WILEY | Hindawi

Review Article

Heuristics, Biases, and Decisions in Resource Allocation for Home Care Packages under Consumer Directed Care: A Systematic Review and Thematic Synthesis

Danelle Kenny [iD],[1] **Kim-Huong Nguyen** [iD],[1] **Lana Friesen** [iD],[2] **Zachary Breig** [iD],[2] **and Tracy Comans** [iD][1]

[1]*University of Queensland Centre for Health Services Research, L5 UQ Health Sciences Building, RBWH Campus, Central, Fig Tree Drive, Herston, Queensland, Australia*
[2]*University of Queensland School of Economics, Colin Clark Building, St Lucia Campus, 39 Blair Drive, St Lucia, Queensland, Australia*

Correspondence should be addressed to Danelle Kenny; d.kenny@uq.edu.au

Consumer-directed care (CDC) is a policy solution for quality deficiencies in aged care where seniors accessing care services are empowered with full choice and flexibility over their service packages. Various programs have been developed using this policy approach around the world, and implementation has invoked a mixture of responses. While consumer organisations welcome a policy direction providing additional choice, there is a concern that this policy complicates the decision-making process, leading people to rely on "rules of thumb" (heuristics) that may not reflect their best interests. Behavioural science provides a lens for looking at heuristics and biases that may occur during complex decision making, particularly as people age. *Objective.* To explore the presence and influence of heuristics and biases on the decision-making processes of older people receiving home care services under a CDC model. *Method.* Qualitative systematic review involving systematic searching of PubMed, MEDLINE via Ovid, Embase via Elsevier, CINAHL via Ebsco, PsycINFO via Ovid, Web of Science, Scopus, and EconLit, from inception until 14th April 2022 was undertaken. Identified articles were deduplicated, screened, and extracted for information relevant to the research question using PRISMA guidelines. Data extraction considered descriptive data and metadata including study type, participants, overall objectives, chosen methodologies, and their relationship to the research question. The variety of study types prompted a thematic synthesis to achieve greater comprehension of the existing knowledge base. *Results.* Descriptive categories were analysed to reveal five themes relevant to the presence and influence of heuristics and biases in decisions made by older people when allocating home care resources. Principally, CDC is implemented to afford autonomy but is complicated by the decision-making environment. Choice and decision making are both specific to the individual, and the processes employed for decision making vary over the life-course. Decision quality can be improved through the identification and mitigation of complicating factors. More research is needed to understand how modifications can assist decision making and improve health outcomes.

1. Introduction

There is no global definition of home care, and the meaning changes from country to country, which can create confusion [1]. In this review, home care is used to describe a program of health-related services that facilitate older, community-dwelling adults to age in place, i.e., in their own homes [2]. Generally, there is a preference for communities to enable older citizens to remain living in their community and their own homes for as long as possible [3]. There are significant economic and societal benefits when transfer to long-term care facilities can be delayed or avoided entirely.

Consumer-directed care (CDC) is a policy approach that attempts to address issues identified in aged care relating to reduced autonomy and disenfranchisement of seniors receiving care services [4]. The primary goal of the policy is to

empower care recipients and their support networks by affording choice and flexibility in resource allocation through a cash benefit mechanism where care recipients decide how approved funds are spent. Many advanced economies in North America and Europe have adopted this policy approach, and Australia implemented CDC for its home care package program in 2015 [2]. Since implementation of CDC programs, concerns over the quality of decision making in relation to package HCP expenditure have been raised, and questions over the effectiveness of current expenditure patterns to fulfil the objective of home care are posited [5].

Behavioural economics explores elements of psychology and economics to understand real-world behaviours and their variance from rational models, particularly in relation to risk and uncertainty [6]. Heuristic thinking and the inherent bias that results are central concepts in behavioural economics theory. The theoretical foundation that explains how and why human decision making deviates from a logical optimal has been increasingly applied to improve policies and define systems that can assist people in making choices more aligned with their long-term goals [7]. Heuristics, in this context, are decision rules or decision-making strategies employed by people when structured and logical decision-making processes are too difficult [8]. They are often referred to as "rules-of-thumb" or mental shortcuts that provide a fast solution. In some situations, these heuristics can result in an optimally efficient choice or function to improve survival, but often, these decision strategies lead to a biased outcome. In this frame of reference, biases relate to suboptimal decisions or "irrational" choices that are incongruent with an individual's utility and preferences.

Despite its broad appeal and wide range of applications, considering heuristics and biases in consumer health decision making is rare. Where behavioural economic theory has been applied to health, it is usually in relation to drug advertising [9], medical insurance [10], or clinician bias [11]. A small number of studies have applied these theories to understand the impact of heuristic decision-making on quality of life [12–15]. None have evaluated the possible impact of heuristic decision making on cost effectiveness or program outcomes. Additionally, none have considered a heuristic lens or the possibility of leveraging anticipated heuristic decisions to improve outcomes, simplify choice, and maintain flexibility in home care programs.

Governments are under increasing pressure to improve the quality of aged care services, particularly in more developed countries where an aging population combined with technological advancements and improved education are placing increasing demands on already scarce resources [16, 17]. In this environment, it is critical that policy changes be evidence-based [18]. The relative dearth of empirical research in the application of behavioural economic theory in a health-care setting and the potential for factoring behavioural economic theory into home care resource allocation prompted the authors to explore what is currently known about heuristics and biases in the decision environment created by CDC policy. A systematic approach was considered most appropriate for ensuring broad coverage and the return of high-quality results that could be communicated to an audience of health professionals in a transparent and reliable way. A pilot search and review of the PROSPERO register confirmed that no systematic reviews have previously been conducted on this topic.

This review considered any research discussing the presence and influence of heuristics and biases in the decision making of older, community-dwelling adults receiving a package of care under CDC policy. The main research question asks how heuristics and biases influence home care package resource allocation decisions by older (>65) decision makers under CDC policies.

2. Methods

2.1. Systematic Review with Thematic Synthesis. We conducted a review following the PRISMA checklist [19], modified for qualitative and mixed-methods studies. The research question was developed prior to the database search but subsequent to a pilot search that guided the identification of keywords used to develop the search strategy. Keywords and synonyms are described in Table 1.

2.2. Search Strategy. The search strategy was developed by the primary author in consultation with an academic research librarian. The academic librarian assisted with database selection as well as both developing and refining the PUBMED search string. The database search was conducted on 27th of April, 2022, and included literature from inception to the date of the search. There were no other filters placed on the search.

Seven databases were selected with the help of an academic librarian and the research team. Databases were selected by cross-referencing the focus of the database with research fields identified by the research question: PUBMED (health), Embase (medicine), PsychINFO (psychology and behavioural science), Scopus (Science), Web of Science (Science and Medicine), Cinahl (Nursing), and Econlit (Economics). A pilot search and the researchers' prior understanding of both the theoretical foundations of behavioural economics and practical aspects of the home care package program were used to identify key concepts and synonyms.

The search string initially attempted to identify papers with all four key concepts, joined by the Boolean operator "AND," with synonyms grouped in "OR" clusters. This initial approach returned zero results, so search criteria were relaxed to identify any articles containing a keyword (joined by "OR"). The search strategy developed in PubMed was translated for other databases using the Polyglot © tool. The full search strategy is included in Appendix 1.

2.3. Study Selection. All study types were considered, provided they addressed at least two of the four identified key concepts. The results of the database search were uploaded to Covidence© and subsequently curated through three screening stages. Initial searches and title and abstract

TABLE 1: Search terms.

	How do heuristics and biases affect home care recipient decision making/resource allocation under CDC?			
	1	2	3	4
Key concept	Home care packages	Consumer directed care	Allocative efficiency	Heuristics and biases in decision making
Free text terms/Natural language terms	Home care services Service providers	Person-centred care direct care Personalised care Customised care Collaborative care Choice	Allocational efficiency Resources allocation Optimal distribution of resources Informational and transactional efficiency Cost benefit	Mental shortcut problem solving Decision making strategy Cognitive bias Predilection Prejudice
Controlled vocab terms/Subject terms	Home care services Nursing home care agencies Home nursing		Resource allocation Allocation of resources efficiency, Allocative health care rationing	Heuristic Rule of thumb observer variation Selection bias Systematic bias Decision support Game theory Mental processes Thinking Choice behaviour Negotiating Uncertainty

screening were independently evaluated by two reviewers, and any disagreement or uncertainty was discussed with the authorial team until consensus was reached. If the article title and abstract contained at least two key concepts, it was advanced to the next stage. The subsequent stage of screening involved full-text evaluation, where articles were included if they met all inclusion criteria. A full-text screen was completed by the primary author, and the results were cross-checked by the authorial team during regular project team meetings.

2.4. Inclusion Criteria. Table 2 defines the applied exclusion criteria. The main guiding criteria were the inclusion of key concepts, identified by the four key words and their synonyms shown in Table 1.

2.5. Data Extraction. Data extraction was conducted by the primary author and confirmed with the authorial team. Basic metadata was manually recorded in Excel, including title, authors, year of publication, type of setting, country of setting, journal, and discipline. Descriptive information about the chosen methodology, outcomes of interest, and study population was concurrently recorded.

2.6. Critical Appraisal. Due to the multidisciplinary nature of the question and the wide variety of research types, a standard risk of bias assessment was not conducted. There is no standard method for assessing the risk of bias or quality in qualitative reviews [20]. This does not exclude the requirement to check rigor, credibility, and relevance. As such, papers were appraised with tools appropriate for their study type. The narrative review was assessed using the SANRA (scale for quality assessment of narrative review articles) [21], and the remaining papers were critiqued with the MMAT (mixed methods appraisal tool) [22]. The MMAT is a validated instrument developed to assess the quality of different study types. It affords flexibility to consider elements of most empirical research and identify the presence or absence of key quality indicators appropriate to the methodology. The appraisal was conducted independently by two researchers (the primary author and a researcher external to the authorial team) and subsequently mapped for consensus.

2.7. Thematic Synthesis. An inductive, iterative (3-cycle) comprehension analysis was conducted to produce a thematic synthesis [23]. All text in the included studies was coded, categorised, and synthesised by the primary author and subsequently presented for discussion with the authorial team. The initial coding followed an inductive line-by-line method to understand the text. The resulting codes were then grouped into descriptive themes through a subtext analysis. Engagement with descriptive themes and the experiences of the authorial team across economics, behavioural science, health care, and public health, provided for contextual analysis and the definition of analytical themes.

3. Results

The systematic search strategy applied to seven databases returned 1220 results that were imported to Covidence©. 644 were identified as duplicates and removed during deduplication. The remaining 576 were screened by title and abstract, with 414 identified as irrelevant to the research question. 156 were subjected to full-text review, and 11 met the final criteria. The process is summarised in the PRISMA flow diagram (Figure 1).

3.1. Database Search. Every database returned some results, though the number of results varied significantly across databases (Table 3). Business databases had the fewest results, and Scopus, a multidisciplinary science-focused database, returned the most. All articles identified in Scopus, however, were also retrieved from other databases, so all search results returned from Scopus were deleted as duplicates.

3.2. Study Selection. Title and abstract screening were conducted asynchronously by the research team. Each author had individual access to the database search results in Covidence© and could review citations independently. A decision to include or exclude a citation required confirmation from at least two authors, with any uncertainty discussed in regular research team discussions.

3.3. Exclusion Criteria. Full-text screening was conducted by the primary author and findings confirmed with the authorial team during research team discussions. A total of 156 articles were evaluated against a criteria developed in relation to the research question. Definitions for exclusion reasons are outlined in Table 2.

3.4. Data Extraction. Eleven articles were determined to satisfy all criteria and provide insights to address the research question. These articles were methodologically diverse, derived from geographically varied locations, and reported details of different subgroups. None of the studies contained all four key concepts, but several contained three. Table 4 reports particulars on methodology and subgroup analysis, and Table 5 details metadata collected about the papers.

3.5. Critical Appraisal. In the absence of standardised critical appraisal methods in qualitative research and the application of strict checklists or scoring argued to result in the loss of high-quality or novel material that answers the query, quality assessment is conducted here as a comment on the elements included in the papers that are considered best practice for the study type. SANRA and the MMAT do not yield an overall score but allow the reader to apply screening questions that can be answered as yes, no, partially, and cannot tell. The consensus mapping conducted by the two quality reviewers on the included papers is available in Appendix 2.

TABLE 2: Exclusion criteria.

Exclusion labels	Definition
Wrong setting	The setting (context where research was conducted) was not at home
Wrong patient population	The population included in the study were not over 65 or the population of the study were not actively making choices about their care
Wrong indication	The indication (set of circumstances) was not home care resource/budgeting decisions (for example, quality of life measurement in home care)
Wrong intervention	The intervention (budget allocation) was not the focus of the study (for example, a study evaluating the impact of participatory research design in health service planning)
Irrelevant	Specifically applied to the time of publication being outside of CDC policy (for example, do consumers want to be involved in health care decisions published in 1984)
Grey literature	Publications arising from nonacademic or nonpeer reviewed sources
Wrong comparator	Comparator (control variable) was outside the scope of resource allocation/ budgeting in home care (for example, a study looking at advertising, antidepressant use, and the prevalence of depression)
Wrong study design	Design of the study was not able to be evaluated under the qualitative systematic review framework (e.g., published protocol, animal studies, and editorials)
Not in English	Study was written and reported in a language other than English

3.6. Thematic Synthesis

3.6.1. First Iteration—Textual Comprehension. The first iteration of inductive coding applied a line-by-line method, considering the textual meaning of each sentence in each paper. This generated a code book of 150 lines. The generated code book is available in Appendix 3.

3.6.2. Second Iteration–Subtextual Comprehension. The second iteration of coding involved grouping each code into categories reflecting congruous syntax (similar meaning between text codes). Eight categories were identified and are described below. The contributions of each article to themes are available in Appendix 4.

(1) Decision Making Is Complex (Which Induces Heuristic Decision Making). Ten of the eleven papers reference the complexity of decision making [13, 15, 24–30, 32]. Factors that complicate decision making in older age are numerous, including time, trade-offs, information quality, the number of decisions being made, and the number of choice options within those decisions [13, 25, 26, 28]. It is acknowledged that the choice set (suite of options) is an important feature of decision making [25], but how many options and how to present them are unclear.

As decision complexity increases, so does confusion and uncertainty [24, 25, 28]. These shifts produce alterations in decision making, tending toward the recruitment of heuristic strategies over systematic and reasoned judgement that produces suboptimal decisions [31]. Quality and consistency of decisions decrease as age increases, and more heuristic patterns are observable [24, 31]. Reported behaviours include placing disproportionate weight on relevance or familiarity; a tendency to choose information presented first; a tendency to trust informal information sources over official or evidence-based information; a reduction in time spent searching for information; a tendency to be satisfied with the status quo; and an increase in risk aversion [13, 15, 24–28, 30, 32].

(2) Decision-Making Strategies Are Heterogenous. There is an inherent assumption that decision making is a static and rational process that lends itself to economic models, i.e., when a person makes a decision, the judgement is final and the individual will consistently choose in line with that judgement [31]. Models of decision making often assume that associated strategies are homogenous and consistent over the life course [24, 31] and that rational choice will reliably lead to optimal allocation of resources [26, 28], provided the consumer is fully aware of all possible constraints and outcomes [13, 15, 30] and is able to process available information [28]. In reality, these assumptions do not hold [28, 31].

Decision making is a heterogenous process with temporal and longitudinal implications and individuals display dynamic preferences influenced by experience, culture, generation, gender, and age [24]. Further complicating this is a commonly employed strategy to transfer decision-making authority to a third party, either to an entity perceived as being of higher authority (e.g., GP or service provider) or to an entity perceived as more capable of making the decision (e.g., a child or spouse) [26, 28].

(3) Decision Making Changes over the Life Course. Another prevalent assumption is that decision-making strategies remain fixed, i.e., that a person will make a decision in the same way when they are 20 as they will when they are 60 [31]. Evidence presented in ten of the articles suggests this is not the case, indicating that age-related changes in decision making are measurable and that the overall effect is a decline in decision quality [13, 15, 24–28, 30–32]. The reasons for this decline are generally related to cognitive function [13, 15, 24, 28, 31, 32], including decreases in processing speed [24, 31], executive function [24], and working memory.

These declines do not mean that older people are incapable of making decisions, they can be highly adaptive, but patterns of decision making will change [25]. Altered patterns in decision making need to be accounted for,
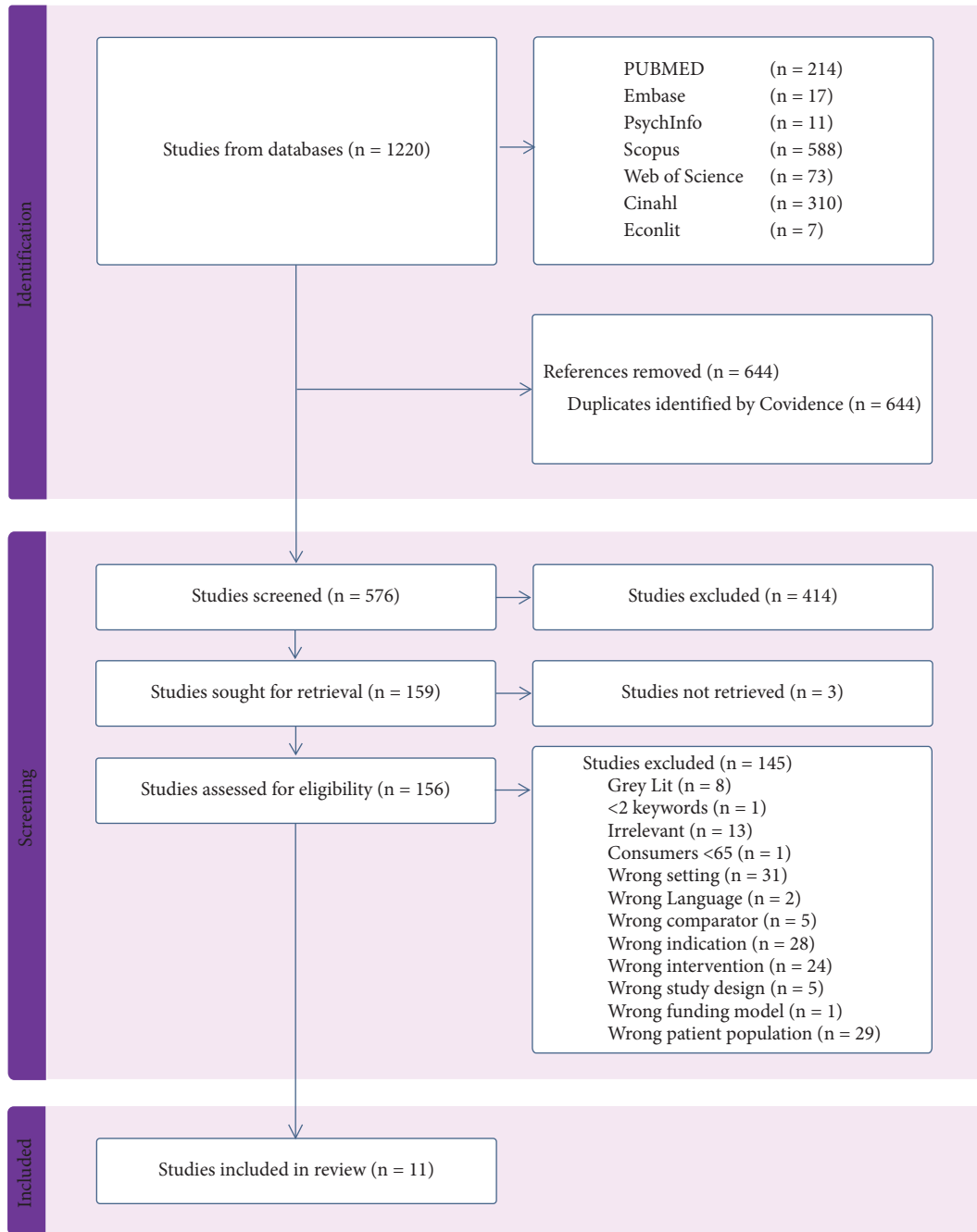
Figure 1: PRISMA flow diagram.

Table 3: Database search results.

Sources	References	Duplicates	Added to screen
CINAHL	310	4	306
EconLit	7	0	7
Embase	17	17	0
ProQuest	73	3	70
PsychINFO	11	7	4
PubMed	214	25	189
Scopus	588	588	0
TOTAL	1220	644	576

TABLE 4: Data extraction.

Authors	Samples	Age range	% female	Objective	Keyword concept	Evaluation method	Measurement
Carpenter and Yoon [24]	NA	NA	NA	Review of extant research on effects of normal aging on cognition and decision processes	Consumer directed care; heuristics and biases in decision making	Narrative review of extant research	Expert review and commentary
Duner et al. [25]	2792 + 28	65+	69%	Investigate older users of home care views and opportunities to exert influence on how services are received	Home care package; consumer directed care	Combined postal survey with reports from qualitative interviews based on Hirschman's framework of consumer strategies to evaluate what was defined as a "quasi-market"	Descriptive statistics and deductive thematic analysis
Elbel et al. [26]	1010	8–89	42%	Improve understanding of how to facilitate the choice process	Consumer directed care; allocative efficiency; heuristics and biases in decision making	Survey-based hypothetical choice experiment	Observed choice
Gill and Cameron [27]	11	60–71	81%	Elicit expectations for health services in the near future (next generation)	Consumer directed care; heuristics and biases in decision making	Constructivist ground theory informed identification of key characteristics, and an inductive approach was taken to thematic development	Qualitative coding-constructivist grounded theory
Gill et al. [13]	14	65+	NA	Explore consumer experience of consumer directed care	Home care package; consumer directed care;	Semi-structured in-depth interviews; thematic framework over transcripts in line with constructivist grounded theory	Thematic analysis of coded interviews
Hillcoat-Nalletamby [28]	29	Mean 81.5 (SD 8.3)	75%	Critical reflection on limitations of rational choice approach to understanding older people's decision making	Home care; consumer-directed care; heuristics and biases in decision making	A critical reflection of the rational choice approach, developing an inductive model describing different choice pathways—proactive coping theory	In case and constant comparison
McWilliam et al. [29]	279	65+	NA	Explore cost consequences of clients choice to case management approaches in home care	Home care package; consumer directed care	Telephone survey with a natural experiment where participants chose their preferred method of case management	ANOVA and regression analysis
Rahja et al. [15]	15	70–94	75%	Understand decision making processes and spending preferences of community-dwelling seniors eligible for home care packages	Home care packages; consumer-directed care; heuristics and biases in decision making	Applied behavioural economic theory to a think-aloud process	Hypothetical choice experiment and thematic analysis of semistructured interviews
Rowland and Joyce [30]	38	NA	77.5%	Understand motives and drivers of spending decisions	Home care package; allocative efficiency	Semi-structured interviews in a thematic analysis	Inductive content analysis

TABLE 4: Continued.

Authors	Samples	Age range	% female	Objective	Keyword concept	Evaluation method	Measurement
Tymula et al. [31]	135	21–90	55%	How decision-making function changes across the life span by measuring risk and ambiguity attitudes in the gain and loss domains	Allocative efficiency heuristics and biases in decision making	Discrete choice experiment	Attitudes toward risk and ambiguity
Wang et al. [32]	318	Mean 77.3 (SD 7.11)	76%	Elicit preference (WTP) for community based long term care on level of flexibility in service provision	Home care package; consumer directed care; heuristics and biases in decision making	Applied random utility theory to a mixed methods analysis, combining a cross-sectional survey and a discrete choice experiment	Generalised multinomial logistic model (willingness to pay)

TABLE 5: Article metadata.

Authors	Type of study	Journal	Academic fields	Setting (country)	Quality appraisal tool
Carpenter and Yoon [24]	Qualitative (narrative review)	Annals of the New York Academy of Sciences	Science	United States	SANRA
Duner et al. [25]	Mixed (survey and qualitative interviews)	Ageing and society	Interdisciplinary, international study of aging	Sweden	MMAT mixed methods
Elbel et al. [26]	Quantitative nonrandom (convenience sample choice experiment)	Journal of Health Services Research and Policy	Health services/Policy	United States	MMAT quantitative randomised controlled trial
Gill and Cameron [27]	Qualitative	Health and Social Care in the Community	Community health care	Australia	MMAT qualitative
Gill et al. [13]	Qualitative (semistructured interviews)	BMC Geriatrics	Gerontology	Australia	MMAT qualitative
Hillcoat-Nalletamby [28]	Qualitative (interviews on randomly selected subset)	Ageing and Society	Interdisciplinary, international study of aging	United Kingdom	MMAT qualitative
McWilliam et al. [29]	Quantitative nonrandom (analysis of data sample and surveys)	Care Management Journals	Programs and policies for home-bound frail elderly	Canada	MMAT quantitative (nonrandomised)
Rahja et al. [15]	Qualitative	Australian Journal of Social Issues	Interdisciplinary social policy debate	Australia	MMAT qualitative
Rowland and Joyce [30]	Qualitative (semi-structured interviews)	Australasian Journal of Ageing	Social research and policy; gerontology	Australia	MMAT qualitative
Tymula et al. [31]	Quantitative nonrandom (behavioural experiment)	PNAS	Psychological and cognitive science economic sciences	United States	MMAT quantitative (nonrandomised)
Wang et al. [32]	Quantitative randomised controlled trial (discrete choice experiment)	International Journal of Environmental Research and Public Health	Public health	China	MMAT quantitative (RCT)

acknowledging that older people are more inclined toward heuristic thinking than younger people [24]. General patterns suggest that older people require more time to process information [24], are more inclined to make decisions emotionally rather than factually (i.e., the affect heuristic) [13, 15, 24, 25, 30, 32], and will make decisions based on what is familiar to them (i.e., the availability heuristic) [13, 15, 24–26, 28]. It is therefore important for decisions to be framed in meaningful, relevant ways [24]. Older decision makers are easily distracted and less inclined to search for information or spend time processing information, instead anchoring themselves to information that is presented first [24, 26]. This increases susceptibility to suggestion and framing effects [13, 24].

Further to this, the initial stated preferences may change. What a person predicts they will want or need does not always correlate with what they actually want or need in the future [27]. Older people may be more aware of this, tending to underspend budgets and be risk-averse [30]. The reasons cited for this are "saving for a rainy day" or simply being uncertain of what the future holds.

(4) There Are Many Methods to Evaluate Decision Making. While most papers included in the review are qualitative, a variety of different techniques and methods were employed to examine decision making (Table 4). Many qualitative authors used a thematic evaluation, but the informing paradigm was highly variable [15, 27, 28, 31, 32]. This variety provides choice not only for methods to further investigate decision making under CDC models but also complicates replicability as there is no standardised way to evaluate decision making.

(5) Consumer Decision Making Impacts Resource Allocation. The most significant emergent finding is that the impact of the CDC funding model on resource allocation is unknown [13, 27, 29, 30, 32]. Marketisation and consumer choice in aged care have advocates and opponents in equal measure [25]. Much has been written regarding the need for autonomy in aged care and the effects on welfare when consumers feel empowered [13, 15, 25, 32], but the effect of the policy has been an increase in financial stress and confusion [25, 26]. One paper suggests incoming policyholders will approach decisions in a different way due to their experience with the system and differences in the generational mindset, but there is no indication or reference frame to consider whether these differences result in improved outcomes [27].

Economic outcomes reported in the studies suggest that the immediate costs of the program are not significantly different, but these studies are not comprehensive economic evaluations [29, 30, 32]. There is a singular reference to the tendency toward underspending of home care funds under CDC, which has further implications for policy, resource allocation, and appropriate distribution of funds for maximising welfare [30].

Preferences for services under CDC funding are also of questionable efficacy, with a tendency for older people to nominate services provided "for" over services provided "with" (e.g., house-cleaning is provided for a home care recipient, or physiotherapy is a service provided "with" the person to improve the ability to complete their own housework) [15, 25]. Whether or not assistance with domestic care has superiority over allied health services in preventing hospitalisations or transfer to residential aged care from a home care setting is not established.

(6) Consumer Decision Making Has Implications for Policy. The literature makes clear that the current policy trend toward free choice is placing significant pressure on the aged care industry for a paradigm shift [13, 30]. What this provision of autonomy looks like is not clearly defined [13]; however, simply assigning a dollar figure to a person is insufficient to achieve the required level of care or the desired outcomes of home care programs [27]. An understanding that the choices of consumers may not necessarily reflect the anticipated or "rational" decision needs to be established and a clearer idea of how those decisions influence outcomes needs development [28, 31]. Consistency of delivery, availability of information, and support for decision makers are all critical to policy success [15, 24, 26, 31].

Acknowledgment of the impact of the decision-making environment and the parties involved in decision-making discussions is also lacking [30]. Decisions are not made in a vacuum, and involved parties are prone to their own heuristic thinking and associated biases [13, 25, 28, 29]. How these interplay and influence resource allocation needs to be considered in further developing policy and service delivery models in government and industry [13, 27, 29, 30, 32]. Under current CDC policy, consumers lack confidence in the level of control they have and are both confused and ignorant of the services they are entitled to [13, 15, 25, 30]. In other words, they have autonomy but do not know how to use it.

(7) There Are Ways to Improve and Support Decision Making across the Life Course. There are numerous techniques for improving decision quality, particularly in situations where heuristic or "irrational" decisions dominate [13, 15, 24, 26, 30–32]. While it is accepted that freedom of choice is desirable, there is also a requirement to support decision makers in revealing their optimal choice [26]. Most decision aids aim to reduce cognitive load by altering the decision-making environment [13, 24, 26].

The most common technique for both simplifying and guiding decision making is improving communication [15, 26, 30]. Communication strategies employed in home care programs are currently insufficient [15, 30]. Format and presentation, including the order of presentation, significantly influence decision making [15, 26, 30]. The amount of information currently provided to home care recipients is overwhelming, confusing, and sometimes conflicting [13, 25, 26, 30, 32]. Combined with the information seeking behaviours associated with older cohorts, this information overload shifts older decision makers toward the status quo or decision deferral [15, 25, 32].

There are many ways to simplify information and reduce the cognitive load [24]. One option available to policymakers is the use of a well-considered default option [26, 32]. This type of choice architecture, or nudge, automatically selects

a "best-fit" for resource allocation while still affording the option to change allocations, thereby providing flexibility to the decision maker without adversely impacting autonomy [26]. There are valid concerns with this approach around the capacity to manipulate decisions without the decision maker's conscious awareness, but it remains a powerful technique to simplify difficult decisions.

The final variable discussed is time: time to make the decision, time to consider the decision, and time to change decisions [13, 24]. Cognitive decline associated with aging includes a reduction in processing speed [24]. This does not mean an inability to think or make decisions, thought processing is slower and fewer items are retained in short-term or working memory [24, 25, 31]. There is some evidence that systematic decision-making processes can be activated by increasing the time allocated to decision making and prompting the decision maker to consider their decision rationale, i.e., to think about their thinking [24, 31]. Breaking down the requirements for decision making so that one decision is considered at a time is also beneficial [30, 32].

(8) Further Research Is Needed. All articles indicated that additional research is needed [13, 15, 24–32]. Research on the impact of aging on decision making and behavioural biases is limited [24, 26, 27, 31]. The majority of papers are qualitative and have small sample sizes [15, 30]. Some of the larger studies were designed with surveys [13, 25, 26, 28, 29], but surveys are prone to responder bias, so true representation of older decision makers is difficult to establish. Most of the studies adopted a normative perspective without clear direction on how to positively evaluate outcomes [13, 25, 26, 29]. None of the studies represented first nations' peoples or participants from culturally and linguistically diverse (CALD) backgrounds, it is therefore unlikely that results are generalisable to these populations [15].

The largest area of identified need is an evaluation of the outcomes of CDC policy, namely that the main objectives of home care programs are realised [13, 15, 26, 29, 30]. Much of the focus of research has been evaluating older adults' satisfaction or happiness with programs under CDC policy as a proxy for Quality of Life [13, 15, 26, 29], but there is no clear link between individual satisfaction with the program and successful program outcomes, such as reduced rates of hospitalisation or delayed transfer to residential aged care.

How home care resources are allocated remains a clear area of research need, particularly identifying how service choices influence program outcomes [13, 27, 29, 30, 32]. The cost consequences of choice patterns need to be calculated and evaluated against other mechanisms of resource allocation to identify how the limited government funding can maximise welfare. There is also opportunity for further exploration around levels of support for decision making under CDC, and what impact supported decision making may have on resource allocation efficiency.

3.6.3. Third Iteration—Contextual Comprehension. The third and final iterations of coding involved application of the researchers' knowledge of behavioural economics and

health care provision to the descriptive categories, translating to five analytical themes that answer the research question of whether and to what extent heuristics and biases influence decisions for resource allocation under CDC. Themes are threads of meaning that weave together to define the overall narrative and answer the central question. The inquiry was focused on home care recipients, as this cohort has been endowed with decision-making responsibility for resource allocation under CDC policy.

(1) A Question of Autonomy. There is no argument that flexibility of choice and empowerment (autonomy) of older people is the socially desirable, current aim of the CDC funding model [13, 27, 32]. The debate rests on the question of how to provide that autonomy whilst ensuring an efficient allocation of resources, particularly given the scarcity of government funding available for welfare provision [27, 29].

There are many assumptions made about what autonomous decision making looks like [25, 31]. With respect to home care funding distribution, there is an assumption that autonomy can only be achieved if the decision maker is left alone to evaluate the many complexities, sifting through voluminous piles of paper, and considering their uncertain future [13, 15, 28, 32]. What this research clarifies is that decisions are never made in isolation [13, 25, 28, 29]. This approach to individual autonomy creates a barrier to effective decision making and may have the opposite effect of its intention, inducing inertia and choice deferral rather than empowering older people to make decisions that are meaningful to them [15, 25, 32].

There is a very clear policy direction toward client-centric models of care across the developed world, forcing industry change that is reported to be desirable [27, 30]. It rests on a quasi-market, engaging participants who are not prepared or equipped to manage the change on either the supply or demand side [13, 25, 27, 30]. The effects of this are currently unknown and unmeasured, meaning the success of the program is unable to be accurately determined.

(2) Choice and Choice Preference Are Heterogenous. To date, policy has considered decision makers as a homogenous group; however, the literature shows that older people are a very heterogenous population and exhibit extensive diversity in decision-making pathways [13, 15, 24–32]. What is also clear is that decision-making capacity, capability, and behaviour differ substantially over the life course [13, 15, 24–28, 30–32].

Existing literature concerning home care under CDC policy is concerned primarily with satisfaction [13, 26–29]. Little information has been gathered regarding outcomes associated with resource allocation by consumers, particularly measures of program success [13, 26–29]. While an argument can be made that satisfaction is associated with improvement in quality of life and that quality of life improves well-being, there is an absence of evidence that satisfaction reduces hospitalisation, institutionalisation, or death. As such, more research is required to understand the heterogeneity of decision making and the role of satisfaction in improving program outcomes [13, 15, 25, 27, 30, 32].

Experience and expertise are generally considered to improve decision quality [13, 15, 25, 30, 32]. This assumption does not always hold. In some instances, experience assists decision makers in making sense of available information [30], while in others, it can produce overconfidence bias [33]. Whether or not home care recipients exhibit learning based on experience with the program not being exclusively or extensively studied [31]. A cohort of people approaching home care eligibility assert that they have learned from experience with their parents and have different expectations of the program, whether this holds "when the time comes" remains uncertain [27].

When considering empowerment and the right to choose, what is often overlooked is the option to not make a choice [28, 32]. Many decision makers faced with increasing risk or uncertainty will opt to maintain the status quo, because it is perceived as the simpler path [15, 25, 32]. This is known as inertia or status quo bias [34]. A dependence on familiarity produces suboptimal decisions [24, 34]. In the case of a home care program, it results in resource allocation inefficiencies such as underspending or preferencing an existing service mix that potentially meets wants ahead of needs [15, 25, 30, 32]. In some situations, the inertia can and should be overcome through decision support or with the use of decision aids [26], while in others, it is a valid choice and should be respected [28]. There is a requirement to cater for multiple decision-making pathways that reflect the heterogeneity and individualism of choice, with the caveat that supported decision making and the choice not to choose are as valid as decisions made alone [13, 15, 24, 26, 30–32].

(3) Decision Making is a Dynamic and Longitudinal Process. There is a consensus that understanding consumer decision making is important to the success of home care programs, CDC policy, and the quality of aged care services [13, 15, 25, 27, 30, 32]. This is coupled with the assumption that decision making is static and occurs at a specific point in time [28, 31]. Analysis of decision making proves the opposite is true [13, 15, 24–28, 30–32].

There is no definition of a "good" decision; strategies vary both across and within individuals, and choices or decisions change with shifting circumstances, possibly even depending on the time of day the decision is made [15, 25, 27–29, 31, 32]. While rational modelling and utility theory draw calculations from mathematical equations, people can and do change their minds [24, 27, 28, 31]. Decisions made in environments of risk and uncertainty are particularly prone to change [15, 30, 31]. There are some predictable thought processes and decision-making behaviours (heuristics) that explain some of the variance in observed decision quality [15, 24, 26, 27, 31].

Several authors comment on the tendency for older people to make decisions based on emotion rather than factual information, labelled the affect heuristic [15, 24, 25, 30, 32]. Personal relevance and relying on gut feeling becomes more prevalent with age [24]. Building relationships is often considered more important than the services provided. In some instances, affect heuristic can improve

decisions, compensating for declining deliberative processes, but only with sufficient information to inform the decision. Affect also explains some of the positivity effect seen to increase with age and the tendency for older people to feel more satisfied [13, 24]. It also increases anchoring and loyalty to providers of services that home care recipients are already receiving, intensifying the status quo bias [30].

Further comments are made regarding the tendency for decisions to be made based on what is familiar rather than what is "rational," labelled the availability heuristic [15, 24–26, 28]. This also contributes to the inertia of status quo bias, explaining why repeat purchasing is common, why purchases of common brands are more prevalent than others, and why services are selected based on what a recipient knows about other people receiving those same services [24, 30]. The observed trend to opt for services such as domestic help and gardening are partly attributable to the recipient's familiarity with those services through social networks and neighbours [25, 28]. It is established that many home care recipients have insufficient knowledge of what products and services are available to them through the program, so they rely on what they have heard from others [13, 30].

Information is provided to home care recipients to assist them with addressing their knowledge gaps regarding service provision, but this information accumulates rapidly and is difficult to process, culminating in a state of information overload [13, 15, 25, 30]. Being overwhelmed and confused also induces inertia. In this frame of mind, particularly if there are numerous options and multiple decisions being made at the same time, the cognitive effort required to make a decision exceeds the cognitive effort required to remain the same [24].

People have a tendency to protect what they perceive to be theirs, a so-called "loss aversion" [31]. It is difficult to ascertain how home care recipients view their funding allocation and whether this perception differs under different models [30]. There is a possibility that loss aversion can explain the tendency to underspend, an acknowledged problem with resource efficiency in home care package spending. Once the funding is received, home care recipients are unwilling to lose it. It can also explain why some package recipients will accept a package at a level different from their existing needs, either lower than the approved level or, in some cases, higher than their current needs. Accepting a package is preferable to "giving it up," especially if you are unsure how long you will have to wait if your circumstances change in the future.

(4) The Decision-Making Environment. The presence of heuristic decision-making behaviours leads many of the authors to propose strategies to improve the quality of decision making, and this is achieved through manipulation of the decision-making environment [13, 15, 24, 26, 30–32]. While the principle aim of CDC is to provide choice and flexibility to community-dwelling older adults, it needs to be recognised that people exercise their freedom of choice in a variety of different ways, including the shaping of their perspectives and opinions by inputs from the decision-

making environment [26, 28]. In some instances, autonomy can be a barrier, adding complexity and difficulty to an already difficult decision [25]. In other situations, they may prefer sharing their autonomy or may consider third-party decisions to yield more optimal outcomes than their own [28]. It is important that service providers responsible for implementing care under CDC are sensitive to these nuances and are able to recognise when support for decision-making is in the best interests of home care recipients.

The way information is presented to decision makers has a significant impact on the decision-making environment and the level of difficulty for decision makers [13, 24, 26]. The volume, clarity, and consistency of information all influence the amount of cognitive effort required to make decisions [26]. The order in which options are presented, propensity to be distracted, and relevance of the information to the individual determine how much weight the information is given, and these influences are more apparent in older decision makers [24, 26, 31]. Information seeking and assumptions about how older people search are of significance to decision-making. Under existing programs, information, while copious, is insufficient to support informed decision-making, and is instead confusing and overwhelming [13, 30]. Knowing the effect of presentation and its influence on choice provides an opportunity to simplify and clarify home care funding for recipients and potentially support choices that maximise welfare for both the individual and a wider aged care community.

(5) Limitations of Existing Literature. All authors identify significant barriers and limitations in using qualitative studies to analyse resource allocation [13, 15, 24–32]. For the most part, there are insufficient studies that evaluate the outcomes of decisions made under CDC policies [13, 15, 26, 27, 29, 30]. While qualitative studies gather the depth required to evaluate how specific individuals approach decisions, the exclusion criteria and restriction of sample size result in a failure to capture diversity in study populations[15].

Qualitative studies are also difficult to replicate and hard to draw generalisable findings from [13, 24–26, 30]. Laboratory experiments provide useful insights, but the constraints of controls often mean real-world observations do not support the findings [31]. Simulations are another common method for evaluating decisions and efficient resource allocation, but accurate population proportions are difficult to calculate, and large datasets at the individual level are not readily accessible [32]. Surveys provide for the collection of quantitative and qualitative data from larger samples but are plagued by selection bias [29]. In short, it is difficult to measure the heterogeneity of decision making in a generalisable way.

Further gaps are evident around outcomes [13, 15, 26, 29, 30]. Qualitative studies are useful for establishing and exploring decision-making behaviours, but the effect of these behaviours on the outcomes of the policy or program are not yet measured [30]. It would be unwise to begin leveraging or mitigating heuristics and biases until it can be established that heuristic decision-making produces inefficient resource allocation and in what ways [26]. Intensive efforts are needed to link decisions to outcomes and evaluate the most cost-effective way of delivering home care programs.

4. Discussion

4.1. Research Implications. What is not written is as important as what is, and this review identifies large gaps in the literature relating to the effect of CDC policies on the outcomes of the program, not purely on client satisfaction at implementation. Many home care users remain confused, isolated, and unsupported under the CDC policy, and further empirical research is needed in various directions and domains to identify what heuristics and biases can be observed in the home care resource allocation decision-making environment with a view to mitigating or leveraging these behaviours to achieve optimal resource allocation.

4.2. Practice Implications. This paper presents a qualitative systematic review of the literature discussing recruitment of heuristic decision-making strategies and associated biases in resource allocation for Home Care Packages under CDC policy. While there are no specific studies on heuristics in home care decision making, several authors have attempted to examine the experiences and behaviours of seniors receiving care in this way. A number of key themes emerged about observable behaviours, barriers and drivers, and strategies to support decision making in older populations. Pragmatically, it is useful for practitioners involved in providing care to vulnerable older populations to be aware of how heuristics and biases alter over the life course and the effect of these alterations on decisions.

4.3. Policy Implications. All people should have the right to make decisions about their care, ensuring that care is provided in a dignified way that is enriching and meaningful to the person receiving care. In theory, the CDC should be a step toward achieving empowerment of senior citizens and the subsequent improvement in health outcomes. What this research indicates, however, is that this result is not guaranteed or correlated with improvements in quality of care and does not necessarily result in better program outcomes. Behavioural economics offers different views on this paradox of autonomy and can suggest interventions that consider observable human bias in their design, providing potentially powerful policy tools to improve program outcomes for senior citizens, service providers, and overall community welfare.

4.4. Limitations of This Review. There are numerous limitations to this review, stemming from the incongruence between qualitative research and systematic review methodology. The bias within systematic review methodology toward quantitative research means a significant body of knowledge is often excluded from these reviews, and this is harmful to good clinical practice. In attempting to address this, standardised processes such as PRISMA, risk of bias assessment, and data extraction had to be modified.

The systematic approach to database searching gives confidence that relevant literature has been sourced; however, methods of qualitative synthesis that both satisfy the requirements of systematic review and maintain the richness and depth characteristic of qualitative research are still being developed, so it is possible that some articles may be relevant but were excluded for quality-related reasons, for example, grey literature. As this methodology matures, the results of this analysis may change.

4.5. Further Research. To the authors' knowledge and at the time of writing, there is currently no research that specifically addresses the presence and influence of heuristics and biases in resource allocation decisions under the CDC for community-dwelling older adults receiving support to age in place. There are only eleven papers that address part of the question, and six of these are purely qualitative. There is only one randomised controlled trial. For behavioural economics to effectively inform policy, more research is needed to understand the effects of the interventions indicated by behavioural economic insights. For CDC to be a successful policy, a greater understanding of how decisions are made and what mechanisms can support decision making without sacrificing autonomy or quality of care is needed.

Glossary

Bias:	The resultant deviation from optimal when heuristic decision-making strategies are employed
Consumer directed care (CDC):	A policy position where the person receiving the funding has full choice of how the funding is spent
Heuristic:	Mental shortcuts that increase the speed of decision-making processes, though potentially resulting in less logical or efficient choices
Home care package program (home care):	A service bundle designed to support older adults to remain living in their home (rather than transfer to long term care facility)
Home care recipient:	Community dwelling older adult (65+) receiving services under a specific program to facilitate aging in place
Mixed methods appraisal tool (MMAT):	A critical appraisal tool designed to capture methodological quality of multiple study types (qualitative research; RCT, nonrandomised studies, quantitative descriptive studies, and mixed methods studies)
SANRA:	A scale assessment for quality assessment of narrative review articles.

Supplementary Materials

Supplementary File Appendix 1: Full search strategy, database selection, and translation of search stings in different databases. Supplementary File Appendix 2: Summary of quality assessment applying MMAT (mixed methods assessment tool) and SANRA (scale for the assessment of narrative review articles) by two reviewers and consensus mapping. Supplementary File Appendix 3: Codebook developed from line-by-line coding of included papers

(inductive comprehension). Supplementary File Appendix 4: Summary table showing contributions of papers to emergent themes (subtext analysis). (*Supplementary Materials*)

References

[1] N. Genet, "Home care across Europe: current structure and future challenges," in *European Observatory on Health Systems and Policies*, W. Boerma, M. Kroneman, and H. Allen, Eds., World Health Organization, Geneva, Switzerland, 2012.

[2] Australian Government Department of Health, "Home Care Packages Program reforms," 2019, https://www.health.gov.au/topics/aged-care/aged-care-reforms-and-reviews/home-care-packages-program-reforms.

[3] World Health Organization, "World Report on Ageing and Health," World Health Organization, 2015, https://apps.who.int/iris/handle/10665/186463.

[4] D. L. Kodner and C. K. Kyriacou, "Bringing managed care home to people with chronic, disabling conditions: prospects and challenges for policy, practice, and research," *Journal of Aging and Health*, vol. 15, no. 1, pp. 189–222, 2003.

[5] K. M. Ericson and J. Sydnor, "The questionable value of having a choice of levels of health insurance coverage," *The Journal of Economic Perspectives*, vol. 31, no. 4, pp. 51–72, 2017.

[6] R. S. Frantz, S.-H. Chen, K. Dopfer et al., *Routledge Handbook of Behavioral Economics*, Routledge, Taylor & Francis Group, England, United Kingdom, 2017.

[7] A. T. Schmidt, "The power to nudge," *American Political Science Review*, vol. 111, no. 2, pp. 404–417, 2017.

[8] D. J. Edwards, "Ensuring effective public health communication: insights and modeling efforts from theories of behavioral economics, heuristics, and behavioral analysis for decision making under risk," *Frontiers in Psychology*, vol. 12, Article ID 715159, 2021.

[9] K. J. Aikin, A. C. O'Donoghue, J. L. Swasy, and H. W. Sullivan, "Randomized trial of risk information formats in direct-to-consumer prescription drug advertisements," *Medical Decision Making*, vol. 31, no. 6, pp. E23–E33, 2011.

[10] J. Abaluck, "Improving the quality of choices in health insurance markets," *National Bureau of Economic Research*, NBER Working Papers 22917, 2016.

[11] J. S. Blumenthal-Barby and H. Krieger, "Cognitive biases and heuristics in medical decision making: a critical review using a systematic search strategy," *Medical Decision Making*, vol. 35, no. 4, pp. 539–557, 2015.

[12] N. B. Bulamu, B. Kaambwa, L. Gill, I. D. Cameron, and J. Ratcliffe, "An early investigation of individual budget expenditures in the era of consumer-directed care," *Australasian Journal on Ageing*, vol. 39, no. 1, pp. e145–e152, 2020.

[13] L. Gill, S. L. Bradley, I. D. Cameron, and J. Ratcliffe, "How do clients in Australia experience consumer directed care?" *BMC Geriatrics*, vol. 18, no. 1, p. 148, 2018.

[14] L. Phillipson, L. Smith, and C. Duncan, "Perspectives and practices associated with consumer-directed care in Australia: synergies and tensions in supporting planning and delivery of home care for older people with dementia," *Health & Social Care In the Community*, vol. 30, no. 5, pp. e2772–e2781, 2022.

[15] M. Rahja, K. Laver, L. Phillipson, T. Comans, and M. Crotty, "The decision-making processes and preferences of older Australians purchasing home support services: an explorative inquiry using a 'think-aloud' technique," *Australian Journal of Social Issues*, vol. 57, no. 2, pp. 372–387, 2021.

[16] National Academies of Sciences, *The National Imperative to Improve Nursing Home Quality: Honoring Our Commitment to Residents, Families, and Staff*, National Academics Science Engineering Medicine, Washington, DC, USA, 2022.

[17] T. Pagone and L. Briggs, "Royal Commission into aged care quality and safety, final report: care, dignity and respect, volume 1: summary and recommendations," *Commonwealth of Australia: Canberra, ACT*, vol. 1, 2021.

[18] D. Oliver, "Preventing hospital admission: we need evidence based policy rather than "policy based evidence"," *British Medical Journal*, vol. 349, 2014.

[19] M. J. Page, J. E. McKenzie, P. M. Bossuyt et al., "The PRISMA 2020 statement: an updated guideline for reporting systematic reviews," *International Journal of Surgery*, vol. 88, Article ID 105906, 2021.

[20] C. R. Jørgensen, T. G. Thomsen, L. Ross et al., "What facilitates "patient empowerment" in cancer patients during follow-up: a qualitative systematic review of the literature," *Qualitative Health Research*, vol. 28, no. 2, pp. 292–304, 2018.

[21] C. Baethge, S. Goldbeck-Wood, and S. Mertens, "SANRA—a scale for the quality assessment of narrative review articles," *Research Integrity and Peer Review*, vol. 4, no. 1, p. 5, 2019.

[22] N. H. Quan, P. Pluye, S. Fabregues et al., "Mixed Methods Appraisal Tool," 2018, http://mixedmethodsappraisaltoolpublic.pbworks.com/w/file/fetch/127916259/MMAT_2018_criteria-manual_2018-08-01_ENG.pdf.

[23] M. S. Linneberg and S. Korsgaard, "Coding qualitative data: a synthesis guiding the novice," *Qualitative Research Journal*, vol. 19, no. 3, pp. 259–270, 2019.

[24] S. M. Carpenter and C. Yoon, "Aging and consumer decision making," *Annals of the New York Academy of Sciences*, vol. 1235, no. 1, pp. E1–E12, 2011.

[25] A. Dunér, P. Bjälkebring, and B. Johansson, "Merely a rhetorical promise? Older users' opportunities for choice and control in Swedish individualised home care services," *Ageing and Society*, vol. 39, no. 4, pp. 771–794, 2019.

[26] B. Elbel, C. Gillespie, and M. C. Raven, "Presenting quality data to vulnerable groups: charts, summaries or behavioral economic nudges?" *Journal of Health Services Research and Policy*, vol. 19, no. 3, pp. 161–168, 2014.

[27] L. Gill and I. D. Cameron, "Identifying baby boomer service expectations for future aged care community services in Australia," *Health and Social Care in the Community*, vol. 30, no. 2, pp. 726–734, 2022.

[28] S. Hillcoat-Nallétamby, "'Pathways to choice' of care setting," *Ageing and Society*, vol. 39, no. 2, pp. 277–306, 2019.

[29] C. L. McWilliam, M. Stewart, E. Vingilis et al., "Can we afford consumers choice in home care?" *Care Management Journals*, vol. 8, no. 4, pp. 171–178, 2007.

[30] D. Rowland and C. M. Joyce, "Decision-making in home care package spending," *Australasian Journal on Ageing*, vol. 39, no. 4, pp. e559–e567, 2020.

[31] A. Tymula, L. A. R. Belmaker, L. Ruderman, P. W. Glimcher, and I. Levy, "Like cognitive function, decision making across the life span shows profound age-related changes," *Proceedings of the National Academy of Sciences*, vol. 110, no. 42, Article ID 17143, 17148 pages, 2013.

[32] K. Wang, E. L.-Y. Wong, A. Y.-K. Wong, A. W.-L. Cheung, and E.-K. Yeoh, "Preference of older adults for flexibility in service and providers in community-based social care: a discrete choice experiment," *International Journal of Environmental Research and Public Health*, vol. 19, no. 2, 2022.

[33] I. E. Beldhuis, R. S. Marapin, Y. Y. Jiang et al., "Cognitive biases, environmental, patient and personal factors associated with critical care decision making: a scoping review," *Journal of Critical Care*, vol. 64, pp. 144–153, 2021.

[34] D. Kahneman, *Thinking, Fast and Slow/Daniel Kahneman*, Farrar, Straus and Giroux, New York, NY, USA, 1 edition, 2013.