interviews was emailed to participants for member-checking,[29] to invite them to provide their opinion on findings and whether they disagreed with them.

4.5 Results

A total of 15 pharmacists participated in an in-depth interview, the majority being female (n=12). Participants came from different states across Australia, the most from New South Wales (n=5), followed by Victoria (n=4), Queensland (n=2), South Australia (n=2) and Western Australia (n=2). All participants had over 10 years experience providing the RMMR service; with eight having 10-15 years experience, and seven having 16-21 years experience. Five pharmacists had been involved since the beginning of the RMMR initiative in 1995, with 14 providing RMMRs as their primary work focus at the time of data collection. Our sample also included three pharmacists who were actively involved in the development of RMMR standards and guidelines. All pharmacists were also

involved in other QUM services at LTC facilities including nurse education, providing medication audits, and involvement in Medication Advisory Committees (MAC). A number of participants also provided reviews to patients living in their own home via the Home Medicines Review (HMR) service, and taught RMMR accreditation courses. Interviews lasted between 30 and 60 minutes.

Pharmacists generally asserted a belief that interdisciplinary medication reviews had excellent potential to improve medication management for LTC residents, including those with advanced dementia. However, rather than perceiving that the RMMR provided structures and support for interdisciplinary collaboration, the over-arching narrative was of pharmacists, GPs and LTC nurses finding ways around the constraints of the RMMR programme to improve quality and safety of prescribing.

Key barriers to the achievement of initiating, conducting high quality medication reviews and follow-up discussions were perceived to include inadequate financial and process supports for collaborative practice, as well as a lack of health professional accountability to the process and maintenance of quality - all within the context of limited time available for RMMRs amidst competing workload demands.

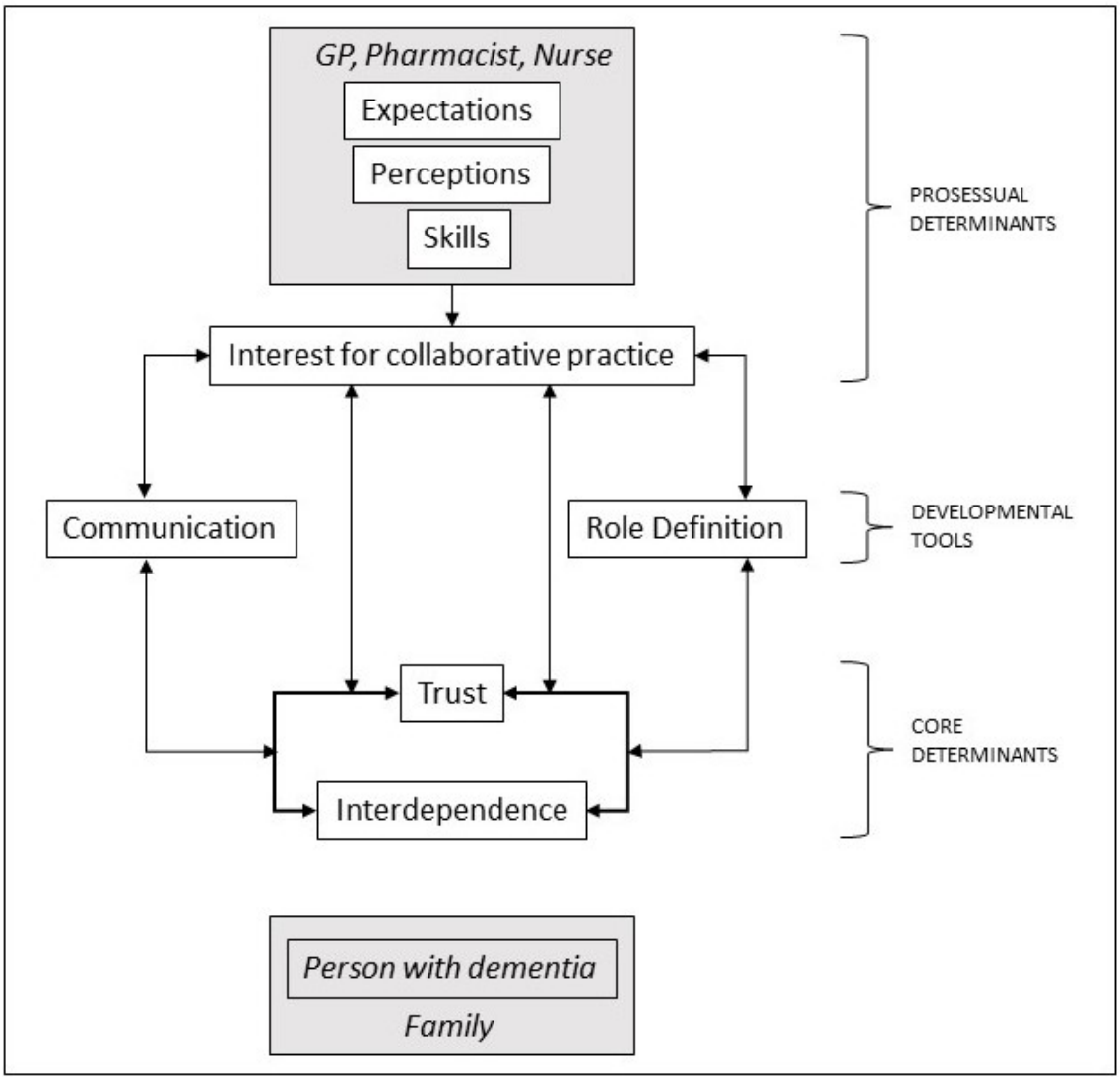

Figure 4.1 Factors influencing interdisciplinary collaboration to improve the quality of Residential Medication Management Reviews and improve outcomes for long-term residents with advanced dementia

Figure 4.1 summarises results from the current study mapped to the domains of Bardet et al's PCPC model.[28] Of the determinants of the PCPC model, interest for collaborative practice appeared to be foundational. If there was an opportunity to build upon collaborators' willingness to engage to achieve shared agreement on the value of an RMMR, the process was perceived to have a good chance of succeeding; if not, informants considered the RMMR's potential effectiveness to be severely limited. Once an interest for collaboration was established, key collaborative elements of trust and interdependence was built over time, enabling the smooth running of the RMMR process.

Not only did developmental tools of communication and established roles in the process further build trust and interdependence but, contrary to the unidirectional influence suggested in the PCPC model, the building of trust and interdependence encouraged health professionals to engage in further opportunities for communication and a stronger understanding of the value of other health professional roles for medication management.

Whilst the PCPC model focused on a dyad of interdisciplinary working between pharmacists and physicians, our results pointed to a triad of collaboration wherein LTC nurses played an important role in driving the review process, especially with regard to referral, information sharing and input of medication changes. Notably, the resident and family were not mentioned as part of the review process, and in many instances, family were portrayed as a barrier to appropriate medication management, especially where the goal was to deprescribe.

4.5.1 The Residential Medication Management Review programme does not support for high-quality person-centred, collaborative medication reviews tailored to resident needs

4.5.1.1 Lack of financial and process support for collaboration

While the RMMR programme enables reviews to be conducted on a needs basis, participants reported that the vast majority of referrals reflected a default biennial cycle. Conducting reviews every two years was seen as inadequate to monitor the needs of residents with dementia, whose health status might change drastically within this period.

> *"You can have massive deterioration in a patient with dementia over that two year period and you've missed the opportunity to improve their quality of life." (P09)*

"The average length of stay in an aged care facility is just over 27 months, so the vast majority of these people are not going to be around for the second review." (P07)

Infrequent referral was partly seen to arise from the arduous process involved. However, inadequate remuneration was considered the most important barrier both to more frequent referral and to high quality reviews. Almost all participants perceived the RMMR programme to offer inadequate remuneration to enable the collaborative practice required.

"I think remuneration being what it is, it's not a good viable model. It's 'one size fits all'…But there's an increasingly complex cohort, if you really want that person-centred care, then there has to be a change in the remuneration structure…We really need to have the capacity to provide a more in-depth service for those who warrant it, and they should be remunerated accordingly… that's why you end up having people [pharmacists] feeling disillusioned because they end up putting more in than the remuneration is providing for." (P12)

A lack of remuneration for case conferencing, especially, was seen as stymieing interdisciplinary communication required for high quality RMMR-related collaborative practice.

"If there was some ability where we could be remunerated for case conferences, and pharmacists aren't obviously at this stage. GPs are, but if we could tap into that sort of funding…where we could all sit down together and discuss patients, or residents of aged care facilities, and determine a management plan that way I think." (P09)

"I think if you're looking for better outcomes then case conferencing is the way to go. Because the doctor is there with you, changes can happen there

and then, we can have better nurse input and I think we get better health outcomes for the residents that way." (P04)

Given this lack of support, finding time to meet face-to-face within competing schedules was seen as difficult, if not impossible.

"Well, I guess it's in time. And GPs are very time poor, pharmacists are time poor, nursing staff are time poor." (P09)

"Any sort of situation where you've got yourself, the GP and your members of staff, the nursing staff, are exceptionally rare." (P14)

4.5.1.2 Lack of health professional accountability

A lack of accountability – for both pharmacists and GPs – was perceived to pose a significant barrier to the referral, conduct and implementation of quality person-centred RMMRs. Alongside inadequate remuneration, a lack of accountability for monitoring and referring residents was seen as the main driver for the unsatisfactory situation of RMMRs only being conducted every two years.

"Yes, it can be done on clinical need, but then you've got two paths. You've got those [pharmacists] that genuinely want to do one [an RMMR] within the two years because there is a clinical need. But then you've got the other path of people that were the very reason why all the funding got cut because they abused the system." (P10)

Pharmacists were also aware that GPs sometimes did not refer residents because they lacked trust and willingness to collaborate with pharmacists due to experiencing poor quality reviews in the past, commonly referred to as a 'cut and paste' service.

"Unfortunately there are pharmacists out there who are blatantly doing the wrong thing. We still can't seem to stamp this out. I can see past reports where it's quite obvious that the pharmacist, I doubt they've even been to the facility

to review the patient, let alone seen the patient. And there's still a little bit of cut and pasting going on out there, and they're just cutting out of MIMS, it's just embarrassing what I've seen out there." (P05)

"I can understand why a GP doesn't take any notice when people [pharmacists] are cutting and pasting slabs out of product information. It's just rubbish." (P09)

Pharmacists perceived there to be a lack of accountability for GPs to follow-up RMMRs with changes in prescribing.

"I think the doctors also need to be a little bit more accountable for their part in the process as well. I don't think them writing 'above noted' or you know 'will review' is sufficient. There really needs to be a little bit more accountability from the doctors." (P05)

"They [GPs] do a tick and flick, which is what I think some are doing." (P03)

One way in which pharmacists tackled the issue of limited GP engagement and accountability in the process, especially post-review of recommendations was to frame medication reviews as the 'medication management plan,' leaving space on the review document for GPs to provide comments once pharmacists had provided recommendations.

"We format our reports as basically the medication management plan…the issues are documented down the left-hand side of the table, and then on the right-hand side the doctor will scribble in whatever they want to, whatever changes they want to make, and whether or not they agree…once you've sort of put the hard yards in and worked at it, you get there in the end." (P08)

"I've sometimes actually faxed them back to the doctor when I received it just signed with nothing else. Because I've said, 'please note that in order to claim item 903, you must complete a medication management plan,' so basically

telling them 'listen, you're being fraudulent if you don't actually do something about this, and you're claiming the money.' So, let face facts, there are doctors out there who love them, because they're making quick revenue from them." (P10)

4.5.2 Interest for collaborative practice

Pharmacists commonly emphasised that team members' commitment to the shared goal of improving resident care and outcomes was a prerequisite for the RMMR to work. However, even where this was established, pharmacists commonly found that interest among GPs and LTC nurses to collaborate on RMMRs was limited to start with, requiring proactive efforts on their part to sell the benefits. Developing an interest for triadic collaborative practice was especially hard when the relationship between GPs and the facility was limited.

"If you've got a facility where you've got a GP who looks after most of the residents who's very willing to engage, it's not an issue. But then you've got a few outliers, and they're difficult to get referrals from, they don't really engage, they're not willing to discuss the report afterwards or even during, and so that makes it a little bit more challenging." (P08)

"I don't think they [GP] understand the value of what they can get out of a medication review. So, getting that liaison and getting that doctor to understand that the pharmacist could help in that area is often quite tricky." (P06)

Pharmacists highlighted the potential offered by collaboration for pooling knowledge to gain the best understanding of each resident, in order to provide the most appropriate person-centred care capable of delivering positive outcomes.

"I don't think we can work in isolation. We're going into [nursing] homes where we are relying on the written documentation, and we are also talking

to the nursing staff. But we're only getting a snapshot of that person who's behind that dementia cloud. We really need to have more information, and I think we can only get that by having a team approach, and everyone sharing their knowledge of that person." (P09)

"The aim is to bring everyone together in the team in the one document in relation to the medication." (P14)

4.5.3 Trust

4.5.3.1 Trust as a vital ingredient of collaboration

Building trust and rapport with GPs was considered crucial to enhance the collaborative process. Pharmacists saw that when a trusting relationship had been built with GPs, this increased referrals, enabled shared decision-making, and improved the chances that GPs would accept the pharmacist's recommendations.

"I haven't always entered into a new contract with GPs who have had good experiences. But I can safely say that most of the RMMRs that I do with doctors on an ongoing basis, it's basically because the relationship is good and the trust is there, and they are happy with what I'm delivering." (P12)

Building trusting relationships with LTC staff was also considered important to gain their valuable time to share information.

"It's kind of developing relationships with the staff so that you can get their time and attention." (P13)

4.5.3.2 Trust cannot be assumed between health professionals and is built over time

While trust was seen as essential to collaboration, it could not be taken for granted at the beginning of a professional relationship. In LTC facilities where pharmacists were new

and had not yet established trust between themselves and LTC staff, gaining information on residents was difficult, negatively affecting review efficiency and outcomes.

> *"With the nursing homes that I work with on a regular basis, we have a pretty fixed set up…but I notice when I go into other nursing homes where I haven't necessarily been connected, getting information about when they [the residents] were diagnosed with dementia, how long they've been on medication, that sort of history, that's often really quite hard to get." (P06)*

Fortunately, building trust with LTC nurses was perceived to be relatively easy, provided the pharmacist engaged proactively by means of a positive, helpful attitude and open, honest communication.

> *"Get yourself known, be willing to engage. The thing at the facilities is that they are so resource poor that anything you can offer them they just love. So if you are seen to be there, available, if you do a good job, if you're personable or at least put up the façade that you're a likeable person, they will engage with you…yeah, that's really a strong driver of success for an RMMR." (P08)*

Building trust with GPs was reported to be a slower process to build an effective collaborative relationship.

> *"There has to be a high quality right from the beginning so that the doctors can sit up and take notice and think, 'yeah, this person does know what they're talking about,' rather than 'they're talking about a drug interaction I can read in my own program. I don't need a pharmacist to send a report to tell me that sort of thing.'" (P04)*

> *"As time goes on, your regulars [GPs], they respect your advice…so you don't feel like you've got to do that public relations sort of thing to actually get them to accept you." (P10)*

QUM activities additional to the RMMR were also seen as a way to strengthen collaboration between different health professionals and build trusting relationships. These activities included Medication Advisory Committee meetings, education and training to LTC staff, and essentially provided additional avenues to meet other health professionals.

> *"I've recommended that all pharmacists should be on that MAC committee, and so should the accredited pharmacists because then you meet the doctors in a different light. If you're having breakfast with someone, you talk in a different way than if you're just sitting across the table." (P02)*

4.5.4 Interdependence

4.5.4.1 Interdependence between health professionals only occurred when trust had been built

Interdependence was achieved when there was an interest for collaborative practice and trust established among all three members of the team. Interdependence was perceived to enable ideas and opinions to be easily shared by different health professionals to enable all information and perspectives to be considered when finding ways to improve the resident's medication regime.

> *"I guess for me the biggest thing is that they [the RMMRs] need to be collaborative…where there is interest and engagement from all players…nurses, carers and doctors…that review ends up being a really useful document that promotes change. I don't bother doing RMMRs where I feel like they're not valuable, because I just don't think they promote change." (P12)*

4.5.5 Role definition

4.5.5.1 Defined and respected roles within the team allowed for flexibility

Pharmacists saw their role and others' as value adding to one another, with pharmacists' knowledge of deprescribing, auditing and monitoring of medications, pain management and weighing risk against benefits of different drugs contributing to the team.

> *"The evidence still says there's huge amounts of inappropriate benzodiazepines and antipsychotics. So, I think that's a significant thing that pharmacists can contribute in RMMRs, is recommending deprescribing, giving guidance on how to taper the dose, or shift, even PPIs [proton-pump inhibitors], shift to intermittent or prn use." (P07)*

> *"Sometimes they've got advanced COPD [Chronic obstructive pulmonary disease] or advanced cancer, even once they get to palliative end of life stage, we'd really be looking to see that they had, medicines available for end of life and for pain relief, while minimising any medicines that you're not expecting to see a benefit for, that could be causing harm." (P03)*

In environments where trust was built, the role of each health professional within the team environment was respected and valued.

> *"I think a significant thing that pharmacists can contribute in RMMRs is recommending deprescribing, giving guidance on how to taper the dose…or shift to intermittent or prn use." (P07)*

> *"In the facilities where I work there is a respect for all the voices on the interdisciplinary team, it's not just 'this is your role,' it's much more fluid. The GP respects that the nurses are there more and understand from a carer and nursing perspective, so yeah…I would say respect for everyone's roles in the care of that elderly resident." (P12)*

4.5.5.2 The important role played by nurses in the pharmacist-general practitioner-nurse triad

While the RMMR's formal process allocates referral to the role of the GP, in practice, LTC nurses typically alerted GPs to residents who needed a review where these were not scheduled as routine. Pharmacists relied on the nurses' understanding of the resident and their clinical needs to initiate referrals.

> *"If the nurse feels that they [resident] might warrant a medicines review, if there's a new drug, or it's a falls risk increasing drug, or there's a change in medication that they're concerned might have contributed, they will highlight that for the GP, and the GP will end up referring for a medication review. That's sort of an example of doing a project that brings all the players in medicines together and you get an idea of the team that is available to effect change." (P12)*

LTC staff were seen as an important information source who could provide current information on the resident, which also saved time. Pharmacists explained that LTC staff were key personnel in decision-making for people with dementia. Often, they explained that they relied on LTC staff for information on the resident, knowing that they were the individuals who interact with residents daily, so would have a better understanding of the health, behaviours and potential changes in symptoms which may warrant a change in medications.

> *"It is often the nursing staff who are the ones who will request medications to settle a resident if they are showing BPSD and it's actually the nursing staff also who will be the main instigators in regular review of trialling cessation of medications." (P11)*

> *"The shared decision-making between the pharmacist and other health professionals is usually with the care staff…I like to get to talk with them because they're the ones that spend the most time with the resident." (P03)*

4.5.5.3 Residents and families have a limited role in collaborative practice

Residents and families were conspicuously absent from the triad of collaboration, despite pharmacists' emphasis on the need to ensure care was person-centred. Pharmacists highlighted the need for family to be involved in medication review to provide an in-depth understanding of the resident and their care needs. In practice, pharmacists were rarely involved in conversations with family but instead empathised with GPs and the difficulties they had in discussing goals of care. Pharmacists commonly reported that providing appropriate medication care to residents – especially deprescribing - was made more difficult by families' unrealistic expectations for the resident, their wishes being focused on active treatment discordant with the palliative goals associated with advanced dementia.

> *"There's difficulty for the GPs…especially if he's been prescribing for this person for the last 6 or 7 years, and convinced the person and the family that they need to be on this batch of medication to prevent further heart attacks or whatever it happens to be. Then saying, 'well we're going to take this person off,' and then they'll say 'well then you don't value my mother any more do you?' So it requires a lot of skill to go down that path." (P06)*

4.5.6 Communication

4.5.6.1 Adequate and appropriate communication improves review efficiency and quality

Having opportunities to talk to nursing staff was seen as the most efficient and reliable means of collecting current information about a resident. In many cases, pharmacists noted that documentation of the resident was not always up-to-date and was fragmented between hardcopy and online sources.

"Yeah, I think a lot of the time with just doing a paper-based review is that quite often, the notes don't actually reflect what's truly going on with the resident ...you get more out of a 30 second conversation than you can after 10 minutes reading through notes." (P08)

Discussion with GPs was considered important because it allowed sharing of information quickly, and determining whether there were any disagreements or clarifications needed on the recommendations provided by the pharmacist. It was seen as a way to fast track medication changes, and ensured that messages between pharmacist and GP were clearly understood.

"I got the satisfaction of running my recommendations past the doctor not just sending him the report and getting a thank you back. And you know, I actually learnt a lot from that doctor because he was able to say 'that's not practical' or 'that's a good idea' or yeah." (P13)

Some pharmacists saw that ongoing collaboration with other team members was important, making sure that changes were being made to resident's medication profiles.

"I see my job as being continued quality improvement rather than 'I get paid to write a report, and my responsibility ends there.' Follow-up is actually one of the most rewarding parts of the job that I do. It's the outcome for the resident.... It's really important it's not unidirectional."(P12)

4.5.6.2 Making time for communication opportunities requires creativity

In recognition of the importance of contact and communication with others on the team and in the absence of formal avenues provided by the RMMR process, pharmacists reported often relying on chance encounters.

"I suppose with the RMMRs it's very difficult to find a time for a start where you can actually talk to the GPs. They are often there at weird and wonderful

times…and if you happen to be there on that day then that's quite good because you can often discuss things as they come up. But that is a rarity in aged care." (P14)

Pharmacists relied on interacting with GPs over the phone and using written communication via fax and email, as face-to-face communication was often seen as impossible. Pharmacists also reported using creative ways to make time to communicate with GPs to talk about residents.

"It was a large nursing home, it was well over 100 beds, but it was a really good example of collaboration. So one GP across the road did about 50% of the residents, and I'd go there, we'd have lunch together and talk about it, make the changes." (P07)

"I used to go running with one of my regular GPs, it's was great, we used to talk about some residents while we were running." (P04)

4.5.7 Perceptions

4.5.7.1 Hierarchical relationships hindered collaboration and an effective medication review process

A hierarchical model adopted by members of some teams – especially with regard to GPs' seniority - hindered the ability to effectively communicate and share goals regarding the management of the residents. Pharmacists perceived that newer GPs trained in the importance of collaboration were more open to pharmacist recommendations.

"A lot of more elderly GPs have gone through a system where collaboration wasn't part of their training…a lot of the newer GPs that are coming out who have been trained in the benefits of collaborating with other health professionals, they are much more receptive and they really will be happy to listen…some GPs, they're still like 'I'm the doctor, we'll do it this way.' So you've got to be very diplomatic and flexible in the way you deal with the

differences in others to make sure that the resident is the most important person, and that we do the best for them." (P14)

Pharmacists expressed the difficulties in providing recommendations and sharing the responsibility of medication decision-making with GPs who held strongly to their perception of GPs as the primary decision-maker. Regardless of their working relationship, GPs' ultimate authority in deciding to follow and implement pharmacist's recommendations was recognised as an important limit on the pharmacist's role.

"You know, you can't just give orders, and I guess, talking about decision-making means that you come to a decision and then you implement it. But we can't actually do that because we're not in charge of the implementation." (P02)

While suboptimal, pharmacists strove to pursue the best care possible within a hierarchical structure by framing recommendations in a way that did not imply that they were the ultimate decision-maker.

"If you found the digoxin level was too high, that would lead you to your decision that the toxicity levels were probably causing the nausea…but then you have to write that down in such a way that the doctor comes to the same conclusion...you have to write it down in such a way that the doctor thinks it's their idea." (P02)

Trust and interdependence was also hindered by preconceived notions of what pharmacists bring to the table, and negative stereotypical role expectations of pharmacists as merely "shopkeepers."

"I think initially we've always been thought of as being shopkeepers rather than clinicians…'just tell me what the life-threatening drug interactions are and stick to the business of dispensing in the shop, and I'll do the rest.'" (P06)

Pharmacists needed to provide evidence not only of their willingness to help but also their 'value add' in terms of expertise and practical support. Pharmacist's explained that in order for GPs to take them seriously, they needed to be providing quality reports from the beginning.

> *"There has to be a high quality right from the beginning so that the doctors can sit up and take notice and think, 'yeah, this person does know what they're talking about,' rather than 'they're talking about a drug interaction I can read in my own programme. I don't need a pharmacist to send a report to tell me that sort of thing.'" (P04)*

4.5.8 Expectations

4.5.8.1 A shared understanding of the resident's goals of care

Many pharmacists identified a shared understanding of goals of care as pivotal in optimising the usefulness of RMMRs for residents with dementia requiring a palliative approach. Participants stressed that goals of care and associated recommendations needed to be contextualised within the history and needs of each individual resident.

> *"It really has to be patient-centred, it has to be for that resident and their issue. I have no issues if someone is on 20 medications and there is no issue with their medication use because of the complexities of what they are, and everything is appropriate, I have no issues with writing on theirs [report] 'no current concerns or issues.' But someone can be on two medications and you can write a whole heap depending on the resident." (P14)*

Pharmacists thought it particularly important that collaborators were advocates for person-centred palliative goals of care for residents with advanced dementia. When pharmacists had this intent they were more likely to provide a quality review even if they knew it would take more time, and advocate for the medication changes required for the resident with advanced dementia.

"I thinks it's quite cruel to continue to ram medications down someone's throat when they've got advanced dementia and yet it happens, which is because no one is accountable, and it's easier to follow the status quo. Whereas if we have pharmacists that have a true knowledge of end of life care and are good communicators and able to get their point across to GPs, then we can minimise the suffering of people with dementia." (P09)

4.5.9 Skills

In addition to their expertise in pharmacological care, many pharmacists demonstrated skills in effectively communicating with GPs and other health professionals to override the RMMR programme's shortfall in providing a platform for communication and ensuring team members were accountable for their role in the medication review process. They showed a steadfastness in building trust and highlighting their value, making sure the review process continued.

"I think in lots of ways it comes back to that individual pharmacist being a bit like a dog with a bone. Having to just keep reminding everybody that we're part of that team." (P06)

4.5.10 Heightened medication considerations for residents with advanced dementia

See Table 4.2 for a summary of considerations specific to advanced dementia raised by participants, together with illustrative quotes.

Table 4.2 Heightened medication considerations for residents with advanced dementia, as identified in interviews with 15 pharmacists

Dementia care considerations	Illustrative quotes
Difficult to predict the health trajectory of dementia. Deterioration can occur rapidly	*"None of us can guess how long that person's going to live, they've got severe dementia and they will probably die by Christmas, but then you'll find they'll last for another couple of years, especially if they're eating well." (P06)*

	"You need to have them reviewed more regularly, but the whole system is kind of coming round to the point that I'm trying to make, it doesn't support that. And I think it's an absolute travesty in that it has been blown up to 24 months when there was absolutely no reason for it." (P08) *"We're not doing our resident's any favours by continuing to treat their hypertension and their diabetes and prick their fingers when they've got advanced dementia! It's cruel. We all try to push for guidelines and reference ranges, but they just don't apply at some point in time." (P09)*
Medications require monitoring and regular review	*"When people are started on antipsychotics and they've been on it for a long time and people forget why they're actually on it..." (P05)* *"So we've had this resident on medication which isn't working for them and is not appropriate for them, and we've had them on it for two years. It may be that I haven't done the review and he started on it 18 months ago. So, the problem is that we can't target them quickly enough." (P11)*
Unable to advocate for themselves	*"It's very patronising for a profession to think that once you reach that MMSE [Mini Mental State Examination] you should be off that drug, that's what the evidence shows. It's much more complex than that…" (P12)* *"I thinks it's quite cruel to continue to ram medications down someone's throat when they've got advanced dementia and yet it happens, which is because no one is accountable." (P09)*
Complexity of residents with advanced dementia needs comprehensive assessment with a team approach	*"I would observe, I would be talking with the DON, observe the patient, you could see if they were agitated, you could see their mobility to some degree, and observation in cognitively impaired people is just so critical. So I think people that don't talk to the resident or don't observe the resident are doing superficial poor quality reviews." (P07)* *"We're going into homes where we are relying on the writ documentation, and we are also talking to the nursing staff. But we're only getting a snapshot of that person who's behind that dementia cloud. We really need to have more information, and I think we can only get that by having a team approach, and everyone sharing their knowledge of that person." (P09)*
Heighted sensitivity to medications and adverse effects	*"The doses that we use for people with dementia need to be a lot lower. Where you might normally start somebody on a 25mg dose*

	of Sertraline, we often start them on a 12.5mg dose of Sertraline. Because the brain is dying, it hasn't got as many receptors." (P06)

4.6 Discussion

This study was the first to explore pharmacist perceptions of interdisciplinary collaboration with GPs and other health care professionals in providing the Australian RMMR service to LTC residents with advanced dementia. The RMMR programme was seen as having potential to improve medication management for LTC residents, including those with advanced dementia, but the success of any given review was considered reliant on the depth of interdisciplinary collaboration and person-centredness. Prerequisites for effective RMMRs were considered to include: having a pharmacist who believed in the merits of the RMMR and could articulate this 'value-add' to other health professionals; accessing best quality information (including reports of people who knew the resident well); and using ingenuity to enable communication and follow-through. Whilst the PCPC model focuses on collaboration between pharmacists and GPs, LTC nurses were also seen as key collaborators in driving the RMMR process, being instrumental in prompting referrals, providing information about residents to enable person-centred recommendations, and enabling communication between all collaborators. Results identified that family members were rarely involved in the RMMR process, and were seen in many cases as a potential barrier to appropriate medication changes.

The need for a trusting relationship between GPs and pharmacists providing medication reviews has been identified in earlier research.[11, 30-37] Consistent with earlier studies, our results show that building trust is a dynamic process requiring time and effort on the pharmacists' part.[30, 38, 39] When interactions frequently occurred, there was greater

opportunity to learn from each other, improve awareness of each other's' professional skills, and develop a collaborative relationship.

Guidelines for pharmacists providing RMMRs are consistent with findings from the pharmacist interviews in stating that effective medication management services need a strong culture of information sharing, the establishment of trust between parties, regular face-to-face interaction, and a commitment to teamwork and collaboration.[17]

RMMR guidelines for pharmacists and GPs providing the RMMR recommend face-to-face communication to develop a collaborative working relationship, and advocating for allocated time for communication post-review dedicated to the resident's medication care.[17, 40] Our study supports concerns that the current RMMR model is not conducive to ongoing communication and feedback between team members, and that post-review discussions rarely occur.[41]

Our study also supports previous research showing that the success of medication reviews depends on GPs' willingness to engage,[30] and that pharmacists are required to take a leading role as initiators.[38] GP acceptance rate of pharmacist's recommendations from LTC medication reviews has been found to vary greatly between studies from 38% to 91.6%,[4, 8, 9, 18, 42-44] likely as an indication of the level of interdisciplinary collaboration.

Findings from this study suggest that a new model is needed to support interdisciplinary collaboration to improve the RMMR process, and promote individualised assessment. Responsive remuneration that does not limit RMMR frequency for complex cases and enables pharmacist involvement in case-conferencing also offer promise for improving QUM in LTC.

4.6.1 Strengths and limitations

The current research focused exclusively on the views of pharmacists and did not include GP and LTC staff perspectives. Even among pharmacists, our sample was biased towards those holding senior roles and is unlikely to be representative of those providing the RMMR more generally. Participating pharmacists who had been involved in the development of RMMR standards and guidelines may potentially see less flaws in the RMMR process, however this sample provided informed insights into the RMMR programme and its shortcomings, as well as expertise in conducting effective reviews and vision regarding systemic improvements. Future research should aim to gain GP and LTC staff perspectives.

The interviewer openly presented herself as a PhD candidate, with a non-clinical background, who was exploring the process of RMMRs and how it may be utilised to improve medication management for LTC residents with advanced dementia. This positioning was critical to establish an open and transparent relationship with participants. This initial rapport building was critical and particularly evident in the quality of the in-depth data that was provided around negative perceptions of themselves as a profession, about other health professionals, and the organisational system as a whole. Participants may have felt more secure in their disclosures and sharing their experiences with someone removed from the service and discipline.

Member checks were carried out with participants in the form of providing them with the key study findings for their feedback.[29] Four of the participants provided feedback which was incorporated into the results.

4.7 Conclusion

This research demonstrates the importance of interdisciplinary collaboration between pharmacists, GPs and other health professionals to improve medication management for LTC residents with advanced dementia. Trust and interdependence were identified as foundational for enabling the depth of collaboration and sharing of knowledge needed to provide quality person-centred RMMRs. Randomised controlled trials are needed to test the effectiveness of interventions focused on inter-professional collaboration in improving the quality of medication reviews, and the potential for these to improve QUM and outcomes for LTC residents, including those with advanced dementia. Further research to gain perspectives of caregivers of people living with dementia and their perception of medication management may provide important insights.
In addition, many LTC facilities are ill equipped to manage behavioural and psychological symptoms of dementia (BPSD), therefore gaining a systems perspective including those of LTC staff would also be important to consider in order to promote culture change in the way medications are prescribed and provided to LTC residents with advanced dementia.

4.8 Summary

The findings of this chapter highlight the need for a strong collaborative working relationships between pharmacist, GP and LTC staff to provide high quality medication reviews. Interviews with pharmacists highlight that while this reviewing service should be collaborative, the model in place as it stands does not support this, preventing the provision of high quality reviews for residents with advanced dementia. Chapter 5 documents findings of focus groups with health professionals looking at dilemmas associated with decisions to start, continue or deprescribe different medication types for LTC residents with advanced dementia.

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Chapter 5: Interdisciplinary perspectives on medication-related decision-making for people with advanced dementia living in long-term care: a critical incident analysis

The interview study with pharmacists reported in Chapter 4 identified the need for a strong collaborative relationship between pharmacist, general practitioner (GP) and long-term care (LTC) staff in order for the process of medication review to be efficient and of high quality. This chapter documents the findings of focus groups with health professionals who deal with medication management for LTC residents with advanced dementia. Focus groups were aimed at elucidating the dilemmas associated with starting, continuing or deprescribing medications commonly regarded as potentially inappropriate.

The focus group study documented in this chapter has been accepted for publication in *European Journal of Clinical Pharmacology* which holds an impact factor of 2.774, which focuses on therapeutic trials, pharmacokinetics, drug metabolism, adverse drug reactions, drug interactions, drug development, prescribing policies, pharmacoepidemiology, and matters relating to the safe use of medicines (See Appendix 5 for acceptance confirmation email and author copy of manuscript). Formatting and changes in wording have been made to conform to thesis guidelines.

5.1 Introduction

A interdisciplinary approach, whereby an integrated team of professionals from different disciplines and specialties comes together in order to reach a combined decision on a complex situation, is considered the gold standard for care of people with advanced dementia living in LTC, especially when decisions need to be made on their medication

regimens.[1] Improving prescribing has been addressed through interdisciplinary medication reviews in LTC facilities.[2-4] However, only two survey studies have sought to understand the process of medication-related decision-making for LTC residents with advanced dementia.[5, 6] Whilst providing some insight into the decision-making process, qualitative research is needed to provide a more in-depth and nuanced understanding of factors influencing medication-related decision-making for inform best practice.

Key medicine decisions for LTC residents with advanced dementia are commencing new medications for symptom control, and deprescribing any for which potential benefit no longer outweighs potential risk of harm. However, decisions are not always straight forward. For example, while antibiotics might not be considered appropriate for extending life, they are sometimes used in palliation to treat significant discomfort of pneumonia and other infections in this population.[1] While acetylcholinesterase inhibitors may provide cognitive and functional benefits, and long-term preventive medications like lipid-lowering agents can reduce risk of vascular events or mortality, these may no longer be primary goals of care for people with advanced dementia.[7]

An issue of concern in LTC is prescribing inertia i.e. continuing to prescribe medications that a resident no longer needs,[8] which has prompted a movement to deprescribe, with new organisations formed specifically to optimise quality use of medicines (QUM) in older adults e.g. Australian Deprescribing Network (ADeN).[9] However, little is known about the factors in decision-making that contribute to prescribing inertia in LTC residents with dementia.

A recent systematic review found the most prominent enablers to deprescribing in people with life-limiting disease were organisational support, and an interdisciplinary approach

to medication review.[10] Further research is needed to better understand factors impacting appropriate deprescribing in palliative care.

A methodology used with promising results to explore medication-related decision-making in other clinical populations is the 'critical incident technique' (CIT) which focuses on 'dilemmas' and factors influencing their resolution.[11] Two separate studies used CIT to explore physician decision-making with regard to prescribing opioids and benzodiazepines to patients in primary healthcare.[12, 13] In both studies, considerations other than pharmacological contributed to decision-making, including concern about maintaining a therapeutic relationship with patients.

5.2 Aims and objectives

This study aimed to explore medication-related decision-making by health professionals from different disciplines and specialties caring for people with advanced dementia living in LTC facilities, with a special focus on the dilemmas associated with starting, continuing or deprescribing medications commonly regarded as potentially inappropriate. Specific medications of interest include acetylcholinesterase inhibitors, antibiotics, opioid analgesics and lipid-lowering agents.

5.3 Method

5.3.1 Study design

The study used a qualitative approach modelled on the CIT.[11] Ethics approval was from the University of Technology Sydney (UTS) Human Research Ethics Committee (Approval Reference No. ETH16-0291) (See Appendix 17). All participants gave written informed consent to participate (See Appendix 10).

The consolidated criteria for reporting qualitative research (COREQ-32)[14] was used for the development and reporting of important aspects of the research team, study methods, context of the study, findings, analysis and interpretations.

5.3.2 Participants

5.3.2.1 Sampling

Eligible participants were health professionals with experience of medication-related decision-making and management for people with advanced dementia. Participants were purposively sampled from health professions most commonly involved in medication-related decisions for people with advanced dementia including medicine, nursing and pharmacy. Because of the central role played by medical professionals in prescribing medicines, we included physicians from the three specialties for whom advanced dementia is a major focus, namely general practice, palliative care, geriatrics and old age psychiatry. Nursing participants needed to be a registered nurse (RN) and have a scope of practice that included medication management. The number of participants in each focus group was determined by ensuring representation from relevant disciplines and specialties. It was considered less important whether the same or different representatives contributed to different focus groups.

5.3.2.2 Recruitment

An email invitation was circulated through professional body newsletters and the team's established clinical networks and professional activities (e.g. special interest groups) (Appendix 8). Those responding with interest were then emailed the information sheet and consent form to be filled out and returned to researcher before the scheduled focus group meeting (Appendix 10).

5.3.3 Data collection

Data were collected using focus groups, as follows.

5.3.3.1 Pre-session

One week prior to the focus groups, participants were sent a questionnaire including questions on number of years in occupation and experience in making medication-related decisions for LTC residents with advanced dementia. Participants were also emailed two different vignettes on each specific medication of interest including acetylcholinesterase inhibitors, antibiotics, opioid analgesics and lipid-lowering agents (see Appendix 13). These have been identified from the literature as being medications that are commonly started or continued for LTC residents with advanced dementia but are of questionable net benefit due to risk of adverse effects, further accentuated for those with advanced dementia due to physiological changes that accompany this condition impair medication metabolism and clearance. Antipsychotic medications were not included due to significant recent research in Australian LTC in this area.[15, 16]

Key parameters of interest were altered across vignettes in terms of clinical and socio-demographic variables including age, sex, comorbidities, cognitive and functional status, a medication list and a short description of the dilemma. Participants were asked to read vignettes prior to the scheduled meeting and encouraged to make notes to use as an aide during focus groups. Vignettes were also intended to prompt health professionals' memories of similar encounters when prescribing or managing medications for people with advanced dementia. Participants were asked to have their notes and the vignettes in front of them during the focus group meeting.

5.3.3.2 Focus groups

Four focus group sessions were undertaken, with each session focusing on a different medication of interest, with participants telephoning into a teleconference call at the scheduled time. Focus groups were audio recorded and lasted approximately 90 minutes.

Three focus groups were facilitated by one supervisor, a female palliative care physician with experience in leading palliative care services including in-reach to LTC; as well as leading an extensive program of research that includes use of the critical incident technique and studies focused on the care of LTC residents with advanced dementia. One focus group was facilitated by another supervisor, a male social scientist with experience in research on improving palliative care for LTC residents with advanced dementia. The female PhD Candidate with a background in medical sciences acted as assistant moderator, taking notes and running the audio recorder during focus group sessions.

Many participants knew focus group facilitators prior to the study through established professional bodies and/or previous collaborative research. Participants were made aware that this research made up part of a PhD programme within the email invitation and information sheet.

The CIT was operationalised in each focus group as exploration of dilemmas in the vignettes, including sources of information useful for informing decision-making and the variables resolving or worsening equivocation in decision-making[17] (see Table 5.1). Participants were also asked “can you think of experiences you have had where similar or different issues occurred in relation to this medication?” Similar to the ‘think aloud’ method used in cognitive interviews, we encouraged participants during focus groups to verbalise their decision-making process as they answered questions.[18] Open discussion and debate was encouraged to make explicit any discipline/specialty-specific assumptions

and perspectives that might otherwise be too embedded for participants to recognise and report.

Table 5.1 General questions asked during focus groups related to medication of interest

- Should the medication in question have been started, continued or deprescribed?
- What are your reasons for that decision?
- What are the contextual considerations needing to be taken into account?
- What are the key learnings from this discussion that could guide ways to better identify PIP and improve prescribing in this population?
- Are there any guidelines that you use to help with your decisions? Are there any additional guidelines that would be helpful for you to make decisions?
- Is there anything else which would make a decision easier to make?

Questions were sometimes opened to any participant but at other times asked to each participant in turn to ensure perspectives from different disciplines/specialties were included and manage group dynamics. It was explained to participants that there were no 'right' or 'wrong' responses and focus groups were aimed at capturing complexity and diversity rather than concordance among perspectives.

5.3.4 Data analysis

Content analysis was first employed to extract generalised principles from the individual vignettes presented and offered by participants. Initially, the PhD student independently coded all four transcripts and developed a coding structure. The structure was coded inductively, grouping text/themes which were found between all medications of interest, and also identifying points of interest which were specific to each medication. The narratives of each vignette were of interest to identify common features that prompt recall

by participants and offer insight into the decision-making process. Areas of disagreement between different disciplines/specialties were regarded as focal points for highlighting dilemmas and contextual considerations.

The PhD student and two supervisors met to discuss and clarify common themes between medications of interest as well as defining features and points of difference. Themes from a review of reviews of person- and patient-centred care [19] were used to transition to interpretive themes. QSR NVivo 11 software was used to manage data.

For verification purposes, a one page summary of themes found throughout all focus groups was emailed to participants, with an invitation to identify any they disagreed with.[20]

5.4 Results

5.4.1 Participant characteristics

The study was conducted between September 2016 and February 2017. A total of 16 participants were recruited, ten of whom were female. Participants' clinical experience is summarised in Table 5.2. Six participants were involved in the focus group on antibiotics, five in the acetylcholinesterase inhibitor focus group, five in lipid-lowering agent focus group and four in the opioid focus group. All four focus groups included medical representation from general practice, a representative from geriatric and/or palliative medicine and nursing representation from aged care and/or palliative care. A heart failure nurse practitioner attended the lipid-lowering agent focus group to give a relevant specialist perspective. A clinical nurse specialist working with a hospital rapid response team participated in the antibiotic focus group to provide insight into use of this medication in LTC residents transferred to acute care. Pharmacists attended three of the

focus groups, but a pharmacist who was scheduled to attend the focus group on lipid-lowering agents cancelled at the last minute due to unforeseeable circumstances and could not be replaced.

Table 5.2 Clinical experience of health professionals who participated in focus groups (N = 16)

Clinical experience		**N**
Years practising		
11 - 20		6
> 20		10
Discipline	**Specialty**	**N***
Medicine (n = 8)	General practice	3
	Geriatric medicine	4
	Palliative medicine	4
	Psychiatry of old age	1
Nursing (n = 5)	Aged care	3
	Heart failure	1
	Palliative care	2
	Rapid response	1
Pharmacy (n = 3)	Aged care	2
	Pain management	1
	Palliative care	1

* Numbers don't add up to 16 because some participants held more than one specialty

Participants had experience in a range of activities related to medication decision-making for LTC residents with advanced dementia, including medication reviews and case conferencing with other health professionals and family to decide medication management, as well as other assessments such as falls risks. There was also many overlaps in experience by specialty and disciplines.

5.4.2 Themes

Participants saw medication-related decision-making for LTC residents with advanced dementia as a serious undertaking with equally significant consequences and responsibility regardless of whether starting, continuing or deprescribing a medication. Participants acknowledged that medications were sometimes continued due to apathy, a

desire not to be seen to threaten the status quo, and/or a concern that changing medication might confer responsibility for negative consequences. However, they emphasised that taking no action should be viewed as an equally active decision that carried equal responsibility.

> *"The last thing a GP wants to do is change things around and then something bad happens, then it would be very easy for people to blame the GP for the decision on retrospect…if the patient is stable and there is no side effects, the tendency of many GPs is to just continue going." (GP2, lipid-lowering agents)*

Concerns were also raised about a perceived trend in LTC by which a dementia diagnosis was seen as a reason to deprescribe indiscriminately, without due individual assessment.

> *"The implication that just because a person who has a cognitive impairment deteriorates from a cognitive perspective in an aged care facility, that that means that they're dying and the best treatment for that situation is comfort care with opioids and benzodiazepines without further thought is just a concerning one sometimes." (Geriatrician 1, opioids)*

> *"He'd stopped eating or drinking and they thought he must be dying…it turned out he had a mouthful of ulcers…there was this presumption that he was deteriorating from his dementia, and he wasn't. You have to have a really careful approach; is it actually deterioration from dementia, or is it something else that could be really easily resolved?" (Nurse 1, opioids)*

Above all else, focus group discussions highlighted the complex interplay of diverse factors specific to each individual resident that health professionals needed to consider when making decisions about risk versus benefit of medications for LTC residents with advanced dementia. Rules-of-thumb and guidelines were seen as useful, especially for health professionals who did not deal with dementia and palliative care regularly.

"I love guidelines because when it's off my scope it helps me to know what to do, and somebody else has already digested the complexities of the literature and given me a frame to work around. The heart failure guidelines specifically, I use them a lot, and certainly we contribute to those working at a high level in the heart failure area, but when I'm off my scope on something like dementia which you know many heart failure patients have, I just don't have a really good knowledge. So for me, a guideline is gold." (Nurse, 3, lipid-lowering agents)

"I think that also depends on the clinicians skill level as well, and who's looking at them and how much do they actually know and how much they can figure out for themselves rather than defaulting to policies and procedures and protocols as well. That's a big thing, who sees them, what level of medical officer, what kind of allied health is around, what kind of nursing skill levels…" (Nurse 5, antibiotics)

However, concerns were raised that they were often over-applied without due reference to individual resident variability. Participants stressed that applying guidelines to each resident's case required collaborative input from a range of professional and personal perspectives, including the person with dementia and their family.

"The guidance is important but it's only one part of what should be a complex management approach involving other professionals" (Psychogeriatrician 1, acetylcholinesterase inhibitors)

"It should be a multidisciplinary approach, including the resident and their family in the discussion. I think that happens most of the time, but sometimes it doesn't. Yes, we can have guidelines and algorithms and everything, but it needs to be individualised, looking at all of their medicines and all of their health conditions." (Pharmacist 2, acetylcholinesterase inhibitors)

"I'm not sure that stopping rules are easy. I think a list of considerations would be better. I think it should be case by case and in discussion with the person with dementia and the family." (GP 3, acetylcholinesterase inhibitors)

"I think you'd have to be careful about being only prescriptive." (Geriatrician 3, antibiotics)

Themes from the focus groups could therefore be grouped within two broad categories as follows: i) Applying a person-centred approach to medication-related decision-making for LTC residents with advanced dementia, and ii) Decision-making as a dialectical process requiring multiple perspectives.

5.4.2.1 Applying a person-centred approach to medication-related decision-making for LTC residents with advanced dementia

Go slow in the face of unpredictability and unknown individual variability

The unpredictability of the dementia trajectory for each individual resident was seen to make medication-related decisions difficult for clinicians in terms of establishing whether the overall goals of care were palliative and appraising whether a medication would have a net benefit within the person's lifetime.

"It's completely unpredictable ... I mean I would be completely shocked if the patient survived another 12 months, but whether this person would die tomorrow, or whether they live for another 6 months, I can't tell." (GP 2, antibiotics)

"Whether he was having any difficulty or whether he was quite stable in his trajectory…sometimes you can only tell that as time goes on." (Nurse 1, lipid-lowering agents)

A high prevalence of polypharmacy received by LTC residents with advanced dementia was seen to combine with multi-morbidity to make it difficult to determine what was

causing symptoms. This was exacerbated by the difficulty of assessing symptoms in someone with cognitive impairment and limited functioning.

> *"He's on numerous medications, so it would be really hard to work out what was doing what." (Nurse 1, acetylcholinesterase inhibitors)*

> *"You really have to use your skills to assess that this is not the usual resident we know, something is wrong, and then we have to do a proper head to toe check of the patient, and stop to find out what is going on." (Nurse 2, lipid-lowering agents)*

Many participants highlighted a need for caution and gaining all the appropriate information on the particular resident as a necessity when making changes to medicine regimes, regardless of the medication type or decision as the repercussion for making the wrong decision was seen as potentially dangerous given the vulnerability associated with dementia and frailty. Possible repercussions participants were worried about included pharmaco-interactions, kidney and liver damage, over sedation and lethargy, increased falls risk, delirium, bradycardia, gastrointestinal effects and nausea.

> *"You'd do one thing at a time, one change at a time, keep revisiting it and see how it impacts her when the change is made." (Nurse 1, acetylcholinesterase inhibitors)*

> *"So it's really for me, stop and think before acting…I don't see much point in prescribing something for the sake of feeling like you've done something as a clinician. I think it's important to have the correct information." (Nurse 4, antibiotics)*

Due to individual variability, it was difficult for clinicians to give a definitive answer as to when to change medications, especially deprescribing long-term treatments. Only

when there was an obvious decline in function or cognition could medication-related decisions be easily made for a resident.

> *"If the person's functional ability is pretty impaired, then it's probably time to stop." (GP 3, acetylcholinesterase inhibitors)*

Clinicians also pointed out that the diagnosis of dementia itself also affected the way they interpreted the appropriateness of medications due it its pharmacological and biological impact.

> *"Yeah, things would be good for him if he had no dementia, but sadly he has and he's sitting at 6a [Functional Assessment Staging Tool (FAST) score] so we have to keep that in mind when we plan." (Nurse 2, lipid-lowering agents)*

> *"The dementia itself is a significant prognostic element, I wouldn't be surprised if [scenario resident #2] died within the next twelve months. His dementia is a major part of that. There's lots of ways that the dementia contributes to the relevance of the lipid-lowering agent and other medications, and to the interpretation of the benefits and harms of those medications for him." (Geriatrician 1, lipid-lowering agents)*

A holistic approach is required

Regardless of the medication in question, the overarching consensus was that decisions about a specific medicine should never be made in isolation, but should also take into account all their other medications and a comprehensive range of clinical and personal considerations. Rather than focus on a single decision, clinicians saw medication management as a continuing process of regular review, monitoring and adjustment.

> *"It's not just one decision, it's a number of decisions." (Nurse 1, opioids)*

> *"Looking at his list of drugs, none of us would ever just look at donepezil in isolation." (Pharmacist 2, acetylcholinesterase inhibitors)*

Weighing up the potential harms and benefits of starting, continuing or deprescribing medications needed to take account of the context of each particular person and their individual goals.

> *"Benefits of continuing those medications have to really outweigh the side effects. How burdensome is it for the resident? If the benefits are much larger, at what stage do we stop it? (Nurse 2, lipid-lowering agents)*

> *"Is there a patient sign or symptom to support either benefit or harm from the drug, or lack of benefit." (Pharmacist 2, acetylcholinesterase inhibitors)*

Clinicians emphasised the need for comprehensive assessment before making medication-related decisions. Considerations listed by participants that needed to be taken into account included the resident's history of adverse effects or drug interactions, whether some medications were potentially negating the effects of another, severity of symptoms, swallowing capacity, illness trajectory, incontinence level, anticholinergic load, evidence of cardiovascular abnormalities, if the resident was completely bedbound or were newly admitted to the LTC facility.

> *"There is a couple of other medications with anticholinergic effect's that he's on which would be counteracting the donepezil anyway, so that's another issue." (GP3, acetylcholinesterase inhibitors)*

> *"If it gets to that point where they can't swallow anything, then obviously that's a different conversation, because that means this patient is incapable of feeding themselves, and eating and drinking…I think, if it gets to that stage where they can't even swallow the tablet, then I think it's a different conversation." (GP 2, antibiotics)*

Understanding the resident's past clinical history was described as enabling clinicians to reach better decisions within the context of individual variability, and prevent repeating previous mistakes.

> *"You'd really want to know where's she's sort of been in terms of her background, and how many times it's occurred in the last little while, and what was done in the past, and how did she recover or not from that, and just that whole background history and her response." (Nurse 4, antibiotics)*

> *"It's a matter of getting that background history, and you know, whether they were given an opioid if they came out of an operation and whether there were other factors that contributed to what appeared to be a poor response." (Pharmacist 1, opioids)*

> *"There certainly are risks of treatment [using opioids] and the risks are higher for some people who've had bad experiences previously but those need to be taken into context with possible clinical benefit." (Geriatrician 1, opioids)*

It was important to view the resident as a person with needs, and that other factors should be looked at, not just medication, in order to improve care and the person's overall quality of life. Non-pharmacological approaches were considered a better approach in many instances to minimise adverse effects from medicines including massage and heat packs.

> *"The most likely and the most effective strategy you would have here would be non-pharmacological to be honest…that would be my first line of intervention rather than a pharmacological one in this situation." (Old age psychiatrist 1, acetylcholinesterase inhibitors)*

Try to clarify the purpose of each medication

Participants frequently focused on distilling the purpose of medications, though sometimes this was challenging. Those that controlled symptoms and maintained quality

of life (e.g. analgesics) were likely to be continued, provided the benefits outweighed associated risk of adverse effects. Some medications (e.g. antibiotics) were more ambiguous with regard to purpose. Starting antibiotics was seen as only beneficial if it was being used to maintain quality of life and to treat symptom burden associated with infection rather than to sustain life.

> *"Certainly from a benefits perspective and quality of life, I think pain management is a critical aspect to consider. I agree that what we go to in terms of pain management is up for debate. In terms of the risks, well that comes back to what we've talk about, being what dose we start with, with what route, how its monitored...pain management has got to be your first priority though." (Pharmacist 1, opioids)*

> *"An infection like this is often a pre-terminal event with someone with advanced dementia and the likely benefits of any treatment with antibiotics may just be prolonging her terminal stage." (Palliative care physician 1, antibiotics)*

Lipid-lowering agents were seen as clear candidates for deprescribing where this was seen as safe and no longer aligned with the resident's therapeutic goals of care which may be focused on palliative principles for strictly comfort. While the prescribing of acetylcholinesterase inhibitors may also no longer align with the resident's goals of care, participants reported clinical experience of seeing rapid decline in cognitive and functional status in residents when acetylcholinesterase inhibitors were stopped, therefore ceasing was seen as needing to be approached with caution for LTC residents with advanced dementia.

> *"I think the difficulty if we start altering his medications is that we run the risk of pushing him into delirium. Certainly, I think there is evidence that shows that if you take people off anticholinesterase inhibitors they can acutely*

decline as well, so you've got to be really careful here." (Psychogeriatrician 1, acetylcholinesterase inhibitors)

"I've seen people deteriorate rapidly…people do deteriorate very rapidly sometimes." (GP 3, acetylcholinesterase inhibitors)

5.4.2.2 Decision-making is a dialectical process requiring multiple perspectives

Diverse professional perspectives may need negotiating

Decision-making in the focus groups proceeded via a dialectical process wherein participants iteratively added layers of factors to consider from their different perspectives. Inter-professional collaboration was stressed as important to share both clinical experience/expertise and knowledge about the individual resident to reach the best decision. Medical practitioners and pharmacists often provided expertise on medicines while nurses from the LTC facility contributed an understanding of the resident and his/her family.

"I just know that my knowledge about this medication is so limited that, you would want someone…to come along and actually have an understanding of how this drug works, and why it's given and you know, you really want someone in your team like that to explain it." (Nurse 1, lipid-lowering agents)

Pharmacists' knowledge of pharmacology was seen as helpful during medication-related decisions, especially in a palliative care context where reducing medication load was a key priority.

"From clinical practice when I've had difficult situations with deprescribing, when patients have been on medications for long periods of time, I found working with a pharmacist extremely beneficial, because often it's beyond my expertise, then together we put together regimes to deprescribe successfully." (Psychogeriatrician 1, acetylcholinesterase inhibitors)

There were very few points of contention during discussion between focus group participants. However, perspectives sometimes differed due to disciplinary or specialty scope of practice. For example, in relation to antibiotic use, the GP placed more emphasis than other participants on their relationship with the family as a consideration in deciding whether antibiotics should be administered.

> Palliative care physician 1:
> *"Reflecting on my practice and comparing with your practice, it seems it's so much the case that it's default treatment…I guess as a palliative care physician I would like to offer a really strong alternative that not treating a patient like this with antibiotics is a very appropriate option. You know, it should be at least equal to the option of treatment. I guess, it's pushing against the tide a lot. But I think it's a really important point to state for a patient like this."*
>
> GP 2:
> *"I think the issue here though is, it's in the context of my practice…If the family wants it quite strongly, there is no way I am going to say 'there is no way I can give it' because it's used enough and you know, it's just not worth having that sort of conflict with the family I think because it is unlikely to do a lot of harm."*
>
> *(antibiotics)*

Guided by strict protocol, those in the acute care setting were more likely to actively treat LTC residents with advanced dementia using antibiotics before taking into account alternate options for treatment, or regardless of the person's obvious frailty. The sepsis pathway was seen as a process that needed to occur, and other actions taken later when provided with more information. If LTC residents with advanced dementia were sent to emergency, then it was assumed that they had been sent in order to provide that higher level of therapeutic care.

"We're more prone in the acute setting to just starting stuff first and figuring it out later…we tend to go with what we know first and then start ruling things out and taking things away as we go… once those blood results come back, and we found that it perhaps wasn't the reason, then antibiotics would be looked at and probably be removed." (Nurse 5, antibiotics)

"It's that cascade effect of escalation of treatment that can just keep on going for that person who is on that conveyer belt…the treatment starts, the protocol starts, the pathway starts, off it all goes." (Palliative care physician 1, antibiotics)

Communication should be iterative to align medication decisions with the changing illness trajectory and goals of care

Ideal communication and collaboration was seen as iterative rather than one-off, given the likelihood that goals would change in light of disease progression and acute events. Participants saw medication decisions as likely to change over time. Much of the discussion revolved around the due process of decision-making, rather than the resulting decision.

"The concept of planning I think is key and that is the progressive series of conversations that happens from the beginning right through…and is readdressed each time there is a change." (Nurse 4, antibiotics)

"What's appropriate now, is not going to be appropriate down the track..." (Geriatrician 3, antibiotics)

Participants also believed that specialists should do more to sensitively explain how the usefulness of these medications changed over the person's illness trajectory, especially preventative medications which their loved one had probably been taking long-term and had shown to provide initial benefits. There was a felt sense that discussions of this nature needed to ideally occur much earlier on than what was usually the case.

"One of the things that I feel that some specialists don't necessarily tell patients, or at least not seemingly heard, is that when they're prescribed their medicine, they're saying, "well this is the right medicine I think for you now," not that this is the right medicine that's always going to be good for you, it's the one that I think is good for you now, you know." (Geriatrician 1, lipid-lowering agents)

View family and resident goals as focal

Focus group participants portrayed shared decision-making as a process that started and finished with resident/family goals. Emphasis was placed on establishing good communication between health professionals, family and (wherever possible) the person with dementia so as to better understand goals and preferences of care, and how they can work together to reach the best quality of life for the resident throughout their treatment.

"The question is very much around the concept of goals of care, focus of care, expectations of care, having not seen evidence of a discussion around care planning for me that's going to be the key in terms of moving forward with any decision-making." (Nurse 4, antibiotics)

"How are you going to work together to help him to live happily and comfortably in his last year?" (Nurse 1, acetylcholinesterase inhibitors)

Engaging with family members early on was seen as optimal to enable a gentler transition toward accepting their loved one's prognosis.

"It becomes a conversation that's had in a controlled and advanced way, rather than in a crisis and in the middle of the night... if we've done a good job they shouldn't be surprised either. It's kind of like they're a bit prepared for this too." (Palliative care physician 1, antibiotics)

Participants emphasised the need to inform families properly to enable them to participate in shared decision-making.

"Sometimes families can be quite directive about what should be given without the understanding of how things work…discussion needs to happen to clarify all the issues that could be going on in people's minds." (Nurse 1, opioids)

"I often find people don't have a very clear understanding of medications that are going to make a difference today and tomorrow, or make me feel better in a few hours versus medications that make a big difference over 10 years." (Geriatrician 1, lipid-lowering agents)

When families were resistant to a palliative approach, their perspective was carefully balanced against participants' clinical judgement regarding the resident's interests.

"If the family are adamant that one thing is the way forward, I try to work with it as long as there are no severe risks…I am guided a lot by what the family say…If something is plainly unsafe, having assessed capacity in the patient, I would go with what is safer. But generally, if there's not a major safety issue, I'll go with what the family say." (Old age psychiatrist 1, acetylcholinesterase inhibitors)

"My sense is that if you know the aim of palliative care is to try and make sure that each day is a little bit better due to what you do. So if ceasing a medication causes harm to everybody around you from doing it, then it's not a great palliative act to do that, so that would certainly influence my continuing it." (Geriatrician 1, lipid-lowering agents)

As well as integral to high quality care, ensuring that decision-making was shared with family and aligned with their goals was also seen as necessary to prevent litigation. There was concern that families might perceive even the most appropriate decisions as grounds for litigation if these did not accord with their understanding of what was best for the resident. As highlighted above, participants were also acutely aware of risks associated

with starting or deprescribing medications and emphasised the need to communicate these to family members to ensure they accepted these within the context of likely benefits.

> *"You know the family's view on this, getting that wrong and having the family or the patient in a different context feeling that the medications are not right for them is another harm, is another risk, and so it needs to be considered within getting this balance right for that person at that time." (Geriatrician 1, opioids)*

The contribution of research evidence

Participants regularly referenced research evidence in their discussions or else highlighted its scarcity. A lack of research evidence was especially highlighted regarding the safety of deprescribing for LTC residents with advanced dementia, with available evidence suggesting mixed results.

> *"In palliative care and in geriatrics I guess the question of when to deprescribe medications comes up a lot, and there's relatively recent evidence to suggest that for people whose prognosis is quite poor who might be within the last 12 months of life, that if you stop the lipid-lowering agent that they're on, even if they're on it for initially very good reasons, there may actually be a quality of life benefit." (Geriatrician 1, lipid-lowering agents)*

5.5 Discussion

The current study is the first to explore case-based medication-related decision-making by interdisciplinary health professionals in relation to LTC residents with advanced dementia. The focus groups conducted in this study suggest that medication-related decision-making in this context, regardless of discipline, may share common features regardless of the medication in question or whether the decision concerns starting, continuing or deprescribing.

Findings from the focus groups are consistent with previous studies that found interdisciplinary decision-making improved care in the management of residents with medication problems and behavioural difficulties (pain- and dementia-related) in high level LTC facilities[21] and at end of life.[22] In the focus groups, health professionals worked together iteratively to reach the best approach to therapeutic management. Previous research has found that 'collective intelligence' of more than one health professional working together outperforms a single health professional in diagnostic decision-making due to reduced human error (e.g. due to cognitive bias) and sharing of experience.[23] The current focus groups add that different perspectives based on scope of practice may diversify the range of factors under consideration and so contribute to a more holistic decision-making process. In particular, current findings echoed those previously in finding the scope of practice and expertise of community pharmacists to be appreciated in LTC.[24]

In the current study, regardless of discipline, participants viewed clinical decision-making as a continuing process requiring regular monitoring and review, with due process in managing medications for people in their care just as important as the decision itself. There was an acceptance that any decision was tentative, pending review of the consequences, and that the balance between harm and benefit would alter over time in light of changes in clinical status and context. Previous work to develop a toolkit of heuristics to aid practitioners making end-of-life care decisions for people with dementia similarly encouraged an iterative process to medication management.[25] Similar to previous findings, participants also identified that the level of vulnerability and unpredictability in trajectory may be higher for those with advanced dementia,[26] adding impetus for close monitoring.

A finding well documented in the literature, participants expressed the difficulty of broaching the subject of deprescribing with families is it confronted families with their loved one's deteriorating health.[27] However, a qualitative study found older adults and carers were open to the idea of medication deprescribing if they understood why this was being recommended.[28] Consistent with previous results,[12, 13] maintaining a therapeutic relationship with the resident was of paramount importance. Participants in the current study reported that having an established trusting relationship with families provided a foundation for helping them to understand that deprescribing might be the best course of action for their loved one's wellbeing.

While participants acknowledged that there was widespread advocacy in relation to initiating and deprescribing certain medicines, they were surprisingly cautious in following this advice. Most participants agreed with recommendations stating appropriate antibiotic use is to improve symptoms associated with infection;[1] however, considerations relating to duty of care towards the family were sometimes considered to 'trump' recommendations where families could not be persuaded not to use antibiotics and these posed minimal risk of harm. Considerations of this kind might partly explain why, while many clinicians see antibiotics as futile treatment and unlikely to improve symptoms at later stages of dementia, results of a study found 40% of LTC residents with advanced dementia receiving them in the last two weeks of life.[29]

Given promotion of the need to actively manage symptoms, particularly pain for people with advanced dementia in the literature,[30] it was surprising how cautious participants were to commence opioids. Similarly, a previous study found GPs feeling uneasy about prescribing opioids, even when the indication was appropriate.[13] Whilst participants did indeed consider symptom management important, they equally stressed the importance

of making careful selections regarding opioid type and dosage, and monitoring adverse effects.

Participants reported being conscious of a trend among some practitioners to deprescribe medications in LTC residents with a dementia diagnosis indiscriminately, without proper assessment. Recent guidelines and recommendations encourage the process of deprescribing long-term medicines in patients with limited life expectancy,[31] but participants described the rapid functional/cognitive decline in their patients when acetylcholinesterase inhibitors were stopped. Previous survey studies found physicians were less likely to recommend discontinuation of acetylcholinesterase inhibitors if there was any indication they stabilised cognition, reduced challenging behaviours or maintained patient function.[6, 32] If discontinuation is attempted, clinicians need to taper the dose slowly, and monitor for signs of cognitive/functional decline. Similarly, many participants saw continuing medications for LTC residents with advanced dementia as a reasonable course of action, instead of running the risk of adverse withdrawal effects from deprescribing.

As in some previous research, participants in the current study were also hesitant to deprescribe medications in frail older populations due to limited evidence to support this practice.[27] They expressed concern on how to best approach this process, and uncertainty around its consequences i.e. medication withdrawal effects. However, participants seemed more confident in deprescribing lipid-lowering agents due to recent evidence supporting the safety and improvement in quality of life and cognition in older patients with limited life expectancy.[33]

Quality evidence in the form of clinical trials to support deprescribing practices for people with advanced dementia, while growing is still limited.[34] Most studies looking to test the

safety of deprescribing of medicines and the barriers and enablers of this process are focused on the broader context of older adults with normal life expectancy.[35] These results are not transferrable to LTC residents with advanced dementia who have a limited life expectancy and goals are focused on a palliative approach.

A number of tools and resources are available for use by clinicians to determine appropriateness of medications and guide deprescribing processes at the end of life (see Table 5.3). However, these have nearly all been developed in elderly frail populations rather than people with advanced dementia more specifically.[36, 37] Consistent with earlier findings,[38] participants in this study saw single disease guidelines of limited usefulness for multi-morbid frail LTC residents with advanced dementia. Guidelines and tools were seen as helpful when a particular drug or comorbidity fell outside of their usual scope of practice, but viewed as only one contribution towards a complex management approach involving other health professionals.

Table 5.3 Tools and resources to support clinicians who are involved in medication-related decision-making for long-term care residents with advanced dementia [adapted from Reeve et al. (2017)[37] and Thompson et al. (2018)[36]]

Criteria to identify and/or help deprescribe potentially inappropriate medications
• Psychotropic medicines use in Residents And Culture: Influencing Clinical Excellence (PRACTICE) tool[39] • Medication Appropriateness Tool for Comorbid Health conditions during Dementia (MATCH-D) tool[40] • Screening Tool of Older Persons Prescriptions in Frail adults with limited life expectancy (STOPPFrail)[41] • Geriatric Risk Assessment Medguide[42] • Patient-Focused Drug Surveillance[43] • Fit for Aged Criteria (FORTA)[44] • Assess, Review, Minimise, Optimise, Reassess (ARMOR) tool[45] • Prescribing Optimization Method[46] • PEACE (Palliative Excellence in Alzheimer Care Excellence) criteria[47] • Anticholinergic Risk Scale (ARS)[48] • Screening Tool for Older Person's Prescriptions (STOPP) criteria[49] • Screening Tool to Alert doctors to Right Treatment (START) criteria[50] • Drug Burden Index (DBI)[51] • Improved Prescribing in the Elderly Tool (IPET)[52] • McLeod's criteria[53] • Beers criteria[54-56] • Medication Appropriate Index (MAI)[57]
Deprescribing algorithms
• Five-step approach and algorithm to guide deprescribing for entire medication list[58] • CEASE deprescribing protocol (Current medications, Elevated risk, Assess, Sort, Eliminate)[59] • Provides guiding principles for deprescribing of entire medication list in older frail patients[60] • An evidence-based, patient-centred deprescribing process, using patient perspectives to inform medicine decisions[61] • Ten step framework to approach deprescribing for entire medication list[62] • Deprescribing in the last year of life[63] – an algorithm guiding safe, rational deprescribing for patients in the last year of life. • Discontinuing Medications: a novel approach for revising the prescribing stage of the medication-use process[64] • Good Palliative-Geriatric Practice (GP-GP) algorithm[65] • Reconsidering medication appropriateness at the end of life[66] • Managing comorbidities in patients at the end of life[67]
Websites containing information and resources to guide prescribing decisions
• NPS MedicineWise and the Commission: An independent, evidence-based organisation primarily funded by the Department of Health to educate professionals and consumers about appropriate use of medicines. The NPS MedicineWise Online Learning Site[68] provide a range of health professional education and training resources on medication safety and quality. https://learn.nps.org.au/ • Primary Health Tasmania Updated deprescribing resources are provided online,[69] outlining deprescribing strategies for commonly used medicines, where ongoing use is considered inappropriate. https://www.primaryhealthtas.com.au/resources/deprescribing-resources/ • Canadian Deprescribing Network (CaDeN)[70] https://www.deprescribingnetwork.ca/ • Australian Deprescribing Network (ADeN)[71] https://australiandeprescribingnetwork.com/au/

- A practical guide to stopping medicines in older people[72]
  http://www.bpac.org.nz/BPJ/2010/April/stopguide.aspx
- NHS Scotland – Polypharmacy Guidance – Medicines Review[73]
  http://www.polypharmacy.scot.nhs.uk/
- Medstopper – website providing a tool to help clinicians and patients make decisions about reducing or stopping medications.[74]
  http://medstopper.com/
- Reducing medications safely to meet life's changes[75]
  Provides guidance for deprescribing different medication classes in specific medical conditions
  https://deprescribing.org/

Participants in the current study empathised with less experienced health professionals who might be reluctant to leave themselves open to blame when negative consequences followed a decision to deprescribe. Consistent with past findings,[76] participants acknowledged the risk of liability as a barrier to deprescribing. Participants emphasised the decision to continue a medication for a person with advanced dementia should be considered an active decision with the same responsibility inherent in deprescribing, given the increased risk of adverse drug reactions.[8]

5.5.1 Strengths and limitations

Study findings are limited by the risk of bias due to group effects common to all focus groups, including the potential for participants perceived to be of greater authority to influence the responses of other participants (i.e. a 'halo' effect).[77] Also, responses may have been constrained by continuing professional relationships with the facilitators. To reduce this risk, the facilitator began by stating that the purpose of the groups was to tease out equivocal considerations rather than reach consensus. Moreover, the CIT enabled probing about decision-making which would have made bland agreement difficult.[17] Though the PhD student has a non-clinical background this offered the opportunity to minimise the risk of clinical biases during analyses. Results of the study may also be limited by focusing on only certain medication types, use of only one focus group for each, and consideration of only two vignettes on each occasion. While discussion on

vignettes were discussed till exhaustion by participants, and resident parameters were altered to see if decision making would change, it is nonetheless noted that results will not be transferrable to disparate cases. Finally, the hypothetical nature of the vignettes meant that our method omitted contributions that would be forthcoming if participants were discussing residents who they had real-world knowledge of. None of the participants responded with feedback after being emailed the themes for comment. One participant said they were happy with the themes.

5.6 Conclusion

Findings from this study highlight the need for a team approach to medication-related decision-making for LTC residents with advanced dementia, which should include the person with dementia where possible and their family, as well as health professionals from a range of disciplines. Consensus on the resident's goals of care should be viewed as the starting point for all decisions. Findings also suggest that decision-making should be viewed as carrying similar responsibility and requirements for justification and review regardless of whether initiating, continuing or deprescribing medications. Further evidence is needed to guide the safety of medication changes, especially deprescribing in palliative care residents nearing the end of life i.e. LTC residents with advanced dementia.

5.7 Summary

The findings from in-depth interviews presented in this chapter highlighted the need for interdisciplinary collaboration to manage the complexity of medication-related decisions for LTC residents advanced dementia as it enables sharing of clinical experience/expertise, differing disciplinary perspectives, and knowledge about the resident. A dialectical approach where decisions were constantly revisited and adjusted

was seen as necessary. Continuing a medication should be considered an active decision that carries as much responsibility as starting or deprescribing. Chapter 6 will provide a final discussion on the principle findings of this PhD programme, implications for policy and practice, and future directions for research.

5.8 References

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Chapter 6: Discussion and conclusions

This programme of research has taken a pragmatic approach using multiple methods to investigate a complex topic through three foundational research questions.[1] Findings confirm that achieving quality use of medicines (QUM) for long-term care (LTC) residents with advanced dementia is challenging, and was perceived by participants to require a multifaceted approach.

This chapter summarises contributions of the programme's findings to answering each of the programme's research questions, and provides suggestions for policy and practice within the context of current Australian initiatives for improving QUM in LTC, as well as directions for future research.

6.1 Summary of principal findings

6.1.1 Research Question 1 – What systems are there to define and identify potentially inappropriate prescribing in the context of advanced dementia?

Chapter 2 presented a systematic review which synthesised published systems for identifying potentially inappropriate prescribing (PIP) in the context of advanced dementia. Five of eight studies included in the systematic review used the Palliative Excellence in Alzheimer Care Efforts (PEACE) criteria developed by Holmes et al. (2008).[2] The PEACE criteria was the only system identified that rated the appropriateness of medication types specifically within the context of advanced dementia. Authors of the PEACE criteria identified a need for further validation of the system through larger samples of medication data and a larger pool of experts. The system's 'one-size fits all' approach does not take into account the importance of taking the individual resident's life expectancy, comorbidities and goals of care into consideration when making medication-

related decisions. Suggestions arising from this systematic review included future research aimed at developing and validating systems with clinical utility for improving QUM for LTC residents with advanced dementia.

Since the publication of the systematic review,[3] the Medication Appropriateness Tool for Comorbid Health conditions during Dementia (MATCH-D) has been developed via a Delphi consensus of Australian experts.[4, 5] This tool is the most recent and comprehensive tool for supporting medicine-related decision-making for people with dementia. This tool guides clinicians on how to manage co-morbid conditions and their associated medications in people with dementia.[6] The authors tested the tool in focus groups with health professionals to determine its utility in clinical practice.[7] While the MATCH-D is not specific to the advanced stage of dementia, it emphasises individualising treatment and the importance of reviewing treatments as dementia progresses. The MATCH-D also provides guidance on the specific issues to discuss with the person with dementia and their families to individualise medication management.[4] Continuing to monitor tools for reliability, utility and accessibility to address pharmacological management will be important as clinical practice evolves and is refined.

6.1.2 Research Question 2 - What is the prevalence of potentially inappropriate prescribing in Australian long-term care residents with advanced dementia

Chapter 3 reported the findings of the first cross-sectional medication chart audit to estimate the proportion of Australian LTC residents with advanced dementia receiving potentially inappropriate medications (PIMs). Using the PEACE criteria, this study also identified resident and facility characteristics associated with receiving PIMs. Over a quarter of residents were receiving at least one medication classed as 'never' appropriate. Similar to previous international studies, lipid-lowering agents,[8-10] antiplatelet agents[8, 10,

[11] and acetylcholinesterase inhibitors[8-10] were the most commonly prescribed 'never' appropriate medications.

Residents who had spent less time at the facility (≤10 months or 11-21 months) had a significantly greater likelihood of receiving a 'never' appropriate medication compared to residents who had been at the facility for more than 5 years, replicating earlier international findings.[9, 10] These findings underscore the importance of embedding medication review as part of care processes.

6.1.3 Research Question 3 - How can we improve safety and quality use of medicines for people in this group?

Chapters 4 and 5 reported qualitative studies aimed at gaining health professional perspectives on ways to optimise QUM for LTC residents with advanced dementia.

Chapter 4 reported findings from in-depth interviews exploring pharmacist perspectives on the Residential Medication Management Review (RMMR) and its role in improving QUM for LTC residents with advanced dementia. While the RMMR is a systems level initiative introduced to support collaborative medication reviews, participants perceived the RMMR service model itself to work against – rather than in support of – interdisciplinary collaboration of the kind required for high quality reviews. The study supported concerns voiced in the literature that the current RMMR programme is not conducive to ongoing communication and relationship building between team members.[12] This study also supported previous research showing that the success of medication reviews depends on GPs' willingness to engage,[13] and that pharmacists are required to take a leading role as initiators.[14] Additionally, this study found that LTC staff are also key collaborators in driving the RMMR process, being instrumental in prompting

referrals, providing information about the residents to enable person-centred recommendations, and enabling communication between collaborators.

Chapter 5 reported findings from a focus group study that explored clinical decision-making by a range of health professionals from different disciplines and specialties regarding medications commonly seen as potentially inappropriate in the context of advanced dementia using individual LTC resident case studies. This study found that medication-related decision-making for LTC residents with advanced dementia should begin with resident goals of care and engagement with families, and be viewed as an iterative process rather than a one-off event given the dynamic considerations involved. These principles were uniformly applied regardless of medication type and whether the decision concerned starting, continuing or deprescribing a medication. Rather than focus on a single decision, clinicians saw medication management as a continuing process of regular review, monitoring and adjustment aimed at ensuring 'due diligence' in the face of uncertainty regarding prognosis and harm/benefit ratio. Decision-making was viewed as requiring a dialectical approach, with an emphasis on communication to share clinical experience and expertise, differing disciplinary perspectives, and knowledge about the individual resident.

6.2 Implications for policy and practice

6.2.1 Importance of interdisciplinary collaboration for improving quality use of medicines for long-term care residents with advanced dementia

This thesis proposes that quality interdisciplinary collaborations underpinned with comprehensive knowledge of and engagement with the person with advanced dementia and the person's surrogate decision-makers are essential for improving QUM for LTC residents with advanced dementia. Suggestions for policy and practice are targeted at the

'gaps' in current systems and processes that serve as barriers to interdisciplinary collaboration.

As explained in Chapters 4 and 5, interdisciplinary collaboration is a process that integrates the specialised knowledge of multiple disciplines to enhance the quality of care and improve outcomes.[15] Since 1987, the World Health Organisation (WHO) has promoted the concept that interdisciplinary collaboration is necessary to ensure the success of primary healthcare.[16] A report released by the National Prescribing Service Limited and Palliative Care Australia (2009) has more specifically provided guidance to health professionals in the community on QUM for palliative and end of life care in Australia, in which better communication between healthcare providers was noted as a key area requiring improvement.[17]

Figure 6.1 presents a proposed model highlighting important elements of clinical decision-making in the context of medication-related decision-making for LTC residents with advanced dementia. Key domains have been adapted from Satterfield et al's (2009) generalised 'transdisciplinary' model of evidence based practice [Satterfield et al. (2009) Fig. 5, pg.382],[18] which included domains of: a) research evidence, b) tools and resources, c) each resident's characteristics, clinical status and needs, d) each resident's values and preferences, and e) the practitioner's expertise. The transdisciplinary or team-based perspective incorporates each discipline's most important skills and knowledge, and attempts to address remaining deficiencies. However, it ignores the importance of shared decision-making and collaboration.[19, 20] A new version of the model proposed by the current thesis emphasises the importance of interdisciplinary collaboration in supporting the domains of medication-related decision-making. The proposed model goes further than transdisciplinary collaboration, which stops at acknowledging the importance of

having the same approach to care. Interdisciplinary collaboration focuses on encouraging teams of health professionals from different disciplines and sectors to reach a level of interdependence where everyone's knowledge and skills are integrated to reach quality health outcomes. Below, each domain is discussed in turn with regard to how interdisciplinary collaboration can provide support to improve QUM and outcomes for LTC residents with advanced dementia.

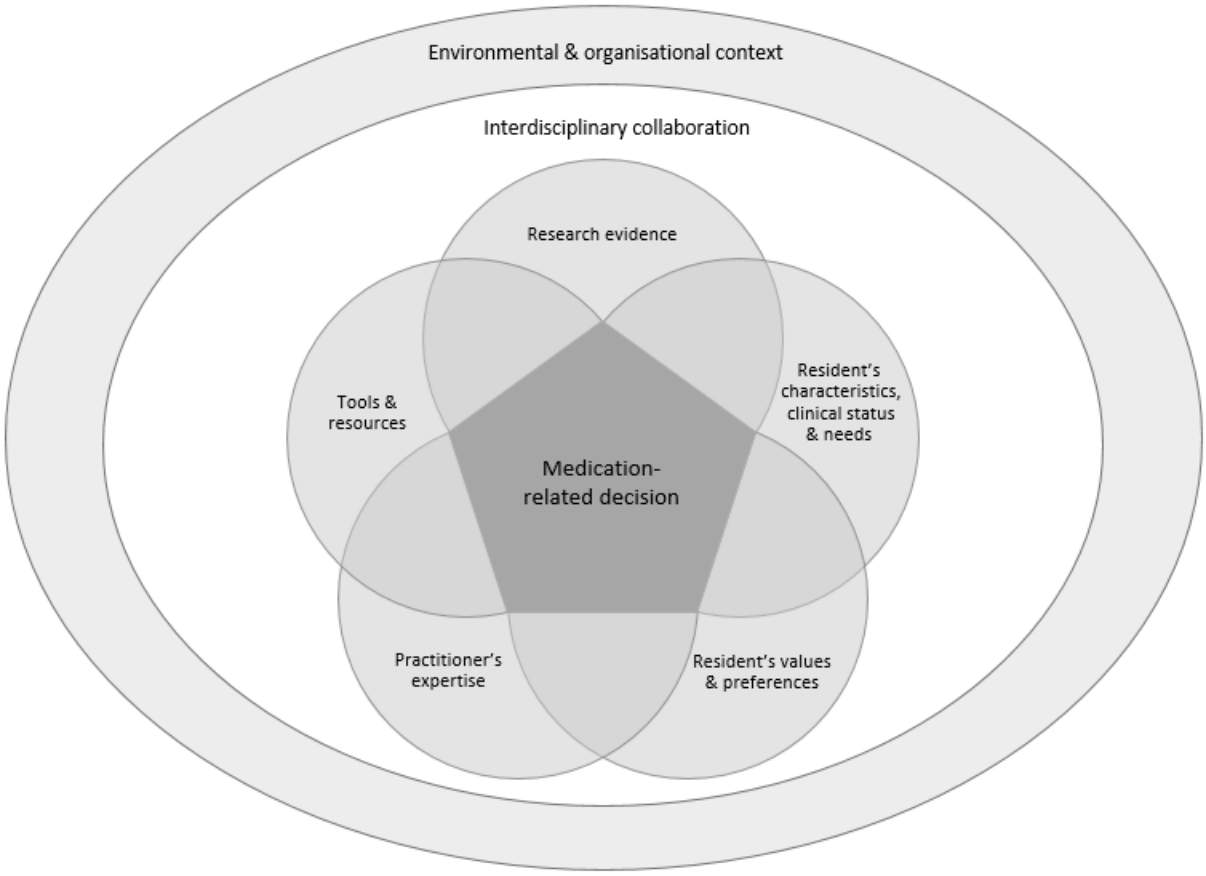

Figure 6.1 Contributions of interdisciplinary collaboration to core elements important for improving medication-related clinical decision-making for long-term care residents with advanced dementia [adapted from Satterfield et al. (2009)[18]]

6.2.2 Environmental and organisational context

Findings reported in Chapters 4 and 5 show that environmental and organisational factors mitigate interdisciplinary collaboration in ways that have important implications for QUM at both systems (Chapter 4), and individual clinical decision-making (Chapter 5).

The more specific areas are detailed below, in particular those areas where potential improvements could occur.

6.2.2.1 Aged care accreditation and quality indicators for medicines risk

As reported in Chapter 1, QUM in LTC is currently under scrutiny by The Royal Commission into Aged Care Quality and Safety. The Commission's recently-released Interim Report[21] has highlighted a significant over-reliance on chemical restraint (i.e. psychotropic use) in LTC with the related breach of the individuals rights and clinical adverse outcomes, driven by environmental and organisational gaps in the LTC sector. Currently, there is no mandatory training and education for LTC staff on dementia and alternate methods or skills to de-escalate behaviour which has in part led to a reliance on psychotropics to manage symptoms.[22] This doctoral programme has highlighted broader suboptimal medication use for LTC residents with advanced dementia. There is a critical need for more attention at clinical, facility and policy levels of QUM, noting that the optimal approach to QUM has unique characteristics when care is underpinned by a palliative approach.

LTC facilities are responsible for providing systems, training opportunities and structures that support staff, health professionals and residents to use medicines wisely and avoid medication errors.[23] Avoidance of PIP should be a fundamental principle in LTC facilities, and an essential requirement for accreditation.

A systematic review identified 28 validated medication-related indicators relevant to the needs of residents in LTC and found validated indicators addressing appropriate medication-related care in those with limited life expectancy to be lacking.[24] A further systematic review has provided a summary of quality indicators available to assess

optimal palliative care in older people with dementia more generally,[25] in line with European Association for Palliative Careguidelines.[26] This review found evidence for indicators being associated with avoiding overly aggressive, burdensome or futile treatment, and optimal treatment of symptoms and providing comfort. However, the review's authors recommended a need for indicators related to determining the appropriateness of pharmacological interventions.

As mentioned in Chapter 1, a new set of Aged Care Quality Standards (Single Quality Framework) was introduced on 1st July 2019.[27] Of the eight standards, two in particular lend themselves to strengthening medication-related decision-making as conceptualised by this thesis: Standard 2.3 (b) *"Assessment and planning identifies and addresses the consumer's current needs, goals and preferences, including advance care planning and end of life planning if the consumer wishes"* (Australian Government, 2019, p. 2); and Standard 3.3 (c) *"The needs, goals and preferences of consumers nearing the end of life are recognised and addressed, their comfort maximised and their dignity preserved."*(Australian Government, 2019, p. 3)

Also starting 1st July 2019, the National Aged Care Mandatory Quality Indicator Program[28] requires all Commonwealth subsidised LTC facilities to collect and provide clinical quality indicator data to the Department of Health. LTC facilities must measure, monitor and report on three clinical quality indicators; pressure injuries, use of physical restraints and unplanned weight loss. Findings from this doctoral programme highlight the need for similar clinical indicators to actively monitor for PIP, identify residents warranting medication reviews, and support QUM. There exist National QUM Indicators for Australian hospitals which may be used for quality improvement projects, performance monitoring or coupled with more in-depth drug use evaluations to ensure

judicious and appropriate medicines choices, and safe and effective use in patients.[29] Similar indicators could be applied in the LTC setting.

Although the PEACE criteria are limited in their use for determining the appropriateness of medications for individual residents with advanced dementia, they may have utility as an indicator at a facility or systems level. The PEACE criteria could also be used within the growing utilisation of electronic medication charts in LTC facilities to alert and provide decision support to clinicians regarding medications that may have an unacceptable harm: benefit ratio for residents with advanced dementia.

Implications for policy and practice: There is a need for QUM indicators that require LTC facilities to formally monitor QUM gaps including PIP and formally monitor actions that address such gaps such as prompt referral to prescribers and/or an RMMR, uptake of RMMR recommendations and utilisation of deprescribing plans. Evidence of activity and improvement over time and benchmarking amongst peers will also optimise performance.

6.2.2.2 Implications for the Residential Medication Management Review program

The current PhD programme suggests that the success of any given RMMR is reliant on the depth of interdisciplinary collaboration and person-centeredness. A recent retrospective cohort study using an Australian LTC administrative healthcare claims database has found that the RMMR is underutilised.[30] Medicare statistics for the financial year 2017/18 showed the uptake of item 903 (GP remuneration item for RMMRs) was 68,189 people.[31] With an approximately 240,000 people in LTC,[32] it seems that only a little over one quarter (29%) received an RMMR over a recent one-year period. Chapter 4 highlighted that there are numerous reasons why GPs may not refer residents for an RMMR. Experiencing poor quality 'cut and paste' reviews in the past was seen as

impeding initial willingness to collaborate in the RMMR programme. Additionally, infrequent referral was partly seen to arise from the arduous process involved, lack of support or process to encourage accountability for monitoring and referring, and limited access for remuneration for case-conferencing which was seen as stymieing interdisciplinary collaboration required for high quality RMMR-related collaborative practice.

The findings from this thesis in terms of the need to build connections and partnerships between health professionals to improve quality of care is a key strategy of the newly published NSW Government's published strategy report which looks to integrate care for patients.[33] Effective working partnerships and relationships across the health system promote clear roles, accountability, trust, shared decision-making and information sharing between the team. Service providers and clinicians need to develop and maintain partnerships within and across services that are proactive, and focused on the needs of the person they are caring for.

Implications for policy and practice: Building trust between health professionals is important to encourage interdisciplinary collaboration required for high quality RMMRs and optimised resident outcomes. A funding model is needed that incentivises interdisciplinary collaboration, and favours individualised assessments at a regularity that is needed to meet the complex and changing needs of LTC residents with advanced dementia.

Integrating pharmacists into general practice has been shown to enhance collaboration and improve the efficiency and quality of Home Medicines Reviews (HMRs),[34-38] raising the possibility that similar integration into LTC may do the same for RMMRs. A recent report from the Pharmaceutical Society of Australia (PSA) provides a plan by which the

role of pharmacists could be optimised within the Australian healthcare system and formalised as principal partners in QUM.[39] Action 3 of the report focuses on embedding pharmacists within healthcare teams to improve decision-making for safe and appropriate use of medicines.[39] A recent pilot study in Australia investigated the feasibility of integrating an on-site clinical pharmacist into LTC teams to improve QUM in this setting.[40, 41] While this was a cross-sectional study with an on-site pharmacist at only a single facility and one parallel control site, it provides initial data that a larger scale investigation implementing a pharmacist as part of the team in LTC has merit.

Implications for policy and practice: Embedding pharmacists into LTC facilities has potential to facilitate trust with other members of the care team, necessary to foster high quality RMMRs and other QUM activities.

Another finding from Chapter 4 concerns the problems with the remuneration model for RMMRs, which caps the number of reviews per resident to one every two years, and offers limited remuneration for pharmacists. Pharmacists reported that high quality reviews often required working hours well beyond what remuneration covered and argued that more frequent reviews were sometimes needed to meet the therapeutic needs of individual residents with complex needs, including those with advanced dementia. The majority of referrals were reported to reflect the default biennial cycle which was seen as inadequate to monitor the needs of highly vulnerable residents such as residents with dementia, whose health status might change drastically within this time period. The Interim report also found that the current remuneration system restricts access to their use, and advocated for a mechanism whereby residents can receive medication reviews and other clinical input from pharmacists on a person-centred basis more frequently than every two years.[21]

The PSA has recently called for accredited pharmacists who provide RMMRs and HMRs to be paid an extra 18% on top of their award rate in a submission to Fair Work Ombudsman's Review of the Pharmacy Industry Award 2010.[42] Although falling short of this request, the Fair Work Commission has agreed to an increase of 5% be paid in two 2.5% instalments. In addition, the Commission has agreed to provide an additional allowance of $106.40 per week (or 10 per cent) from 1 October 2019 for an employee who is classified as a Pharmacist, Experienced Pharmacist, Pharmacist in Charge or Pharmacist Manager and who is required by their employer as part of their employment conditions to perform RMMRs or HMRs.[43]

There is hope that this increase in funding may promote and support other pharmacist roles in collaborative QUM activities in LTC, such as staff education and involvement in Medication Advisory Committees. In Chapter 4, additional QUM activities such as Medication Advisory Committee meetings, education and training to LTC staff were seen by participants as important avenues to address overall medication management in LTC, and build trusting relationships as the basis for quality collaboration between different health professionals.

A further problem identified in Chapter 4 concerns minimal follow-up and collaboration occurring post-review between the GP and RMMR pharmacist to consolidate and clarify recommendations. At present, there is no access to remuneration for pharmacists and allied health to participate in case conferencing, which is an obvious forum for post-review discussion between health professionals and is likely to also encourage collaboration and engagement in future RMMRs. While post-review discussions are encouraged by RMMR guidelines for both GPs and pharmacists,[44, 45] the general consensus was that this rarely occurred. An additional way to increase medication review

and ensure follow-up by means of interdisciplinary collaboration is to tie MBS item 903 GP funding with a formalised case conference activity afterwards, in which all health professionals can access remuneration.[46]

Implications for policy and practice: Responsive remuneration that does not limit RMMR frequency for complex and vulnerable cases such as residents with advanced dementia, and enables pharmacist involvement in case conferencing offers promise for improving QUM in LTC.

6.2.3 Resident's characteristics, clinical status and needs

As highlighted in Chapter 5, health professionals need to consider a complex interplay of diverse factors related to each individual resident with advanced dementia when making medication-related decisions. Pathophysiological changes and cognitive impairments associated with dementia warrant careful consideration of medication effectiveness, safety and expected time to benefit within the context of each resident's goals of care.

In Chapter 5, the need for a dialectical process of decision-making was identified to be the ideal way to work with the complex interplay of competing factors. Clinicians making medication-related decisions need to consider not only all relevant factors but also the priority accorded each, and how these factors interact with one another and the environment. In Chapter 5, ideal communication and collaboration was also viewed as iterative rather than one-off. The trajectory of dementia requires a continuous process of regular review, monitoring and adjustment. LTC residents are typically frail and exposed to multiple medications, making it imperative to continually monitor and optimise the harm: benefit ratio in this population.[30] Medication management for LTC residents with advanced dementia needs to be viewed as a therapeutic journey.

Implications for policy and practice: The complex needs of residents with advanced dementia require ongoing collaboration between a range of health professionals to ensure all relevant factors are considered and ensure appropriate pathways to revisit decisions as the resident's clinical status changes.

6.2.4 Resident's values and preferences

Shared decision-making is recognised as an important aspect of person-centred care for people with dementia[47] and end of life care more generally.[48] In the context of advanced dementia, a resident's values and preferences are likely to be represented by the resident's family and health providers rather than the resident him/herself, unless advance care planning was undertaken early in the disease process. A finding from the focus groups study reported in Chapter 5 was that making a decision to deprescribe medications that are no longer of benefit in a resident who is imminently dying might seem straightforward from a clinical perspective, but this can be a highly emotional decision for family members and professional carers within the LTC facility. A decision to deprescribe that appears to be made suddenly can seem uncaring, even when the rationale is rooted in the resident's values and preferences. Families may feel the team is 'abandoning' or 'giving up on' their loved one.[49] As identified in Chapter 5, a trusting and supportive relationship between health professionals and family to allow for early conversations is an opportunity for empowering them and enabling a gentle transition toward accepting their loved one's prognosis.[50, 51]

An understanding of what the resident would have wanted can be improved via interdisciplinary collaboration. Multiple perspectives can help to better understand what the resident would have wanted, clarify goals of care and add weight to evidence-based decisions. Standard 2 of the recently released Australian Aged Care Quality Standards

highlights the need for ongoing assessment and planning for LTC residents to reach their individual goals and preferences,[52] stipulating the need to work together to provide safe and effective care. Standard 3 highlights the need for best practice and tailored care for older persons at the end of life.[27]

Implications for policy and practice: Early and iterative discussions over time that involve families as part of collaboration are needed to enable time for family members to adjust to changes. In this way, deprescribing for LTC residents with advanced dementia can be introduced as an empathic, person-centred and 'active' management option rather than as withdrawal of care.

6.2.5 Practitioner's expertise

There is a growing consensus that undergraduate education for all clinical professionals should include the knowledge, skills, and attitudes required to effectively participate in interdisciplinary teams.[53] A key finding of this PhD programme documented in Chapter 4 concerns the complementary roles played in the medication review process by pharmacists, LTC nursing staff and GPs. Their ability to work in a team was regarded by informants as an important skill in order to make quality medication-related decisions and provide quality reviews. A systematic review has found that interdisciplinary interventions in LTC facilities have a positive impact on residents' outcomes, with participation of the residents' primary physician and pharmacist, and effective communication and coordination consistent features of successful interventions.[54]

The pharmacist interviews reported in Chapter 4 added that trust between health professionals may be among the most important factors in fostering quality medication-related decisions and ensuring follow-up through to changes in prescribing. Chapter 4

highlighted that a lack of accountability among health professionals was a significant barrier to referral, conduct and implementation of quality person-centred medication management decisions in the RMMR programme. With more frequent interactions, there is greater opportunity to learn from each other, improve awareness of each other's professional skills, and develop a collaborative relationship.

In the pharmacist interviews, informants not only emphasised the importance of each health professional bringing their disciplinary skillset to the team but also expertise relating to communication and collaboration. LTC nurses were seen as key collaborators in driving the RMMR process, instrumental in prompting referrals, providing information about the resident to enable person-centred recommendations, and enabling communication between other health professionals. The success of the RMMR process was impacted by the GPs willingness to engage in the process. Pharmacists were required to take a leading role as initiators in the review process. When each member of the team provided their knowledge and skills, and the level of interdisciplinary collaboration was high, this was seen to improve the quality of the review, encouraging further uptake of the RMMR process.

In Chapter 4, pharmacists perceived that newer GPs trained in the importance of collaboration were more open to pharmacist recommendations. Early education and skills training for all clinical professionals at the undergraduate level to better work collaboratively with each other can enhance and provide an understanding that this should be a foundational skill to provide quality care to patients. Providing cases of residents with advanced dementia as case-studies for interdisciplinary collaboration can foster an early appreciation for the expertise and skills required to cater to their complex needs.

Implications for policy and practice: The RMMR programme should recognise diverse forms of expertise brought to medication reviews, including skills in communication and collaboration. Processes should recognise the role of LTC nurses in addition to GPs and pharmacists and provide support for developing trusting ongoing collaborations between teams. Increased training should be provided to build skills for interdisciplinary collaboration around medication-related decision-making.

6.2.6 Tools and resources

Findings from focus groups reported in Chapter 5 highlighted the need to consider each resident's individual context when applying guidelines. As seen in Chapter 5, there are a number of tools and resources that can be used to identify PIM in the elderly, and may be used for residents with advanced dementia when relevant. In addition, there is a need for tools that enable teams to appraise the quality of their interdisciplinary collaborations and their potential to contribute to better medication-related decision-making. The Assessment of Interprofessional Team Collaboration Scale (AITCS) is one such candidate. It was developed for use across settings and has been tested for reliability and validity in health practitioners from different specialties, including palliative and geriatric care.[55] It has been widely used internationally to assess team collaboration across a variety of settings including primary care,[56, 57] acute care,[58-62] home care,[63] community settings,[64] and in studies evaluating interventions.[65] Originally containing 37 items within three domains (partnership, cooperation and coordination), the AITCS was recently revised and simplified to 23 items using the same domains, while maintaining its psychometric properties.[66] Items that align especially with findings in Chapters 4 and 5 include the need to involve patients/families in setting goals for their care, listening to the wishes of

patients, meeting on a regular basis and maintaining consistent communication, and establishing a sense of trust among team members.

The Australian online resource End of Life Directions for Aged Care (ELDAC) has recently made available a Working Together Toolkit [67] designed to help LTC facilities establish partnerships with primary and palliative care service providers. The Toolkit is made up of four different modules based on the established Plan-Do-Check-Act (PDCA) cycles of quality improvement, each providing practical steps for health professionals to work through in order to reach quality partnerships within the team.[68] The "Plan" module focuses on the organisation's current teamwork process and identifying if any other partners are required. The "Do" module focuses on planning goals, utilising appropriate strategies and resources, and broadening engagement activities. The "Check" module focuses on progress in achieving service delivery goals, responding to obstacles, and evaluating partnerships with each other. The "Act" module focuses on sustaining partnerships, and making sure old processes do not return.

Additionally, CareSearch's palliAGED (Palliative Care Aged Care Evidence) provides tools and resources through their online Practice Centre that can be used to support consumers, GPs, care workers and LTC staff collaborate to apply evidence into practice.[69] Tools and resources include how to appropriately communicate with patients, families and colleagues in relation to a palliative approach, informational support on advanced care planning, and how to therapeutically manage symptoms such as pain.

Implications for policy and practice: Implementing a tool for teams to appraise the quality of their collaboration and resources that encourage teamwork may help team members identify foci for improvement to reach optimum partnerships necessary for quality medication-related decisions for residents with advanced dementia.

6.2.7 Research evidence

Currently, there is a 'patchwork' of medication-related literature focused on end of life, palliative care, LTC, older adults, dementia and/or QUM across populations, but relatively little focused on LTC residents with advanced dementia more specifically (Figure 6.2). This requires clinicians to piece together evidence, adapting as necessary. The intersection of knowledge required to make sound medication-related decisions for this population requires pooling of health professional knowledge to cover all relevant domains.

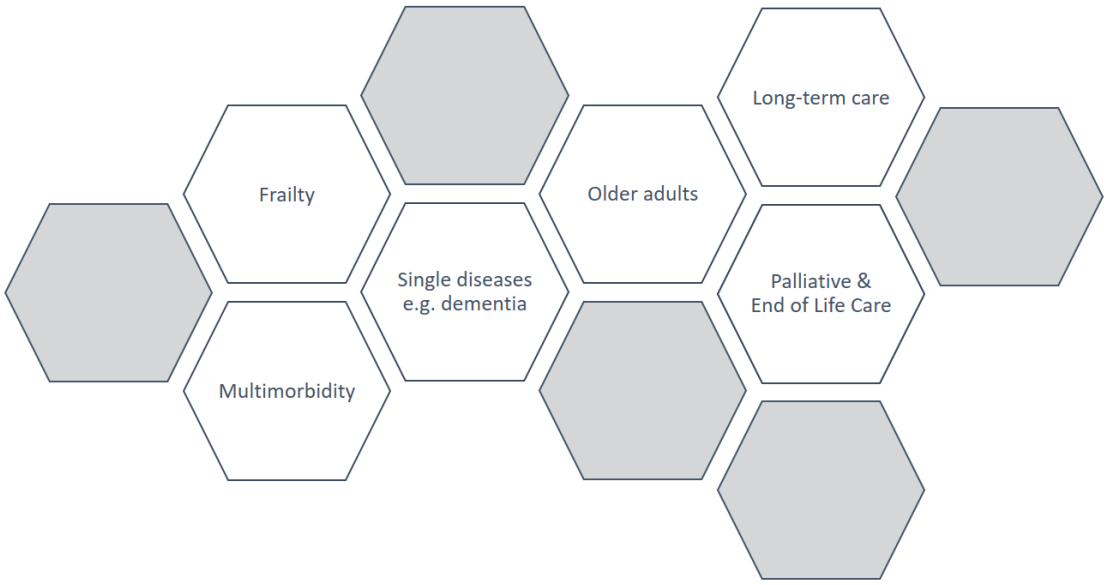

Figure 6.2 The interplay of research evidence relevant to improving quality use of medicines for long-term care residents with advanced dementia

From a clinician's perspective, making a medication-related decision for an individual with dementia with an indication or outcome in mind may require consideration of an array of research evidence, which may differ in accordance with setting, stage of illness, comorbidities and range of therapeutic dose and durations. In many situations, there may not be specific data available for the context of advanced dementia, or for the full range of relevant outcomes needed to inform a clinical decision.

In the focus group study (Chapter 5), different perspectives based on scope of practice were seen to diversify the range of factors under consideration and therefore contribute to a more holistic decision-making process. This process also helped to deal with contradictory information arising from considerations based on multi-comorbidity and complex therapeutic options for LTC residents with advanced dementia.

Implications for policy and practice: The array of research evidence is best integrated through interdisciplinary collaboration, sharing knowledge from different disciplines and specialties.

6.2.7.1 Evidence on safety of deprescribing for long-term residents advanced dementia

In Chapter 5, a lack of research evidence on the safety of deprescribing was highlighted as a barrier to QUM in LTC residents with advanced dementia. While there have been a number of systematic reviews on the safety and effectiveness of deprescribing interventions in older adults (not dementia specific),[6, 70-74] these have only found evidence for reducing PIMs, not whether this led to any meaningful beneficial outcomes such as prevention of hospital admissions and adverse drug events, and improvement in mortality rates.[71-73] One systematic review that focused on specific medication classes found it safe to reduce psychotropics (including antipsychotics and benzodiazepines), diuretics, antihypertensives, digoxin and nitrates.[70] A Cochrane review has also demonstrated that withdrawal of antipsychotics does not seem to cause detrimental behavioural symptoms in people with dementia.[75] However, further evidence on the safety of withdrawing medications at the end of life for people with advanced dementia in the LTC context is needed to determine whether there is need for additional monitoring over and above other older adults in the palliative care phase. As discussed in Chapter 5, health professionals need to tread carefully when making medication-related decisions for people in the

advanced stage of dementia due to their vulnerability and unpredictability in the dementia trajectory.[76]

Implications for policy and practice: Further research is needed to provide guidance on systematic deprescribing in the context of advanced dementia specifically. In the meantime, careful monitoring is recommended when undertaking deprescribing in this context.

6.3 Outline of implications for policy and practice

6.3.1 Environmental and organisational context

- There is a need for QUM indicators that require LTC facilities to formally monitor QUM gaps including PIP and formally monitor actions that address such gaps such as prompt referral to prescribers and/or an RMMR, uptake of RMMR recommendations and utilisation of deprescribing plans. Evidence of activity and improvement over time and benchmarking amongst peers will also optimise performance.

- Building trust between health professionals is important to encourage interdisciplinary collaboration required for high quality RMMRs and optimised resident outcomes. A funding model is needed that incentivises interdisciplinary collaboration, and favours individualised assessments at a regularity that is needed to meet the complex and changing needs of LTC residents with advanced dementia.

- Embedding pharmacists into LTC facilities has potential to facilitate trust with other members of the care team, necessary to foster high quality RMMRs and other QUM activities.

- Responsive remuneration that does not limit RMMR frequency for complex and vulnerable cases such as residents with advanced dementia, and enables pharmacist involvement in case conferencing offers promise for improving QUM in LTC.

6.3.2 Resident's characteristics, state and needs

- The complex needs of residents with advanced dementia require ongoing collaboration between a range of health professionals to ensure all relevant factors are considered and ensure appropriate pathways to revisit decisions as the resident's clinical status changes.

6.3.3 Resident's values and preferences

- Early and iterative discussions over time that involve families as part of collaboration are needed to enable time for family members to adjust to changes. In this way, deprescribing for LTC residents with advanced dementia can be introduced as an empathic, person-centred and 'active' management option rather than as withdrawal of care.

6.3.4 Practitioners' expertise

- The RMMR programme should recognise diverse forms of expertise brought to medication reviews, including skills in communication and collaboration. Processes should recognise the role of LTC nurses in addition to GPs and

pharmacists and provide support for developing trusting ongoing collaborations between teams. Increased training should be provided to build skills for interdisciplinary collaboration around medication-related decision-making.

6.3.5 Tools and resources

- Implementing a tool for teams to appraise the quality of their collaboration and resources that encourage teamwork may help team members identify foci for improvement to reach optimum partnerships necessary for quality medication-related decisions for residents with advanced dementia.

6.3.6 Research evidence

- The array of research evidence is best integrated through interdisciplinary collaboration, sharing knowledge from different disciplines and specialties.

- Further research is needed to provide guidance on systematic deprescribing in the context of advanced dementia specifically. In the meantime, careful monitoring is recommended when undertaking deprescribing in this context.

6.4 Future research directions

First and foremost, research is needed to further develop, refine and evaluate systems or tools to identify PIP in the context of LTC residents with advanced dementia. Studies are needed that define PIP in advanced dementia with reference to empirical data on adverse events and other negative outcomes. The current thesis recommends that efforts be less directed towards trying to define inappropriate medication types and more towards building an understanding of how contextual factors make medications more or less likely to be inappropriate in different situations.

As noted above, further evidence is also required on the safety of deprescribing medications in advanced dementia. Availability of high quality evidence via randomised controlled trials (RCTs) may assist to alleviate clinicians' fears of potential negative consequences of deprescribing and reduce prescribing inertia. Finally, RCTs are also needed to test the effectiveness of interventions focused on building interdisciplinary collaboration for enhancing the quality of medication reviews and other QUM activities and improving outcomes for LTC residents, including those with advanced dementia.

6.5 Strengths and limitations of the doctoral programme

Using a multiple methods approach, this doctoral work has examined issues surrounding the identification and improvement of QUM for LTC residents with advanced dementia at a range of levels and perspectives. A multiple methods approach was taken to enable answering of disparate research questions across the broad topic. A mixed methods approach would have inhibited such broad ranging enquiry but might have generated more detailed insights into a more narrowly-focused component of QUM by means of integration. Given that participants from all three empirical studies included in the programme were from metropolitan Australian settings, findings may not be generalisable to regional, remote or rural LTC, or LTC in other countries.

6.6 Conclusion

This doctoral programme highlights that changes may need to occur across the levels of resident, provider and systems/policy to implement effective interdisciplinary collaboration and shared-decision making to meet the medication care needs of LTC residents with advanced dementia. At the level of individual decisions, more emphasis needs to be placed on the degree to which 'due diligence' has been undertaken to ensure

that the best possible decision has been made given all information available, accepting high degrees of uncertainty and that decisions need revisiting over time as dynamic and iterative rather than finite. Health professionals need to be working collaboratively at their upper level of scope of practice, using tools and guidance where available with a conscious focus on the benefits of interdisciplinary collaboration for understanding resident and family's preferences and values and applying expertise and a wide range of relevant research evidence in order to reach quality medicines decisions. Finally, at the systems level, there is a need for structures and incentives that support interdisciplinary collaboration in LTC, as well as further research evaluating the benefits this approach might provide for the medication-related care of LTC residents with advanced dementia. Given the growing prevalence of dementia and the limitations of current models in LTC, there is a critical need for ongoing focus in policy, practice education and research.

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Chapter 7: Appendices

Appendix 1. Publication – Study 1

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RESEARCH ARTICLE Open Access

Systems to identify potentially inappropriate prescribing in people with advanced dementia: a systematic review

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Abstract

Background: Systems for identifying potentially inappropriate medications in older adults are not immediately transferrable to advanced dementia, where the management goal is palliation. The aim of the systematic review was to identify and synthesise published systems and make recommendations for identifying potentially inappropriate prescribing in advanced dementia.

Methods: Studies were included if published in a peer-reviewed English language journal and concerned with identifying the appropriateness or otherwise of medications in advanced dementia or dementia and palliative care. The quality of each study was rated using the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) checklist. Synthesis was narrative due to heterogeneity among designs and measures. Medline (OVID), CINAHL, the Cochrane Database of Systematic Reviews (2005 – August 2014) and AMED were searched in October 2014. Reference lists of relevant reviews and included articles were searched manually.

Results: Eight studies were included, all of which were scored a high quality using the STROBE checklist. Five studies used the same system developed by the *Palliative Excellence in Alzheimer Care Efforts (PEACE)* Program. One study used number of medications as an index, and two studies surveyed health professionals' opinions on appropriateness of specific medications in different clinical scenarios.

Conclusions: Future research is needed to develop and validate systems with clinical utility for improving safety and quality of prescribing in advanced dementia. Systems should account for individual clinical context and distinguish between deprescribing and initiation of medications.

Keywords: Dementia, Polypharmacy, Deprescribing, Inappropriate prescribing, Medication review, Palliative care

Background

Advanced dementia infers a range of physical and psychosocial needs [1]. A palliative approach that maximises comfort is considered best practice [2]. Medication use should be focused on symptom relief and quality of life rather than treating secondary conditions where burden is likely to outweigh clinical benefit [2].

Most research on potentially inappropriate prescribing has focused on the elderly rather than dementia specifically. The harm/benefit risk ratios of numerous medications are unfavourably affected by age-related changes in pharmacokinetic and pharmacodynamic parameters [3]. Biological changes can result in medications having longer durations of action, greater risks of toxicity, and increased frequencies of adverse effects.

Several systems for identifying potentially inappropriate medications in older adults have been developed to operationally define the harm/benefit risk in clinical practice and research [4, 5]. These systems have been applied in early but not advanced dementia [6, 7]. Generalizability to people with advanced dementia is limited by pathophysiological changes as dementia progresses and the fact that systems have not been developed for use where goals of care are palliative. In advanced dementia, there is an exaggerated

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decrease in total body water and muscle and an increase in relative adipose tissue [8]. These changes are additional to the changes due to aging and have a direct and variable impact on the metabolism of drugs [9]. This means that individuals with advanced dementia may be more prone to adverse drug effects and drug-drug interactions than other older people [10]. People with advanced dementia are also less able than others to report adverse effects or to be involved in decision-making about whether to initiate or withdraw medications. Finally, individuals with advanced dementia have typically been excluded from research examining quality use of medications in older populations, limiting evidence regarding benefits and harms. Identifying potentially inappropriate medications to guide prescribing practice for people with advanced dementia is therefore likely to face challenges over and above those for older populations more generally.

A review by Parsons et al. (2010) summarised literature on specific medication types proposed to be potentially inappropriate for people with dementia nearing the end of life, and examined decision-making regarding medication discontinuation [9]. Potentially inappropriate medications were identified to include anticholinesterase inhibitors, memantine, antipsychotics, statins, antibacterials, antihypertensives, antihyperglycaemic agents, anticoagulants and medications to manage osteoporosis. Parsons et al. highlighted the lack of guidance on identifying potentially inappropriate medications and when and how to safely discontinue medications at the end of life.

A distinct but related concept is polypharmacy. Polypharmacy refers to the combination of multiple medications which may lead to cumulative adverse effects and antagonistic drug-drug interactions where a worse adverse effect is produced than either drug could have caused alone [11]. Polypharmacy can lead to worse side effects in the same domain (e.g. if receiving several psychoactive medications) or more side effects across different domains (e.g. if receiving a psychoactive medication and a blood pressure medication). Each of the medications involved may or may not be deemed potentially inappropriate on their own.

The current authors set out to update the review by Parsons et al. using a more rigorous systematic methodology and specifically aiming to identify and synthesise any published systems and recommendations for identifying potentially inappropriate prescribing in people with advanced dementia.

Methods

This systematic review was undertaken in adherence with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) Statement [12].

Eligibility criteria

Articles needed to be published in a peer-reviewed English language journal and report on a system or recommendations for identifying the appropriateness or otherwise of medications in advanced dementia or dementia and palliative care.

Information sources

Electronic databases Medline (OVID), CINAHL, the Cochrane Database of Systematic Reviews (2005 – August 2014) and AMED were searched in October 2014. Reference lists of the review by Parsons et al. (2010) and included articles were searched by hand.

Search

Database searches used keyword searches and medical subject headings (MeSH) based on terms used by Parsons et al. (2010) but further terms were also added as detailed in Table 1.

Study selection

Two researchers (DD, TL) independently applied the eligibility criteria to 10 % of search results and checked inter-rater reliability. After finding 100 % agreement, a single investigator (DD) rated the remaining 90 % articles alone. Full-texts were reviewed where a decision could not be made on abstract and title alone.

Data collection and items

Data were extracted from eligible studies by a single researcher (DD) using a standardised template. Data items extracted included: study design, aims, setting, sample size and characteristics, details of the approach taken to

Table 1 Electronic database search terms used to find articles reporting on systems to identify potentially inappropriate prescribing in people with advanced dementia

Parsons et al. (2010) [9] search terms:

medication(s)	withdraw(al)
medicine(s)'	dementia
discontinue,	severe dementia
discontinuation	end of life
withhold(ing)	palliative care
withheld	nursing home
withdraw	

Terms recommended by the Australian online palliative care knowledge network, CareSearch [30] were further included:

Inappropriate prescri*	hospices
inappropriate med*	hospice patients
medication management	hospice care
medication review	deprescrib*[a]
medic* of risk	prescribing patterns
terminal care	polypharmacy

[a]The term "deprescribing" has been coined to describe the process of tapering or withdrawing drugs with the goal of managing polypharmacy and improving outcomes [31], *Truncation used to ensure all variations and different spelling of words were retrieved

identifying inappropriate medications, and outcome variables related to inappropriate prescribing.

Risk of bias in individual studies

The quality of each study was rated independently by two researchers (DD and TL) using criteria from the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) [13]. Any disagreements were resolved via discussion.

Synthesis

Expected heterogeneity among designs and methods meant that synthesis needed to be narrative rather than via meta-analysis. Methods for narrative synthesis were based on techniques described by Popay et al. (2006) [14].

Results

Study selection

Database searches identified 882 records once duplicates were removed. Five articles were included for analysis from electronic database searches [15–19], and a further three articles were additionally identified through hand searching [20–22]. See Fig. 1 for more details.

Study characteristics

Characteristics of the eight studies included in this review are summarised in Table 2. The studies variously aimed to: 1) determine the prevalence of potentially inappropriate prescribing in aged care residents with advanced dementia [15–18, 20, 22], 2) identify the factors associated with likelihood of potentially inappropriate medications [16–18, 20, 22], and 3) explore the perceptions of healthcare professionals regarding factors determining medication-related decision-making in this population [19, 21].

Five studies were undertaken in the USA [15–17, 19, 22] and three were undertaken in European countries [18, 20, 21].

Study designs included two cross-sectional surveys [19, 21], three prospective cohort studies [15, 17, 18], one of which reported the cross-sectional results of medication data collected at baseline [18], two retrospective clinical record audits [20, 22], and one combining a retrospective clinical record audit with a consensus panel component [16].

Six studies analysed medication data from a total of 7457 participants with advanced dementia, their age ranging from 57 to 100 years of age and the majority being female, ranging from 55.2 % [15] to 87.5 % [17] of their samples. Of these, four studies focused solely on nursing homes [15–17, 20, 22] while two also included people with advanced dementia receiving home care [18, 20].

Risk of bias within studies

The eight studies included in the systematic review were generally of high quality as rated by STROBE criteria, complying with 76 % [16] to 100 % [17, 22] of criteria. However, Toscani et al. (2013) did not indicate the

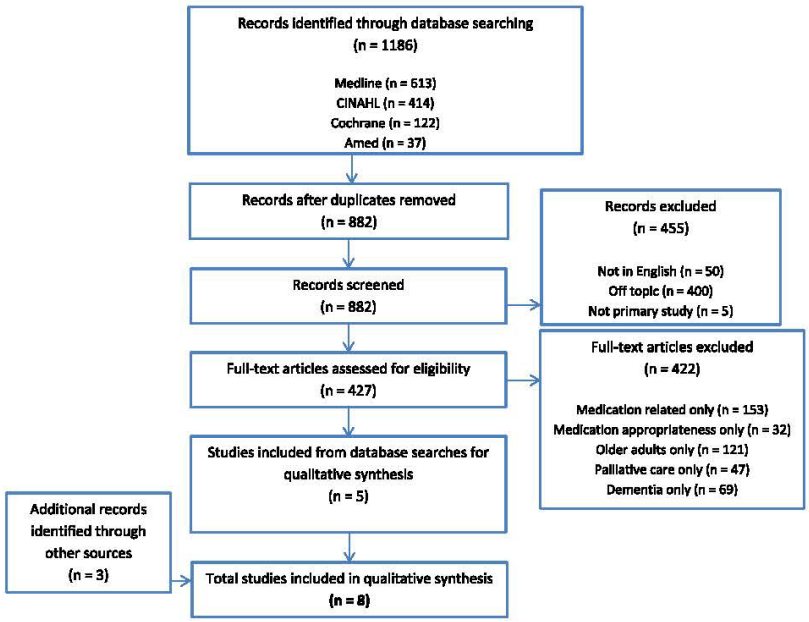

Fig. 1 Flowchart depicting inclusion/exclusion

Table 2 Summary of eight studies included in the review which use a system to identify potentially inappropriate prescribing in advanced dementia or dementia in palliative care

First Author, Year	Country	Aim(s)	Design	N at baseline	Setting	Approach to identify inappropriate medications	Medication variables	Results
Studies which use number of medications as indication of potentially inappropriate prescribing i.e. polypharmacy								
Blass et al. 2008 [15]	USA (Baltimore)	Identify how medication usage changed over time as resident with advanced dementia moves toward death, and identify correlates of increased medication usage.	Prospective cohort study (longitudinal)	125 residents	3 nursing homes	Number of medications prescribed i.e. polypharmacy.	Number of medications prescribed (regular + prn) at baseline, and factors associated with total number of medications.	Residents prescribed 14.6 medications each. Increase in palliative medicines i.e. opiates and a decrease in antibiotics, anti-dementia agents, cardiovascular agents and psychotropics as death approaches. No change in the number of medications given over time.
Studies using explicit criteria to identify potentially inappropriate prescribing								
Holmes et al. 2008 [16]	USA	Evaluate the feasibility of developing consensus recommendations for appropriate prescribing for patients with advanced dementia.	Modified Delphi consensus panel (and medication record audit) (cross-sectional)	34 patients	3 long term care facilities	Using modified Delphi process (12 geriatricians), medications categorised for use in palliative care patients with advanced dementia; never, rarely, sometimes and always appropriate.	Determine frequency of inappropriate medication prescribing, using in-house developed explicit criteria.	Patients taking 6.5 medications each. Six patients taking ten or more medications daily. 29 % of patients taking a medication considered never appropriate.
Tjia et al. 2010 [17]	USA (Chicago)	Describe the pattern and factors associated with daily medication use in nursing home residents with advanced dementia.	Prospective cohort study (longitudinal)	323 residents	22 nursing homes	Drugs of questionable benefit i.e. 'never appropriate' according to medications classified by Holmes et al. 2008.	Resident characteristics associated with the use of daily medications and drugs deemed inappropriate.	Male, shorter length of stay at facility (<1 year), higher functional ability and diabetes independently associated with inappropriate drug use. Having a DNR order independently associated with a lower likelihood of inappropriate drug use.
Colloca et al. 2012 [20]	7 EU countries (Czech Republic, England, Finland, France, Germany, Italy, The Netherlands) and Israel	Identify prevalence and factors associated with use of inappropriate drugs in older adult patients with severe cognitive impairment.	Medication chart audit (cross-sectional)	1449 residents	57 nursing homes	The use of drugs classified as rarely or never appropriate by criteria developed by Holmes et al. 2008.	Inappropriate drug use defined as rarely or never appropriate in patients with severe cognitive impairment based on the Holmes criteria published in 2008.	Inappropriate drug use in 643 (44.9 %) of residents. Most commonly prescribed inappropriate drugs were lipid-lowering agents (9.9 %), antiplatelet agents (9.9 %), Ach inhibitors (7.2 %) and anti-spasmodics (6.9 %). Inappropriate drug use associated with diabetes, HF, stroke, recent hospitalization. An inverse relationship between inappropriate drug use and geriatrician at facility.
Toscani et al. 2013 [18]	Italy	Assess and compare treatments and prescriptions of patients with advanced dementia cared for in nursing homes and in home care and assess their	Baseline data from multicentre prospective observational cohort study	245 residents	Nursing homes	Used criteria developed by Holmes et al. 2008.	The appropriateness of each prescription assessed according to the Holmes et al. 2008 classification.	Patients received 4.1 medications on average (range 0–13). Laxatives, antipsychotics, and anxiolytics were the most frequently prescribed in the nursing homes. 8.1 % of residents receiving at least one analgesic.

Table 2 Summary of eight studies included in the review which use a system to identify potentially inappropriate prescribing in advanced dementia or dementia in palliative care *(Continued)*

		appropriateness from a palliative care perspective.						
Tjia et al. 2014 [22]	USA	Estimate the prevalence of medications with questionable benefit used by nursing home residents with advanced dementia.	Medication record audit (cross-sectional)	5406 residents	Nursing homes	Medications deemed never appropriate for use in advanced dementia according to criteria developed by Holmes et al. 2008.	Use of medication of questionable benefit in advanced dementia based on previously published criteria and mean 90-day expenditures due to these medications per resident.	53.9 % of residents receiving at least one medication with questionable benefit. Anticholinesterase inhibitors (36.4 %), memantine (25.2 %) and lipid-lowering agents (22.4 %) most commonly prescribed medications with questionable benefit.
Other approaches to identify inappropriate prescribing								
Shega et al. 2009 [19]	USA	Describe hospice medical directors practice patterns and experiences in the use and discontinuation of anticholinesterase inhibitors and memantine in hospice patients with dementia.	Mail survey (cross-sectional)	152 hospital medical directors	Hospice care	N/A	Associations between the likelihood of survey response and participant characteristics. Comparisons analysing whether or not a physician would recommend medication discontinuation based upon reported clinical benefit of anticholinesterase inhibitors and memantine use.	Of the respondents, 75 % and 33 % reported that at least 20 % of patients were taking anticholinesterase inhibitor or memantine at hospice admission. 80 % of respondents would recommend discontinuation of these agents, however, a subset believe they stabilize cognition (22 %), decrease challenging behaviours (28 %), maintain patient function (22 %,) reduce caregiver burden (20 %) and improve caregiver quality of life (20 %).
Parsons et al. 2014 [21]	NI (Northern Ireland), RoI (Republic of Ireland)	Evaluate the extent to which patient-related factors and physicians' country of practice influenced decision making regarding medication use in patients with end-stage dementia.	Factorial survey design	662 health professionals	Community, nursing home, hospital	Medications selected due to contradictory evidence available to guide practice or because they have been identified in the limited literature as potentially inappropriate for individuals with advanced dementia: antibiotics, anticholinesterase inhibitors, memantine, lipid-lowering agents and antipsychotics.	Assess physician decision making regarding withholding or continuation/ discontinuation of key medications in patients with end-stage dementia.	Considerable variability found regarding initiating/withholding antibiotics and continuing/ discontinuing anticholinesterase inhibitors and memantine hydrochloride. Less variability found in decision making regarding lipid-lowering agents and antipsychotics. Patient place of residence and physician country of practice had the strongest and most consistent effects on decision making.

study's design in the title or abstract [18], and Colloca et al. (2012) did not sufficiently explain a larger study's design from which their data were drawn [20]. Four studies did not give a rationale for sample size [15, 16, 20, 21]. Three studies did not attempt to address potential sources of bias [15, 16, 21]. These same three studies also provided limited descriptions of statistical methods or how they dealt with missing data. Three studies did not provide unadjusted results for their multivariate analyses [16, 18, 20], and one controlled only for gender and age rather than other socio-demographic, clinical and nursing home variables [18]. Two studies did not discuss the generalizability of their results [18, 19].

Synthesis of results

Five of the eight studies [16–18, 20, 22] used the same system for identifying potentially inappropriate medications – that was developed by the *Palliative Excellence in Alzheimer Care Efforts (PEACE)* Program reported by Holmes et al. (2008) [16]. In the PEACE program, medications were audited for 34 patients with advanced dementia where a palliative approach was deemed appropriate. In a three-round modified Delphi process, 12 geriatricians rated each medication identified via the audit as 'never', 'rarely', 'sometimes' or 'always' appropriate. Consensus for a medication or medication class was defined as agreement on categorisation by >50 % (i.e. at least 7/12) participants. See Table 3 for drug classes in each category according to the final consensus.

Following Holmes and colleagues' preliminary study [16], four other international studies utilised [17, 18, 20, 22] the PEACE criteria to rate the appropriateness of medications taken by large cohorts of aged care residents with advanced dementia and examine predictors of taking 'never' appropriate medications among socio-demographic and clinical variables. See Table 4 for a summary of these studies' samples and results.

Blass et al. (2008) used a more rudimentary index of potentially inappropriate prescribing in people with advanced dementia based purely on number of medications [15]. The study identified that nursing home residents with advanced dementia received a mean of 14.6 medications (±7.4) and that, as residents approached death, the type but not number of medications altered. The study identified an increase in medications for symptom control (i.e. opioids and laxatives) and a decrease in medications for comorbid conditions (i.e. antibiotics, anti-dementia drugs, cardiovascular agents and psychotropic agents).

Two studies by Shega et al. (2009) and Parsons et al. (2014) explored factors influencing medication-related decisions by physicians (hospital medical directors [19], general practitioners and hospital physians [21]), specifically their continuation or discontinuation in dying patients with dementia [19, 21]. Physicians from both

Table 3 Appropriateness of medications as defined by PEACE consensus panel

Always appropriate		
Antidiarrheals	Antiepileptic drugs	Expectorants
Laxatives	Anxiolytics	Lubricating eye drops
Antiemetics	Narcotic analgesics	Pressure ulcer products
Inhaled bronchodilators	Nonnarcotic analgesics	Lidoderm
Sometimes appropriate		
Proton pump inhibitors	Antidepressants	Insulin
Histamine-2 receptor blockers	Tricyclic antidepressants	Antihistamines
Beta-blockers	Antibacterials	Decongestants
Calcium channel blockers	Antivirals	Electrolytes
Diuretics	Antiparasitic agents	Nutritional supplements
Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers	Antifungal creams	Antiglaucoma drops
Nitroglycerin	Oral hypoglycaemics	Anti-inflammatory eye drops
Mucolytics	Thyroid hormones	Capsaicin
Inhaled corticosteroids	Antithyroid medications	Allopurinol
Antipsychotics	Corticosteroids	Colchicine
Rarely appropriate		
Alpha blockers	Antiandrogens	Appetite stimulants
Digoxin	Bisphosphonates	Bladder relaxants
Clonidine	Mineralocorticoids	Tamsulosin
Antiarrhythmics	Heparin and low molecular-weight heparins	Antispasmodics
Hydralazine	Warfarin	
Never appropriate		
Lipid-lowering medications	Memantine	Cytotoxic chemotherapy
Antiplatelet agents, excluding aspirin	Antiestrogens	Hormone antagonists
Leukotriene receptor antagonists	Sex hormones	Immunomodulators
Acetylcholinesterase inhibitors		
No consensus		
Aspirin	Meclizine	Bladder stimulants
Sedatives and hypnotics	Vitamins	Iron
Central nervous system stimulants	Mineral supplements	Finasteride
Muscle relaxants	Calcitonin	Red blood cell colony stimulating factors

Sourced from Holmes et al. (2008) [16]

Table 4 Results from studies utilising PEACE criteria to determine appropriateness of medications in individuals with advanced dementia

Authors	Country	N at baseline	Mean (SD) medications per resident at baseline	N (%) using 'never' appropriate medications[a]	Most common 'never' appropriate medications	Factors associated with using 'never' appropriate medications	Factors measured but did not show an association with using 'never' appropriate medications
Holmes et al. 2008 [16]	USA	34	6.5 (2.7)	10 (29 %)	Cardiovascular agents	*Not measured*	*Not measured*
Tjia et al. 2010 [17]	USA	323	6.2 (3.33)	121 (37.5 %)	Lipid lowering agents Anticholinesterase inhibitors	Male Shorter length of stay[a] Higher functional ability[c] Diabetes mellitus DNH order (inverse)	Age Ethnicity (non-white race vs white) In special care dementia unit Dementia due to Alzheimer's disease Test for Severe Impairment score > 0[d] Cardiovascular disease[e] Cancer Acute illness in prior 90 days[f] Recent hospitalization[g] Recent physician/nurse professional visits in prior 90 days No feeding tube No hospice referral
Colloca et al. 2012 [20]	7 EU countries (Czech Republic, England, Finland, France, Germany, Italy, The Netherlands) and Israel	1449	4 *(not reported)*	388 (26.8 %)	Lipid lowering agents Antiplatelets Anticholinesterase inhibitors	Stroke	Age Gender Shorter length of stay[b] Ethnicity (non-white vs white) ADL Hierarchy Scale score[h] Behavioural symptoms Falls Number of diseases Ischaemic heart disease Diabetes Heart failure Cancer Parkinson's disease Urinary tract infections Pneumonia Fractures Recent hospitalization[g] Presence of a geriatrician Presence of a pharmacist
Toscani et al. 2013 [18]	Italy	245	*Not reported*	9 (2.2 %)	Antihypertensives Antiplatelets	*Not measured*	*Not measured*
Tjia et al. 2014 [22]	USA	5406	7.33 (3.5)	2911 (53.9 %)	Lipid lowering agents Memantine Anticholinesterase inhibitors	High facility use of feeding tubes	Age Gender Ethnicity (non-white vs white) DNR order Hospice enrolment Whether Medicaid is primary payor In special care dementia unit Recent hospitalization[g] Recent physician visit (last 14 days)

Table 4 Results from studies utilising PEACE criteria to determine appropriateness of medications in individuals with advanced dementia *(Continued)*

	Diabetes mellitus Heart Failure Hypertension Stroke Osteoporosis Depression Nutritional problems Oral problems Behavioural issues Functional status

[a]as defined by the *Palliative Excellence in Alzheimer Care Efforts (PEACE)* criteria reported by Holmes et al. (2008) [13]
[b]Less than 1 year in nursing home
[c]Bedford Alzheimer Nursing Scale – Severity Subscale, possible range 7–28, higher scores indicate greater functional disability
[d]possible range 0–24, lower scores indicate greater cognitive impairment
[e]Cardiovascular disease includes history of coronary artery disease and cerebrovascular accident
[f]Acute illnesses include infectious episodes myocardial infarction, stroke, any bone fracture, gastrointestinal bleed, and seizure
[g]any hospitalization occurring in the last 90 days
[h]ADL hierarchical scale score ranges from 0 (no impairment) to 6 (total dependence in self-care)
ADL Activities of Daily Living, *DNH* Do Not Hospitalize, *DNR* Do Not Resuscitate, *N* number, *SD* standard deviation

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Appendix 2 - Medline (Ovid) Search strategy – Study 1

1	Inappropriate prescribing.mp. or exp Inappropriate Prescribing/
2	inappropriate medic*.mp.
3	polypharmacy.mp. or exp Polypharmacy/
4	medication management.mp.
5	medication therapy management.mp. or exp Medication Therapy Management/
6	medication review.mp.
7	medic* of risk.mp.
8	1 or 2 or 3 or 4 or 5 or 6 or 7 **[Potentially inappropriate prescribing search terms]**
9	terminal care.mp. or exp Terminal Care/
10	palliative care.mp. or exp Palliative Care/
11	hospices.mp. or exp Hospices/
12	hospice care.mp. or exp Hospice Care/
13	end of life.mp.
14	terminally ill.mp. or exp Terminally Ill/
15	9 or 10 or 11 or 12 or 13 or 14 **[End of life search terms]**
16	dementia.mp. or exp Dementia/
17	alzheimer disease.mp. or exp Alzheimer Disease/
18	16 or 17 **[Dementia search terms]**
19	deprescrib*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
20	medic* discontinu*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
21	ceas* medic*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
22	medic* cessat*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
23	discontinu* medic*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
24	19 or 20 or 21 or 22 or 23 **[Deprescribing search terms]**
25	8 and 15 **[Potentially inappropriate prescribing + End of life]**
26	8 and 18 **[Potentially inappropriate prescribing + Dementia]**
27	15 and 24 **[Deprescribing + End of life]**
28	18 and 24 **[Deprescribing + Dementia]**

Appendix 3. Permission and Publication – Study 2

Permission

RE: LiebertPub Website Customer Question

Ballen, Karen <KBallen@liebertpub.com>
Fri 22-Nov-19 3:35 AM
To: Domenica Disalvo < [redacted]@student.uts.edu.au>
Dear Domenica:

Copyright permission is granted for this request. Please give proper credit to the journal and to the publisher:
Mary Ann Liebert, Inc.
New Rochelle, NY

Kind regards,

Karen Ballen
Manager, Liebert Open Access, Reprints, and Copyright Permissions

From: [redacted]@student.uts.edu.au <[redacted]@student.uts.edu.au>
Sent: Thursday, November 21, 2019 12:26 AM
To: Ballen, Karen <KBallen@liebertpub.com>
Subject: LiebertPub Website Customer Question

LiebertPub Website Customer Question

First Name - Domenica
Last Name - Disalvo
Position - PhD Candidate
Department -
Institution/Affiliation - UTS
Address - +
City -
Country/Province - AUSTRALIA
Zip -
Email - [redacted]@student.uts.edu.au
Phone -
Fax -
Regarding - Reprints and permissions
For Publication - Journal of Palliative Medicine
Questions/Comments - Hi, I would like to request permission to include a copy of the following article in my Thesis. I am first/corresponding author of this paper: Disalvo D, Luckett T, Luscombe G, Bennett A, Davidson P, Chenoweth L, et al. Potentially inappropriate prescribing in Australian nursing home residents with advanced dementia: A substudy of the IDEAL study. Journal of Palliative Medicine. 2018;21(10):1472-9. The publication would be included in the appendices. Please let me know if you need any additional information. Thank you very much. Domenica Disalvo

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Potentially Inappropriate Prescribing in Australian Nursing Home Residents with Advanced Dementia: A Substudy of the IDEAL Study

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Stephen Goodall, BSc, MSc, PhD,[9] and Meera Agar, MBBS, MPallCare, PhD[1,10,11]

Abstract

Background: Prescribing medications for nursing home residents with advanced dementia should focus on optimizing function and comfort, reducing unnecessary harms and aligning care goals with a palliative approach.
Objective: The aim of the study was to estimate the proportion of Australian nursing home residents with advanced dementia receiving potentially inappropriate medications, and identify those most commonly prescribed and factors associated with their use.
Design: Data were collected through retrospective audit of medication charts.
Setting/Subjects: Two hundred eighteen nursing home residents with advanced dementia from 20 nursing homes participated in a cluster-randomized controlled trial of case conferencing (the IDEAL Study) from June 2013 to December 2014.
Measurements: Inappropriate drug use was defined as medications classified as "never appropriate" by the Palliative Excellence in Alzheimer Care Efforts (PEACE) program criteria. Generalized linear mixed models were used to identify variables predicting use of "never" appropriate medications.
Results: Over a quarter ($n=65$, 30%) of residents received at least one medication classed as "never" appropriate, the most common being lipid-lowering agents ($n=38$, 17.4%), antiplatelet agents ($n=18$, 8.3%), and acetylcholinesterase inhibitors ($n=16$, 7.3%). Residents who had been at the nursing home for ≤10 months (odds ratio [OR] 5.60, 95% confidence interval [CI] 1.74–18.06) and 11–21 months (OR 5.41, 95% CI 1.67–17.75) had significantly greater odds of receiving a never appropriate medication compared with residents who had been at the nursing home for >5 years.
Conclusions: Use of potentially inappropriate medications in Australian nursing home residents with advanced dementia is common. A greater understanding of the rationale that underpins prescribing of medications is required.

Keywords: aged care; dementia; deprescribing; polypharmacy; potentially inappropriate prescribing

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Introduction

A PALLIATIVE APPROACH is best practice for people with advanced dementia. Their care should focus on comfort and minimizing suffering.[1,2] The role of medications in a palliative approach is primarily to relieve symptoms, and these are prescribed when adverse effects are outweighed by the likelihood of benefits that fall within the individual's life expectancy and no nonpharmacological alternatives are available.[3] Adverse effects associated with potentially inappropriate prescribing in older adults are associated with increased hospitalization and mortality,[4,5] and it involves extensive costs to healthcare systems.[6,7] People with advanced dementia are particularly vulnerable to adverse drug reactions as they undergo extreme physiological changes (in addition to those of normal aging) that affect the way medications are metabolized in the body.[8–10]

While there are several criteria available for assessing the appropriateness of prescribing in the elderly,[11] these are not readily applicable to a palliative approach to prescribing in advanced dementia.[12] A recent systematic review identified only one currently available dementia-specific criterion for identifying potentially inappropriate medications, which was developed through the Palliative Excellence in Alzheimer Care Efforts (PEACE)[13] program and classifies medications as "never," "rarely," "sometimes," or "always" appropriate based on a Delphi process carried out with 12 geriatricians.[14]

Six international studies have used these criteria to examine the prevalence of inappropriate prescribing in nursing home residents with advanced dementia and associated factors.[15–20] These studies were undertaken in European countries,[17–19] the United States,[15,16] and Canada,[20] and found that proportions of nursing home residents with advanced dementia receiving "never" appropriate medications ranged from 3%[17] to 45%[20] of study populations. Lipid-lowering agents,[15,16,18,20] antiplatelet agents,[17,18,20] antihypertensives,[17] and antidementia drugs, specifically acetylcholinesterase inhibitors[15,16,18,20] and memantine,[15] were found to be the most commonly prescribed "never" appropriate medications. Predictors found to be associated with receiving "never" appropriate medications included male gender,[16] a higher functional status,[16] earlier stage dementia,[16,20] a shorter length of stay at the nursing home,[16] diabetes,[16,20] having had a stroke,[18,20] living in a nursing home with frequent use of feeding tubes,[15] and receiving high numbers of medications.[20]

To date, there have been two studies estimating the prevalence of inappropriate prescribing in Australian nursing home residents with dementia.[21,22] Bosboom et al. included residents at varying stages of dementia progression and used general elderly measures of potentially inappropriate prescribing [Beers criteria, Drug Burden Index (>0), and polypharmacy (≥5 medications)] rather than dementia-specific or palliative-specific criteria. Somers et al. also used the Beers criteria to determine appropriateness of medications in their sample of residents with dementia.

More recently, a new set of Delphi-constructed guidance measures have been developed by Australian experts to help guide clinicians who manage comorbid conditions in people with dementia.[23] The authors also further externally validated these guidance statements in focus groups with health professionals to determine their utility in clinical practice.[24] However, these guidance measures have not been designed to identify the prevalence of potentially inappropriate medications through chart audit.

This project aimed to estimate the prevalence of potentially inappropriate prescribing in Australian nursing home residents with advanced dementia, using the disease- and stage-specific PEACE criteria. Specific objectives were to identify (1) the proportion of residents taking "never" appropriate medications, (2) the most commonly prescribed "never" appropriate medications, and (3) factors associated with an increased likelihood of residents receiving "never" appropriate medications.

Methods

Study design

This research formed a substudy of a cluster-randomized controlled trial (RCT) of facilitated case conferencing for residents with advanced dementia living in 20 nursing homes in Sydney and Brisbane, Australia (the "IDEAL Study").[25] The substudy used a retrospective medication chart audit.

Ethics approval

Approval to undertake this research was obtained from the University of New South Wales Human Research Ethics Committee (Approval No. HC12455). Because individuals with advanced dementia lack capacity to provide informed consent, ethics approval was gained for proxy consent by a family member. Medication data were collected from June 2013 to December 2014.

Study population

Nursing homes. Nursing homes were eligible to participate in the IDEAL Study if they were located in the greater metropolitan areas of Sydney or Brisbane and met the following criteria: (1) ≥100 high care beds and (2) ≥50% residents with dementia (or equivalent number of residents with dementia achieved by a higher proportion or residents with dementia but lower number of beds).

To minimize selection bias, eligible nursing homes were identified through the Aged Care Australia website (recently superseded by www.myagedcare.gov.au) and approached in random order until the target sample size of 20 was achieved.

Residents. To be eligible for the IDEAL project, residents needed to have (1) dementia status reported in their progress notes and level of cognitive impairment stable for ≤1 month according to residential aged care staff; (2) advanced dementia as determined by screening using the Functional Assessment Staging Tool (FAST)[26] of ≥6a, and an Australia-modified Karnofsky Performance Status (AKPS)[27] score of ≤50; (3) availability of a person legally responsible to give consent on their behalf; and (4) informed consent from a family member or other who knew the resident well and was willing to participate in IDEAL to report their perception of quality of care. Criterion 2 was chosen because dementia stage and functioning are predictive of <6 months survival[28] and the IDEAL project's primary endpoint related to end-of-life care.

Data collection

Sociodemographic and clinical data. Wherever available and relevant to the Australian setting, data for the current analyses used variables found by previous studies to be significantly predictive of "never" appropriate prescribing as defined by the PEACE criteria.[15–18] These included gender,[16] length of stay at the nursing home,[16] functional status,[16] dementia status,[16] diabetes,[16] and stroke.[18]

Significant predictors found in two studies[19,20] utilizing similar approaches to Holmes et al. were excluded from the analysis for the following reasons: Differences in the way Parsons et al. categorized medications from Holmes et al. include reaching consensus for aspirin, iron, vitamins, mineral supplements, and finasteride, and placing them under the "never" appropriate category.[19] Parsons et al.'s criteria also deviated from Holmes et al. by placing acetylcholinesterase inhibitors under "rarely" appropriate and memantine under "sometimes" appropriate, both of which were under "never" appropriate in the PEACE criteria. We chose not to include Parsons et al. as a source study because of these medication classification differences, and because they used a small sample of only 15 residents. Matlow et al. focused their analysis on the last week of life, making their sample incomparable with our own.

Data on dementia stage and functional status collected at baseline were used for this substudy's analysis, and were collected using the FAST and AKPS, respectively. All other data were collected from administrative and nursing records kept at each nursing home.

The FAST divides progression of dementia into seven distinct stages based on observable cognitive and behavioral symptoms. The observational nature of the FAST enables it to be used to assess moderate-to-severe stages of dementia when cognitive tests such as the Mini Mental State Examination[29] no longer provide useful information.

The AKPS assigns a single score between 0 (dead) and 100 (normal; no complaints; no evidence of disease) based on observation of functional independence. A score of 50, the maximum at which a resident was deemed eligible for this study, indicates that a person "requires considerable assistance and frequent medical care."

Resident variables found to be predictive of "never" appropriate prescribing by previous studies but either not relevant to the Australian setting or unavailable in the IDEAL Study dataset were African American ethnicity[15] and hospitalizations in the last 90 days,[15] respectively. Use of feeding tubes was found predictive in one previous study[15]; however, none of the residents participating in the IDEAL Study was using a feeding tube. Nursing home variables found predictive that had no variability in the IDEAL Study sample were dementia specificity,[15] metropolitan status,[15] and facility-level use of feeding tubes; all nursing homes participating in the IDEAL Study included high proportions of residents with dementia, were metropolitan, and had equally low proportions of residents using feeding tubes.

Medication charts. To increase reliability, data collection and coding was undertaken through a standardized approach maintained for all residents in all nursing homes, leaving little room for error or variation in investigator interpretation.[30] Medication charts were reviewed for each resident, and names extracted as written. This substudy focused on regularly prescribed medications because of the difficulty in deducing burden from *pro re nata* and short-term medications.

Box 1. Medications Defined as "Never" Appropriate for People with Advanced Dementia Based on a Consensus Process and with Anatomical Therapeutic Chemical Codes Allocated by Toscani et al.[17]

Antiplatelet agents, excluding Aspirin (B01AC excl B01AC06); Lipid-lowering medications (C10); Sex hormones (G03H); Cytotoxic chemotherapy (L01); Hormone antagonists (L02B); Antiestrogens (L02BA; L02BB); Immunomodulators (L03); memantine (N06DX01); Acetylcholinesterase inhibitors (N07AA); Leucotriene receptor antagonists (R03DC)

Medications with ATC code N06D are included in this study's classification of "never" appropriate acetylcholinesterase inhibitors.
ATC, anatomical therapeutic chemical.

Medication chart data were entered into Microsoft Excel version 10 (Microsoft Corporation, Seattle) using study numbers to identify each resident. Medications were then coded according to the Anatomical Therapeutic Chemical (ATC) Classification System, an international standard for drug utilization studies recognized by the World Health Organization[31] and used extensively in the literature to categorize medications.

Once ATC codes had been allocated to each medication, these were then classified according to PEACE criteria for "never" appropriate prescribing, adopting the codes reported by Toscani et al. (Box 1).[17]

While we used the same codes previously selected by Toscani et al., there was one exception where they included N06D acetylcholinesterase inhibitors into the "always" appropriate category, possibly due to the recent evidence showing effectiveness in severe dementia. However, we chose to include these medications under the "never" appropriate category, as the safety and benefit of these medications for individuals receiving palliative care are still contentious.

Statistical analyses

Descriptive analyses were conducted to provide summary characteristics for residents. A chi-square analysis was conducted to test whether there was a significant difference in the percentages of residents taking a "never" appropriate medication between intervention and control groups. Where no significant difference was observed, it was considered appropriate to combine the arms for all further analyses.

Generalized linear mixed models (GLMMs) with a logit link function were used to determine predictors of receiving a "never" appropriate medication (binomial distribution). GLMMs allow for the inclusion of fixed and random effects in the model, and allow for nested sources of variability in data. In these models, the nursing home was included as a random effect, to account for the intracluster correlations in the sample and produce better fixed-effect estimates.

A preliminary GLMM included all variables found in previous studies as predictors of residents with advanced dementia receiving a "never" appropriate medication; these

Table 1. Characteristics for 218 Residents with Advanced Dementia

Characteristics	*Whole sample (n=218), n (%)*	*At least one "never" appropriate medication (n=65), n (%)*	*All medications appropriate (n=153), n (%)*
Gender, female	135 (61.9)	34 (52.3)	101 (66.0)
Length of stay at nursing home			
≤10 months	47 (21.6)	21 (32.3)	26 (17.0)
11–21 months	43 (19.7)	18 (27.7)	25 (16.3)
22–37 months	44 (20.2)	11 (16.9)	33 (21.6)
38–60 months	41 (18.8)	10 (15.4)	31 (20.3)
>5 years	43 (19.7)	5 (7.7)	38 (24.8)
AKPS			
20 (totally bedfast)	40 (18.3)	6 (9.2)	34 (22.2)
30	42 (19.3)	13 (20.0)	29 (19.0)
40	49 (22.5)	13 (20.0)	36 (23.5)
50 (considerable assistance)	87 (39.9)	33 (50.8)	54 (35.3)
FAST			
6 (severe cognitive decline)	51 (23.4)	17 (26.2)	34 (22.2)
7 (very severe cognitive decline)	167 (76.6)	48 (73.8)	119 (77.8)
Comorbidities			
Stroke	27 (12.4)	6 (9.2)	21 (13.7)
Diabetes	29 (13.3)	12 (18.5)	17 (11.1)

AKPS, Australia-modified Karnofsky Performance Status[27]; FAST, Functional Assessment Staging Tool.[26]

variables included gender, length of stay at the nursing home (categorized into quintiles), functional status (AKPS score), dementia status (FAST score 7 vs. 6), diabetes, and stroke. The final model included only factors significant ($p<0.05$) or approaching significance ($p<0.2$) in the first analysis. For each model, p-values were provided for each estimate of fixed effects, and odds ratio (OR) and 95% confidence interval (95% CI) were provided for each fixed coefficient.

All analyses were conducted using SPSS (version 24), and p-values <0.05 considered to indicate statistical significance.

Results

The IDEAL project recruited 13 nursing homes in Sydney and 7 in Brisbane. Nursing homes had a median of 115 beds (IQR 100–135), and 12 were private and 8 not for profit. Of the 286 residents recruited for the IDEAL project, we were able to collect not only complete medication data but also sociodemographic and clinical data for 218 residents, 110 residents from intervention nursing homes, and 108 from nursing homes allocated to the control group. See Table 1 for sample characteristics. A chi-square analysis found no significant difference in the percentages of residents taking a "never" appropriate medication between intervention and control groups ($p=0.183$), so the groups were combined for all further analyses.

Table 2. Summary of Residents Receiving "Never" Appropriate Medications, $N=218$ Residents

Medication type	*Number of residents receiving (% of total residents), n (%)*
Lipid-lowering medications	38 (17.4)
Antiplatelet agents	18 (8.3)
Acetylcholinesterase inhibitors	16 (7.3)
Memantine	6 (2.8)
Cytotoxic chemotherapy	1 (0.5)
Antiestrogens	1 (0.5)
Hormone antagonists	1 (0.5)

Prevalence of different medications

Residents with advanced dementia were receiving an average of 7.3 (median 7.0, SD 3.5, range 0–21) regularly prescribed medications each. The most commonly prescribed medication types overall were laxatives (64.7%, $n=141/218$), simple analgesics (58.3%, $n=127/218$), vitamins (51.8%, $n=113/218$), and antipsychotics (46.8%, $n=102/218$). Of the 218 residents included in the study, 65 (29.8%) were receiving at least one medication rated "never" appropriate by the PEACE criteria, with 11 (5.0%) receiving more than one. The most commonly prescribed "never" appropriate medications were lipid-lowering agents, antiplatelet agents, and acetylcholinesterase inhibitors (Table 2). Please see Supplementary Data (Supplementary Table S1) for number of residents receiving "rarely" appropriate medications. (Supplementary Data is available online at www.liebertpub.com/jpm.)

Predictors of "never" appropriate medications

Of the factors associated with "never" appropriate medications in previous studies, only shorter length of stay was found predictive in this sample [$F(4, 206)=2.61$, $p=0.037$; Table 3]. Residents who had been at the nursing home ≤10 months, or between 11 and 21 months, had five times greater odds of receiving a "never" appropriate medication than residents who had been at the nursing home for 61+ months (>5 years).

Table 3. Preliminary Model of Associations of Potential Risk of Receiving "Never" Appropriate Medications (N=218)

Variable	*Categories*	*OR*	*95% CI*	p
Sex	Male	1.102	0.729–2.813	0.295
	Female	—		
Length of stay				**0.037**
	≤10 months	5.349	1.600–17.879	**0.007**
	11–21 months	5.624	1.673–18.911	**0.005**
	22–37 months	2.866	0.826–9.937	0.097
	38–60 months	2.459	0.705–8.582	0.157
	>5 years	—		
AKPS				0.158
	20	0.329	0.110–0.980	**0.046**
	30	1.088	0.423–2.797	0.861
	40	0.625	0.253–1.545	0.308
	50	—		
FAST	Score 6	1.015	0.296–1.483	0.315
	Score 7	—		
Stroke	No	1.218	0.418–3.547	0.716
	Yes	—		
Diabetes	No	0.482	0.191–1.214	0.121
	Yes	—		

Reference categories indicated by "—." The p-values correspond to the fixed effects F statistics. The results are based on the GLMM analysis with nursing home as a random effect. Statistically significant ORs are in bold ($p<0.05$).

AKPS, Australia-modified Karnofsky Performance Status[27] (lower scores indicate greater assistance required); CI, confidence interval; FAST, Functional Assessment Staging Tool[26] (higher scores indicate greater functional deterioration); GLMM, generalized linear mixed effect model; OR, odds ratio.

While functional status (AKPS) as an overall fixed effect was not found to be significant [$F(3, 206)=1.75$, $p=0.16$], residents with AKPS 20 had significantly lower odds of receiving a "never" appropriate medication compared with those with AKPS 50 (OR 0.33, 95% CI 0.11–0.98; Table 3).

Table 4. Final Model of Associations of Potential Risk of Receiving "Never" Appropriate Medications (N=218)

Variable	*Categories*	*OR*	*95% CI*	p
Length of stay				**0.025**
	≤10 months	5.599	1.736–18.055	**0.004**
	11–21 months	5.411	1.666–17.750	**0.005**
	22–37 months	2.836	0.838–9.592	0.093
	38–60 months	2.415	0.708–8.242	0.158
	>5 years	—		
AKPS				0.221
	20	0.375	0.132–1.067	0.066
	30	1.101	0.454–2.667	0.831
	40	0.662	0.285–1.538	0.335
	50	—		
Diabetes	No	0.445	0.181–1.093	0.077
	Yes	—		

The p-values correspond to the fixed effects F statistics. The results are based on the GLMM analysis with nursing home as a random effect. Statistically significant ORs are in bold ($p<0.05$).

Table 4 shows the results of the final GLMM, which included length of stay, functional status (AKPS), and diabetes. Length of stay continued to be the only significant predictor of receiving a "never" appropriate medication [$F(4, 209)=2.84$, $p=0.025$].

Discussion

This study is the first to estimate prevalence of potentially inappropriate prescribing in Australian nursing home residents with advanced dementia using the PEACE criteria, explicit disease- and stage-specific criteria. Nursing home residents in this study were taking an average of seven medications, with nearly one-third receiving at least one medication rated "never" appropriate. Similar to previous studies, lipid-lowering agents,[15,16,18] antiplatelet agents,[15,17,18] and acetylcholinesterase inhibitors[15,16,18] were the most commonly prescribed "never" appropriate medications. Our data also replicate previous findings that a shorter length of stay[16,18] is a significant predictor for receiving one or more "never" appropriate medications, highlighting the need for medication review shortly after a resident's admission to ensure that medications are consistent with a palliative approach where appropriate. Two studies have identified an association between inappropriate medication use and higher functional status.[15,32] While our study did not find an overall association between functional status (AKPS score) and receiving "never" appropriate medications, our results trended toward the same direction, with residents who had a lower functional status (AKPS 20, totally bedfast) being significantly less likely than those with the highest functional status (AKPS 50, requiring considerable assistance and frequent medical care) to receive a "never" appropriate medication.

The finding that a shorter length of stay increases the odds of receiving "never" appropriate medications in residents with advanced dementia may suggest that a longer stay allows for more time for conversations to be had with substitute decision makers regarding goals of care, and a rationale developed for stopping medications where applicable. This finding may also highlight the need for medication review early on or even at the time of a resident's admission to ensure that medications are consistent with a palliative approach.

No significant change in odds of receiving inappropriate medications between residents with higher and lower cognitive and functional status is troubling as it suggests that recommended monitoring, review, and deprescribing of unnecessary medications as end-of-life approaches may not yet be a common practice of medication management in residents with advanced dementia.

The proportion of residents (29.8%) taking "never" appropriate drugs in this study was lower than those in similar studies undertaken in the United States (37%, 54%),[15,16] similar to that found in a pan-European study (27%),[18] and higher than that reported in a study exclusively undertaken in Italy (3%).[17] These inconsistencies may be due to differences in prescribing cultures between countries, or differences in the ways studies sampled nursing homes and residents.

Rationalizing the use of "never" appropriate medications such as lipid-lowering agents and antiplatelet agents is difficult. Their therapeutic goal to reduce vascular events and mortality becomes irrelevant in a population where maintaining comfort rather than extending life is the focus, and

time to benefit almost certainly exceeds the person's life span. Both pose risks of adverse effects, including abdominal pain, constipation, and nausea for lipid-lowering agents,[33,34] and hemorrhage of the gastrointestinal tract for antiplatelet agents.[35] Australian clinical practice guidelines[36,37] provide recommendations on the rational use and deprescribing of acetylcholinesterase inhibitors and memantine. While these medications may be appropriate for people with advanced dementia under some circumstances, evidence of their benefits is limited,[38,39] and has been met with criticism.[40] They also have side effects, including nausea, vomiting, diarrhea, and muscle cramps.[41]

The rate of residents being prescribed antipsychotics (47%) is much higher than those previously reported in studies conducted in other countries,[15–17] which range from 27%[16] to 30%.[17] While classed as "sometimes" rather than "never" appropriate by the PEACE criteria, a report by Alzheimer's Australia (2014) recommended that the use of antipsychotics should be time limited and reviewed regularly with multidisciplinary input from pharmacists, behavior management experts, general practitioners, and psychiatrists.[32]

As well as identifying high rates of medicines of concern, our study found that laxatives (65%) and simple analgesics (58%) were the most commonly prescribed medications overall. Rates of analgesic use were similar to the results from U.S. studies (58%[16] and 59%[15]) and substantially higher than rates reported in the Italian study (8.1%[17]). While our analysis did not examine the reasons for prescription, higher rates of analgesic and laxative use are generally encouraging, given evidence that symptoms often go unrecognized and undertreated in this population.[42–44]

Limitations

The limitations of this study arise from data being collected through retrospective chart audit, its dependence on a single method (the PEACE criteria) of identifying inappropriate prescribing, and its status as an RCT substudy. Problems relating to retrospective chart audits identified in the literature include a lack of standardization in chart formats utilized, incomplete records, and illegibility.[45] This study sought to minimize these problems by using residents' medication chart as the primary source of data—charts that are required to be up-to-date and legible for regular use and surveillance. However, an exclusive focus on medication charts meant the study lacked information on the reasons "never" appropriate medications had been prescribed and had not been withdrawn. Even a detailed review of progress notes and clinical assessments would have been unlikely to inform understanding of appropriateness for each resident given variability in the quality of reporting and long duration of prescription in many cases, for some residents even before admission. The PEACE criteria categories offer a "one size fits all" approach to identifying inappropriate medications, and do not take into account clinical factors and context that may be at play in individual cases. Holmes et al.[13] identified a need for future research focusing on larger sample populations, which can better showcase the relationship between comorbidities and medication use, as well as identify distinct medication classes that may be overused.[14] Dependence on IDEAL Study data meant that some variables found predictive by previous studies (especially those at the nursing home level) could not be included in the current analyses. Also, the nursing homes involved in the RCT may have been more aware of issues relating to inappropriate prescribing than the industry average. Twenty-two percent of residents in the intervention arm (11% of the total sample) had their medication charts collected after the intervention commenced at their nursing home, raising the possibility that the intervention may have influenced prescribing, even though this was not of a magnitude that led to a significant difference in the number of residents taking "never" appropriate medications in each arm. These factors mean that our results may have underestimated the prevalence of inappropriate prescribing in Australian nursing homes more generally. Finally, our study shares a limitation with those previously reported in not exploring the risk and seriousness of adverse effects observed from being prescribed a never appropriate medication. More research is needed to establish the clinical outcomes of such prescriptions in nursing home residents with advanced dementia.

Conclusion

To our knowledge, this is the first Australian study to estimate the prevalence of inappropriate prescribing in nursing home residents with advanced dementia using a disease- and stage-specific tool. Our results indicate that a significant minority of residents may be taking inappropriate medications, including lipid-lowering medications, antiplatelet agents, and acetylcholinesterase inhibitors. These findings are limited by use of only one set of criteria for identifying inappropriate medications and the lack of detailed clinical data to contextualize prescribing for each individual resident. More research is needed to guide deprescribing of these medicines and the associated negative outcomes of their use in advanced dementia.

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RESEARCH ARTICLE

Pharmacists' perspectives on medication reviews for long-term care residents with advanced dementia: a qualitative study

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Abstract
Background Medication reviews by pharmacists have been shown to identify and reduce drug-related problems in long-term care residents. *Objective* To explore pharmacist perspectives of the Australian Government funded pharmacist-conducted residential medication management review and its role improving the quality and safety of prescribing in long-term care, in particular for those living with advanced dementia. *Setting* Australian Long-term care pharmacists. *Method* A qualitative research methodology approach using semi-structured interviews was used, with participants pharmacists with Residential Medication Management Review experience. Interviews were recorded, transcribed and coded utilising a meta-model of Physician-Community Pharmacy Collaboration in medication review. *Main outcome measure* Pharmacists' perspectives on the Residential Medication Management Review and how to improve the quality of reviews for residents with advanced dementia. *Results* Fifteen accredited pharmacists participated. The majority believed that the Residential Medication Management Review had the potential to improve the quality and safety of medicines but highlighted systemic issues that worked against collaborative practice. Participants emphasised the importance of three-way collaboration between general practitioners, pharmacists and nursing staff and highlighted key strategies for its optimisation. *Conclusion* Incorporating avenues for greater communication between team members can improve collaboration between health professionals and ultimately the quality of medication reviews.

Keywords Advanced dementia · Australia · Deprescribing · Interdisciplinary collaboration · Long-term care · Medication review · Palliative care

Impacts on practice

- Greater emphasis on the importance of inter-professional collaboration between health professionals is vital for successful medication review models.
- The Residential Medication Management Review can improve quality and safety of medicines for Australian long-term residents with advanced dementia.
- Avenues for greater communication within the Residential Medication Management Review service model are required to build trusting working relationships between general practitioners, pharmacists and nursing staff in long-term care facilities to help reach better outcomes for residents.

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Introduction

Medication reviews is an approach employed internationally to identify and reduce drug-related problems (DRP) in the elderly [1–3], reduce polypharmacy and the associated unnecessary health care costs [4]. A DRP is defined as "an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes" [5], and can occur due to inappropriate drug choice, adverse drug reactions, or drug over or under use [6, 7]. Pharmacist-led medication reviews may have a special role to play in long-term care (LTC) [8, 9], especially for residents with advanced dementia who are especially vulnerable to DRPs and less able to advocate for themselves.

Recent studies have highlighted the success of pharmacist-led medication reviews for reducing the number of medicines prescribed and identifying and addressing DRPs [4, 10–12]. There is growing evidence of the importance of multidisciplinary teamwork and collaboration as the main driver of success of medication review services in LTC facilities, especially for residents with complex needs [6, 13]. However, the effects of medication reviews on patient health outcomes such as quality of life, hospital admissions and mortality is less clear [14].

First initiated in 1997, the Residential Medication Management Review (RMMR) is an Australian Government funded service in which accredited pharmacists are remunerated to formally review permanent residents of government funded LTC facilities [15, 16]. The RMMR programme is a key component of the Australian Medicines Policy to achieve quality use of medicines (QUM) in LTC settings [17] to prevent DRPs, with a focus on general practitioner (GP) and pharmacist collaboration to reach these goals. In Australia, it is rare for aged care providers to employ pharmacists as staff members to coordinate or deliver clinical medications services. Instead, community pharmacists are employed externally and must be accredited to provide the RMMR service with the Society of Hospital Pharmacists of Australia (SHPA) or the Australian Association of Consultant Pharmacists (AACP).

The RMMR is intended to be a full clinical medication review including the following steps; (1) referral of the LTC resident by their GP, based on need or biennially, (2) accredited pharmacist gathers resident information from resident, family and/or carer, LTC staff, and/or case notes, (3) pharmacist provides medication review findings and recommendations in a written report for the GP within a reasonable time-frame of no more than 4 weeks from being initiated, and (4) post-RMMR discussion between pharmacist and GP [18].

Retrospective audits of recommendations made by pharmacists following RMMRs have found that these identify DRPs [8, 19, 20] and can reduce the median drug burden index by 12% from baseline if implemented by a GP [21]. Their results demonstrate that medication review as a collaborative process—in this case GP cooperation—is essential to reach positive medication management outcomes. Pharmacists play a critical role in RMMRs, however to our knowledge their perspectives of how RMMRs could be optimised to deliver improved medication quality and safety, especially for residents with advanced dementia has not been explored to date.

Aim of the study

The current study aimed to explore pharmacist perspectives on barriers and facilitators to the RMMR's potential for improving QUM, with particular reference to residents with advanced dementia.

Ethics approval

The study was approved by the Human Research Ethics Committee (HREC) at the University of Technology Sydney. All participants gave written informed consent.

Method

The consolidated criteria for reporting qualitative research (COREQ) was used to report important aspects of the research team, study methods, context of the study, analysis and findings [22].

Participants

Participants were eligible for the study if they were accredited pharmacists who currently or had previously conducted RMMRs. We were interested in perspectives of pharmacists who had moved onto management or policy roles as well as those currently conducting RMMRs.

Recruitment used two methods. First, pharmacists were contacted via the AACP website [23], which provides contact details of accredited pharmacists and indicates those who provide the RMMR service. Pharmacists listed as providing RMMRs were contacted consecutively in alphabetical order. Secondly, recruitment used a snowball method. An email invitation with contact details was circulated to the team's established networks. Recruitment occurred from November 2015 to July 2017.

Data collection

Semi-structured interviews were undertaken with pharmacists over the telephone or face-to face. Field notes were taken during and immediately after interviews. One female researcher (DD) with a background in medical science and no previous qualitative research experience conducted all interviews. DD had brief training prior to facilitating interviews. There was no prior relationship between the interviewer and participants at the time of the interviews. Participants were told about the interviewer's background and that she was conducting this study as part of her doctoral programme. Twelve out of the fifteen participants knew one researcher (AB) prior to the study through pharmacy associations and established networks.

The interview method was used in preference over focus groups to avoid social desirability bias and encourage frank speech [24, 25]. Participants were reassured that data would be reported in a way that did not identify them. All interviews were audio-recorded and transcribed verbatim.

The interview topic guide (see Box 1) focused on experience of conducting RMMRs and aspects of the process perceived to be working well or needing improvement, using residents with advanced dementia as a case study. Emergent themes were tested in subsequent interviews.

Analysis

QSR NVivo 11 software was used to manage data.

Transcripts underwent qualitative data analysis using an integrative approach [26]. Each interview transcript was inductively coded independently by two authors (DD, TL) to form emerging initial descriptive codes. Descriptive codes were then compared and discussed to reach consensus and grouped into categories [27]. When moving to interpretive themes, codes were initially compared and allocated to sections of a model for interdisciplinary collaboration [28]. This initial model allowed for a broader understanding of interdisciplinary collaboration within the context of the RMMR process.

A meta-model of physician-community pharmacist collaboration (PCPC) was then adopted to refine themes [29]. The PCPC model proposed by Bardet et al. [29] conceptualises trust and interdependence as core determinants of successful collaboration between physicians and community pharmacists. The forming of these core determinants depends on four processual determinants; perceptions, expectations, skills, and interest for collaborative practice. Finally, role definition and communication were conceptualised as tools to develop PCPC [29]. This model was used to classify main themes within the context of collaboration during medication review of people with advanced dementia in LTC. Sample size was determined by saturation of themes against components of the PCPC model.

Results

A total of 15 pharmacists participated in an in-depth interview, the majority being female (n = 12). Participants came from different states across Australia, the most from New South Wales (n = 5), followed by Victoria (n = 4), Queensland (n = 2), South Australia (n = 2) and Western Australia (n = 2). All participants had over 10 years experience providing the RMMR service; with eight having 10–15 years experience, and seven having 16–21 years experience. Five pharmacists had been involved since the beginning of the RMMR initiative in 1995, with 14 providing RMMRs as their primary work focus at the time of data collection. Our sample also included three pharmacists who were actively involved in the development of RMMR standards and guidelines. All pharmacists were also involved in other QUM services at LTC facilities including nurse education, providing medication audits, and involvement in Medication

Box 1 Interview topic guide questions and prompts

1. Can you please talk about your experience with the Residential Medication Management Review (RMMR) initiative?
   - Have you conducted RMMRs yourself, and if so, roughly how many?
2. Are there ways in which you think the RMMR process could be improved? For example, would you prefer there to be a national standard RMMR template? Why/why not?
   - How is the decision-making in an RMMR shared between the pharmacist and other health professionals?
   - What (if any) challenges do pharmacists face when dealing with other health professionals when preparing for, conducting or reporting an RMMR and knowing whether your recommendations have been acted on?
3. Do you have any ideas on how communication between pharmacists and other health professionals may be improved?
4. What information might be used when making decisions in the RMMR?
   - What (if any) information would be helpful to complete an RMMR but is difficult to source?
5. What (if any) special considerations are there when conducting an RMMR for an individual with advanced dementia requiring a palliative approach?
6. Are there any other Quality Use of Medicines (QUM) activities in long-term care (LTC) facilities apart from RMMRs that you think are important? (E.g. Medication Advisory Committee)
7. Is there anything else you want to mention that hasn't been covered?

Advisory Committees (MAC). A number of participants also provided reviews to patients living in their own home via the Home Medicines Review (HMR) service, and taught RMMR accreditation courses. Interviews lasted between 30 and 60 min.

Pharmacists generally asserted a belief that interdisciplinary medication reviews had excellent potential to improve medication management for LTC residents, including those with advanced dementia. However, rather than perceiving that the RMMR provided structures and support for interdisciplinary collaboration, the over-arching narrative was of pharmacists, GPs and LTC nurses finding ways *around* the constraints of the RMMR programme to improve quality and safety of prescribing.

Key barriers to the achievement of initiating, conducting high quality medication reviews and follow-up discussions were perceived to include inadequate financial and process supports for collaborative practice, as well as a lack of health professional accountability to the process and maintenance of quality—all within the context of limited time available for RMMRs amidst competing workload demands.

Figure 1 summarises results from the current study mapped to the domains of Bardet et al's PCPC model [29]. Of the determinants of the PCPC model, interest for collaborative practice appeared to be foundational. If there was an opportunity to build upon collaborators' willingness to engage to achieve shared agreement on the value of an RMMR, the process was perceived to have a good chance of succeeding; if not, informants considered the RMMR's potential effectiveness to be severely limited. Once an interest for collaboration was established, key collaborative elements of trust and interdependence was built over time, enabling the smooth running of the RMMR process.

Not only did developmental tools of communication and established roles in the process further build trust and interdependence but, contrary to the unidirectional influence suggested in the PCPC model, the building of trust and interdependence encouraged health professionals to engage in further opportunities for communication and a stronger understanding of the value of other health professional roles for medication management.

Whilst the PCPC model focused on a dyad of interdisciplinary working between pharmacists and physicians, our results pointed to a triad of collaboration wherein LTC nurses played an important role in driving the review process, especially with regard to referral, information sharing and input of medication changes. Notably, the resident and family were not mentioned as part of the review process,

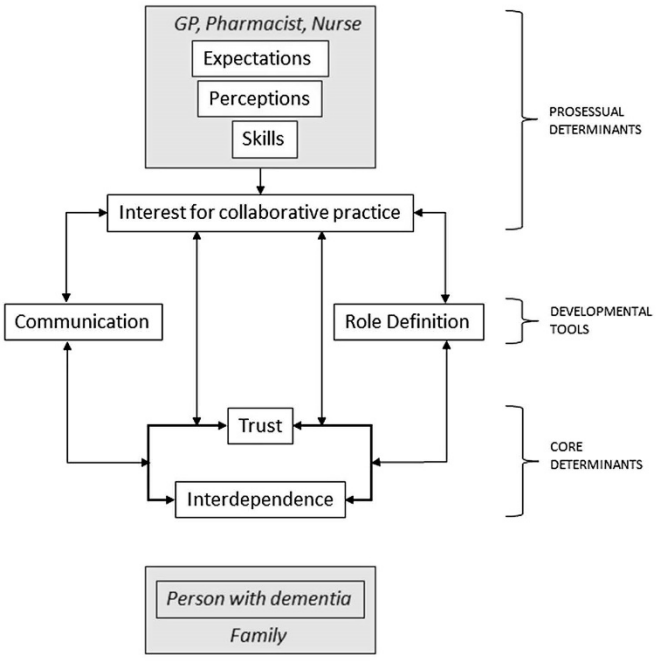

Fig. 1 Factors influencing interdisciplinary collaboration to improve the quality of medication reviews and improve outcomes for long-term care residents with advanced dementia (adapted from Bardet et al. [29])

and in many instances, family were portrayed as a barrier to appropriate medication management, especially where the goal was to deprescribe.

The RMMR programme does not support for high-quality person-centred, collaborative medication reviews tailored to resident needs

Lack of financial and process support for collaborative RMMRs

While the RMMR programme enables reviews to be conducted on a needs basis, pharmacists reported that the vast majority of referrals reflected a default biennial cycle. Conducting reviews every 2 years was seen as inadequate to monitor the needs of residents with dementia, whose health status might change drastically within this period.

> You can have massive deterioration in a patient with dementia over that two year period and you've missed the opportunity to improve their quality of life. (P09)

> The average length of stay in an aged care facility is just over 27 months, so the vast majority of these people are not going to be around for the second review. (P07)

Infrequent referral was partly seen to arise from the arduous process involved. However, inadequate remuneration was considered the most important barrier both to more frequent referral and to high quality reviews. Almost all interviewees perceived the RMMR programme to offer inadequate remuneration to enable the collaborative practice required.

> I think remuneration being what it is, it's not a good viable model. It's 'one size fits all'…But there's an increasingly complex cohort, if you really want that person-centred care, then there has to be a change in the remuneration structure…We really need to have the capacity to provide a more in-depth service for those who warrant it, and they should be remunerated accordingly… that's why you end up having people [pharmacists] feeling disillusioned because they end up putting more in than the remuneration is providing for. (P12)

A lack of remuneration for case conferencing, especially, was seen as stymieing interdisciplinary communication required for high quality RMMR-related collaborative practice.

> If there was some ability where we could be remunerated for case conferences, and pharmacists aren't obviously at this stage. GPs are, but if we could tap into that sort of funding…where we could all sit down together and discuss patients, or residents of aged care facilities, and determine a management plan that way I think. (P09)

> I think if you're looking for better outcomes then case conferencing is the way to go. Because the doctor is there with you, changes can happen there and then, we can have better nurse input and I think we get better health outcomes for the residents that way. (P04)

Given this lack of support, finding time to meet face-to-face within competing schedules was seen as difficult, if not impossible.

> Well, I guess it's in time. And GPs are very time poor, pharmacists are time poor, nursing staff are time poor. (P09)

> Any sort of situation where you've got yourself, the GP and your members of staff, the nursing staff, are exceptionally rare. (P14)

Lack of health professional accountability in the RMMR programme

A lack of accountability—for both pharmacists and GPs—was perceived to pose a significant barrier to the referral, conduct and implementation of quality person-centred RMMRs. Alongside inadequate remuneration, a lack of accountability for monitoring and referring residents was seen as the main driver for the unsatisfactory situation of RMMRs only being conducted every 2 years.

> Yes, it can be done on clinical need, but then you've got two paths. You've got those [pharmacists] that genuinely want to do one [an RMMR] within the two years because there is a clinical need. But then you've got the other path of people that were the very reason why all the funding got cut because they abused the system. (P10)

Pharmacists were also aware that GPs sometimes did not refer residents because they lacked trust and willingness to collaborate with pharmacists due to experiencing poor quality reviews in the past, commonly referred to as a 'cut and paste' service.

> Unfortunately there are pharmacists out there who are blatantly doing the wrong thing. We still can't seem to stamp this out. I can see past reports where it's quite obvious that the pharmacist, I doubt they've even been to the facility to review the patient, let alone seen the patient. And there's still a little bit of cut and pasting going on out there, and they're just cutting out of MIMS, it's just embarrassing what I've seen out there. (P05)

> I can understand why a GP doesn't take any notice when people [pharmacists] are cutting and pasting slabs out of product information. It's just rubbish. (P09)

Pharmacists perceived there to be a lack of accountability for GPs to follow-up RMMRs with changes in prescribing. One way in which pharmacists tackled the issue of limited GP engagement and accountability in the process, especially post-review of recommendations was to frame medication reviews as the 'medication management plan,' leaving space on the review document for GPs to provide comments once pharmacists had provided recommendations.

> We format our reports as basically the medication management plan…the issues are documented down the left-hand side of the table, and then on the right-hand side the doctor will scribble in whatever they want to, whatever changes they want to make, and whether or not they agree…once you've sort of put the hard yards in and worked at it, you get there in the end. (P08)

Interest for collaborative practice

Pharmacists commonly emphasised that team members' commitment to the shared goal of improving resident care and outcomes was a prerequisite for the RMMR to work. However, even where this was established, pharmacists commonly found that interest among GPs and LTC nurses to collaborate on RMMRs was limited to start with, requiring proactive efforts on their part to sell the benefits. Developing an interest for triadic collaborative practice was especially hard when the relationship between GPs and the facility was limited.

> If you've got a facility where you've got a GP who looks after most of the residents who's very willing to engage, it's not an issue. But then you've got a few outliers, and they're difficult to get referrals from, they don't really engage, they're not willing to discuss the report afterwards or even during, and so that makes it a little bit more challenging. (P08)

> If a doctor's maybe only got one patient or hasn't had a lot of experience in that particular area, I don't think they understand the value of what they can get out of a medication review. So, getting that liaison and getting that doctor to understand that the pharmacist could help in that area is often quite tricky. (P06)

Pharmacists highlighted the potential offered by collaboration for pooling knowledge to gain the best understanding of each resident, in order to provide the most appropriate person-centred care capable of delivering positive outcomes.

> I don't think we can work in isolation. We're going into [nursing] homes where we are relying on the written documentation, and we are also talking to the nursing staff. But we're only getting a snapshot of that person who's behind that dementia cloud. We really need to have more information, and I think we can only get that by having a team approach, and everyone sharing their knowledge of that person. (P09)

> The aim is to bring everyone together in the team in the one document in relation to the medication. (P14)

Trust

Trust as a vital ingredient of collaboration

Building trust and rapport with GPs was considered crucial to enhance the collaborative process. Pharmacists saw that when a trusting relationship had been built with GPs, this increased referrals, enabled shared decision-making, and improved the chances that GPs would accept the pharmacist's recommendations.

> I haven't always entered into a new contract with GPs who have had good experiences. But I can safely say that most of the RMMRs that I do with doctors on an ongoing basis, it's basically because the relationship is good and the trust is there, and they are happy with what I'm delivering. (P12)

Building trusting relationships with LTC staff was also considered important to gain their valuable time to share information.

> It's kind of developing relationships with the staff so that you can get their time and attention. (P13)

Trust cannot be assumed between health professionals and is built over time

While trust was seen as essential to collaboration, it could not be taken for granted at the beginning of a professional relationship. In LTC facilities where pharmacists were new and had not yet established trust between themselves and LTC staff, gaining information on residents was difficult, negatively affecting review efficiency and outcomes.

> With the nursing homes that I work with on a regular basis, we have a pretty fixed set up…but I notice when I go into other nursing homes where I haven't necessarily been connected, getting information about when they [the residents] were diagnosed with dementia, how long they've been on medication, that sort of history, that's often really quite hard to get. (P06)

Fortunately, building trust with LTC nurses was perceived to be relatively easy, provided the pharmacist engaged proactively by means of a positive, helpful attitude and open, honest communication.

> Get yourself known, be willing to engage. The thing at the facilities is that they are so resource poor that anything you can offer them they just love. So if you are seen to be there, available, if you do a good job, if you're personable or at least put up the façade that you're a likeable person, they will engage with you… yeah, that's really a strong driver of success for an RMMR. (P08)

Building trust with GPs was reported to be a slower process to build an effective collaborative relationship.

> As time goes on, your regulars [GPs], they respect your advice…so you don't feel like you've got to do that public relations sort of thing to actually get them to accept you. (P10)

Interdependence

Interdependence between health professionals only occurred when trust had been built

Interdependence was achieved when there was an interest for collaborative practice and trust established among all three members of the team. Interdependence was perceived to enable ideas and opinions to be easily shared by different health professionals to enable all information and perspectives to be considered when finding ways to improve the resident's medication regime.

> I guess for me the biggest thing is that they [the RMMRs] need to be collaborative…where there is interest and engagement from all players…nurses, carers and doctors…that review ends up being a really useful document that promotes change. I don't bother doing RMMRs where I feel like they're not valuable, because I just don't think they promote change. (P12)

Role definition

Defined and respected roles within the team allowed for flexibility

Pharmacists saw their role and others' as value adding to one another, with pharmacists' knowledge of deprescribing, auditing and monitoring of medications, pain management and weighing risk against benefits of different drugs contributing to the team. In environments where trust was built, the role of each health professional within the team environment was respected and valued.

> I think a significant thing that pharmacists can contribute in RMMRs is recommending deprescribing, giving guidance on how to taper the dose…or shift to intermittent or prn use. (P07)

> In the facilities where I work there is a respect for all the voices on the interdisciplinary team, it's not just 'this is your role,' it's much more fluid. The GP respects that the nurses are there more and understand from a carer and nursing perspective, so yeah…I would say respect for everyone's roles in the care of that elderly resident. (P12)

The important role played by nurses in the pharmacist-GP-nurse triad

While the RMMR's formal process allocates referral to the role of the GP, in practice, LTC nurses typically alerted GPs to residents who needed a review where these were not scheduled as routine. Pharmacists relied on the nurses' understanding of the resident and their clinical needs to initiate referrals.

> If the nurse feels that they [resident] might warrant a medicines review, if there's a new drug, or it's a falls risk increasing drug, or there's a change in medication that they're concerned might have contributed, they will highlight that for the GP, and the GP will end up referring for a medication review. That's sort of an example of doing a project that brings all the players in medicines together and you get an idea of the team that is available to effect change. (P12)

LTC staff were seen as an important information source who could provide current information on the resident, which also saved time. Pharmacists explained that LTC staff were key personnel in decision making for people with dementia. Often, they explained that they relied on LTC staff for information on the resident, knowing that they were the individuals who interact with residents daily, so would have a better understanding of the health, behaviours and potential changes in symptoms which may warrant a change in medications.

> It is often the nursing staff who are the ones who will request medications to settle a resident if they are showing BPSD and it's actually the nursing staff also who will be the main instigators in regular review of trialling cessation of medications. (P11)

> The shared decision making between the pharmacist and other health professionals is usually with the care

staff…I like to get to talk with them because they're the ones that spend the most time with the resident. (P03)

Residents and families have a limited role in collaborative practice

Residents and families were conspicuously absent from the triad of collaboration, despite pharmacists' emphasis on the need to ensure care was person-centred. In practice, pharmacists were rarely involved in conversations with family but instead empathised with GPs and the difficulties they had in discussing goals of care. Pharmacists commonly reported that providing appropriate medication care to residents—especially deprescribing—was made more difficult by families' unrealistic expectations for the resident, their wishes being focused on active treatment discordant with the palliative goals associated with advanced dementia.

There's difficulty for the GPs…especially if he's been prescribing for this person for the last 6 or 7 years, and convinced the person and the family that they need to be on this batch of medication to prevent further heart attacks or whatever it happens to be. Then saying, 'well we're going to take this person off,' and then they'll say 'well then you don't value my mother any more do you?' So it requires a lot of skill to go down that path. (P06)

Communication

Adequate and appropriate communication improves RMMR efficiency and quality

Having opportunities to talk to nursing staff was seen as the most efficient and reliable means of collecting current information about a resident. In many cases, pharmacists noted that documentation of the resident was not always up-to-date and was fragmented between hardcopy and online sources.

Yeah, I think a lot of the time with just doing a paper-based review is that quite often, the notes don't actually reflect what's truly going on with the resident … you get more out of a 30 second conversation than you can after 10 minutes reading through notes. (P08)

Discussion with GPs was considered important because it allowed sharing of information quickly, and determining whether there were any disagreements or clarifications needed on the recommendations provided by the pharmacist. It was seen as a way to fast track medication changes, and ensured that messages between pharmacist and GP were clearly understood.

I got the satisfaction of running my recommendations past the doctor not just sending him the report and getting a thank you back. And you know, I actually learnt a lot from that doctor because he was able to say 'that's not practical' or 'that's a good idea' or yeah. (P13)

Making time for communication opportunities requires creativity

In recognition of the importance of contact and communication with others on the team and in the absence of formal avenues provided by the RMMR process, pharmacists reported often relying on chance encounters.

I suppose with the RMMRs it's very difficult to find a time for a start where you can actually talk to the GPs. They are often there at weird and wonderful times…and if you happen to be there on that day then that's quite good because you can often discuss things as they come up. But that is a rarity in aged care. (P14)

Pharmacists relied on interacting with GPs over the phone and using written communication via fax and email, as face-to-face communication was often seen as impossible. Pharmacists also reported using creative ways to make time to communicate with GPs to talk about residents.

It was a large nursing home, it was well over 100 beds, but it was a really good example of collaboration. So one GP across the road did about 50% of the residents, and I'd go there, we'd have lunch together and talk about it, make the changes. (P07)

I used to go running with one of my regular GPs, it's was great, we used to talk about some residents while we were running. (P04)

Perceptions

Hierarchical relationships hindered collaboration and an effective RMMR process

A hierarchical model adopted by members of some teams—especially with regard to GPs' seniority—hindered the ability to effectively communicate and share goals regarding the management of the residents. Pharmacists perceived that newer GPs trained in the importance of collaboration were more open to pharmacist recommendations.

A lot of more elderly GPs have gone through a system where collaboration wasn't part of their training…a lot of the newer GPs that are coming out who have been trained in the benefits of collaborating with other

> health professionals, they are much more receptive and they really will be happy to listen…some GPs, they're still like 'I'm the doctor, we'll do it this way.' So you've got to be very diplomatic and flexible in the way you deal with the differences in others to make sure that the resident is the most important person, and that we do the best for them. (P14)

Pharmacists expressed the difficulties in providing recommendations and sharing the responsibility of medication decision-making with GPs who held strongly to their perception of GPs as the primary decision maker. Regardless of their working relationship, GPs' ultimate authority in deciding to follow and implement pharmacist's recommendations was recognised as an important limit on the pharmacist's role.

> You know, you can't just give orders, and I guess, talking about decision making means that you come to a decision and then you implement it. But we can't actually do that because we're not in charge of the implementation. (P02)

While suboptimal, pharmacists strove to pursue the best care possible within a hierarchical structure by framing recommendations in a way that did not imply that they were the ultimate decision-maker.

> If you found the digoxin level was too high, that would lead you to your decision that the toxicity levels were probably causing the nausea…but then you have to write that down in such a way that the doctor comes to the same conclusion…you have to write it down in such a way that the doctor thinks it's their idea. (P02)

Trust and interdependence was also hindered by preconceived notions of what pharmacists bring to the table, and negative stereotypical role expectations of pharmacists as merely "shopkeepers."

> I think initially we've always been thought of as being shopkeepers rather than clinicians…'just tell me what the life-threatening drug interactions are and stick to the business of dispensing in the shop, and I'll do the rest.' (P06)

Pharmacists needed to provide evidence not only of their willingness to help but also their 'value add' in terms of expertise and practical support. Pharmacist's explained that in order for GPs to take them seriously, they needed to be providing quality reports from the beginning.

> There has to be a high quality right from the beginning so that the doctors can sit up and take notice and think, 'yeah, this person does know what they're talking about,' rather than 'they're talking about a drug interaction I can read in my own programme. I don't need a pharmacist to send a report to tell me that sort of thing.' (P04)

Expectations

A shared understanding of the resident's goals of care

Many pharmacists identified a shared understanding of goals of care as pivotal in optimising the usefulness of RMMRs for residents with dementia requiring a palliative approach. Participants stressed that goals of care and associated recommendations needed to be contextualised within the history and needs of each individual resident.

> It really has to be patient-centred, it has to be for that resident and their issue. I have no issues if someone is on 20 medications and there is no issue with their medication use because of the complexities of what they are, and everything is appropriate, I have no issues with writing on theirs [report] 'no current concerns or issues.' But someone can be on two medications and you can write a whole heap depending on the resident. (P14)

Pharmacists thought it particularly important that collaborators were advocates for person-centred palliative goals of care for residents with advanced dementia. When pharmacists had this intent they were more likely to provide a quality review even if they knew it would take more time, and advocate for the medication changes required for the resident with advanced dementia.

> I thinks it's quite cruel to continue to ram medications down someone's throat when they've got advanced dementia and yet it happens, which is because no one is accountable, and it's easier to follow the status quo. Whereas if we have pharmacists that have a true knowledge of end of life care and are good communicators and able to get their point across to GPs, then we can minimise the suffering of people with dementia. (P09)

Skills

In addition to their expertise in pharmacological care, many pharmacists demonstrated skills in effectively communicating with GPs and other health professionals to override the RMMR programme's shortfall in providing a platform for communication and ensuring team members were accountable for their role in the medication review process. They showed a steadfastness in building trust and highlighting their value, making sure the review process continued.

> I think in lots of ways it comes back to that individual pharmacist being a bit like a dog with a bone. Having to just keep reminding everybody that we're part of that team. (P06)

Heightened medication considerations for residents with advanced dementia

See Table 1 for a summary of considerations specific to advanced dementia raised by participants, together with illustrative quotes. Constraints of the RMMR programme highlighted as challenging in the advanced dementia context fell under developmental tools of communication and role definition in the PCPC model. Having 2 years between reviews and limited remuneration opportunities prevented communication opportunities and valued health professional roles to develop and sustain trusting working relationships. These developmental tools are imperative to support the total collaborative model to work effectively and reach the demands of complex patients like LTC residents with advanced dementia.

Discussion

This study is the first to explore pharmacist perceptions of interdisciplinary collaboration with GPs and other health care professionals in providing the Australian RMMR service to LTC residents with advanced dementia. The RMMR programme was seen as having potential to improve medication management of LTC residents, including those with

Table 1 Heightened medication considerations for residents with advanced dementia

Dementia care considerations	Illustrative quotes
Difficult to predict the health trajectory of dementia. Deterioration can occur rapidly	None of us can guess how long that person's going to live, they've got severe dementia and they will probably die by Christmas, but then you'll find they'll last for another couple of years, especially if they're eating well. (P06)
	You need to have them reviewed more regularly, but the whole system is kind of coming round to the point that I'm trying to make, it doesn't support that. And I think it's an absolute travesty in that it has been blown up to 24 months when there was absolutely no reason for it. (P08)
	We're not doing our resident's any favours by continuing to treat their hypertension and their diabetes and prick their fingers when they've got advanced dementia! It's cruel. We all try to push for guidelines and reference ranges, but they just don't apply at some point in time. (P09)
Medications require monitoring and regular review	When people are started on antipsychotics and they've been on it for a long time and people forget why they're actually on it… (P05)
	So we've had this resident on medication which isn't working for them and is not appropriate for them, and we've had them on it for two years. It may be that I haven't done the review and he started on it 18 months ago. So, the problem is that we can't target them quickly enough. (P11)
Unable to advocate for themselves	It's very patronising for a profession to think that once you reach that MMSE [Mini Mental State Examination] you should be off that drug, that's what the evidence shows. It's much more complex than that… (P12)
	I thinks it's quite cruel to continue to ram medications down someone's throat when they've got advanced dementia and yet it happens, which is because no one is accountable. (P09)
Complex of residents with advanced dementia needs comprehensive assessment with a team approach	I would observe, I would be talking with the DON, observe the patient, you could see if they were agitated, you could see their mobility to some degree, and observation in cognitively impaired people is just so critical. So I think people that don't talk to the resident or don't observe the resident are doing superficial poor quality reviews. (P07)
	We're going into homes where we are relying on the writ documentation, and we are also talking to the nursing staff. But we're only getting a snapshot of that person who's behind that dementia cloud. We really need to have more information, and I think we can only get that by having a team approach, and everyone sharing their knowledge of that person. (P09)
Heighted sensitivity to medications and adverse effects	The doses that we use for people with dementia need to be a lot lower. Where you might normally start somebody on a 25 mg dose of Sertraline, we often start them on a 12.5 mg dose of Sertraline. Because the brain is dying, it hasn't got as many receptors. (P06)

advanced dementia, but the success of any given review was considered reliant on the depth of interdisciplinary collaboration and person-centredness. Prerequisites for effective RMMRs included: having a pharmacist who believed in the merits of the RMMR and could articulate this 'value-add' to other health professionals; accessing best quality information (including reports of people who knew the resident well); and using ingenuity to enable communication and follow-through. Whilst the PCPC model focuses on collaboration between pharmacists and GPs, LTC nurses were also seen as key collaborators in driving the RMMR process, being instrumental in prompting referrals, providing information about residents to enable person-centred recommendations, and enabling communication between all collaborators. Results identified that family members were rarely involved in the RMMR process, and were seen in many cases as a potential barrier to appropriate medication changes.

The need for a trusting relationship between GPs and pharmacists providing medication reviews has been identified in earlier research [6, 30–37]. Like other studies, our results show that building trust is a dynamic process requiring time and effort on the pharmacists' part [30, 38, 39]. When interactions frequently occurred, there was greater opportunity to learn from each other, improve awareness of each other's' professional skills, and develop a collaborative relationship.

RMMR guidelines for pharmacists and GPs providing the RMMR recommend face-to-face communication to develop a collaborative working relationship, and advocating for allocated time for communication post-review dedicated to the resident's medication care [40, 41]. Our study supports concerns that the current RMMR model is not conducive to ongoing communication and feedback between team members, and that post-review discussions rarely occur [18].

Our study also supports previous research showing that the success of medication reviews depends on GPs' willingness to engage [30], and that pharmacists are required to take a leading role as initiators [38]. GP acceptance rate of pharmacist's recommendations from LTC medication reviews has been found to vary greatly between studies from 38 to 91.6% [4, 11, 12, 19, 42–44], likely as an indication of the level of interdisciplinary collaboration.

Recommendations for system-level improvements arising from our study are as follows. Community-based studies and Australian government funded initiatives have suggested that locating clinical pharmacists within general practices may improve the efficiency and quality of home medication reviews [45–49]; embedding pharmacists within LTC organisations may similarly improve the quality of RMMRs.

The remuneration model which caps the number of review per residents and doesn't remunerate pharmacist involvement in case conferences limits capacity to tailor reviews to the therapeutic needs of individual residents. Furthermore, a funding model is needed that dis-incentivises 'cut and paste' reviews in favour of individualised assessments and interdisciplinary collaboration. Responsive remuneration that does not limit RMMR frequency for complex cases and enables pharmacist involvement in case-conferencing also offer promise for improving QUM in LTC.

Randomised controlled trials are needed to test the effectiveness of interventions focused on inter-professional collaboration in improving the quality of medication reviews, and the potential for these to improve QUM and outcomes for LTC residents, including those with advanced dementia.

Strengths and limitations

The current research focused exclusively on the views of pharmacists and did not include GP and LTC staff perspectives. Even among pharmacists, our sample was biased towards those holding senior roles and is unlikely to be representative of those providing the RMMR more generally. Participating pharmacists who had been involved in the development of RMMR standards and guidelines may potentially see less flaws in the RMMR process, however this sample provided informed insights into the RMMR programme and its shortcomings, as well as expertise in conducting effective reviews and vision regarding systemic improvements. Future research should aim to gain GP and LTC staff perspectives.

Conclusion

Trust and interdependence were identified as foundational for enabling the depth of collaboration and sharing of knowledge needed to provide quality person-centred medication reviews. This research demonstrates the importance of interdisciplinary collaboration between pharmacists, GPs and other health professionals to improve medication management for LTC residents with advanced dementia.

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Appendix 5. Acceptance Letter and Author copy of Publication – Study 4

From: em.ejcl.0.67d154.78912bac@editorialmanager.com on behalf of European Journal of Clinical Pharmacology - Editorial Office
To: Domenica Disalvo
Subject: Your Submission EJCL-D-19-00546R1
Date: Monday, 9 December 2019 10:05:01 PM

Dear Miss Disalvo,

We are pleased to inform you that your manuscript, "Multidisciplinary perspectives on medication-related decision-making for people with advanced dementia living in long-term care: a critical incident analysis", has been accepted for publication in
European Journal of Clinical Pharmacology.

You will receive an e-mail in due course regarding the production process.

Please remember to quote the manuscript number, EJCL-D-19-00546R1, whenever inquiring about your manuscript.

With best regards,

David J Williams
Associate Editor

Reviewer #1: The authors have satisfactorily addressed the comments made by both reviewers; in my opinion, this manuscript is now suitable for publication in the European Journal of Clinical Pharmacology.

Reviewer #2: None

Multidisciplinary perspectives on medication-related decision-making for people with advanced dementia living in long-term care: a critical incident analysis

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Abstract

Purpose: This study aimed to explore medication-related decision-making by health professionals from different disciplines and specialties caring for people with advanced dementia living in long-term care facilities, focusing on dilemmas associated with starting, continuing or deprescribing medications commonly regarded as potentially inappropriate.

Methods: Four focus groups were undertaken, each on a different medication type (antibiotics, lipid-lowering agents, opioids and acetylcholinesterase inhibitors). Transcripts underwent qualitative analysis using line by line inductive coding and then a person-centred framework to highlight themes across medication types.

Results: Sixteen participants participated in focus groups. Regardless of medication type or dilemma, results suggested decision-making for residents with advanced dementia should begin with discussing goals of care and engaging with families, and be viewed as an iterative process involving regular monitoring and adjustment. Decision-making was seen as requiring a dialectical approach involving multiple perspectives, with an emphasis on establishing communication between health professionals, family and the person with dementia to better understand goals/preferences for care.

Conclusion: Inter-professional collaboration enables sharing of clinical experience/expertise, differing disciplinary perspectives, and knowledge about the resident. Continuing a medication should be considered an active decision that carries as much responsibility as starting or deprescribing.

Keywords: decision-making, potentially inappropriate prescribing, long-term care, deprescribing, dementia, interdisciplinary collaboration

Multidisciplinary perspectives on medication-related decision-making for people with advanced dementia living in long-term care: a critical incident analysis

Introduction

Guidance from the European Association for Palliative Care (EAPC) recommends that care for people with advanced dementia requires a palliative approach which emphasises quality of life and comfort [1]. However, identifying when a given individual should transition to a palliative approach requires a person-centred approach which takes into account the trajectory, goals of care and context that are unique to each person. Most people with advanced dementia live in long-term care (LTC) [2], where care is often inconsistent with a palliative approach [3]. LTC residents with advanced dementia often have symptoms that go under-recognised and under-treated and may receive medications that are focused on prolonging life rather than comfort, and cause harms through adverse effects [4].

A multidisciplinary approach, whereby an integrated team of professionals from different disciplines and specialties comes together to reach a combined decision on a complex situation, is considered the gold standard for care of people with advanced dementia living in LTC [1]. Only two survey studies have sought to understand the process of medication-related decision-making in this context [5, 6]. Whilst providing some insight into the decision-making process, further qualitative research is needed to provide a more in-depth and nuanced understanding of factors influencing decision-making to inform best practice.

Key medicine decisions for LTC residents with advanced dementia are commencing new medications for symptom control, and deprescribing any for which potential benefit no longer outweighs potential risk of harm. However, decisions are not always straight forward. For example, while antibiotics might not be considered appropriate for extending life, they are sometimes used in palliation to treat significant discomfort of pneumonia and other infections in this population [1]. While acetylcholinesterase inhibitors (AChEI) may provide cognitive and functional benefits, long-term preventive medications like lipid-lowering agents can reduce risk of vascular events or mortality, these may no longer be primary goals of care in advanced dementia [7].

An issue of concern in LTC is prescribing inertia i.e. continuing to prescribe medications that a resident no longer needs [8], which has prompted a movement to deprescribe, with new organisations formed specifically to optimise quality use of medicines (QUM) in older adults e.g. Australian Deprescribing Network (ADeN) [9]. However, little is known about the factors in decision-making that contribute to prescribing inertia in LTC residents with dementia.

A recent systematic review found the most prominent enablers to deprescribing in people with life-limiting disease were organisational support, and a multidisciplinary approach to medication review [10]. Further research is needed to better understand factors impacting appropriate deprescribing in palliative care.

A methodology used with promising results to explore medication-related decision-making in other clinical populations is the 'critical incident technique' (CIT) which focuses on 'dilemmas' and factors influencing their resolution [11]. Two separate studies used CIT to explore physician decision-making with regard to prescribing opioids and benzodiazepines to patients in primary healthcare [12, 13]. In both studies, considerations other than pharmacological contributed to decision-making, including concern about maintaining a therapeutic relationship with patients.

This study aimed to explore medication-related decision-making by health professionals from different disciplines and specialties caring for people with advanced dementia living in LTC facilities, with a special focus on the dilemmas associated with starting, continuing or deprescribing medications commonly regarded as potentially inappropriate.

Method

Study design

The study used a qualitative approach modelled on the CIT [11]. Ethics approval was from the University of Technology Sydney (UTS) Human Research Ethics Committee (Approval Reference No. ETH16-0291). All participants gave written informed consent to participate. The consolidated criteria for reporting qualitative research (COREQ-32) [14] guided reporting (see Appendix A2 published as supplementary material online).

Participants

Sampling

Eligible participants were health professionals with experience of medication-related decision-making and management for people with advanced dementia. Participants were purposively sampled from health professions most commonly involved in medication-related decisions for people with advanced dementia including medicine, nursing and pharmacy. Because of the central role played by medical professionals in prescribing medicines, we included physicians from the three specialties for whom advanced dementia is a major focus, namely general practice, palliative care, geriatrics and old age psychiatry. Nursing participants needed to be a registered nurse (RN) and have a scope of practice that included medication management.

Recruitment

An email invitation was circulated through professional body newsletters, the team's established clinical networks and professional interest groups.

Data collection

Data were collected using focus groups, as follows.

Pre-session

One week prior to the focus groups, participants were sent a questionnaire including questions on number of years in occupation and experience in making medication decisions in advanced dementia. Participants were also emailed two different vignettes on each specific medication of interest (see Appendix A1 published as supplementary material online attached to the electronic version of this paper), including AChEIs, antibiotics, opioid analgesics and lipid-lowering agents. These have been identified from the literature as being medications that are commonly started or continued in LTC residents with advanced dementia but are of questionable net benefit due to risk of adverse effects, further accentuated in those with advanced dementia due to physiological changes that accompany this condition impair medication metabolism and clearance. Antipsychotic medications were not included due to significant recent research in Australian LTC in this area [15, 16].

Key parameters of interest were altered across vignettes in terms of clinical and socio-demographic variables including age, sex, comorbidities, cognitive and functional status, a medication list and a short description of the dilemma. Participants were asked to read vignettes prior to the scheduled meeting and encouraged to make notes to use as an aide during focus groups. Vignettes were also intended to prompt health professionals' memories of similar encounters when prescribing or managing medications for people with advanced dementia. Participants were asked to have their notes and the vignettes in front of them during the focus group meeting.

Focus groups

Four focus group sessions were undertaken, with each session focusing on a different medication of interest, with participants telephoning into a teleconference call at the scheduled time. Focus groups were audio recorded and lasted approximately 90 minutes.

Three focus groups were facilitated by MA, a female palliative care physician with experience in leading palliative care services including in-reach to LTC; as well as leading an extensive program of research that includes use of the CIT and studies focused on the care of LTC residents with advanced dementia. One focus group was facilitated by TL, a male social scientist with experience in research on improving palliative care for LTC residents with

advanced dementia. A female PhD Candidate (DD) with a background in medical sciences acted as assistant moderator, taking notes and running the audio recorder during focus groups.

Many participants knew the focus group facilitators prior to the study through established professional bodies and/or previous collaborative research. Participants were made aware that this research made up part of a PhD programme within the email invitation and information sheet.

The CIT was operationalised in each focus group as exploration of dilemmas in the vignettes, including sources of information useful for informing decision-making and the variables resolving or worsening equivocation in decision-making [17] (see Table 1). Participants were also asked "can you think of experiences you have had where similar or different issues occurred in relation to this medication?" Similar to the 'think aloud' method used in cognitive interviews, we encouraged participants during focus groups to verbalise their decision-making process as they answered questions [18]. Open discussion and debate was encouraged to make explicit any discipline/specialty-specific assumptions and perspectives that might otherwise be too embedded for participants to recognise and report.

[insert Table 1 here]

Questions were sometimes opened to any participant but at other times asked to each participant in turn to ensure perspectives from different disciplines/specialties were included and manage group dynamics. It was explained to participants that there were no 'right' or 'wrong' responses and focus groups were aimed at capturing complexity and diversity rather than concordance among perspectives.

Data analysis

Content analysis was first employed to extract generalised principles from the individual vignettes presented and offered by participants. Initially, DD independently coded all four transcripts and developed a coding structure. The structure was coded inductively, grouping text/themes which were found between all medications of interest, and also identifying points of interest which were specific to each medication. The narratives of each vignette were of interest to identify common features that prompt recall by participants and offer insight into the decision-making process. Areas of disagreement between different disciplines/specialties were regarded as focal points for highlighting dilemmas and contextual considerations.

DD, TL and MA met to discuss and clarify common themes between medications of interest as well as defining features and points of difference. Themes from a review of reviews of person- and patient-centred care [19] were used to transition to interpretive themes. QSR NVivo 11 software was used to manage data. For verification purposes, a one page summary of themes found throughout all focus groups was emailed to participants, which also invited them to identify any they disagreed with.

Results

Participant characteristics

The study was conducted between September 2016 and February 2017. A total of 16 participants were recruited, ten of whom were female. Participants' clinical experience is summarised in Table 2. Six participants were involved in the focus group on antibiotics, five in AChEI focus group, five in lipid-lowering agent focus group and four in the opioid focus group. All four focus groups included medical representation from general practice, a representative from geriatric and/or palliative medicine and nursing representation from aged care and/or palliative care. A heart failure nurse practitioner attended the lipid-lowering agent focus group to give a relevant specialist perspective. A clinical nurse specialist working with a hospital rapid response team participated in the antibiotic focus group to provide insight into use of this medication in LTC residents transferred to acute care. Pharmacists attended three of the focus groups, but a pharmacist who was scheduled to attend the focus group on lipid-lowering agents cancelled at the last minute due to unforeseeable circumstances and could not be replaced.

[insert Table 2 here]

Participants had experience in a range of activities related to medication decision-making for LTC residents with advanced dementia, including medication reviews and case conferencing with other health professionals and

family to decide medication management, as well as other assessments such as falls risks. There was also many overlaps in experience by specialty and disciplines.

Themes

Participants saw medication-related decision-making for LTC residents with advanced dementia as a focus of concern for patient care with equal potential for significant consequences regardless of whether starting, continuing or deprescribing a medication. Participants attributed prescribing inertia to apathy, a desire not to be seen to threaten the status quo, and/or a concern that changing medication might confer responsibility for negative consequences. However, they emphasised that taking no action should be viewed as an equally active decision that carried equal responsibility.

"The last thing a GP wants to do is change things around and then something bad happens, then it would be very easy for people to blame the GP for the decision on retrospect…if the patient is stable and there is no side effects, the tendency of many GPs is to just continue going." (GP2, lipid-lowering agents)

Concerns were also raised about a perceived trend in LTC by which a dementia diagnosis was seen as a reason to deprescribe indiscriminately, without due individual assessment.

"The implication that just because a person who has a cognitive impairment deteriorates from a cognitive perspective in an aged care facility, that that means that they're dying and the best treatment for that situation is comfort care with opioids and benzodiazepines without further thought is just a concerning one sometimes." (Geriatrician 1, opioids)

"He'd stopped eating or drinking and they thought he must be dying…it turned out he had a mouth full of ulcers…there was this presumption that he was deteriorating from his dementia, and he wasn't. You have to have a really careful approach; is it actually deterioration from dementia, or is it something else that could be really easily resolved?" (Nurse 1, opioids)

Above all else, focus group discussions highlighted the complex interplay of diverse factors specific to each individual resident that health professionals needed to consider when making decisions about potential harm versus potential benefit for medications in LTC residents with advanced dementia. Rules-of-thumb and guidelines were seen as useful, especially for health professionals who did not deal with dementia and palliative care regularly.

"I love guidelines because when it's off my scope it helps me to know what to do, and somebody else has already digested the complexities of the literature and given me a frame to work around. The heart failure guidelines specifically, I use them a lot, and certainly we contribute to those working at a high level in the heart failure area, but when I'm off my scope on something like dementia which you know many heart failure patients have, I just don't have a really good knowledge. So for me, a guideline is gold." (Nurse 3, lipid-lowering agents)

However, concerns were raised that they were often over-applied without due reference to individual resident variability. Participants stressed that proper understanding of each resident's case required collaborative input from a range of professional and personal perspectives, including the person with dementia and their family.

"The guidance is important but it's only one part of what should be a complex management approach involving other professionals" (Old age psychiatrist 1, AChEI)

"It should be a multidisciplinary approach including the resident and their family in the discussion. I think that happens most of the time but sometimes it doesn't. Yes, we can have guidelines and algorithms and everything, but it needs to be individualised, looking at all of their medicines and all of their health conditions." (Pharmacist 2, AChEI)

Themes from the focus groups could therefore be grouped within two broad categories as follows: i) Applying a person-centred approach to medication-related decision-making for LTC residents with advanced dementia, and ii) Decision-making as a dialectic process requiring multiple perspectives in which layers of clinical factors are considered, reflected upon as a team and integrated to reach a quality medication-related decision.

Applying a person-centred approach to medication-related decision-making for LTC residents with advanced dementia

Go slow in the face of unpredictability and unknown individual variability

The unpredictability of the dementia trajectory for each individual resident was seen to make medication related decisions difficult for clinicians in terms of a) establishing whether overall goals of care were palliative and b) appraising whether a medication would have a net benefit within the person's lifetime.

"It's completely unpredictable ... I mean I would be completely shocked if the patient survived another 12 months, but whether this person would die tomorrow, or whether they live for another 6 months, I can't tell." (GP 2, antibiotics)

A high prevalence of polypharmacy in LTC residents with advanced dementia added complexity to multi-morbidity to make it difficult to determine what was causing symptoms, especially in the context of cognitive impairment and limited functioning.

"He's on numerous medications…so it would be really hard to work out what was doing what." (Nurse 1, AChEI)

"You really have to use your skills to assess that this is not the usual resident we know, something is wrong, and then we have to do a proper head to toe check of the patient, and stop to find out what is going on." (Nurse 2, lipid-lowering agents)

Many participants highlighted the necessary need for caution and gaining all the appropriate resident information when changing medication, regardless of the medication type or decision as the repercussion for making the wrong decision was seen as potentially dangerous given the vulnerability associated with dementia and frailty. Possible repercussions described included drug interactions, kidney and liver damage, over-sedation and lethargy, increased falls risk, delirium, bradycardia, gastrointestinal effects and nausea.

"So it's really for me, stop and think before acting…I don't see much point in prescribing something for the sake of feeling like you've done something as a clinician. I think it's important to have the correct information." (Nurse 4, antibiotics)

Due to individual variability, it was difficult for clinicians to give a definitive answer as to when to change medications, especially deprescribing long-term treatments. Only when there was an obvious decline in function or cognition could medication-related decisions be easily made for a resident.

"If the person's functional ability is pretty impaired, then it's probably time to stop." (GP 3, AChEI)

A holistic approach is required

Regardless of the medication in question, the overarching consensus was that decisions about a specific medicine should never be made in isolation, but should also take into account all their other medications and a comprehensive range of clinical and personal considerations. Rather than focus on a single decision, clinicians saw medication management as a continuing process of regular review, monitoring and adjustment.

"Looking at his list of drugs, none of us would ever just look at donepezil in isolation." (Pharmacist 2, AChEI)

Weighing up the potential harms and benefits of starting, continuing or ceasing medications needed to take account of the context of each particular person and their individual goals.

"Benefits of continuing those medications have to really outweigh the side effects. How burdensome is it for the resident? If the benefits are much larger, at what stage do we stop it? (Nurse 2, lipid-lowering agents)

"Is there a patient sign or symptom to support either benefit or harm from the drug, or lack of benefit." (Pharmacist 2, AChEI)

Clinicians emphasised the need for comprehensive assessment before making medication-related decisions. Considerations listed by participants that needed to be taken into account included the resident's history of adverse effects or drug interactions, whether some medications were potentially negating the effects of another, severity

of symptoms, swallowing capacity, illness trajectory, incontinence level, anticholinergic load, evidence of cardiovascular abnormalities, if the resident was completely bedbound or were newly admitted to the LTC facility.

"There is a couple of other medications with anticholinergic effects that he's on which would be counteracting the donepezil anyway, so that's another issue." (GP3, AChEI)

"If it gets to that point where they can't swallow anything, then obviously that's a different conversation, because that means this patient is incapable of feeding themselves, and eating and drinking…I think, if it gets to that stage where they can't even swallow the tablet, then I think it's a different conversation." (GP 2, antibiotics)

It was important to view the resident as a person with needs, and that other factors should be looked at, not just medication, in order to improve care and the person's overall quality of life. Non-pharmacological approaches were considered a better approach in many instances to minimise adverse effects from medicines including massage and heat packs.

"The most likely and the most effective strategy you would have here would be non-pharmacological to be honest…that would be my first line of intervention rather than a pharmacological one in this situation." (Old age psychiatrist 1, AChEI)

Try to clarify the purpose of each medication

Participants frequently focused on distilling the purpose of medications, though sometimes this was challenging. Those that controlled symptoms and maintained quality of life (e.g. analgesics) were likely to be continued, provided the benefits outweighed associated risk of adverse effects. Some medications (e.g. antibiotics) were more ambiguous with regard to purpose. Starting antibiotics was seen as only beneficial if it was being used to maintain quality of life and to treat symptom burden associated with infection rather than to sustain life.

"Certainly from a benefits perspective and quality of life, I think pain management is a critical aspect to consider…In terms of the risks, well that comes back to what we've talk about, being what dose we start with, with what route, how its monitored...pain management has got to be your first priority though." (Pharmacist 1, opioids)

"An infection like this is often a pre-terminal event with someone with advanced dementia and the likely benefits of any treatment with antibiotics may just be prolonging her terminal stage." (Palliative care physician 1, antibiotics)

-Lipid-lowering agents were seen asclear candidates for deprescribing where this was seen as safe and no longer aligned with the resident's therapeutic goals of care which may be focused on palliative principles for strictly comfort. While the prescribing of AChEI's may also no longer align with the resident's goals of care, participants reported clinical experience of seeing rapid decline in cognitive and functional status in residents when AChEIs were stopped, therefore ceasing was seen as needing to be approached with caution in LTC residents with advanced dementia.

"I think the difficulty if we start altering his medications is that we run the risk of pushing him into delirium. Certainly, I think there is evidence that shows that if you take people off anticholinesterase inhibitors they can acutely decline as well, so you've got to be really careful here." (Old age psychiatrist 1, AChEI)

"I've seen people deteriorate rapidly…people do deteriorate very rapidly sometimes." (GP 3, AChEI)

Decision-making is a dialectic process requiring multiple perspectives

Diverse professional perspectives may need negotiating

Decision-making in the focus groups proceeded via a dialectic process wherein participants with their different perspectives iteratively added layers of factors for consideration. Inter-professional collaboration was stressed as important to share both clinical experience/expertise and knowledge about the individual resident to reach the best decision. Medical practitioners and pharmacists often provided expertise on medicines while nurses from the LTCF contributed an understanding of the resident and his/her family.

"I just know that my knowledge about this medication is so limited that you would want someone…to come along and actually have an understanding of how this drug works, and why it's given… you really want someone in your team like that to explain it." (Nurse 1, lipid-lowering agents)

Pharmacists' knowledge of pharmacology was seen as helpful to inform medication-related decisions, especially in a palliative care context where reducing medication load was a key priority.

"From clinical practice when I've had difficult situations with deprescribing, when patients have been on medications for long periods of time, I found working with a pharmacist extremely beneficial because often it's beyond my expertise, then together we put together regimens to deprescribe successfully." (Old age psychiatrist 1, AChEI)

There were very few points of contention during discussion between focus group participants. However, perspectives sometimes differed due to disciplinary or specialty scope of practice. For example, in relation to antibiotic use, the GP placed more emphasis than other participants on their relationship with the family as a consideration in deciding whether antibiotics should be administered.

Palliative care physician 1:
"Reflecting on my practice and comparing with your practice, it seems it's so much the case that it's default treatment…I guess as a palliative care physician I would like to offer a really strong alternative that not treating a patient like this with antibiotics is a very appropriate option. You know, it should be at least equal to the option of treatment. I guess it's pushing against the tide a lot, but I think it's a really important point to state for a patient like this."
GP 2:
"I think the issue here though is it's in the context of my practice…If the family wants it quite strongly, there is no way I am going to say 'there is no way I can give it' because it's used enough and you know, it's just not worth having that sort of conflict with the family I think because it [antibiotic] is unlikely to do a lot of harm." (antibiotics)

Communication should be iterative to align medication decisions with the changing illness trajectory and goals of care

Ideal communication and collaboration was seen as iterative rather than one-off, given the likelihood that goals would change in light of disease progression and acute events. Participants saw medication decisions as likely to change over time. Much of the discussion revolved around the due process of decision-making, rather than the resulting decision.

"The concept of planning I think is key and that is the progressive series of conversations that happens from the beginning right through…and is readdressed each time there is a change." (Nurse 4, antibiotics)

"What's appropriate now, is not going to be appropriate down the track..." (Geriatrician 3, antibiotics)

View family and resident goals as focal

Focus group participants portrayed shared decision-making as a process that started and finished with resident/family goals. Emphasis was placed on establishing good communication between health professionals, family and (wherever possible) the person with dementia to better understand goals and preferences of care.

"The question is very much around the concept of goals of care, focus of care, expectations of care, having not seen evidence of a discussion around care planning for me that's going to be the key in terms of moving forward with any decision making." (Nurse 4, antibiotics)

Engaging with family members early on was seen as optimal to enable a gentler transition toward accepting their loved one's prognosis.

"It becomes a conversation that's had in a controlled and advanced way, rather than in a crisis and in the middle of the night... if we've done a good job they shouldn't be surprised either. It's kind of like they're a bit prepared for this too." (Palliative care physician 1, antibiotics)

Participants emphasised the need to inform families properly to enable them to participate in shared decision-making.

"Sometimes families can be quite directive about what should be given without the understanding of how things work…discussion needs to happen to clarify all the issues that could be going on in people's minds." (Nurse 1, opioids)

"I often find people don't have a very clear understanding of medications that are going to make a difference today and tomorrow, or make me feel better in a few hours versus medications that make a big difference over 10 years." (Geriatrician 1, lipid-lowering agents)

When families were resistant to a palliative approach, their perspective was carefully balanced against participants' clinical judgement regarding the resident's interests.

"If the family are adamant that one thing is the way forward, I try to work with it as long as there are no severe risks…I am guided a lot by what the family say…If something is plainly unsafe, having assessed capacity in the patient, I would go with what is safer. But generally, if there's not a major safety issue, I'll go with what the family say." (Old age psychiatrist 1, AChEI)

"My sense is that if you know the aim of palliative care is to try and make sure that each day is a little bit better due to what you do. So if ceasing a medication causes harm to everybody around you from doing it, then it's not a great palliative act to do that, so that would certainly influence my continuing it." (Geriatrician 1, lipid-lowering agents)

As well as integral to high quality care, ensuring that decision-making shared with family and aligned with their goals was also seen as necessary to prevent litigation. There was concern that families might perceive even the most appropriate decisions as grounds for litigation if these did not accord with their understanding of what was best for the resident. As highlighted above, participants were also acutely aware of risks associated with starting or deprescribing medications and emphasised the need to communicate these to family members to ensure they accepted these within the context of likely benefits.

"You know the family's view on this, getting that wrong and having the family or the patient in a different context feeling that the medications are not right for them is another harm, is another risk, and so it needs to be considered within getting this balance right for that person at that time." (Geriatrician 1, opioids)

The contribution of research evidence

Participants regularly referenced research evidence in their discussions or else highlighted its scarcity. A lack of research evidence was especially highlighted regarding the safety of deprescribing in LTC residents with advanced dementia, with available evidence suggesting mixed results.

"In palliative care and in geriatrics I guess the question of when to deprescribe medications comes up a lot, and there's relatively recent evidence to suggest that for people whose prognosis is quite poor who might be within the last 12 months of life, that if you stop the lipid-lowering agent that they're on, even if they're on it for initially very good reasons, there may actually be a quality of life benefit." (Geriatrician 1, lipid-lowering agents)

Discussion

The current study is the first to explore case-based medication-related decision-making by multidisciplinary health professionals in relation to LTC residents with advanced dementia. The focus groups conducted in this study suggest that medication-related decision-making in this context, regardless of discipline, may share common features regardless of the medication in question or whether the decision concerns starting, continuing or deprescribing.

Findings from the focus groups are consistent with previous studies that found interdisciplinary decision-making improved care in the management of residents with medication problems and behavioural difficulties (pain- and dementia-related) in high level LTC facilities [20] and at end of life [21]. In the focus groups, health professionals worked together iteratively to reach the best approach to therapeutic management. Previous research has found

that ‘collective intelligence’ of more than one health professional working together outperforms a single health professional in diagnostic decision-making due to reduced human error (e.g. due to cognitive bias) and sharing of experience [22]. The current focus groups add that different perspectives based on scope of practice may diversify the range of factors under consideration and so contribute to a more holistic decision-making process. In particular, current findings echoed those previously in finding the scope of practice and expertise of community pharmacists to be appreciated in LTC [23].

In the current study, regardless of discipline, participants viewed clinical decision-making as a continuing process requiring regular monitoring and review, with due process in managing medications for people in their care just as important as the decision itself. There was an acceptance that any decision was tentative, pending review of the consequences, and that the balance between harm and benefit would alter over time in light of changes in clinical status and context. Previous work to develop a toolkit of heuristics to aid practitioners making end-of-life care decisions for people with dementia similarly encouraged an iterative process to medication management [24]. Similar to previous findings, participants also identified that the level of vulnerability and unpredictability in trajectory may be higher for those with advanced dementia [25], adding impetus for close monitoring.

A finding well documented in the literature, participants expressed the difficulty of broaching the subject of deprescribing with families is it confronted families with their loved one’s deteriorating health [26]. However, a qualitative study found older adults and carers were open to the idea of medication deprescribing if they understood why this was being recommended [27]. Consistent with previous results [13, 12], maintaining a therapeutic relationship with the resident was of paramount importance. Participants in the current study reported that having an established trusting relationship with families provided a foundation for helping them to understand that deprescribing might be the best course of action for their loved one’s wellbeing.

While participants acknowledged that there was widespread advocacy in relation to initiating and deprescribing certain medicines, they were surprisingly cautious in following this advice. Most participants agreed with recommendations stating appropriate antibiotic use is to improve symptoms associated with infection [1]; however, considerations relating to duty of care towards the family were sometimes considered to ‘trump’ recommendations where families could not be persuaded not to use antibiotics and these posed minimal risk of harm. Considerations of this kind might partly explain why, while many clinicians see antibiotics as futile treatment and unlikely to improve symptoms at later stages of dementia, results of a study found 40% of LTC residents with advanced dementia receiving them in the last two weeks of life [28].

Given promotion of the need to actively manage symptoms, particularly pain in people with advanced dementia in the literature [29], it was surprising how cautious participants were to commence opioids. Similarly, a previous study found GPs feeling uneasy about prescribing opioids, even when the indication was appropriate [13]. Whilst participants did indeed consider symptom management important, they equally stressed the importance of making careful selections regarding opioid type and dosage, and monitoring adverse effects.

Participants reported being conscious of a trend among some practitioners to deprescribe medications in LTC residents with a dementia diagnosis indiscriminately, without proper assessment. Recent guidelines and recommendations encourage the process of deprescribing long-term medicines in patients with limited life expectancy [30], but participants described the rapid functional/cognitive decline in their patients when AChEIs were stopped. Previous survey studies found physicians were less likely to recommend discontinuation of AChEIs if there was any indication they stabilised cognition, reduced challenging behaviours or maintained patient function [31, 6]. If discontinuation is attempted, clinicians need to taper the dose slowly, and monitor for signs of cognitive/functional decline. Similarly, many participants saw continuing medications in LTC residents with advanced dementia as a reasonable course of action, instead of running the risk of adverse withdrawal effects from deprescribing.

As in some previous research, participants in the current study were also hesitant to deprescribe medications in frail older populations due to limited evidence to support this practice [26]. They expressed concern on how to best approach this process, and uncertainty around its consequences i.e. medication withdrawal effects. However, participants seemed more confident in deprescribing lipid-lowering agents due to recent evidence supporting the safety and improvement in quality of life and cognition in older patients with limited life expectancy [32].

Quality evidence in the form of clinical trials to support deprescribing practices for people with advanced dementia, while growing is still limited [33]. Most studies looking to test the safety of deprescribing of medicines and the barriers and enablers of this process are focused on the broader context of older adults with normal life expectancy [34]. These results are not transferrable to LTC residents with advanced dementia who have a limited life expectancy and goals are focused on a palliative approach.

Consistent with earlier findings [35], participants in the current study saw single disease guidelines of limited usefulness for multi-morbid frail LTC residents with advanced dementia. Guidelines were seen as helpful when a particular drug or comorbidity fell outside of their usual scope of practice, but viewed as only one contribution towards a complex management approach involving other health professionals.

Participants in the current study empathised with less experienced health professionals who might be reluctant to leave themselves open to blame when negative consequences followed a decision to deprescribe. Consistent with past findings [36], participants acknowledged the risk of liability as a barrier to deprescribing. Participants emphasised the decision to continue a medication in a person with advanced dementia should be considered an active decision with the same responsibility inherent in deprescribing, given the increased risk of adverse drug reactions [8].

Limitations

Study findings are limited by the risk of bias due to group effects common to all focus groups, including the potential for participants perceived to be of greater authority to influence the responses of other participants (i.e. a 'halo' effect) [37]. Also, responses may have been constrained by continuing professional relationships with the facilitators. To reduce this risk, the facilitator began by stating that the purpose of the groups was to tease out equivocal considerations rather than reach consensus. Moreover, the CIT enabled probing about decision-making which would have made bland agreement difficult [17]. Though DD has a non-clinical background this offered the opportunity to minimise the risk of clinical biases during analyses. Results of the study may also be limited by focusing on only certain medication types, use of only one focus group for each, and consideration of only two vignettes on each occasion. While discussion on vignettes were discussed till exhaustion by participants, and resident parameters were altered to see if decision making would change, it is nonetheless noted that results will not be transferrable to disparate cases. Finally, the hypothetical nature of the vignettes meant that our method omitted contributions that would be forthcoming if participants were discussing residents who they had real-world knowledge of.

Conclusion

The current study highlights the need for a team approach to medication-related decision-making for LTC residents with advanced dementia, which should include the person with dementia where possible and their family, as well as health professionals from a range of disciplines. Consensus on the resident's goals of care should be viewed as the starting point for all decisions. Findings also suggest that decision-making should be viewed as carrying similar responsibility and requirements for justification and review regardless of whether initiating, continuing or deprescribing medications. Further evidence is needed to guide the safety of medication changes, especially deprescribing in palliative care residents nearing the end of life i.e. LTC residents with advanced dementia.

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Conflicts of interest None.

Authors' contributions DD contributed to the development of the research questions, conducted the search, analysed the articles, and drafted the manuscript. TL and MA contributed to the development of research questions, analysis of data, and helped to draft the manuscript. AB and PD contributed to analysis of data. All authors contributed to and approved the final manuscript.

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Appendix 7. Invitation Letter – Study 3

Approach via team networks

Dear (Participant name),

I would like to invite you to participate in a study aimed at understanding the views of accredited pharmacists who provide or have provided the Residential Medication Management Review (RMMR) service to aged care residents. Through your participation we hope to understand what is working well in this established process and what areas may need improvement. The aim of this study is to inform a future intervention to improve the use of the RMMR for aged care residents with advanced dementia in particular.

Participation would involve an interview of approximately 30 minutes to take place either via telephone or face-to-face at the University of Technology Sydney (UTS), as you prefer. This study has been reviewed and received ethics approval through the Human Research Ethics Committee for UTS. The work will contribute towards my PhD, which is supervised by Drs Tim Luckett and Sasha Bennett and Profs Patricia Davidson and Meera Agar.

I attach a participant information and consent form with more information about the project.

I would of course be happy to answer any questions you may have.

I look forward to hearing from you.

Sincerely,

Domenica Disalvo
PhD Candidate
Faculty of Health, UTS

Tel: [redacted]

Email: [redacted]@student.uts.edu.au

Email approach from peak bodies to their membership via email circulars

UTS interview study on RMMRs

Accredited pharmacists who provide or have provided the Residential Medication Management Review (RMMR) service are invited to participate in an interview study aimed at informing a future intervention to improve use of RMMRs for aged care residents with advanced dementia.

Interviews will take approximately 30 minutes and can occur either via telephone or face-to-face at the University of Technology Sydney (UTS) according to preference.

For more information, please contact Domenica Disalvo via telephone ( ) or email (@student.uts.edu.au)

Appendix 8. Invitation Letter – Study 4

UNIVERSITY OF TECHNOLOGY, SYDNEY

PRINTED ON UTS (and/or joint) LETTERHEAD

INVITATION LETTER

'Multidisciplinary panel exploring dilemmas in deciding the appropriateness of potentially inappropriate medications for people with advanced dementia: a critical incident analysis'

Dear ……

I would like to invite you to participate in a multidisciplinary panel aimed at exploring the perspectives of health professionals on the use of medications commonly identified as potentially inappropriate in aged care residents with advanced dementia. Through your participation, we hope to understand the variables influencing the decisions made around the initiation, continuation and withdrawal of these medications in different clinical contexts. These considerations will be used to guide health professionals with regards to quality use of medicines for people with advanced dementia.

You have been asked to participate because of your experience in providing to care for people with advanced dementia, especially in relation to their medication management.

Your participation will take three hours spread over four weeks, to fill out one survey and participate in 5 focus groups related to medications of concern for use in aged care residents with advanced dementia. Focus groups will be conducted via teleconference.

This study has been reviewed and received ethics approval through the Human Research Ethics Committee for UTS. The work will contribute towards my PhD, which is supervised by Drs Tim Luckett and Sasha Bennett and Profs Patricia Davidson and Meera Agar.

I attach a participant information sheet with more information about the project. If you would like to take part, please sign the consent form and return via scan/email or post to the address below.

I would of course be happy to answer any questions you may have.

I look forward to hearing from you.

Sincerely,

Domenica Disalvo
PhD Candidate
Centre for Cardiovascular and Chronic Care
Faculty of Health, UTS
Tel:
Email: @student.uts.edu.au

Appendix 9. Participant Information Sheet and Consent Form – Study 3

UNIVERSITY OF TECHNOLOGY, SYDNEY

INFORMATION SHEET

'Improving the safety and quality of prescribing for aged care residents with advanced dementia: In-depth interviews with pharmacists who provide the Residential Medication Management Review'

WHO IS DOING THE RESEARCH?

This research is conducted by a UTS doctorate student, Domenica Disalvo, as part of her degree. Project supervisors include Dr. Tim Luckett, Associate Professor Meera Agar, Professor Patricia Davidson and Dr. Alexandra (Sasha) Bennett.

WHAT IS THIS RESEARCH ABOUT?

The Residential Medication Management Review (RMMR) initiative is federally funded and available to all residents living in aged care to improve the safety and quality of pharmacological management. Aged care residents with advanced dementia are especially vulnerable to adverse effects from medications and prescribing that is not consistent with a palliative approach to care.

Interviews with pharmacists will be conducted in order to document current practice of the RMMR and barriers/facilitators to its use for residents with advanced dementia, with the aim of informing a future intervention.

IF I SAY YES, WHAT WILL IT INVOLVE?

This research will involve your participation in an in-depth interview that will be focused on the RMMR. Interviews are expected to take a maximum of half an hour and can take place either face-to-face or via telephone, as preferred. Interviews will be recorded and later transcribed for analysis. Interviews will focus on interviewees' experience of conducting RMMRs and perceptions of what is working well and what areas can be improved in the process, with an emphasis on residents with advanced dementia. Scenarios which are given in interviews are hypothetical and there are no right or wrong answers.

ARE THERE ANY RISKS/INCONVENIENCE?

Questions in the interview are focused on your experience of RMMRs rather than personal issues so are unlikely to cause distress. However, interviewees will remain at liberty to choose not to answer any questions or to stop the interview should they wish to do so. Whilst the results from this research may be reported in journal articles or conference presentations, information collected from interviewees will be reported in such a way that they cannot be identified.

WHY HAVE I BEEN ASKED?

You are eligible to take part if you are an accredited pharmacist with experience conducting RMMRs.

DO I HAVE TO SAY YES?

Participation in this research is entirely voluntary.

WHAT WILL HAPPEN IF I SAY NO?

Refusal to take part will not influence your relationship with UTS.

IF I SAY YES, CAN I CHANGE MY MIND LATER?

If you change your mind, you will be at liberty to withdraw from the research at any time. You can request that any information you have provided be removed from the study, should you choose to do so.

WHAT IF I HAVE CONCERNS OR A COMPLAINT?

Concerns can be directed to the doctoral student (Email: [redacted]@student.uts.edu.au Ph: [redacted]), principal supervisor (Email: tim.luckett@uts.edu.au Ph: 02 9514 4861) or the Research Ethics Officer on 02 9514 9772, quoting this number 2014000687

UNIVERSITY OF TECHNOLOGY, SYDNEY

CONSENT FORM

I _____ agree to participate in the research project *'Improving the safety and quality of prescribing for aged care residents with advanced dementia: In-depth interviews with pharmacists who provide the Residential Medication Management Review'* (UTS HREC approval reference number 2014000687) being conducted by Domenica Disalvo ([redacted]@student.uts.edu.au ph: [redacted]) of the University of Technology Sydney as part of her degree Doctor of Philosophy: Health.

I understand that the purpose of this study is to inform a future intervention to improve the use of the Residential Medication Management Review (RMMR) for residents with advanced dementia.

I understand that I have been asked to participate in this research because I am an accredited pharmacist who provides or has provided in the past the RMMR service. My participation in this research will involve one in-depth interview, expected to take a maximum of half an hour which can take place either face-to-face or via telephone, as I prefer. I understand that interviews will be recorded and later transcribed for analysis.

Questions in the interview are focused on your experience of RMMRs rather than personal issues so are unlikely to cause distress. Scenarios are hypothetical and there are no right or wrong answers. However, I understand that I remain at liberty to choose not to answer any questions or to stop the interview should you I wish to do so.

I am aware that I can contact Domenica Disalvo, her supervisor Dr. Tim Luckett or the UTS Ethics Officer if I have any concerns about the research. I also understand that I am free to withdraw my participation from this research project at any time I wish, without consequences, and without giving a reason.

I agree that Domenica Disalvo has answered all my questions fully and clearly.

I agree that the research data gathered from this project may be published in a form that does not identify me in any way.

_____ ____/____/____
Signature (participant)

_____ ____/____/____
Signature (researcher or delegate)

NOTE:
This study has been approved by the University of Technology, Sydney Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research which you cannot resolve with the researcher, you may contact the Ethics Committee through the Research Ethics Officer (ph: +61 2 9514 9772 Research.Ethics@uts.edu.au) and quote the UTS HREC reference number. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Appendix 10. Participant Information Sheet and Consent Form – Study 4

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PRINTED ON UTS (and/or joint) LETTERHEAD

INFORMATION SHEET

'Multidisciplinary panel exploring dilemmas in deciding the appropriateness of potentially inappropriate medications for people with advanced dementia: a critical incident analysis'
(UTS APPROVAL NUMBER)

WHO IS DOING THE RESEARCH?
This research is conducted by a UTS doctorate student, Domenica Disalvo, as part of her degree. Project supervisors include Dr. Tim Luckett, Professor Meera Agar, Professor Patricia Davidson and Dr. Alexandra (Sasha) Bennett.

WHAT IS THIS RESEARCH ABOUT?
A multidisciplinary approach to care is considered the gold standard for people with advanced dementia living in aged care, especially when decisions need to be made on their medication regimen. The research involves focus groups with health professionals from a range of disciplines and specialties aimed at gaining their perspectives on the initiation, continuation and withdrawal of medications deemed potentially inappropriate for use in people with advanced dementia. We hope to identify the factors influencing decisions as to whether prescribing of these medications is appropriate or not in different clinical contexts. These considerations will be used to inform guidance for health professionals with regard to quality use of medicines for people with advanced dementia

IF I SAY YES, WHAT WILL IT INVOLVE?
This research will involve filling out a questionnaire asking your age, gender, profession, number of years in occupation, and your experience in making medication decisions in advanced dementia. Questionnaires will also involve five vignettes related to medications of concern in advanced dementia. Participants will be ask to write down three considerations which come to mind in relation to each vignette. Participants will then be asked to partake in focus groups for each medication dedicated to exploring 'dilemmas' in decision-making. The questionnaire and focus groups will take a maximum of three hours spread over six weeks. Focus groups will be recorded and later transcribed.

ARE THERE ANY RISKS/INCONVENIENCE?
There are no right or wrong responses to questions, focus groups are aimed at capturing differing views from various disciplines and specialties rather than at reaching agreement. Whilst the results from this research may be reported in journal articles or conference presentations, information collected from interviewees will be reported in such a way that they cannot be identified.

WHY HAVE I BEEN ASKED?
You are eligible to take part if you are a health professional who has experience of medication-related decision-making for people with advanced dementia.

DO I HAVE TO SAY YES?
Participation in this research is entirely voluntary.

WHAT WILL HAPPEN IF I SAY NO?
Refusal to take part will not influence your relationship with UTS.

IF I SAY YES, CAN I CHANGE MY MIND LATER?
If you change your mind, you will be at liberty to withdraw from the research at any time. You can request that any information you have provided be removed from the study, should you choose to do so.

WHAT IF I HAVE CONCERNS OR A COMPLAINT?
Concerns can be directed to the doctoral student (Email: [redacted]@student.uts.edu.au Ph: [redacted]), principal supervisor (Email: tim.luckett@uts.edu.au Ph: 02 9514 4861) or the Research Ethics Officer on 02 9514 9772, quoting this number XXXXXXXXXXXX

UNIVERSITY OF TECHNOLOGY, SYDNEY

CONSENT FORM

I _____ agree to participate in the research project *'Multidisciplinary panel exploring dilemmas in deciding the appropriateness of potentially inappropriate medications for people with advanced dementia: a critical incident analysis'* (ETH16-0291) being conducted by Domenica Disalvo ([redacted]@student.uts.edu.au ph: [redacted]) of the University of Technology, Sydney as part of her degree Doctor of Philosophy: Health.

I understand that the purpose of this study is to explore perspectives of health professionals from different disciplines regarding the dilemmas associated with the starting, continuing or withdrawing medications commonly regarded as potentially inappropriate in aged care residents with advanced dementia.

I understand that I have been asked to participate in this research because I am a health professional with experience of contributing to medication-related decisions for aged care residents with advanced dementia. My participation in this research will involve filling out one questionnaire via email, and participating in five focus groups, taking three hours in total over four weeks, which will take place via telephone. I understand that focus groups will be recorded and later transcribed.

I am aware that I can contact Domenica Disalvo, her supervisor Dr. Tim Luckett or the UTS Ethics Officer if I have any concerns about the research. I also understand that I am free to withdraw my participation from this research project at any time I wish, without consequences, and without giving a reason.

I agree that Domenica Disalvo has answered all my questions fully and clearly.

I agree that the research data gathered from this project may be published in a form that does not identify me in any way.

_____ ____/____/____
Signature (participant)

_____ ____/____/____
Signature (researcher or delegate)

NOTE:
This study has been approved by the University of Technology, Sydney Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research which you cannot resolve with the researcher, you may contact the Ethics Committee through the Research Ethics Officer (ph: +61 2 9514 9772 Research.Ethics@uts.edu.au) and quote the UTS HREC reference number. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Appendix 11. Interview Guide – Study 3

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QUESTIONS GUIDE

'Improving the safety and quality of prescribing for aged care residents with advanced dementia: In-depth interviews with pharmacists who provide the Residential Medication Management Review'

Introductory questions:

- Can you please talk about your experience with the Residential Medication Management Review (RMMR) initiative?
    - Follow-up: Have you conducted RMMRs yourself, and if so, roughly how many?

2. Are there ways in which you think the RMMR process could be improved?
    - For example, would you prefer there to be a national standard RMMR template? Why/why not?

3. How is the decision-making in an RMMR shared between the pharmacist and other health professionals?
    - What (if any) challenges do pharmacists face when dealing with other health professionals when preparing for, conducting or reporting an RMMR and knowing whether your recommendations have been acted on?
    - Do you have any ideas on how communication between pharmacists and other health professionals may be improved?

4. What information might be used when making decisions in the RMMR?
    - What (if any) information would be helpful to complete an RMMR but is difficult to source?

5. What (if any) special considerations are there when conducting an RMMR for an individual with advanced dementia requiring a palliative approach?

6. Are there any other Quality Use of Medicines (QUM) activities in aged care facilities apart from RMMRs that you think are important? (e.g. Medication Advisory Committee)

7. Is there anything else you want to mention that hasn't been covered?

8. Our sampling uses a snowball method. Are there any other pharmacists you know of who you think might be interested in participating in an interview? We are interested in talking both to senior pharmacists who have a high-level policy perspective on the RMMR and more junior pharmacists who are currently conducting RMMRs regularly.

Domenica Disalvo
PhD Candidate
Faculty of Health, University of Technology Sydney
[redacted]
[redacted]@student.uts.edu.au

Appendix 12. Focus Group Guide – Study 4

UNIVERSITY OF TECHNOLOGY, SYDNEY

FOCUS GROUP GUIDE

'Multidisciplinary perspectives in dilemmas in deciding the appropriateness of medications for people with advanced dementia: a critical incident analysis'

- Facilitator will welcome participants and thank them for agreeing to participate.
- For the first meeting, the facilitator and note-taker will introduce themselves to the panel. Participants will be encouraged to introduce themselves to the rest of the group.
- Facilitator will explain the purpose of the focus groups, repeating information given in the information sheet.
- Ask the group if there are any questions before we get started, and address those questions.
- Facilitator will seek permission to audio-record the focus group and explain that she will tell participants when the recorder is switched on and off.
- With participants' permission, turn on tape recorder.
- Facilitator reads through the vignette based on the chosen medication of interest.
- Participants will then be asked to expand on the three issues they have previously highlighted as important considerations.
- Participants will be encouraged to discuss other experiences they have had in relation to this medication where similar or different issues occurred
- Prompts:
    - Whether the medication in question was/should have been started, continued or withdrawn
    - Reasons for that decision
    - Contextual considerations needing to be taken into account
    - Lessons for the future

Materials and supplies for focus groups

- Meeting room with conference telephone
- Focus Group Discussion Guide for facilitator
- 1 Audio recording device
- Extra batteries for recording device
- Notebook and pen for note-taking

Appendix 13. Vignettes related to medication types and accompanying questions – Study 4

Lipid-lowering agents (vignette 1)

VIGNETTE 1

NAME Jeffrey Conway **AGE** 79 **SEX** Male

CURRENT CONDITIONS

Multi-infarct dementia, Parkinson's disease, dry eye condition, VitB12 deficiency, hypertension, peripheral vascular disease, osteoarthritis, history of falls, urinary incontinence, constipation.
Stroke 18 months ago with a residual mild left hemiparesis.
Underwent hip replacement surgery 1 year previously.

MEDICATIONS

Amlodipine 5 mg Tab – 1 qd mane
Telmisartan 80 mg Tab – 1 qd mane
Solifenacin 5 mg Tab – 1 qd mane
Clopidogrel 75 mg – 1 qd mane
Atorvastatin 10 mg Tab – 1 qd mane
Sertraline 100 mg – 1 qd mane
Galantamine hydrobromide SR 16 mg Tab – 1 qd mane
Carbidopa – Levodopa 100 mg/25 mg Tab – 2 qd mane
Vitamin D3 1000iu – 1 qd mane
Movicol – 1 qd bd
Xalacom eye drops – 1 nocte BE
Refresh Tears Plus 0.5% eye drops – 1 qid BE
Buprenorphine transdermal patch 5mcg/hour – 1 weekly

FUNCTIONING

AKPS 50 (considerable assistance & frequent medical care)
FAST 7a (severe dementia – speaks 5-6 words during day)

CLINICAL HISTORY

Jeffrey Conway is a 79 year old gentleman who has only newly moved to this facility and has a new GP. Jeffrey likes to have his cup of tea in the morning while listening to his favourite radio program. For over fifty years, Jeffrey worked as a fisherman and likes to watch fishing shows on tv.

From the records, it seems that the lipid-lowering agent he is receiving has been prescribed for over 10 years at the same dose, but the situation when it was commenced is unknown.

There is no record in Jeffrey's files of last measured serum triglycerides and cholesterol. His wife is very worried about him having another stroke. He has been lethargic for the last two weeks.

QUESTIONS

1. Why do you think the lipid-lowering agent might have been indicated?
2. Why might the GP still be prescribing a lipid-lowering agent?
3. Do you need any further information to decide the appropriateness of the lipid-lowering agent for Jeffrey?
4. How would you apply the risk to benefit ratio to this scenario?
5. Are there any risks of interaction with other medications?
6. Are there any alternative approaches?
7. What are the key clinical features that have guided your decisions?
8. If it was decided that medication were to be ceased, how would you broach the subject with Jeffrey's wife?
9. What change in variables would alter the risk/benefit ratio for Jeffrey?

Lipid-lowering agents (vignette 2)

VIGNETTE 2

NAME Nicholas Raftopolous **AGE** 75 **SEX** Male

FUNCTIONING

AKPS 50 (considerable assistance & frequent medical care)

FAST 6c (moderately severe dementia – needs help toileting

CURRENT CONDITIONS

Cardiovascular disease, hyperlipidaemia, hypertension, kidney disease, diabetes mellitus type 2, angina.

Heart attack in 2009.

MEDICATIONS

Metoprolol 25mg Tab – 1 qd mane

Irbesartan 150mg Tab – qd

Aspirin - 100mg Tab – 1 qd with food/water

Metformin hydrochloride 1mg Tab – 1 qd before breakfast

Isosorbide dinitrate 5mg Tab – 2 tab every 2 hrs or as necessary PRN

Simvastatin 10mg Tab – 1 qd nocte

CLINICAL HISTORY

Nicholas migrated to Australia from Greece in his early 20's and ran a profitable fruit and vegetable shop with his family for many years. Nicholas has been living at the facility for a year, and has finally become accustomed to living without his wife Alexandra always present. Whilst Alexandra was unhappy placing Nicholas in an aged care facility, it was becoming harder to look after him at home with their children living far away and unable to help regularly.

Nicholas enjoys sitting outside in the garden, and has his mid-morning coffee outside with Alexandra when she comes to visit. Nicholas enjoys the sweets that Alexandra brings regularly. There have been times when Nicholas' BSL level have been between 12 and 16.

Nicholas's GP has been asked to review him because of his ongoing unstable angina. Walking to the dining room seems to trigger these episodes - around three a week. Nicholas has also been complaining of the number of tablets he has to take.

QUESTIONS

1. Would there be merit in stopping the lipid-lowering agent?
2. Why might the GP still be prescribing the lipid-lowering agent?
3. Do you need any further information to decide the appropriateness of a lipid-lowering agent for Nicholas?
4. How would you weigh up the risk/benefit ratio in this scenario?
5. Are there any alternative approaches that could be used?
6. Are there any risks of interaction with other medications?
7. What change in variables would alter the risk/benefit ratio for Nicholas?

Acetylcholinesterase inhibitors (vignette 1)

VIGNETTE 1

NAME Jeffrey Conway **AGE** 79 **SEX** Male

CURRENT CONDITIONS

Multi-infarct dementia, Parkinson's disease, dry eye condition, VitB12 deficiency, hypertension, peripheral vascular disease, osteoarthritis, history of falls, urinary incontinence, constipation.
Stroke 18 months ago with a residual mild left hemiparesis.
Underwent hip replacement surgery 1 year previously.

MEDICATIONS

Amlodipine 5 mg Tab – 1 qd mane

Telmisartan 80 mg Tab – 1 qd mane

Solifenacin 5 mg Tab – 1 qd mane

Clopidogrel 75 mg – 1 qd mane

Atorvastatin 10 mg Tab – 1 qd mane

Sertraline 100 mg – 1 qd mane

Galantamine hydrobromide SR 16 mg Tab – 1 qd mane

Carbidopa – Levodopa 100 mg/25 mg Tab – 2 qd mane

Vitamin D3 1000iu – 1 qd mane

Movicol – 1 qd bd

Xalacom eye drops – 1 nocte BE

Refresh Tears Plus 0.5% eye drops – 1 qid BE

Buprenorphine transdermal patch 5mcg/hour – 1 weekly

FUNCTIONING

AKPS 50 (considerable assistance & frequent medical care)

FAST 7a (severe dementia – speaks 5-6 words during day)

CLINICAL HISTORY

Jeffrey Conway is a 79 year old gentleman who has only newly moved to this facility and has a new GP. Jeffrey likes to have his cup of tea in the morning while listening to his favourite radio program. For over fifty years, Jeffrey worked as a fisherman and likes to watch fishing shows on tv.

From the records, it seems that the lipid-lowering agent he is receiving has been prescribed for over 10 years at the same dose, but the situation when it was commenced is unknown.

There is no record in Jeffrey's files of last measured serum triglycerides and cholesterol. His wife is very worried about him having another stroke. He has been lethargic for the last two weeks.

QUESTIONS

1. Why do you think the lipid-lowering agent might have been indicated?
2. Why might the GP still be prescribing a lipid-lowering agent?
3. Do you need any further information to decide the appropriateness of the lipid-lowering agent for Jeffrey?
4. How would you apply the risk to benefit ratio to this scenario?
5. Are there any risks of interaction with other medications?
6. Are there any alternative approaches?
7. What are the key clinical features that have guided your decisions?
8. If it was decided that medication were to be ceased, how would you broach the subject with Jeffrey's wife?
9. What change in variables would alter the risk/benefit ratio for Jeffrey?

Acetylcholinesterase inhibitors (vignette 2)

VIGNETTE 2

NAME Nicholas Raftopolous **AGE** 75 **SEX** Male

FUNCTIONING

AKPS 50 (considerable assistance & frequent medical care)

FAST 6c (moderately severe dementia – needs help toileting

CURRENT CONDITIONS

Cardiovascular disease, hyperlipidaemia, hypertension, kidney disease, diabetes mellitus type 2, angina.

Heart attack in 2009.

MEDICATIONS

Metoprolol 25mg Tab – 1 qd mane

Irbesartan 150mg Tab – qd

Aspirin - 100mg Tab – 1 qd with food/water

Metformin hydrochloride 1mg Tab – 1 qd before breakfast

Isosorbide dinitrate 5mg Tab – 2 tab every 2 hrs or as necessary PRN

Simvastatin 10mg Tab – 1 qd nocte

CLINICAL HISTORY

Nicholas migrated to Australia from Greece in his early 20's and ran a profitable fruit and vegetable shop with his family for many years. Nicholas has been living at the facility for a year, and has finally become accustomed to living without his wife Alexandra always present. Whilst Alexandra was unhappy placing Nicholas in an aged care facility, it was becoming harder to look after him at home with their children living far away and unable to help regularly.

Nicholas enjoys sitting outside in the garden, and has his mid-morning coffee outside with Alexandra when she comes to visit. Nicholas enjoys the sweets that Alexandra brings regularly. There have been times when Nicholas' BSL level have been between 12 and 16.

Nicholas's GP has been asked to review him because of his ongoing unstable angina. Walking to the dining room seems to trigger these episodes - around three a week. Nicholas has also been complaining of the number of tablets he has to take.

QUESTIONS

1. Would there be merit in stopping the lipid-lowering agent?
2. Why might the GP still be prescribing the lipid-lowering agent?
3. Do you need any further information to decide the appropriateness of a lipid-lowering agent for Nicholas?
4. How would you weigh up the risk/benefit ratio in this scenario?
5. Are there any alternative approaches that could be used?
6. Are there any risks of interaction with other medications?
7. What change in variables would alter the risk/benefit ratio for Nicholas?

Antibiotics (vignette 1)

VIGNETTE 1

NAME Linda Price **AGE** 78 **SEX** Female

CURRENT CONDITIONS

Alzheimer's dementia, cataracts – bilateral, glaucoma, reduced hearing, ischaemic heart disease, vitamin B12 deficiency, dermatitis, risk of falls, confusion, incontinent – both, constipation, GORD, dysphagia, skin cancers, UTIs, cellulitis – legs, conjunctivitis.

*Modified softened diet, thickened fluids

MEDICATIONS

Lactulose oral liquid 10g/15mL – 20mL bd

Lansoprazole dissolvable Tab 15 mg – 1qd

Ural – 1 sachet qd

Buprenorphine transdermal patch 5mcg/hour – 1 qw

Paracetamol liquid 240mg/5mL mg – 20mL every 4-6 hrs (max 80mL/day)

Betamethasone valerate 0.1% cream – Top, qd

Latanoprost 0.005% eye-drops – 1 drop in effected eye, qd

FUNCTIONING

AKPS 20 (totally bedfast and requiring extensive nursing care by professionals and/or family)

FAST 7e (severe dementia – can no longer smile)

CLINICAL HISTORY

Linda Price is an 86 year old woman who was admitted to the aged care facility one year ago. She came to the nursing home using a wheelchair and needing considerable assistance in personal care.

In the last two months her health has rapidly declined, she has trouble swallowing and is now completely immobile. She has been reviewed today and has suspected right lower lobe pneumonia.

There is no evidence of a discussion for an Advanced Care Plan (ACP) with the family.

QUESTIONS

1. What approach to medication management would you take for Linda?
2. What are the key clinical features that have guided your decisions?
3. How would you apply the risk to benefit ratio to this scenario?
4. What would be the role of antibiotic use for Linda?
5. Do you need any further information to decide the appropriateness of the antibiotic use for Linda?
6. Does location play a role in the medication choices of antibiotics?
7. Does the Advanced Care Plan (ACP) help in this situation?
8. Are there any risks of interaction with other medications?
9. Are there any alternative approaches?
10. What change in variables would alter the risk/benefit ratio for Linda?
11. Is there anything else you want to change in Linda's medication list?
12. What other health professionals can support antibiotic use/choices? E.g. pharmacists, wound specialist, infection control nurse, infectious disease specialist.

Antibiotics (vignette 2)

VIGNETTE 2

NAME Conrad Murray **AGE** 68 **SEX** Male

FUNCTIONING

AKPS 50 (considerable assistance & frequent medical care)

FAST 6c (moderately severe dementia – needs help toileting

CURRENT CONDITIONS

Early onset Alzheimer's disease, constipation, asthma, arthritis.

MEDICATIONS

Soflax 25mg Tab – 2 tab qd

Calsource D – qd in water

Movicol – dissolve in water and drink Mon, Wed, Fri

Dulcolax supp 10mg – 1-2 supp qd PRN

Temazepam 10mg Tab – qd nocte PRN

Hydrozole 1% cream – Top bd, face, neck, groin PRN

Mometasone furoate (Elocon) lotion 1mg/g – Top, twice weekly to scalp

Diazepam 5mg Tab – 1 Tab qd nocte PRN

CLINICAL HISTORY

Conrad Murray practiced for over 40 years as a successful lawyer and judge. He is known for being very loud and jovial, and likes to socialise with the staff and other residents. In the last few weeks he has been uncharacteristically quiet, and doesn't want to participate in activities run in the afternoon, which is worrying his wife.

Conrad has developed delirium and has a urinary tract infection. Conrad used to sleep throughout the night, but is now quite unsettled and needs to be taken to the toilet multiple times throughout the night by nursing staff. He is at a high risk of falling during these walks.

His temperature has been monitored and he doesn't have a fever.

QUESTIONS

1. What approach to medication management would you take for Conrad?
2. What are the key clinical features that have guided your decisions?
3. How would you apply the risk to benefit ratio to this scenario?
4. What would be the role of antibiotic use for Conrad?
5. Do you need any further information to decide the appropriateness of the antibiotic use for Conrad?
6. Does location play a role in the medication choices of antibiotics?
7. Does the Advanced Care Plan (ACP) help in this situation?
8. Are there any risks of interaction with other medications?
9. Are there any alternative approaches?
10. What change in variables would alter the risk/benefit ratio for Conrad?
11. Is there anything else you want to change in Conrad's medication list?
12. What other health professionals can support antibiotic use/choices? E.g. pharmacists, wound specialist, infection control nurse, infectious disease specialist.

Opioid analgesics (vignette 1)

VIGNETTE 1

NAME Freya Robinson **AGE** 74 **SEX** Female

FUNCTIONING

AKPS 30 (almost completely bedfast)

FAST 7a (severe dementia – speaks 5-6 words during day)

CURRENT CONDITIONS

Alzheimer's disease, diabetes, hypertension, CVD, Arthritis, double incontinence, arthritis, hormonally responsive breast cancer with two single bone metastases (vertebra).

MEDICATIONS

Omeprazole 20mg Tab – 1 mane

Aspirin 100mg Tab – 1 mane

Metoclopramide 10mg Tab – 1 bd PRN

Metformin hydrochloride 1000mg Tab – 1 bd

Atorvastatin 20mg Tab – 1 nocte

Quetiapine fumarate 25mg Tab – 12.5mg nocte

Tamoxifen 20mg – 1 qd

Movicol sachet – 1 mane

TwoCal HN liquid – 40mL bd

Multivitamin – 1 mane

Vitamin D3 – 1 qd

CLINICAL HISTORY

Freya Robinson is a Sister from the local parish, who worked for many years as a science teacher and then later as a librarian at the affiliated girls school. When she first came to the dementia unit, she enjoyed sitting in the facility's lounge area and organising the books on the shelves. Her niece brings her daughter to visit every few weeks which Sister Robinson loves, as she enjoys reading through books together.

Sr. Robinson has a history of diabetes, HbA1c measured to be 7.5%, indicating inadequate glycaemic control. In the last few months, her dementia has progressed rapidly, and in the last week her health has deteriorated. Her AKPS has changed from 50 to 30. She is now completely bed bound and only partly verbal. She has been moaning and has stopped eating and drinking. Due to her bone metastases, she is likely to be in pain.

QUESTIONS

1. Do you think an opioid should be introduced? If so, why?
2. What concerns might the GP have in prescribing opioids to Freya?
3. How would you weigh up the risk/benefit ratio to this scenario?
4. Are there any risks of interaction with other medications?
5. If her behaviour settles with an opioid, would you adjust any other medications?
6. Would you adjust anything else in her medication regime?
7. Are there any alternative approaches to analgesia worth trying?
8. What are the key clinical features that have guided your decisions?
9. Do you need any further information to decide?
10. Are there any issues related to administration of medications?
11. Might the family have a view on this medication use?
12. Under what circumstances would the risk/benefit ratio change in this scenario?

Opioid analgesics (vignette 2)

VIGNETTE 2

NAME George Jansen **AGE** 90 **SEX** Male

FUNCTIONING

AKPS 40 (in bed more that 50% of the time)

FAST 7b (severe dementia – speaks only 1 word clearly)

CURRENT CONDITIONS

Lew Body dementia, leg ulcer, oedema – feet, constipation, dysphagia, depression, diabetes, peripheral vascular disease, renal impairment.

MEDICATIONS

Aspirin 100mg Tab – 1 mane

Atorvastatin 40mg Tab – 1 mane

Coloxyl with Senna Tab – 2 bd

Lactulose Syrup – 20ml bd

Paracetamol 500mg Tab – 2 qid

NSAID 200 mg Tab – 2 tab every 4-6 hrs PRN

Paracetamol 500mg-**codeine** 30mg Tab – 2 tab when severe pain PRN

Oxycodone hydrochloride 5 mg Tab – 1 tab every 6hrs PRN (prescribed at hospital)

CLINICAL HISTORY

Mr. Jansen is a 90 year old gentleman who is now being nursed in a water chair. The staff stated Mr. Jansen appears to be happy and comfortable. His wife, Patricia lives in another wing of the facility requiring lower level care, and she often comes and visits. He is happy to take his medications. Creatinine clearance is at 35mL/m.

Mr. Jansen was recently admitted to hospital for his leg ulcer. However he was not fit for the surgical procedure to correct arterial deficiency. Due to low sugar levels, his two diabetic medications were stopped as well as his antihypertensive medications.

Mr. Jansen was placed on panadeine forte and endone at the hospital.

QUESTIONS

1. What do you think of George's current pain regimen?
2. What might have been the decision-making process made by the hospital doctor?
3. How would you weigh up the risk/benefit ratio to this scenario?
4. What other information may be helpful for you to decide?
5. What other clinical situations would make the decision clearer?
6. Are there any other alternative approaches?
7. When would the risk/benefit change in this scenario?

Appendix 14. Participant Questionnaire – Study 4

UTS
UNIVERSITY OF TECHNOLOGY, SYDNEY

QUESTIONNAIRE

'Multidisciplinary perspectives in dilemmas in deciding the appropriateness of medications for people with advanced dementia: a critical incident analysis'

1. **What is your gender?**
   - ☐ Male
   - ☐ Female

2. **What is your age?**
   - ☐ 20 – 30
   - ☐ 31 – 40
   - ☐ 41 – 50
   - ☐ 51 – 60
   - ☐ Over 60

3. **What is your discipline?**
   - ☐ Medicine
   - ☐ Pharmacy
   - ☐ Nursing

   Please explain your specialty:_____

4. **How many years have you been practicing?**
   - ☐ < 5 years
   - ☐ 5 – 10
   - ☐ 11 – 20 years
   - ☐ > 20 years

5. **Have you had any participation in the Residential Medication Management Review (RMMR)?**
   - ☐ **Yes**
   - ☐ **No**

   If yes, please give details:_____

6. **Do you have experience in other activities related to decision-making on medication use in aged care residents with advanced dementia? E.g. case conferencing, prescribing**

Appendix 15. Ethics Approval Letter – Study 2 (IDEAL Project of which cross-sectional medication chart audit formed a sub-study)

From: Ethics Secretariat [Research.Ethics@uts.edu.au] Sent: Wednesday, 3 October 2012 2:46 PM To: Lynn Chenoweth Subject: Eth: HREC Approval Letter - UTS HREC 2012-367R

Dear Lynnette, Re: "IDEAL Project: Improving Dementia End of Life Care at Local Aged Care Facilities" [External Ratification: University of New South Wales Human Research Ethics Committee HREC approval - HC12455 - 4/9/12 to 3/9/2017] At its meeting held on 2/10/2012, the UTS Human Research Ethics Expedited Review Committee reviewed your application and I am pleased to inform you that your external ethics approval has been ratified. Your UTS approval number is UTS HREC REF NO. 2012-367R

You should consider this your official letter of approval. If you require a hardcopy please contact the Research Ethics Officer (Research.Ethics@uts.edu.au). Please note that the ethical conduct of research is an on-going process. The National Statement on Ethical Conduct in Research Involving Humans requires us to obtain a report about the progress of the research, and in particular about any changes to the research which may have ethical implications. This report form must be completed at least annually, and at the end of the project (if it takes more than a year). The Ethics Secretariat will contact you when it is time to complete your first report. You must also provide evidence of continued approval from the Human Research Ethics Committee you originally received approval from. I also refer you to the AVCC guidelines relating to the storage of data, which require that data be kept for a minimum of 5 years after publication of research. However, in NSW, longer retention requirements are required for research on human subjects with potential long-term effects, research with long-term environmental effects, or research considered of national or international significance, importance, or controversy. If the data from this research project falls into one of these categories, contact University Records for advice on long-term retention. If you have any queries about your ethics approval, or require any amendments to your research in the future, please do not hesitate to contact the Ethics Secretariat at the Research and Innovation Office, on 02 9514 9772. Yours sincerely, Professor Marion Haas Chairperson UTS Human Research Ethics Committee C/- Research & Innovation Office University of Technology, Sydney Level 14, Tower Building Broadway NSW 2007 Ph: 02 9514 9772 Fax: 02 9514 1244 Web: http://www.research.uts.edu.au/policies/restricted/ethics.htm UTS CRICOS Provider Code: 00099F

Appendix 16. Ethics Approval Letter – Study 3

Initial approval letter

From: Research.Ethics@uts.edu.au [mailto:Research.Ethics@uts.edu.au]
Sent: Tuesday, 30 June 2015 11:21 AM
To: [redacted]@student.uts.edu.au; Tim Luckett; Research Ethics
Subject: HREC Approval Granted

Dear Applicant,
Thank you for your response to the Committee's comments for your project titled, "Improving medication management in aged care residents with advanced dementia - interviews with pharmacists who provide the Residential Medication Management Review (RMMR)". Your response satisfactorily addresses the concerns and questions raised by the Committee who agreed that the application now meets the requirements of the NHMRC National Statement on Ethical Conduct in Human Research (2007). I am pleased to inform you that ethics approval is now granted.
Your approval number is UTS HREC REF NO. 2014000687 Approval will be for a period of five (5) years from the date of this correspondence subject to the provision of annual reports.

Please note that the ethical conduct of research is an on-going process. The National Statement on Ethical Conduct in Research Involving Humans requires us to obtain a report about the progress of the research, and in particular about any changes to the research which may have ethical implications. This report form must be completed at least annually from the date of approval, and at the end of the project (if it takes more than a year). The Ethics Secretariat will contact you when it is time to complete your first report.
I also refer you to the AVCC guidelines relating to the storage of data, which require that data be kept for a minimum of 5 years after publication of research. However, in NSW, longer retention requirements are required for research on human subjects with potential long-term effects, research with long-term environmental effects, or research considered of national or international significance, importance, or controversy. If the data from this research project falls into one of these categories, contact University Records for advice on long-term retention.

You should consider this your official letter of approval. If you require a hardcopy please contact Research.Ethics@uts.edu.au.

To access this application, please follow the URLs below:
* if accessing within the UTS network: http://rmprod.itd.uts.edu.au/RMENet/HOM001N.aspx
* if accessing outside of UTS network: https://remote.uts.edu.au , and click on "RMENet - ResearchMaster Enterprise" after logging in.
We value your feedback on the online ethics process. If you would like to provide feedback

please go to: http://surveys.uts.edu.au/surveys/onlineethics/index.cfm
If you have any queries about your ethics approval, or require any amendments to your research in the future, please do not hesitate to contact Research.Ethics@uts.edu.au.

Yours sincerely,
Professor Marion Haas
Chairperson
UTS Human Research Ethics Committee
C/- Research & Innovation Office
University of Technology, Sydney
E: Research.Ethics@uts.edu.au

Ref: E13

Amendment Approval Letter

From: Research.Ethics@uts.edu.au <Research.Ethics@uts.edu.au>
Sent: Tuesday, August 02, 2016 4:09 PM
To: [redacted]@student.uts.edu.au; Tim Luckett <Tim.Luckett@uts.edu.au>; Research Ethics <research.ethics@uts.edu.au>; Alexandra Bennett <Alexandra.Bennett@uts.edu.au>; Meera Agar <Meera.Agar@uts.edu.au>; Patricia Davidson <PatriciaMary.Davidson@uts.edu.au>
Subject: UTS HREC Approval - ETH16-0645

Dear Applicant

UTS HREC REF NO. ETH16-0645

The UTS Human Research Ethics Expedited Review Committee reviewed your amendment application for your project titled, "Improving medication management in aged care residents with advanced dementia: interviews with pharmacists who provide the Residential Medication Management Review (RMMR)", and agreed that the amendments meet the requirements of the NHMRC National Statement on Ethical Conduct In Human Research (2007). I am pleased to inform you that the Committee has approved your request to amend the protocol as follows:

1. Change of title - Improving medication management in aged care residents with advanced dementia: interviews with health professionals who provide the Residential Medication Management Review (RMMR); and
2. Change to recruitments of participants to extend the inclusion criteria from pharmacists to include other disciplines involved in providing RMMRs.

You should consider this your official letter of approval.

Appendix 17. Ethics Approval Letter – Study 4

HREC Approval Granted - ETH16-0291
Research.Ethics@uts.edu.au
Thu 05-May-16 2:53 PM
Tim Luckett; Domenica Disalvo; Research Ethics

Dear Applicant

Thank you for your response to the Committee's comments for your project titled, "Multidisciplinary perspectives of dilemmas in deciding the appropriateness of medications for people with advanced dementia: a critical incident analysis". Your response satisfactorily addresses the concerns and questions raised by the Committee who agreed that the application now meets the requirements of the NHMRC National Statement on Ethical Conduct in Human Research (2007). I am pleased to inform you that ethics approval is now granted.

Your approval number is UTS HREC REF NO. ETH16-0291
Approval will be for a period of five (5) years from the date of this correspondence subject to the provision of annual reports.

Your approval number must be included in all participant material and advertisements. Any advertisements on the UTS Staff Connect without an approval number will be removed.

Please note that the ethical conduct of research is an on-going process. The National Statement on Ethical Conduct in Research Involving Humans requires us to obtain a report about the progress of the research, and in particular about any changes to the research which may have ethical implications. This report form must be completed at least annually from the date of approval, and at the end of the project (if it takes more than a year). The Ethics Secretariat will contact you when it is time to complete your first report.

I also refer you to the AVCC guidelines relating to the storage of data, which require that data be kept for a minimum of 5 years after publication of research. However, in NSW, longer retention requirements are required for research on human subjects with potential long-term effects, research with long-term environmental effects, or research considered of national or international significance, importance, or controversy. If the data from this research project falls

You should consider this your official letter of approval. If you require a hardcopy please contact Research.Ethics@uts.edu.au.

To access this application, please follow the URLs below:
* if accessing within the UTS network: https://rm.uts.edu.au
* if accessing outside of UTS network: https://remote.uts.edu.au , and click on "RM6 - ResearchMaster Enterprise" after logging in.

We value your feedback on the online ethics process. If you would like to provide feedback please go to: http://surveys.uts.edu.au/surveys/onlineethics/index.cfm

If you have any queries about your ethics approval, or require any amendments to your research in the future, please do not hesitate to contact Research.Ethics@uts.edu.au.

Yours sincerely,

Professor Marion Haas
Chairperson
UTS Human Research Ethics Committee
C/- Research & Innovation Office
University of Technology, Sydney
E: Research.Ethics@uts.edu.au