PROSpER: PReferences for the Organisation of acute health Services for oldER people: protocol for a mixed methods study

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ABSTRACT

Background: Organisation of acute care services for people living in residential aged care facilities (RACF) is a complex area of health policy. For people living in RACF, the emergency department is often used to provide acute care; needs of RACF residents, however, are not always well met. Alternative models of delivering care must be acceptable to a variety of stakeholders; however, little is known about the values and preferences that people attach to aspects of how and where care is delivered.

Methods/design: The PROSpER Study examines people's preferences for the organisation of acute healthcare services for older people in RACF. The authors aim to (1) determine which factors influence preferences of residents, carers and providers for how and where acute care is delivered and (2) determine the relative importance of these factors and the acceptable trade-offs between them. Qualitative and quantitative methods will be used. One-on-one interviews will be conducted with RACF residents, their families, staff of RACF and emergency department staff. A discrete choice study will then be designed to quantitatively assess preferences for alternative models of care delivery. Approximately 600 respondents from three respondent groups will be surveyed: older people living in RACF, family members of aged care residents and staff of RACF. A mixed logit model will be used; results will be expressed as parameter estimates (β) and odds of choosing one option over an alternative. Trade-offs between attributes will also be calculated.

Ethics and dissemination: The PROSpER Study has been approved by the University of Sydney, Human Research Ethics Committee (Protocol numbers 10653 and 14382) and Royal Perth Hospital Ethics Committee (reference 2009/045). Results will be published in peer-reviewed scientific journals and via conference presentations; a newsletter will also be provided to study participants. A stakeholder roundtable will also be held to discuss the results.

ARTICLE SUMMARY

Article focus

- To assess the preferences of older people living in residential aged care facilities (RACF), their families and staff in relation to the provision of acute health care services for older Australians in RACF.
- To determine what factors most influence the preferences of these stakeholders for how and where acute care is delivered.
- To determine the relative importance of these factors and the trade-offs between them.

Key messages

- The organisation of acute healthcare services for older people living in RACF is a complex area of health policy involving considerations of clinical, economic, ethical and legal issues. For older people living in RACF, the emergency department is frequently used to provide acute care services. While emergency department generally works well if people have a short-term problem that can be resolved with a one-off intervention, the needs of people from RACF, often with chronic disease, multiple complex health problems and frailty are less well met.
- Alternative models of delivering acute care need to be acceptable to the residents, family and RACF staff; however, little is known about the values and preferences that people attach to aspects of how and where care is delivered or the trade-offs between various aspects of care that people are willing to make.
- This study will use best practice qualitative and quantitative methods for preference elicitation (a discrete choice experiment) to assess the preferences and acceptable trade-offs of RACF residents, their families and staff for alternative healthcare delivery models.

BACKGROUND

As of June 2008, there were around 157 000 people living permanently in residential aged care facilities (RACF) in Australia, a 19% increase over the prior decade. Almost all (96%) were aged 65 years or over and approximately 75% required high-level care.[1] People living in RACF often represent the frailest and most vulnerable subgroup of older Australians and as a consequence have considerable healthcare needs.

ARTICLE SUMMARY

Strengths and limitations of this study
- The strengths of the study are that it is the first study to use discrete choice methods to examine preferences for alternative models of acute healthcare service delivery in multiple stakeholder groups: residents of RACF, their families and RACF staff.
- The limitation is that it is conducted in one country, Australia, and thus its generalisability may be limited by the prevailing model of acute healthcare service delivery.

The organisation of acute healthcare services for older people living in RACF is a complex area of health policy involving major clinical, economic, ethical and legal issues.[2][3] Acute healthcare is defined as the necessary treatment of significant illness or injury for a short period of time[4] and is usually rendered in an ambulatory setting (eg, general practice), hospital emergency department (ED) or other short stay facility.

The ED model of care

For older people living in RACF, the ED is frequently used to provide acute care services, with up to 1.5 transfers to ED per RACF bed per year.[5][6] Acute clinical care in the ED is generally of high clinical standard, and the ED offers some other advantages for patients: it is a 'one-stop-shop' with 24 h access to diagnostic services such as pathology and radiology and easy access to specialty consultation services, it is generally a no cost option and patients (and their relatives) may feel reassured by being treated in a hospital environment. However, it is now widely asserted that this practice is financially unsustainable, given shifts in population demographics. It has been estimated that up to half of all transfers to ED from RACF are avoidable,[7] and 20% of older people in public hospitals would be more appropriately cared for outside an acute hospital setting.[5] In ED the additional care needs of people with chronic disease, multiple complex health problems and frailty are relatively poorly met. People living in RACF typically fall into all these categories, and ED-based care is associated with a number of negative consequences.

After an ED visit, older people are at increased risk of medical complications, functional decline and poorer quality of life.[8][9] The ED environment is often over-crowded, noisy and lacks privacy and is unsuited to the needs of vulnerable older patients.[10] The physical layout of the ED, designed for rapid assessment, stabilisation and management, focuses on open space, no walls and the need for sharing of space during busy periods. The priorities of ED care and the physical design are often not aligned with special needs of older people.[11] ED staff have limited time to assist with the additional care needs (such as help with toileting and spending long periods of time answering questions) that may be required by older people.[11][12] Complications frequently arise during patient transfers from RACF to the ED.[13] For example,

the common practice of using bladder catheters can increase the risk of delirium and infection,[14][15] and older patients are at substantially increased risk of falling because of multiple gait hazards such as linoleum floors, unnatural lighting and equipment.[11] Some limited data suggest that residents and carers may prefer acute care be delivered in the RACF setting, with a known environment and staff and without the need for ambulance transfer to and from the ED.[16] ED care, at least for some illnesses, is also expensive and resource intensive compared with comparable care delivered in a primary care setting.[17]

Alternatives to the ED model

Alternatives to ED-based care for people living in RACF have been proposed. Most commonly these involve 'outreach' programmes where care is provided in RACF instead of transferring residents to the ED.[18] Various practice models include enhanced primary care through general practitioner or nurse practitioner-led care,[19][20] supplementation of staffing within the RACF with highly trained multidisciplinary geriatric teams,[21] the use of remote telephone or telemedicine advice lines for RACF staff[22] and 'hospital in the nursing home' programmes[23] or specialist geriatric EDs.[11][24]

Non-ED-based services will avoid many of the negative consequences of ED discussed above but may have potential disadvantages: nursing staff in RACF have high existing patient to staff ratios, some staff may not have the skills or resources to help manage acutely ill people, and alternative models may not offer the 24 h access that is necessary in some situations. Though many arguments are made in favour of reducing hospitalisation rates in older people in RACF, the success of policies to achieve this will rely on the support of patients, carers and providers. Alternative models of delivering acute care need to be designed in such a way as to be effective, cost−effective and ultimately acceptable. Until we understand the values and preferences people attach to aspects of how and where care is delivered, any new policy to reorganise acute healthcare services and reduce reliance on ED care will not be responsive to community expectations and is likely to fail.

Aims

We will assess the preferences of older people living in RACF, their families and staff in relation to the provision of acute healthcare services for older Australians in RACF. Specifically we will
- determine what factors most influence the choices of these stakeholders for how and where acute care is delivered.
- determine the relative importance of these factors and the trade-offs between them.

Through a better understanding of the value that various stakeholders attach to the different components of healthcare provision, we can optimise design of acute care strategies for RACF patients such that provision of care is both efficient and responsive to patient and family preferences.

METHODS/DESIGN
Overview of approach and methods
This study will explore preferences and views on the delivery and organisation of acute care services for older Australians. A mixed methods approach will be used. One-on-one interviews will be conducted, and discrete choice experiments (DCEs) will be used to quantitatively assess preferences for alternative care delivery options. The discrete choice study will follow the ISPOR Guidelines for Good Research Practices for conjoint analysis in health.[25]

Discrete choice experiments
DCEs involve surveys in which respondents are asked to choose between alternative policies or treatments defined by a set of differing attributes. This method is becoming more widely used in health as a means of quantifying patient and consumer preferences for healthcare policies and programmes.[25–29] The method is based on the idea that goods and services, including healthcare services, can be described in terms of a number of separate attributes or factors. The levels of attributes are varied systematically in a series of questions and respondents choose the option that they prefer for each question. People are required to choose the option that is most preferred or has the highest 'value'. From these choices, a mathematical function is estimated which describes numerically the value that respondents attach to different choice options. Other data collected in the survey, including attitudinal questions and socio-demographic information, may also enter the value functions as explanatory variables. Ultimately, DCE studies can determine which attributes are driving patient preferences, the trade-offs between attributes that people are willing to accept and how changes in attributes can lead to changes in preferences and likely service uptake.

A simplified example from a UK survey of community preferences for alternative policy models of out of hours general practice contact[30] is shown in figure 1. Two unlabelled alternative healthcare delivery policies, option A and option B, were described using six different attributes, time to make initial contact, time waiting for advice or treatment, whether you are informed of the waiting time, face to face or telephone contact, whether you are seen by a doctor or nurse and likelihood contact relieves anxiety. The analysis will indicate individuals' preferences for out of hours care (option A and option B) based on the relative weight attached to attributes. For example, choosing option A would suggest that respondents were willing to wait an extra 55 min to be assessed and treated by a doctor rather than by a nurse.

By presenting respondents with a series of choices where the levels of the attributes are varied, researchers are able to quantify how these attributes influence choice. Given a sufficient number of choices to allow variation across all attributes, this approach enables estimates of the marginal effect of each attribute on choice and the marginal rate of substitution or trade-offs between attributes. In principle, this can be done by offering respondents choices using every combination of attributes, a 'full factorial' design. In practice, such a design is rarely feasible; efficient designs are therefore paramount, particularly when considering manifold choice options and interactions between attributes and socio-demographic characteristics on choice.

STUDY METHODS
Stage 1: establishing attributes using qualitative methods
Qualitative one-on-one semi-structured interviews will be conducted with RACF residents, their families, staff of aged care facilities and ED staff. Maximal variation purposive sampling will be employed to ensure that a wide range of views are explored.

A semi-structured interview guide has been developed to investigate the key areas around which attributes for the DCE will be developed. We begin by asking contextual information on the respondents' previous experiences with an episode of care in the ED. Second, we seek evaluative information, asking the respondents to describe positive and negative perceptions concerning ED care and any alternative methods of acute care they have experienced. Specifically we explore the decision-making processes that went into seeking care, the technical quality of care delivery in terms of things such as waiting time and relief of symptoms and process factors such as comfort of the physical environment, attentiveness of staff and communication. Finally, we seek strategic data from respondents, asking them to describe their ideal care delivery policy and their attitude towards alternative policies. The total number of interviews conducted will be based upon reaching 'saturation point', when no new views are expressed, and subsequent participants repeat views expressed by previous participants. 'Saturation point' is often reached by the 20th interview. Respondent groups are likely to have different experiences; therefore, we will recruit up to 20

Figure 1 Example of a discrete choice question.

	Option A	Option B
Time to make initial contact	5 min	5 min
Time waiting for advice or treatment	1 h	5 min
Informed of expected waiting time	Yes	Yes
Type of contact is	In person	In person
You are attended to by	Doctor	Specially trained nurse
Chance contact relieves anxiety is	50%	50%
	☐	☐

staff from ED, 20 staff from RACF (recognising RACF and ED staff may have similar views and saturation occur earlier), 20 RACF residents and 20 family members.

Qualitative analysis

All interviews will be recorded and transcribed and then analysed. Transcripts will be entered into NVIVO V.9 (QSR International Pty Ltd) and reviewed line by line by the study team. A preliminary coding system will be developed, using a phenomenological approach for thematic analysis as detailed by Crotty.[31] Because of limited previous research in this area, findings from the content and thematic analyses will be essential to inform the design of the DCE and will form a fundamental and separate research output.

Stage 2: design of discrete choice questionnaires

Data from stage 1, systematic reviews of the quantitative[6] and qualitative literature on non-ED alternative models of care, and other research[16 32 33] will be used to inform DCE attributes. Once the attributes have been decided, a statistically efficient design for the discrete choice study will be created. This approach links statistical efficiency to the econometric model that is likely to be estimated from choice data using the design.[34 35] This approach often lets go of the orthogonality constraint and attempts to minimise the expected asymptotic variance−covariance (AVC) matrix of the design. Efficient choice designs therefore attempt to maximise the likely asymptotic t-ratios obtained from choice data collected. As such, they attempt to minimise the correlation in the data for estimation purposes, and collect data such that parameter estimates have as small as possible standard errors. These designs make use of the fact that the AVC matrix (the roots of the diagonal of this matrix are the asymptotic standard errors) of the parameters can be derived if the parameters are known. Since the objective of the DCE is to estimate these parameters, they are unknown at the time of design. However, if some prior information about these parameters is available (eg, parameter estimates available in the literature from similar studies or parameter estimates from pilot studies), then this AVC matrix can be determined, assuming that the priors are correct.

The initial design will be tested with a small pilot study to assess survey comprehension. Results will be used to revise the wording and design of the study. This step is important because of the age of RACF respondents, though high acceptance levels and good reliability and validity of DCE in older people are anticipated.[36]

Once attribute descriptions are finalised, a second pilot study will be conducted to collect response data to calculate prior parameter estimates with which to inform the design of the main study. It is expected that approximately 20 respondents per group will be sufficient to calculate these priors. Based on these prior parameter estimates, the study design will be revised to maximise efficiency and validity.

Stage 3: DCE survey

Three respondent groups will be included: older people living in RACF, family members of aged care residents and staff of RACF. RACF that have taken part in *stage 1* will also recruit respondents for the DCE. Quota sampling will be used to recruit a respondent sample broadly representative of the Australian RACF resident population (based upon characteristics such as age, sex, recent experience of an ED facility); family members of residents and staff of RACF will also be approached via RACF. Many residents in high-level RACF will have cognitive impairment, excluding them from participation in the DCE. This, however, reflects the reality of current decision making; care decisions for these residents are made on their behalf by staff, relatives or health professionals.

Respondents will either complete the DCE as a web-based survey or in a face-to-face setting using a computer-assisted personal interview (CAPI). Previous experience suggests that web-based surveys can be successfully utilised, even in older respondents, and provide a highly efficient means to collect data; we anticipate that most family member and RACF staff respondents will prefer to complete the DCE in this way. For those respondents preferring a face-to-face approach, particularly RACF residents, CAPIs can also be successfully implemented in a relatively efficient manner while ensuring data quality and timeliness. Upon consent, respondents will be asked to choose between the status quo option of ED and alternative unlabelled acute care delivery options, which vary across a range of attributes. Final respondent numbers required for the DCE will depend on the number of attributes and the range of each attribute and the prior parameter estimates identified from *stages 1* and *2*.

Sample size

The current theory of sampling for these experiments does not directly address the issue of minimum sample size requirements in terms of the reliability of the parameter estimates produced in the design of stated choice experiments (see eg, Hensher *et al*[37] and Louviere *et al*[38]). Rather, sampling theory as applied to choice modelling is designed to minimise the error in the choice proportions of the alternatives under study.[34 35] This means that the final sample size required is based upon the characteristics of the design itself such as the number of attributes included, the attribute level range, the number of choice scenarios presented, the number of alternatives in each choice set and the size and direction of prior parameters obtained from the pilot study.

We expect a sample size of approximately 200 respondents from each respondent group. With an efficient choice design, this sample size will likely be sufficient to assess any differences in preference structure between respondent groups and across age, sex and other demographic characteristics.

Stage 4: analysis

A mixed multinomial logit (MMNL) (also known as random parameters logit) model using a panel size specification will be used for each analysis. A panel specification of the model allows for non-independence of observations provided by the same respondent, that is, it can account for correlations among the multiple choices made by the same individual. MMNL models relax certain statistical assumptions of more commonly used multinomial logit (MNL) models and often lead to models that better explain choice behaviour.[37 39] In MNL choice models, commonly used in health economics, parameters associated with each attribute are treated as fixed. These fixed values are the average (or point estimates) associated with a population-level distribution; other information in the distribution is not considered. An MMNL allows consideration of the full distribution of a parameter estimate, and the fixed parameter becomes a random parameter. 'Random parameter' simply implies that each individual has an associated parameter estimate on that specified distribution. While the exact location of each individual's preferences on the distribution may not be known, estimates of 'individual-specific preferences' can be accommodated by deriving the individual's conditional distribution, based—within sample—on their choices (ie, prior knowledge).[39] Interactions between attributes in the discrete choice surveys and between attributes and population characteristics (eg, age, gender, income, education, prior ED experience) will be explored in the mixed logit analysis.

Model results will expressed as parameter estimates (β), the odds of choosing one option instead of another (and 95% CIs of the ORs) and p values. Acceptable trade-offs between attributes will also be calculated.

ETHICAL CONSIDERATIONS

The PROSpER Study has been approved by the University of Sydney, Human Research Ethics Committee (Protocol numbers 10653 and 14382) and the Royal Perth Hospital Ethics Committee (reference 2009/045).

Confidentiality and anonymity of the data will be strictly maintained. Respondent interviews, including face-to-face CAPI for the DCE, will only take place after written informed consent is obtained from participants. Participants will not be identifiable in any transcripts or in any publications. It will be made clear to all participants that they have the right to withdraw from the research at any point in time.

For respondents choosing to complete the survey online, written consent is not possible. As such participant information for the online survey will include the following statement "Being in this study is completely voluntary—you are not under any obligation to consent and—if you do consent—you can withdraw at any time without affecting your relationship with The University of Sydney. By completing the survey you have consented to be part of the study. You may stop completing the online survey at any point if you do not wish to continue, and we will not use your answers. Once you have submitted your survey anonymously, your responses cannot be withdrawn."

DISSEMINATION

The results will be published in internal reports, peer-reviewed scientific journals and via conference presentations; a newsletter will also be provided to study participants who are interested. At the conclusion of the study, we will also hold a stakeholder roundtable to discuss the results and subsequent implementation strategies.

DISCUSSION

The results from this survey will inform health policy by highlighting the factors that influence preferences for how acute care services should be designed for older Australians. Our analysis will directly address the aims of this research project by providing:

- ▶ Estimates of the marginal effect (importance) of each attribute on overall preference for each policy.
- ▶ Estimates of marginal rates of substitution between attributes based on the ratio of parameter estimates, giving an indication of the extent to which respondents are prepared to trade-off one attribute for another, for example, if waiting time and ability to be treated by a specialist emergency physician are attributes, the marginal rates of substitution between these reflects the waiting time people are willing to accept in order to be seen by a specialist.
- ▶ An indication of the predicted values or 'market shares' associated with different parameter levels within the estimated utility functions. This allows forecasting of the likely uptake of various policy options, given particular policy characteristics.
- ▶ An understanding of the relationship between resident, family and provider preferences in acute care decisions.

These outputs will inform the development of health policy regarding the provision of acute care services for older people living in RACF. Given that separate surveys will be carried out across multiple stakeholder groups, an analysis of whether the preferences of particular groups are under- or over-represented in current practice will be assessed. By understanding the trade-offs and likely uptake of alternative models of care provision, we will be able to guide delivery of health services such that they are responsive to consumer preferences.

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