

**Defining an 'older' patient in the context of therapeutic decision-making: perspectives of
Australian pharmacists and nurses**

Perspectives of Australian pharmacists and nurses on defining an older patient

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ABSTRACT

OBJECTIVE: To explore Australian nurses and pharmacist's perspectives on defining an 'older' patient in the context of decision-making around pharmacotherapy.

DESIGN: A qualitative study was conducted using semi-structured interviews, facilitated by a purpose-designed interview guide.

SETTING: Practitioners were recruited from the primary care setting (i.e., registered community pharmacists, registered community nurses, general practice nurses) and tertiary care setting (i.e., referral hospitals, specialist clinics).

PARTICIPANTS: Non-prescribing health professionals directly involved in medication management (i.e., nurses, pharmacists) with experience in caring for in older patients.

RESULTS: This exploratory study identified three key themes: 1) defining 'older' patients is difficult, given the heterogeneity of the population; 2) age is more than a number and therefore alone cannot be used for tailoring and managing a patient's treatment; and 3) a contemporary definition of an 'older' patient needs to be integrated into guidelines for treating aged patients. Overall, Australian nurses and pharmacists shared similar perspectives about defining an 'older' patient, favouring holistic assessments of individual patients.

CONCLUSIONS: Non-prescribing health practitioners, such as nurses and pharmacists, advocate an individualised approach, rather than a number-based approach, to decision-making in older patients.

KEY WORDS: Medication management, Pharmacotherapy, Aged/Older patients

KEY POINTS

- This study highlights that there is awareness and an effort from Australian pharmacists and nurses to perform a holistic and individualised type of care for older patients.
- Participants drew attention to the inadequacies of current clinical guidelines in addressing the specificities of older patients and recommended several improvements to increase their relevance.
- Given the suboptimal use of pharmacotherapy in older persons, more fully engaging these health practitioners in decision-making around treatment may assist doctors in providing more patient-centred pharmacotherapeutic care.
- The results draw attention to the need to develop a contemporary definition of an older patient and incorporate it into current guidelines to better assist healthcare professionals in making appropriate pharmacotherapy decisions and to minimise the potential for medication misuse.

INTRODUCTION

The World Health Organisation (WHO) estimates that by the year 2050 the proportion of the world's population over 60 years of age will increase to 22%, i.e., a total of around 2 billion.¹ As older persons are the greatest consumers of medications, the inappropriate use of medicines in this patient group has the potential for significant clinical and economic implications for the individual, families, and the healthcare system.^{2,3} It is apparent that, despite acknowledging the inter-individual variability of older patients, a degree of ageism appears to exist among health professionals caring for older patients.⁴⁻⁷ Singh and Bajorek observed that inappropriate prescribing (both over-treatment and under-treatment) is often detected in older patients, increasing the potential for adverse clinical outcomes.⁸ Indeed, age-bias has been identified in the under-treatment of angina, rheumatoid arthritis, and hypertension.⁵ It is reported that age-based decision-making in the use of high risk medications i.e. anticoagulants, may 'skew' a health care professionals risk-benefit assessment, resulting in potential patient harm such as stroke or even death.⁵ Furthermore, several studies highlight the risks of polypharmacy in older patients, including drug-drug interactions, anticholinergic burden as well as the use of potentially inappropriate medications (PIMs), which may result in hospitalisation and harm to patients including falls etc.⁹⁻¹²

The inappropriate use of medicines in this patient group may be attributed to the lack of a standard definition that appropriately characterises an older adult patient. Often, chronological age is used as a basis for making pharmacotherapeutic decisions, i.e. older patients are classified as those 65 years and older.¹³ Whilst age-based decision-making may be useful if it prompts practitioners to consider renal function, liver function and frailty, but becomes problematic when 'age' itself is used as a surrogate marker, such that clinicians assume all older patients will have these impairments and problems. Slack highlights that a definition comprising biological age that takes into account genetic and environmental factors, rather than chronological age may be more appropriate in making pharmacotherapeutic decisions.¹⁴ Singh and Bajorek report that biological age is often defined using

clinical markers, or biomarkers, which measure the rate or extent of aging.⁵ Some proposed biomarkers include skin elasticity, vital capacity, total protein and serum creatinine, and have been shown to change significantly with age.¹⁵⁻¹⁷ Biological age is more appropriate in addressing the heterogeneity observed within the older patient population, and may be more useful in providing individualised pharmacotherapeutic care to patients.¹⁸ A recent study by Krzyzaniak et.al. highlighted that, although medical prescribers in Australia recognised that there was a difference in perceiving someone as being an older patient and defining an older patient by their age, these doctors still defaulted to using an age-based approach in their initial decision-making.¹⁹ However, at this stage there is no accepted definition of an 'older' person that is able to estimate the aging process.

Given the increasing roles of non-prescribing health practitioners such as pharmacists and nurses in medication management and therapeutic recommendations, it is important to consider how they too define older patients in their approach to patient care.²⁰⁻²³ As key figures in the medication management process, both pharmacists and nurses have significant however differing roles to play in ensuring the appropriate use of medicines in older patients. Pharmaceutical care programs in community pharmacies related to diabetes, hypertension, asthma and hyperlipidaemia have been shown to improve quality of life, compliance with medications as well as decrease the potential for hospitalisation.²⁴⁻²⁸ Likewise, nurses practising in the hospital setting play an important role in ensuring patient safety in the use of medicines, ensuring appropriate administration, ordering, dosing and also patient compliance.²⁹ Jutel et.al. report that all nurses in their study influenced the prescription of medicines, from recommending treatments to the prescribing doctor, to actually writing prescriptions.³⁰ Whilst studies have canvassed pharmacists and nurses perspectives on their roles in caring for older patients, no studies, however, have explored pharmacist and nurse perspectives towards specifically and practically defining an 'older' adult patient.

Therefore, the aim of this study was to examine the perspectives of non-prescribing health professionals, i.e., specifically, nurses and pharmacists, in Australia on how to define an 'older'

patient, including the identification of clinically relevant features that characterised older patients in relation to decision-making around medicines i.e. decisions around the use of pharmacotherapy, initiation, cessation and dosing.

METHOD

Study design

A qualitative study, comprising semi-structured individual interviews with Australian nurses and pharmacists, was undertaken between February and March 2015. Approval for the conduct of this study was granted by the University of Technology Sydney (UTS) Human Research Ethics Committee (approval number: UTS HREC REF NO. 2014000645).

Setting and participants

Purposive sampling was used to recruit participants³¹ based on the following inclusion criteria:

- non-prescribing health professionals who were directly involved in medication management and/or decision-making around treatment selection (i.e., registered nurses, registered pharmacists) with ≥ 1 year of experience in caring for and managing treatment in older patients. This involved practitioners from the primary care setting (i.e., community pharmacists, community nurses, general practice nurses) and tertiary care setting (i.e., referral hospitals, specialist clinics).
- A primary care clinician refers to a doctor, dentist, nurse, allied health professional or a pharmacist. "This level of care may be provided in a general practice, community or allied health centre or Aboriginal and Community Controlled Health Services."³² Tertiary care refers to highly specialised care provided to inpatients in the hospital or clinic setting and includes complex medical or surgical procedures.³²
- practicing within the Sydney metropolitan area of New South Wales, Australia

Initially, the sampling frame comprised three geographical locations in Sydney, New South Wales (i.e., northern Sydney, inner west Sydney, western Sydney) that were known to have a larger population of older persons.³³ Following an online search (via telephone directories, e.g., Sydney White Pages, www.whitepages.com.au) a list of hospitals, general practices, and community pharmacies within these local areas was generated. Sites were then randomly selected from this list (via random number generation in Microsoft Excel™) to create a short-list of sites to be sent an invitational study flyer (via email, post, hand-delivery). Individuals who expressed an interest to participate were then provided the full study details; written informed consent was obtained from all participants. Interested individuals and sites were also invited to forward the study flyer on to colleagues (i.e., chain referral sampling) to broaden the sampling frame. The target sample size was based on the number of participants needed to achieve data saturation, and was set at a minimum of 6 participants in each subgroup (6 nurses, 6 pharmacists).³⁴ Guest et.al. highlighted that ‘12 interviews should suffice to attain data saturation and enable the development of meaningful themes and useful interpretations’.³⁵ Data saturation was defined as the point when no new information was being provided by participants that would add to or modify the findings.³⁶

Researcher characteristics

There was no relationship between the researchers and participants prior to the commencement of the study. Each member of the research team holds qualifications in pharmacy with experience in qualitative research. NK and SS are postgraduate researchers, and BB is a full-time academic pharmacist with significant experience in the conduct of qualitative studies. The researchers’ characteristics were not used to influence the outcomes of this research.

Data collection

For consistency, each interview was facilitated by one researcher (SS) using a purpose-designed interview guide. The interview guide comprised eight key open-ended questions, canvassing the clinically relevant characteristics (i.e., patient features and resources) that contributed to their decision-making for older patients:

- 1) How do you define an 'older' patient?
- 2) What are the limitations of using a chronological age-based definition of an older patient?
- 3) What if we take the number out of the equation, do you think that will help us to better optimise medication use in older patients?
- 4) What is different about older patients in terms of their clinical management?
- 5) What are the key issues that complicate clinical decision-making in older patients?
- 6) How helpful are the clinical practice guidelines in understanding the specific needs of an older patient?
- 7) What key resources do you use to help guide your decision-making in older patients?
- 8) What modifications would you like to see in these resources?

The interview guide was pilot-tested (2 nurses, 2 pharmacists, and 1 researcher) for question clarity and refined prior to use. The average interview time was approximately 20 minutes. Field notes were taken during the interviews. Keywords were used to facilitate preliminary coding.³⁷ Furthermore, these notes were used as a means for recording researcher reflections and as well to identify bias. Each interview was digitally (audio)-recorded and later transcribed verbatim by one researcher (SS). Each of the participants were provided the opportunity to comment on their transcripts and the themes derived from thematic analysis.

Data Analysis

The interview transcripts were thematically analysed, and all data was stored in Microsoft Word documents. This method of data analysis was chosen as it is regarded as a flexible approach that can

be widely used across research questions.^{38,39} Furthermore, thematic analysis allows for a rich and detailed description of the data set.^{38,39} Other theories, such as grounded theory are to be utilized in the next stage of the research, comprising a larger data set and involving a broader participant base. Manual inductive coding was used to identify relevant themes. This approach meant that the themes identified were data-driven and derived solely from the data collected. Meaningful statements from participants responses were categorised into key themes centred around the study objectives.⁴⁰ Two researchers (NK, BB) independently considered the data and compared themes to attain consensus and to ensure correct understanding and coding of data. A pragmatic approach was applied to the data analysis; which enabled the triangulation of data.⁴¹ In this study, triangulation referred to the use of:⁴²

- various data sources (data triangulation)
- several different researchers (investigator triangulation)

The study aimed to ensure a high level of trustworthiness and credibility by adhering to several elements of Lincoln and Guba's proposed criteria for trustworthiness, including the use of researcher triangulation (by using three different researchers for data analysis), reflexive journaling, a coding framework, team consensus on themes as well as respondent verification.^{39,43}

RESULTS

An accurate response rate cannot be calculated due to the nature of the chain referral sampling method of recruiting participants. Furthermore, it is not known how many sites are represented, which participants declined to participate or their reasons for declining.

A total of 14 health care professionals participated in the interviews: 7 nurses and 7 pharmacists. All pharmacists were practising in community-based pharmacies, whereas all nurses were practising on public hospital wards. Data collection was concluded when thematic data saturation was reached. No new themes were perceived by the researcher to emerge between interviews 10 and 14, and data

collection was ceased following the 14th interview.⁴⁴ Data analysis confirmed three emergent themes:

- Defining 'older' patients
- Ageing is more than a number
- Need for a contemporary definition of an older patient

Theme 1: Defining 'older' patients

Overall, it is apparent that for both pharmacists and nurses, defining an older person was ambiguous, with uncertainty and confusion around the use of a number based definition or a description of the patient's presentation (Table 1). All participants expressed that using a number-based age cut-off was a limiting factor in defining an older patient due to the differing health backgrounds, family histories and the medical status presented by each patient. Despite this, the majority of pharmacists (5 out of 7) and nurses (6 out of 7) provided a response utilising a measure based on chronological age, which ranged between 65 and 80 years. This apparent lack of consistency in designating a specific age was attributed to the extensive variation found among the older population, which was identified by both nurses and pharmacists as involving: varying types of comorbidities, numbers of medications, cognitive and physical function, organ (kidney, liver) function and carer involvement. This is highlighted in the following statement:

"... you cannot categorise the same patients or 65 year olds, you cannot match them up to the hundred year olds... You get 65 year olds who are very fit, and then you get 65 year olds who are on death row." (P06)

As a result of this heterogeneity, participants highlighted that individual assessments of each presenting patient were required in combination with their age to adequately define an older

patient. One nurse and two pharmacists in particular highlighted that they did not use a chronological age to define a patient:

"I do not rely on the term (elderly), I do not use that term even when I see my patients... We are not talking about the age, we are looking at an individual persons performance in their ability to do things... When I am looking at a patient, I look at a human being and their function. I do not really rely on age." (N06)

"I think elderly is not a chronological thing; basically I think it is actually a cognitive process... both in their cognitive recognition of their environment and what is going on around them... and if they have lost mobility... Some people who are basically approaching 100, who have their wisdom, are very, very sharp and even people who are mobile at those ages. Yes, they are chronologically elderly, but they are still in control of their faculties and functioning well independently, and on the other side you have people much younger that do not." (P05)

"...its not only just about your physical presentation and your comorbidities. It is also mental and the way you think." (P01)

Theme 2: Ageing is more than a number

Both nurses and pharmacists emphasised the importance of individualising pharmacotherapy for older patients by using the clinical characteristics of the patient instead of making clinical decisions based on age (Table 2).

"You cannot make a decision based on age, age is just a number. We are now helping people get healthier relying on their presentation [not age]." (N06)

“I will go back to, what this is person’s level of functioning going to be as an outcome of my treatment or not treating. Is my decision to be conservative or be active in my treatment plan, how is that to actually going to change their response to treatment and whether they are actually going to improve?” (N03)

“So key issues that would affect the way I speak, engage, and interact with someone and the decision-making process is probably like the history of that patient. By social history I do not mean alcohol or sort of things, but their ability to use medication and their compliance, that sort of things. I guess, also, their understanding of medications. Some people are very particular, and they are like, no I have to make sure I have to take my medication 7 o’clock every morning, rain, hail or shine. Some people are less particular.” (P01)

However, specific characteristics were identified that acted as flags or markers to alert both nurses and pharmacists. These included: polypharmacy, being treated by multiple doctors, level of cognition and physical function, degree of organ function including hepatic and renal clearance, age-related pharmacokinetic changes, number of comorbidities, possibility of side effects, adherence (compliance), degree of frailty, falls risk, comprehension of medicines prescribed (including generic and brand names), English speaking background and level of carer involvement (Table 3).

Such characteristics highlighted the needs of older patients, requiring a tailored type of care.

“I think often with elderly people, sometimes you can get a lot of comorbidities with the management. They can be fragile.... And I suppose when you are looking at their multiple comorbidities, then when you are looking at their medication as well, what are you going to have them on, is it going to make something worse.” (N01)

“In terms of choosing medications, you consider are they likely to fall? So, if you got them on blood pressure tablets you do not want them to drop their blood pressure and fall. You are looking at the lot of side-effects and other effects of medications going to impact on an already frail person.” (N05)

“Changes in pharmacokinetics plays a big role in selection of medications. Drug disposition could be different. If you are prescribing something that is not absorbed at high pH, then you have to consider how to give that. Their protein binding is different, and something that is highly protein bound, such as phenytoin or say warfarin, in that case close monitoring is very important.” (P02)

“With the elderly, I find that when you remove or add a new medicine or even change a dose they find it very difficult to understand why it is. Too many medicines and too many different brands. So, for instance, in the hospital they will go home with a generic version of the brand to the brand they receive in pharmacy. So having to relay that you know, the APO brand of Atorvastatin is infact Lipitor.” (P06)

Theme 3: Need for a contemporary definition of an ‘older’ patient

One of the most pervasive themes coming through the interviews was the lack of tailored and comprehensive medication management guidelines for older patients (Table 4). Several professionals identified that whilst the few guidelines that were available provided a ‘guide’ for health care professionals, there were not applicable to the majority of patients. As such, they relied on their own practice experience or on the experience of other medical staff to make more appropriate therapeutic decisions. Guidelines only offered textbook patient examples to work from. In the absence of more geriatric-focussed and tailored guidelines, non-prescribing health professionals have to rely on experience to make the most appropriate decisions.

"The guidelines are not straightforward. You have to base decisions on experience and patient conditions." (P02)

"I think it is based on both knowledge and experience. I think the thing is that when you work in aged care, not only do you have your own knowledge that you have learnt as an accredited pharmacist, but as well you can see how the prescribers are prescribing the medications. So you work very closely with nurses and doctors and that way you learn as well what would be acceptable or what would be expected for the patient." (P04)

In terms of guiding their clinical practice, both nurses and pharmacists highlighted that current guidelines were not useful:

"I would say they are terrible. I think you need to consider them as not being fit for purpose. I would like to provide care that is patient-centred and individualised and tailored to the needs of the patients. However, often if you provide it with rigid risk assessment or risk stratification tools, does not allow for the flexibility and things to be patient-centred and individualised to the needs to the patients." (N02)

Both pharmacists and nurses highlighted that the currently available guidelines were too broad and not specific enough when it came to making pharmacotherapy decisions in older patients with multiple morbidities, medications and risk factors.

"... they do probably guide my decision-making in terms of risk stratification for different factors, but they are not individualised to the patient and not individualised for patients aged over 65." (N02)

"... there is nothing that I have been able to find that is really specific for the elderly." (N03)

Currently used resources included the Australian Medicines Handbook (AMH), particularly the geriatric edition, therapeutic guidelines, electronic Monthly Index of Medical Specialties (eMIMs), and monographs of medications. Nurses also specifically mentioned that they used condition-based guidelines (i.e. stroke), risk assessment/patient assessment tools (mini-mental, Rowland Universal Dementia Assessment Scale (RUDAS), Bed sores, falls risk, malnutrition) and other health professionals (e.g. clinicians, pharmacists and clinical nurse consultants) as resources in guiding treatment. Both groups called for the development of resources that were more individualised for older patients, taking into consideration the multiple medical conditions, medications and organ function that older patients present with. Pharmacists identified a need for 'older' patients to be clearly defined in guidelines, whereas nurses called for greater specificity in guidelines i.e., guidelines relating to medication use specifically in patients with comorbidities, high frailty and falls risk. Both groups expressed a need for guidelines to pinpoint when to continue therapy versus when to discontinue therapy and instead focus on improving an older patient's quality of life.

"... I think there is a lot of work to be done; guidelines at the moment are very condition based... Patients do not have just one condition, they have like 5. There is not one that addresses multimorbidity... you have 6 different guidelines saying 6 different things...." (N02)

"I think, basically, rather than having general drug interactions in classes, I think we should have interactions with conditions as well as classes. And also therapeutic efficacies, whether the doses are effective for the patient or not. And also give us advice on what other tests they need to have done." (P05)

DISCUSSION

This is the first study of its kind to investigate the perceptions of non-prescribing health professionals towards defining an 'older' patient, particularly in the context of appropriate medication management. An important finding of this study highlights that there is awareness and an effort from Australian pharmacists and nurses to perform a holistic and individualised type of care for older patients. In particular, it was recognised that both health-care professional groups were conscious of not labelling older patients, but rather informing the use of their medications according to specific patient characteristics. Participants commonly highlighted that they assessed patients based on their unique physical presentation in combination with their chronological age to make more appropriate pharmacotherapeutic decisions and called for more suitable guidelines to be developed to support their practice.

Ageing is not a uniform process, and the heterogeneity that exists among older persons limits any correlation between the age in years and the full range of human characteristics that determine their suitability for certain types of pharmacotherapies⁴⁵. The participants highlighted that this diversity among the older population is what makes defining them difficult. Therefore, there is a need to actively develop a contemporary definition of an 'older' patient as well as alternative strategies or algorithms to implement into current guidelines that take into account patient heterogeneity to steer away from these age-based tendencies. In particular, there is an apparent need for appropriate criteria that better characterise biological age. There is potential for biological age estimation models, such as the principal component analysis (PCA), multiple linear regression (MLR), Hochschild's method or the Klemra and Doubal's method to be integrated into these guidelines.⁴⁶⁻⁴⁹ However, Jia et.al. state that more studies are needed to improve the accuracy of criteria determining biological age and to validate its clinical use.¹⁵

Participants drew attention to the inadequacies of current clinical guidelines in addressing the specificities of older patients and recommended several improvements to increase their relevance. This finding is similar to that observed in a Canadian-based study by Mutasingwa et.al. who explored the applicability of clinical practice guidelines (CPG's) to older patients with comorbidities. This study highlighted that only a 'handful' of CPG's were found to adequately address issues related to comorbidities in older patients.⁵⁰ Likewise, Cox et.al. also highlighted within their research that there is a low representation of advanced age patients in CPG's as well as within the studies upon which these guidelines are based, rendering the applicability of chronic disease CPG's in older individuals, questionable.⁵¹ Comprehensive and tailored guidelines for this population are needed to encourage the quality use of medicines. There have been some advances in the formation of evidence-based guidelines for target populations. For example, in trials for stroke prevention in atrial fibrillation dating back to the 1990s, older people were excluded from participating and subsequently the data obtained were found to be not representative of the target population of the medicines themselves.^{52,53} More recently, study trials (e.g. for cancer and atrial fibrillation) have broadened their inclusion criteria to include patients over 70 years of age, with multiple comorbidities to better reflect the user population.⁵⁴⁻⁵⁶ However, these trials still appear to be in the minority. A report by the *Alliance for Ageing Research* identifies that a lack of appropriate geriatric-informed standards of care leads to patient morbidity through inappropriate prescribing including, medication over-use, under-use or misuse.⁵⁷ Ouchida et.al. stated that due to the lack of specific recommendations in clinical practice guidelines for older patients suffering from more than one chronic disease, prescribers were forced to combine multiple clinical practice guidelines, thereby increasing the risk of adverse drug events and interactions.⁵⁸ Furthermore one participant drew attention to the importance of these guidelines in ensuring the maximum potential benefit or effectiveness of pharmacotherapy for older patients as well as presenting a risk/benefit ratio. As Bowling highlighted: "in assessing the ability to benefit from treatment, chronological age is less important than other factors concerned with the biological ageing process and the presence of associated disease. Any

rationing because of limitation of health resources should be on the basis of assessed individual physiological ability to benefit, not on the basis of age.”⁵⁹

Another interesting finding emphasised that practitioner experience was essential in making accurate therapeutic decisions for older patients. As such, there is an opportunity to introduce training and education specifically relating to the care of older patients to increase the practice confidence of non-prescribing health care professionals.³ Lavan et.al. advocate for non-prescribing health care professionals to undergo structured training in geriatric medicine and geriatric pharmacotherapy as undergraduates and as postgraduates⁶⁰. Engaging nurses and pharmacists in medication management for older patients, may improve the provision of patient centred care as well as the potential for the minimising medication misuse and errors. Studies that have integrated pharmacists into interdisciplinary teams, performing medication reconciliation as well as clinical interventions have been shown to improve the appropriateness of prescribing, prevent prescribing errors and decrease drug costs in older patients.^{53,60-63} Similarly, interventions made by nurses that aid patients in managing their medications, may prevent unnecessary admissions to hospitals, nursing homes and can help in improving patients quality of life.⁶⁴

LIMITATIONS

This is a small sample of participants and a sub-section of Australian pharmacist and nurse workforce. As such, these findings may not be representative of all non-prescribing health professionals and have limited generalizability. Furthermore, as participants self-identified to participate in the study our data may reflect the views of those who feel more strongly on the issues, which may not necessarily be representative of the broader opinion in practice settings. Non-prescribing health professionals from secondary care settings were not recruited, which may have limited the number of possible participants included in the study. There is also potential for social

desirability bias, with the presence of the researcher during interviews impacting upon the participants' responses.

CONCLUSION

Overall, this study has found that Australian nurses and pharmacists advocate an individualised approach, rather than a number-based approach, to decision-making in older patients. Given the suboptimal use of pharmacotherapy in older persons, more fully engaging these health practitioners in decision-making around treatment may assist doctors in providing more patient-centred pharmacotherapeutic care. Further investigation is needed to develop a contemporary definition of an 'older' patient to promote appropriate tailored and individualised care for this patient group.

REFERENCES

1. Ageing and Health - Fact Sheet No 404. 2015;
<http://www.who.int/mediacentre/factsheets/fs404/en/>. Accessed 25/09/2016.
2. Le Couteur DG, Ford GA, McLachlan AJ. Evidence, Ethics and Medication Management in Older People. *Journal of Pharmacy Practice and Research*. 2010;40(2):148-152.
3. Spinewine A, Schmader KE, Barber N, et al. Appropriate prescribing in elderly people: how well can it be measured and optimised? *The Lancet*. 2007;370(9582):173-184.
4. Gallagher S, Bennett KM, Halford JC. A comparison of acute and long-term health-care personnel's attitudes towards older adults. *International Journal of Nursing Practice*. 2006;12(5):273-279.
5. Singh S, Bajorek B. Pharmacotherapy in the ageing patient: The impact of age per se (A review). *Ageing Research Reviews*. 2015;24:99-110.
6. Gnani R, Migliardi A, Demaria M, Petrelli A, Caprioglio A, Costa G. Statins prescribing for the secondary prevention of ischaemic heart disease in Torino, Italy. A case of ageism and social inequalities. *European Journal of Public Health*. 2007;17(5):492-496.
7. Jacobson TA. Overcoming 'ageism' bias in the treatment of hypercholesterolaemia : a review of safety issues with statins in the elderly. *Drug Safety*. 2006;29(5):421-448.
8. Singh S, Bajorek B. Defining 'elderly' in clinical practice guidelines for pharmacotherapy. *Pharmacy Practice*. 2014;12(4):489.
9. Lee JK, Alshehri S, Kutbi HI, Martin JR. Optimizing pharmacotherapy in elderly patients: the role of pharmacists. *Integrated Pharmacy Research & Practice*. 2015;4:101-111.
10. Lu WH, Wen YW, Chen LK, Hsiao FY. Effect of polypharmacy, potentially inappropriate medications and anticholinergic burden on clinical outcomes: a retrospective cohort study. *CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne*. 2015;187(4):E130-137.
11. Obreli Neto PR, Nobili A, de Lyra DP, Jr., et al. Incidence and predictors of adverse drug reactions caused by drug-drug interactions in elderly outpatients: a prospective cohort study. *Journal of pharmacy & pharmaceutical sciences : a publication of the*

- Canadian Society for Pharmaceutical Sciences, Societe canadienne des sciences pharmaceutiques*. 2012;15(2):332-343.
12. Wang Y, Singh S, Bajorek B. Old age, high risk medication, polypharmacy: a 'trilogy' of risks in older patients with atrial fibrillation. *Pharm Pract (Granada)*. 2016;14(2):706.
 13. Australian Institute of Health and Welfare. Older people. 2018; <https://www.aihw.gov.au/reports-statistics/population-groups/older-people/overview>. Accessed 20/04/18.
 14. Slack C. Biological vs chronological age: how old are you really? 2016; <https://theconversation.com/biological-vs-chronological-age-how-old-are-you-really-66962>. Accessed 20/04/18.
 15. Jia L, Zhang W, Chen X. Common methods of biological age estimation. *Clinical Interventions in Aging*. 2017;12:759-772.
 16. Morrow DA, de Lemos JA. Benchmarks for the assessment of novel cardiovascular biomarkers. *Circulation*. 2007;115(8):949-952.
 17. Nakamura E, Lane MA, Roth GS, Cutler RG, Ingram DK. Evaluating measures of hematology and blood chemistry in male rhesus monkeys as biomarkers of aging. *Experimental gerontology*. 1994;29(2):151-177.
 18. Nakamura E, Miyao K. Further evaluation of the basic nature of the human biological aging process based on a factor analysis of age-related physiological variables. *The journals of gerontology Series A, Biological sciences and medical sciences*. 2003;58(3):196-204.
 19. Krzyzaniak N, Singh S, Bajorek B. Physicians' Perspectives On Defining An Older Adult Patient and In Making Appropriate Prescribing Decisions. 2017.
 20. Somers A, Robays H, De Paepe P, Van Maele G, Perehudoff K, Petrovic M. Evaluation of clinical pharmacist recommendations in the geriatric ward of a Belgian university hospital. *Clinical Interventions in Aging*. 2013;8:703-709.
 21. Health Quality O. Specialized Nursing Practice for Chronic Disease Management in the Primary Care Setting: An Evidence-Based Analysis. *Ontario Health Technology Assessment Series*. 2013;13(10):1-66.
 22. Halvorsen KH, Ruths S, Granas AG, Viktil KK. Multidisciplinary intervention to identify and resolve drug-related problems in Norwegian nursing homes. *Scandinavian Journal of Primary Health Care*. 2010;28(2):82-88.

23. Hanlon JT, Weinberger M, Samsa GP, et al. A randomized, controlled trial of a clinical pharmacist intervention to improve inappropriate prescribing in elderly outpatients with polypharmacy. *The American Journal of Medicine*. 1996;100(4):428-437.
24. Machado M, Bajcar J, Guzzo G, Einarson T. Sensitivity of patient outcomes to pharmacist interventions. Part I: systematic review and meta-analysis in diabetes management. *Annals of Pharmacotherapy*. 2007;41(10):1569-1582.
25. Pelicano-Romano J, Neves MR, Amado A, Cavaco AM. Do community pharmacists actively engage elderly patients in the dialogue? Results from pharmaceutical care consultations. *Health Expectations*. 2013;18(5):1721-1734.
26. Machado M, Bajcar J, Guzzo GC, Einarson TR. Sensitivity of patient outcomes to pharmacist interventions. Part II: Systematic review and meta-analysis in hypertension management. *The Annals of pharmacotherapy*. 2007;41(11):1770-1781.
27. Machado M, Nassor N, Bajcar JM, Guzzo GC, Einarson TR. Sensitivity of patient outcomes to pharmacist interventions. Part III: systematic review and meta-analysis in hyperlipidemia management. *The Annals of pharmacotherapy*. 2008;42(9):1195-1207.
28. Santos DdO, Martins MC, Cipriano SL, Pinto RMC, Cukier A, Stelmach R. Pharmaceutical care for patients with persistent asthma: assessment of treatment compliance and use of inhaled medications. *Jornal brasileiro de pneumologia*. 2010;36(1):14-22.
29. Stefanacci R, Riddle A. Preventing medication errors. *Geriatric Nursing*. 2016;37(4):307-310.
30. Jutel A, Menkes DB. Nurses' reported influence on the prescription and use of medication. *International nursing review*. 2010;57(1):92-97.
31. Bajramovic J, Emmerton L, Tett SE. Perceptions around concordance – focus groups and semi-structured interviews conducted with consumers, pharmacists and general practitioners. *Health Expectations*. 2004;7(3):221-234.
32. Understanding our health care system.
<http://healthissuescentre.org.au/consumers/health-care-in-australia/understanding-our-health-care-system>. Accessed 20/04/18.

33. Population Composition: Regional population ageing. 2006;
<http://www.abs.gov.au/ausstats/ABS@.nsf/2f762f95845417aeca25706c00834efa/851dece969d9182cca2570ec000a2501!OpenDocument>. Accessed 15/12/2016.
34. Guest G, Bunce A, Johnson L. How many interviews are enough? An experiment with data saturation and variability. *Field methods*. 2006;18(1):59-82.
35. Guest G, Bunce A, Johnson L. How Many Interviews Are Enough?:An Experiment with Data Saturation and Variability. *Field Methods*. 2006;18(1):59-82.
36. Data Saturation – numbers left out in the rain, or something else? 2018;
<http://nsfconsulting.com.au/data-saturation/>. Accessed 02/03/18.
37. Phillippi J, Lauderdale J. A Guide to Field Notes for Qualitative Research: Context and Conversation. *Qualitative Health Research*. 2018;28(3):381-388.
38. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology*. 2006;3(2):77-101.
39. Nowell LS, Norris JM, White DE, Moules NJ. Thematic Analysis:Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*. 2017;16(1):1609406917733847.
40. Thomas DR. A general inductive approach for qualitative data analysis. *American Journal of Evaluation*. 2006;27(2):237-246.
41. Cooper S, Endacott R. Generic qualitative research: a design for qualitative research in emergency care? *Emergency Medicine Journal : EMJ*. 2007;24(12):816-819.
42. The four main approaches. 2009; <http://www.alzheimer-europe.org/Research/Understanding-dementia-research/Types-of-research/The-four-main-approaches>. Accessed 28/03/2017.
43. Lincoln YS, Guba EG. *Naturalistic inquiry*. Vol 75: Sage; 1985.
44. Nik J, Lai PSM, Ng CJ, Emmerton L. A qualitative study of community pharmacists' opinions on the provision of osteoporosis disease state management services in Malaysia. *BMC Health Services Research*. 2016;16(1):448.
45. Health Statistics and Information Systems – Definition of an older or elderly person, . 2016; <http://www.who.int/healthinfo/survey/ageingdefnolder/en/>.
46. Dubina TL, Dyundikova VA, Zhuk EV. Biological age and its estimation. II. Assessment of biological age of albino rats by multiple regression analysis. *Experimental gerontology*. 1983;18(1):5-18.

47. Hochschild R. Improving the precision of biological age determinations. Part 1: A new approach to calculating biological age. *Experimental gerontology*. 1989;24(4):289-300.
48. Zhang W-G, Zhu S-Y, Bai X-J, et al. Select aging biomarkers based on telomere length and chronological age to build a biological age equation. *Age*. 2014;36(3):9639.
49. Klemmera P, Doubal S. A new approach to the concept and computation of biological age. *Mechanisms of ageing and development*. 2006;127(3):240-248.
50. Mutasingwa DR, Ge H, Upshur REG. How applicable are clinical practice guidelines to elderly patients with comorbidities? *Canadian Family Physician*. 2011;57(7):e253-e262.
51. Cox L, Kloseck M, Crilly R, McWilliam C, Diachun L. Underrepresentation of individuals 80 years of age and older in chronic disease clinical practice guidelines. *Canadian family physician Medecin de famille canadien*. 2011;57(7):e263-269.
52. Turazza FM, Franzosi MG. Is anticoagulation therapy underused in elderly patients with atrial fibrillation? *Drugs & aging*. 1997;10(3):174-184.
53. Bajorek BV, Krass I, Ogle SJ, Duguid MJ, Shenfield GM. Optimizing the Use of Antithrombotic Therapy for Atrial Fibrillation in Older People: A Pharmacist-Led Multidisciplinary Intervention. *Journal of the American Geriatrics Society*. 2005;53(11):1912-1920.
54. Baunemann Ott CL, Ratna N, Prayag R, Nugent Z, Badiani K, Navaratnam S. Survival and treatment patterns in elderly patients with advanced non-small-cell lung cancer in Manitoba. *Current Oncology*. 2011;18(5):e238-e242.
55. Connolly SJ, Ezekowitz MD, Yusuf S, et al. Dabigatran versus Warfarin in Patients with Atrial Fibrillation. *New England Journal of Medicine*. 2009;361(12):1139-1151.
56. Giugliano RP, Ruff CT, Braunwald E, et al. Edoxaban versus Warfarin in Patients with Atrial Fibrillation. *New England Journal of Medicine*. 2013;369(22):2093-2104.
57. Ageism: How Healthcare Fails the Elderly.
http://www.agingresearch.org/backend/app/webroot/files/Pressroom/51/Ageism_How_Healthcare_Fails_the_Elderly.pdf. Accessed 25/09/2016.
58. Ouchida K, Lachs M. Not for Doctors Only: Ageism in Healthcare. *Journal of the American Society on Ageing*. 2015.
59. Bowling A. Ageism in cardiology. *British Medical Journal*. 1999;319(7221):1353-1355.

60. Lavan AH, Gallagher PF, O'Mahony D. Methods to reduce prescribing errors in elderly patients with multimorbidity. *Clinical Interventions in Aging*. 2016;11:857-866.
61. Leape LL, Cullen DJ, Dempsey Clapp M, et al. Pharmacist Participation on Physician Rounds and Adverse Drug Events in the Intensive Care Unit. *JAMA*. 1999;282(3):267-270.
62. Lipton HL, Bero LA, Bird JA, McPhee SJ. The impact of clinical pharmacists' consultations on physicians' geriatric drug prescribing: a randomized controlled trial. *Medical care*. 1992:646-658.
63. Castelino RL, Bajorek BV, Chen TF. Targeting Suboptimal Prescribing in the Elderly: A Review of the Impact of Pharmacy Services. *Annals of Pharmacotherapy*. 2009;43(6):1096-1106.
64. Marek K, Antle L. Medication Management of the Community-Dwelling Older Adult. In: Hughes R, ed. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Rockville: Agency for Healthcare Research and Quality; 2008: <https://www.ncbi.nlm.nih.gov/books/NBK2670/>.

TABLE 1 - THEME 1: DEFINING THE AN OLDER PATIENT - SELECTED QUOTATIONS FROM PARTICIPANTS

- *“I do not know when to start calling them (patients) elderly. I can say someone who is 80 is elderly, or someone who is 70 is elderly, I do not know...There are lots of limitations. For example, someone aged 50 might have diabetes, blood pressure, cholesterol... have COPD because they are a smoker. But you might have someone 70 who has looked after themselves, never smoked, like always been active, that if you compare the benefits in their health, the health they are going through, someone in their 50’s might not be in better health than someone in their 70’s. When we use age, it is a limitation.” (P03)*
- *“We categorise everybody over 65 as elderly, but when you deal with patients that are between 65 and 90, and with the age life expectancy increasing, you are going to have a larger variation of people considered as elderly if you look at over 65. That is 30 years of difference... and then you’ve got the 60 years of how you’ve been living your life in terms of eating, drinking, exercise, looking after your health. So, it is a tricky one I do not know.” (P07)*
- *“... I think elderly is a state of mind really. I have treated a 95-year-old lady who was doing yoga and just fell and broke her wrist, she said when can she go back to yoga... And then you have like a 45 year old who is obese, not mobile, with diabetes.... I work in an environment where there is a big aged care population. And their health is really vast, between being really well and quite unwell.” (N03)*
- *“Age is a very rough guide. Some people can be extremely healthy in their 90’s, doing all sorts of things and have really good kidney function, blood pressure, good cholesterol....” (N06)*
- *“A person who is 65 may be completely independent and well, while someone younger may not be.” (N07)*
- *“... sometimes you see very fit and healthy, sort of, 80 and 90 year olds, and then you see some 60 year olds not healthy...in South Asian countries, 60 years old is really old there. 60 and 70 here in Australia is like, run marathon stuff...” (P01)*

TABLE 2 – THEME 2: AGEING IS MORE THAN JUST A NUMBER - SELECTED QUOTATIONS FROM PARTICIPANTS

<ul style="list-style-type: none"> • <i>“... you’ve got to look at their overall condition, because, just because you are elderly does not meant that you are going to be unfit. There is not a one-size fits all with their care.” (N01)</i> • <i>“You cannot assume that all elderly people are going to be as ill or as frail as other elderly patients.” (P04)</i> • <i>“I will go back to, what is this person’s level of functioning going to be as an outcome of my treatment or not treating. Is my decision to be conservative or active in my treatment plan, how is that actually going to change their response to treatment and whether they are actually going to improve.” (N03)</i>
<p>CONSIDERATIONS WHEN TREATING OLDER PATIENTS</p>
<ul style="list-style-type: none"> • <i>“Elderly people tend to be on more medication as they get older, probably due to their increasing comorbidities in elderly patients. And those who are older may have greater comorbidities that they require more pharma interventions for those chronic conditions. I think this is what distinguishes between elderly and younger patients.” (N02)</i> • <i>“...with elderly patients, also you have a problem with sometimes they have cognitive impairment, that they do not understand the situation, the do not understand their medicine.” (P05)</i> • <i>“With the elderly, I find that when you remove or add a new medicine or even change a dose they find it very difficult to understand why it is. Too many medicines and too many different brands.” (P06)</i> • <i>“It would be renal function, liver function, mobility, usually elderly would have more medical conditions that younger patients. Dementia might be an issue. Risk of falls...” (P03)</i> • <i>“They might have multiple morbidities and multiple medical conditions. They are more prone to getting side-effects than younger patients.” (P02)</i> • <i>“Elderly patients have a high risk of their body response to medications mainly related to the health issues. We need to be extremely cautious in the way we prescribe, if we do not need to use a medication then we should not use it. We should go low and slow” (N06)</i>

TABLE 3 - CHARACTERISTICS CONSIDERED BY NURSES AND PHARMACISTS WHEN TREATING AND MANAGING OLDER PATIENTS

NURSES	PHARMACISTS
DISEASE/AGE BASED CONCERNS	
Comorbidities/multiple morbidities Chronic conditions Renal failure, cardiac failure	Comorbidities Diseases more common in older patients i.e. osteoporosis Organ function – kidney, liver Pharmacokinetic changes
MEDICATION RELATED CONCERNS	
Adherence to medications Complexity of medications Polypharmacy Response to medications Risks associated with medicines Types of medications	Adherence Multiple doctors Polypharmacy – too many brands of medicines, generics etc. Side effects
INDEPENDENCE	
Caregiver support Self care behaviour	Carer involvement
COGNITION	
Cognitive function Comprehension of medicines, education/knowledge about conditions	Cognitive function i.e. dementia Comprehension and level of understanding of medications English speaking background
PHYSICAL ABILITY	
Falls risk Frailty Mobility	Falls risk Frailty

TABLE 4 – THEME 3: NEED A CONTEMPORARY DEFINITION OF AN OLDER PATIENT - SELECTED QUOTATIONS FROM PARTICIPANTS

GUIDELINES ARE NOT SPECIFIC TO OLDER PATIENTS
<ul style="list-style-type: none"> • <i>“When it comes to prescribing in elderly, they (the guidelines) do not define, they just say elderly.” (P02)</i> • <i>“They are very vague usually with elderly patients.... Most of them will not say over a certain age, it will just be elderly. It depends on how you define elderly...” (P07)</i> • <i>“The definition of elderly or someone who is old is unknown.” (P03)</i> • <i>“In some guidelines there are certain flowcharts of the ways you might do things, but there is nothing really specific that just goes across to the elderly.” (N01)</i> • <i>“I must say that, a lot of things are not on those guidelines.... The guidelines work in textbook examples of patients... the guidelines are not specific enough to say what to do.” (P01)</i>
RECOMMENDED MODIFICATIONS TO GUIDELINES
<ul style="list-style-type: none"> • <i>“... simplification and making things easy to pinpoint, bit like a Google search or an app with the guidelines..” (N01)</i> • <i>“And as patients age, I would probably say that, it is not often around the patients wish to live longer, it is about patients’ wish to have a better quality of life.” (N02)</i> • <i>“Just having a small blurb in places where you might be making general recommendations for treatment or management plans for the elderly... to have specific kind of work in websites around how there might be some differences for elderly patients would be useful.” (N03)</i> • <i>“I think having a resource that you can put in all their comorbidities, current issues, age and renal function and then plug in all the medications they are on – a system, like that would be very useful. So you would put in their cognitive status, their frailty, where they live and their falls history.” (N05)</i> • <i>“... more detailed documents on different patients with different levels of comorbidities, like prescribing in different conditions.” (P02)</i>

- *“It would be useful to have some sort of guidance to when it is better to just move on to improving the patient quality of life as opposed to continuing therapy.” (P04)*
- *“There needs (to be) a classification of what classifies elderly.” (P07)*
- *“They are not very specific but are like a guideline... I think if after 65 we have smaller categories or smaller groups or maybe other situations that could influence decision making.” (P03)*