

A core capability framework for physiotherapists to deliver quality care when working with people living with dementia and their families/caregivers: An international modified e-Delphi

1. Morag E Taylor^{a,b,c}
^aFalls, Balance and Injury Research Centre, Neuroscience Research Australia, Sydney, New South Wales, Australia.
^bPopulation Health, Faculty of Medicine, University of New South Wales, Sydney, New South Wales, Australia.
^cUNSW Ageing Futures Research Institute, Sydney, New South Wales, Australia.
m.taylor@neura.edu.au
2. Karen Sverdrup^{d,e}
^dThe Norwegian National Centre for Ageing and Health, Vestfold Hospital Trust, Tønsberg, Norway.
^eDepartment of Geriatric Medicine, Oslo University Hospital, Oslo, Norway.
karen.sverdrup@aldringoghelse.no
3. Julie Ries^f
^fCenter for Optimal Aging and Program in Physical Therapy, Marymount University, Arlington, VA, USA
jries@marymount.edu
4. Erik Rosendahl^g
^gDepartment of Community Medicine and Rehabilitation, Umeå University, Sweden.
erik.rosendahl@umu.se
5. Gro Gujord Tangen^{d,e,h}
^dThe Norwegian National Centre for Ageing and Health, Vestfold Hospital Trust, Tønsberg, Norway.
^eDepartment of Geriatric Medicine, Oslo University Hospital, Oslo, Norway.
^hDepartment of Rehabilitation Science and Health Technology, Oslo Metropolitan University, Oslo, Norway
gro.tangen@aldringoghelse.no
6. Elisabeth Telenius^{d,h}
^dThe Norwegian National Centre for Ageing and Health, Vestfold Hospital Trust, Tønsberg, Norway.
^hDepartment of Rehabilitation Science and Health Technology, Oslo Metropolitan University, Oslo, Norway
elisabeth.w.telenius@aldringoghelse.no
7. Katherine Lawler^{i,j}
ⁱSchool of Allied Health, Human Services and Sport, La Trobe University, Melbourne, Victoria, Australia.
^jWicking Dementia Research and Education Centre, University of Tasmania, Hobart, Tasmania, Australia.
katherine.lawler@utas.edu.au
8. Keith Hill^{k,l}
^kRehabilitation Ageing and Independent Living (RAIL) Research Centre, Monash University, Frankston, Australia.
^lNational Centre for Healthy Ageing (NCHA), Monash University and Peninsula Health, Frankston, Australia.

Keith.Hill@Monash.edu

9. Annika Toots[§]
[§]Department of Community Medicine and Rehabilitation, Umeå University, Sweden.
annika.toots@umu.se
10. Hans Hobbelen^{m,n}
^mResearch Group in Healthy Ageing, Allied Health Care and Nursing, Hanze University of Applied Sciences Groningen, The Netherlands
ⁿDepartment of General Practice and Elderly Care Medicine, University Medical Center Groningen, University of Groningen, Groningen, The Netherlands.
j.s.m.hobbelen@pl.hanze.nl
11. Vanina Dal Bello-Haas^o
^oSchool of Rehabilitation Science, McMaster University, Hamilton, Ontario, Canada.
vdalbel@mcmaster.ca
12. Abi Hall^p
^pDepartment of Public Health and Sports Science, University of Exeter, Exeter, UK.
A.Hall4@exeter.ac.uk
13. Susan W Hunter^q
^qSchool of Physical Therapy, The University of Western Ontario, London, Ontario, Canada.
smuir4@uwo.ca
14. Victoria A Goodwin^p
^pDepartment of Public Health and Sports Science, University of Exeter, Exeter, UK.
V.Goodwin@exeter.ac.uk
15. Julie Whitney^f
^fDepartment of Physiotherapy, The School of Life Course & Population Sciences, King's College London.
julie.whitney@nhs.net
16. Michele Callisaya^{l,s,t}
^lNational Centre for Healthy Ageing (NCHA), Monash University and Peninsula Health, Frankston, Australia.
^sPeninsula Clinical School, Monash University, Melbourne, Australia.
^tMenzies Institute for Medical Research, University of Tasmania, Hobart, Australia.
michele.callisaya@monash.edu

Twitter handles: @taylor_morag; @MicheleCallisaya

Corresponding author: Morag Taylor, Falls, Balance and Injury Research Centre, Neuroscience Research Australia, 139 Barker St, Randwick, New South Wales, Australia. Phone: +61 2 9399 1885; Email: morag.taylor@unsw.edu.au

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ABSTRACT

Objective: What are the core capabilities physiotherapists need to deliver quality care when working with people with dementia and their families/caregivers?

Design: A three-round modified e-Delphi study.

Participants: Panel members were physiotherapists experienced in working with people with dementia and/or educating and/or researching in the dementia field.

Methods: A steering group (16 international physiotherapists and a consumer) developed a draft framework including 129 core capabilities across 5 domains for panel members to rate their appropriateness for inclusion as a core capability to provide high quality care to people with dementia and their caregivers/families. The RAND/UCLA method was used to assess consensus.

Results: Thirty-five physiotherapists from 11 countries participated in Round 1, 31 (89%) in Round 2 and 28 (80% of Round 1) in Round 3. All core capabilities were rated appropriate for inclusion in each round. Panel members recommended wording refinements across the rounds and suggested 52 core capabilities for consideration. Three rounds were needed to reach consensus, resulting in 137 core capabilities rated appropriate for inclusion across 5 domains: 1) Knowledge and understanding, n=36; 2) Assessment, n=39; 3) Management, interventions and prevention n=40; 4) Communication, therapeutic relationship and person-centred care, n=17; and 5) Physiotherapists self-management and improvement, n=5.

Conclusions: This e-Delphi outlines the core capabilities physiotherapists need to provide high quality care to people with dementia and their families/caregivers. These core capabilities can be used by physiotherapists to help identify knowledge/skill gaps, as well as by educators to improve their training of undergraduate and postgraduate students, and clinicians.

Contribution of the paper

- This e-Delphi study has developed, through expert consensus, the first comprehensive physiotherapy specific core capability framework for providing high-quality care to people with dementia and their families/caregivers.
- The core capability framework can be used by physiotherapists to identify knowledge and/or skill gaps, and by physiotherapy educators to assist with entry-level and post-graduate curriculum development and student/workforce training.

As physiotherapists play a vital role in working with people with dementia and their caregivers/families, and competencies lie at the heart of effective quality care and service delivery, the newly developed core capability framework serves as basis for broader consultation and input.

Keywords: physical therapy; physical therapy modalities; aged; dementia, education

1 INTRODUCTION

2 More than 55 million people are living with dementia worldwide with 10 million new cases
3 each year.[1] As life expectancy increases, the estimated number of people living with dementia
4 is expected to sharply rise.[2] People with dementia experience impairments in cognition and
5 activities of daily living but may also experience several other symptoms associated with
6 dementia, for example, changed behaviour, balance and mobility problems, falls, and changed
7 psychological functioning, resulting in a loss of independence and increased care needs.

8 Physiotherapists are key members of multidisciplinary teams who play a vital role in working
9 with people living with dementia and their caregivers/families, across all settings within the
10 full health care continuum.[3] There is evidence that people living with dementia can benefit
11 from exercise to improve functional strength, balance, mobility, endurance, and activities of
12 daily living,[4, 5] as well as emerging evidence for falls prevention[6-9] and reduction of
13 behavioural and psychological symptoms, especially depression.[10, 11] Physiotherapists
14 assess and treat movement and mobility issues that may be directly related to dementia or
15 related to co-morbidities, such as hip fracture or stroke. Physiotherapy has been shown to be
16 beneficial for people living with dementia.[4, 12]

17 Since symptoms of dementia vary during the course of the condition and impact treatment
18 delivery, the needs of people with dementia can be complex, requiring unique skills, knowledge
19 and understanding.[13-16] Prior studies have found that physiotherapists have low levels of
20 dementia knowledge once graduated.[15, 17, 18] Physiotherapy entry to practice programs
21 often have only one or two lectures that include education on dementia and many students will
22 not obtain practical experience working with people with dementia prior to starting clinical
23 practice. Due to a lack of preparation and training in professional programs it has been reported
24 that some physiotherapists find working with people with dementia overwhelming.[19] Other
25 studies have reported that despite reasonable knowledge and attitudes, physiotherapy students
26 had low levels of confidence in working with people with dementia.[19, 20] Low knowledge
27 may lead to negative beliefs about a person's ability to benefit from physiotherapy
28 interventions, and poorer quality of care.[21-23] It is therefore important to define the core
29 capabilities needed to provide high quality physiotherapy care to this population.

30 Generic and health profession specific competency and core capability frameworks are
31 common in social and health care contexts, serving as 1) resource documents detailing the
32 essential skills and knowledge necessary for the provision of effective care and management

33 for patient and client populations; and 2) guides for curriculum development, and work force
 34 training and education. However, a published core capability framework for physiotherapists
 35 working with people with dementia and their families/caregivers describing the key areas of
 36 knowledge and practice required to provide quality care does not exist. Therefore, the aim of
 37 this study was to develop a consensus-based framework on the core capabilities
 38 physiotherapists need to facilitate high quality care to people with dementia and their
 39 families/caregivers.

40 **METHODS**

41 The research team undertook an e-Delphi process, a commonly used formal consensus-building
 42 method that allows for the participation of geographically dispersed individuals.

43 **Modified e-Delphi panel member inclusion criteria**

44 e-Delphi methods do not employ random sampling but rather use purposeful sampling to
 45 identify ‘experts’ as panel member participants. Panel members needed to be physiotherapists
 46 who were >18 years of age and able to read, understand and write in English, and who had
 47 access to an email address and a computer with the ability to connect to the internet for the
 48 duration of the modified e-Delphi study period. Physiotherapy eligibility criteria based on
 49 current roles are described in Table 1.

Table 1. Physiotherapy eligibility criteria (in addition to common inclusion criteria described in the text)

Academic physiotherapists
<ul style="list-style-type: none"> a) first or last author on at least three papers on primary human research in dementia in the past 5 years or; b) invited to give a plenary or keynote presentation on dementia at a national or international conference in the last 5 years.
Physiotherapist lecturers
<ul style="list-style-type: none"> a) taught in gerontology for at least 3 years and at least 3 years of prior clinical practice experience in working with people with dementia (averaging a caseload with $\geq 20\%$ of clients having dementia).
Physiotherapist clinicians
<ul style="list-style-type: none"> a) registered to practice as a physiotherapist in their home country; and

b) have a caseload that contained on average >20% of clients with dementia over the most recent year and had a minimum of 5 years clinical practice experience.

50 **Recruitment of e-Delphi panel members**

51 A list of potential panel members was developed by the steering group, drawing from their
52 teaching, research and clinical networks as well as internet searches. Invited panel members
53 were also given the opportunity to identify additional potential panel members.

54 **Ethics approval and consent**

55 An initial invitation email describing the study with the Participant Information Statement
56 (PIS) attached was sent to potential panel members by the Chief Investigators (CIs; [REDACTED]).
57 Potential panel members indicated their willingness to participate by return email to the CIs
58 ([REDACTED]) and then confirmed (checkboxes) their eligibility and consent to participate
59 prior to undertaking the first e-Delphi round. Implied consent was also indicated by completing
60 the e-Delphi round. The study was approved by [REDACTED] Human
61 Research Ethics Advisory Panel (HC220104).

62 **Modified e-Delphi consensus process**

63 The initial e-Delphi round was developed by an international steering group of 16
64 physiotherapists whose research, teaching and/or practice involves people with dementia. To
65 additionally inform the relevance and applicability of the e-Delphi process and outcome, a
66 consumer with caregiving experience of a person with dementia and who served in a similar
67 role for a dementia focused project of [REDACTED] (CI/author) was invited/recruited as the public
68 voice representative. The steering group created the initial list of 129 capabilities based on their
69 experience and review of the literature. Five databases (AMED (Allied and Complementary
70 Medicine), Embase Classic+Embase, Global Health, Ovid Medline and APA PsycInfo) that
71 contain health, medical, rehabilitation and primary health care literature were searched from
72 database inception to 21 July 2021 using the following search terms: core, capabilit*,
73 competence*, framework, guide*, Delphi, dementia, physioth*. The same databases were then
74 searched by combining search terms. Grey literature were also searched using Google and
75 Google Scholar. A capability was defined as an 'integration of knowledge, skills, personal
76 qualities and understanding used appropriately and effectively'.[24]

77 Three rounds, delivered electronically, were planned. Each round was open for two weeks with
78 at least three weeks between rounds. Potential panel members who had indicated their
79 willingness to participate received a formal study invitation from Clinvivo (an independent
80 company that designs and facilitates web-based Delphi studies; <https://www.clinvivo.com/>).
81 Panel member specific formal email invitations included a link to the e-Delphi platform
82 including being able to access the PIS, confirm eligibility, provide consent and access Round
83 1. In the PIS, panel members were asked to keep their participation and responses confidential
84 from other potential panel members and through the study procedures they were blind to the
85 identity of other panel members (panel member specific communication and deidentified round
86 material). If potential panel members did not respond to the formal invitation to participate, a
87 reminder email was sent at week-1. For Rounds 2 and 3, up to three reminder emails were sent
88 while the round was open to non-responders to encourage completion (at week-1 and day-11
89 by Clinvivo and, day-13 by one of the CIs [REDACTED]). Clinvivo provided the study team with a
90 quantitative report and qualitative comments from panel members after each round, which only
91 included a unique participant identification number so that the steering group were blind to the
92 identity of panel members. The steering group reviewed the quantitative report together with
93 the qualitative data after each round, and this information was used to inform subsequent
94 rounds. Round 1 opened on 27 February 2023 and Round 3 closed on 2 June 2023.

95 **Round 1:** Demographic information, including age, gender, country of residence/practice,
96 participant type (broadly i.e. lecturers, clinicians, researchers), teaching/research title,
97 qualification achieved and year, number of years of clinical, teaching or research experience
98 and setting experience gained (e.g. community, hospital, rehabilitation, residential care/long
99 term care, emergency) in working with people with dementia was collected, as well as any
100 perceived conflicts of interest.

101 Core capabilities developed by the steering group were listed in Round 1 and panel members
102 scored each item ranging from 1-9 in terms of appropriateness for inclusion (1-3, inappropriate
103 for inclusion; 4-6, neither appropriate nor inappropriate for inclusion; 7-9, appropriate for
104 inclusion).[25] Panel members were able to provide comments regarding the presented core
105 capabilities and/or suggest additional core capabilities for consideration in subsequent rounds.
106 Panel members rated their confidence in rating the core capabilities on a scale of 1=not at all
107 confident to 9=very confident.

108 **Round 2 and 3:** At the start of the round, panel members were provided a link where they
109 could access items rated appropriate for inclusion from the preceding round/s, together with
110 the median panel rating for each item. Panel members received feedback on the panel's median
111 scores from the preceding round, as well as their own score for capabilities being re-rated. For
112 Rounds 2 and 3 panel members re-evaluated core capabilities in the uncertain category (i.e.
113 rated 4-6 or any median with disagreement), any new capabilities suggested by the panel and
114 any capabilities where significant wording refinements were made as suggested by panel
115 members. The same criteria for inclusion from Round 1 were used. Panel members could
116 suggest new items for consideration. Panel members again rated their confidence in rating the
117 core capabilities on a scale of 1=not at all confident to 9=very confident.

118 **Data analysis**

119 Descriptive statistics are presented as frequency and percent. Criteria for inclusion were
120 determined using the Research AND Development (RAND)/ University of California Los
121 Angeles (UCLA) appropriateness method, an approach we outlined a priori in our ethically
122 approved protocol.[25] The RAND/UCLA method involves calculating the median score, the
123 inter-percentile range (IPR; 30th and 70th), and the inter-percentile range adjusted for
124 symmetry (IPRAS), for each item being rated.[25] Agreement/consensus was considered to be
125 present when the IPR was equal to or less than the IPRAS and disagreement to be present when
126 the IPR was greater than the IPRAS.[25] For inclusion the core capability needed to be deemed
127 appropriate by the panel members (median rating 7-9, without disagreement).[25] Items rated
128 as unimportant (rating 1-3 without disagreement) were excluded.[25] Items rated uncertain
129 (rated 4-6) or any median with disagreement were re-rated. Qualitative data were reviewed to
130 identify common themes and issues. Newly suggested core capabilities were discussed by the
131 steering group and included if they were substantially different to current items, if not,
132 rewording of current similar items was considered. Rewording of some items was suggested
133 by panel members, and where this was minor, did not change the meaning and was considered
134 to improve the readability of a core capability that was rated appropriate for inclusion, these
135 changes were made without re-rating. Where the rewording suggestions changed the meaning
136 or interpretation, these items were re-rated in subsequent rounds. Some panel members
137 suggested changes to headings, we set an a priori threshold of $\geq 75\%$ agreement (yes vs no) to
138 pass these changes.

139 **RESULTS**

140 Of the 111 invited experts, 51 (46%) agreed to participate by emailing the CIs. Of these, 35
141 (69% of those who agreed to CIs; 32% of those invited by CIs) consented and completed Round
142 1. These panel members represented 11 countries, 80% were aged 41-60 years and 83% were
143 female (Table 2). Panel members indicated that they were currently in a variety of roles: 71%
144 clinician, 29% lecturer and 40% academic/researcher (Table 2).

145 **Round 1**

146 In Round 1, the 35 panel members rated 129 items across five domains (Figure 1 and
147 Supplementary Table 1). All items were rated appropriate for inclusion by the panel members
148 with no disagreement and the median confidence in rating the items was 8 [IQR 7-9]. There
149 were 156 wording change suggestions, 42 new core capability suggestions and 6 additional
150 comments (Table 4).

151 **Round 2**

152 In Round 2, 31 panel members (89%) responded. Round 2 contained 35 items for rating (seven
153 new items and 28 items with wording changes for re-rating) and five heading changes for
154 ratification (Figure 1 and Supplementary Table 2). All 35 items were rated appropriate for
155 inclusion by the panel members with no disagreement. Two of the five heading changes did not
156 achieve $\geq 75\%$ agreement, so the original headings were retained. The panel members' median
157 confidence in rating the Round 2 items was 8 [IQR 8-9]. There were 49 suggestions for wording
158 changes, five suggestions for new capabilities and 8 uncategorised comments (Table 4).

159 **Round 3**

160 In Round 3, 28 panel members (90% of Round 2; 80% of Round 1) responded. There were six
161 items (one new and five with wording changes) for rating and two heading changes and one
162 footnote for ratification (Figure 1 and Supplementary Table 3). All six items were rated
163 appropriate for inclusion by the panel members with no disagreement. The two heading
164 changes and the footnote were ratified with $\geq 75\%$ agreement. The panel members' median
165 confidence in rating the Round 3 items was 8 [IQR 8-9]. There were eight suggestions for
166 wording changes, four suggestions for new capabilities and one uncategorised comment (Table
167 4). After Round 3, minor revisions were made to one capability, one heading and the footnote
168 (Table 4).

169 The three rounds resulted in consensus for 137 core capabilities across five domains; 1)
170 Knowledge and understanding (n=36), 2) Assessment (n=39), 3) Management, interventions
171 and prevention (n=40), 4) Communication, therapeutic relationship and person-centred care
172 (n=17) and 5) Physiotherapists self-management and improvement (n=5) (Table 3). While
173 individual item scores ranged from one to nine and varied by core capability, panel members
174 rated all items as appropriate for inclusion, with median scores ranging from seven to nine. The
175 median panel ratings and round of final inclusion for each item are presented in Supplementary
176 Table 4 and a summary of the core capability iterations made based on the steering group's
177 review of panellists' feedback is provided in Supplementary Table 5.

178 **DISCUSSION**

179 In this study, a diverse range of experienced physiotherapists were engaged to determine core
180 capabilities for physiotherapists working with people with dementia and their
181 families/caregivers. There were 137 core capabilities rated appropriate for inclusion by expert
182 physiotherapist panel members who were confident in their ability to rate the capabilities. None
183 of the original 129 proposed capabilities were eliminated and the limited number of additional
184 capabilities (n=8) suggests that the initial capabilities created by the steering group were
185 comprehensive. The results of this study describe important core capabilities for
186 physiotherapists to help identify knowledge/skill gaps and for educators to improve their entry
187 to professional practice training and postgraduate/post professional training.

188 There were several strengths to the study. We had a group of 16 international experts and a
189 consumer with lived experience develop the initial core competencies. Panel members were a
190 variety of experienced clinical, educator and academic physiotherapists from different settings
191 (e.g., community, hospital, residential care) and countries (n=11). This improved the
192 framework's relevance and scope which spanned dementia prevention through to end-of-life
193 care. The retention rate was high. (Round 2: 89% and Round 3: 80% of Round 1 panel
194 members). Retention was facilitated by three reminders (one personalised from a CI), providing
195 deadlines for responses, and by offering to send the results of the e-Delphi to panel members
196 at completion of the study.

197 There are also limitations to consider. To reduce conformity and desirability bias, panel
198 members were encouraged to refrain from discussing their participation and responses with
199 other potential panel members, their identity and individual responses were not disclosed to

200 other panel members and their responses were de-identified for the steering group, we also
201 provided controlled feedback and group medians for Round items being rerated.[26] However,
202 there may still have been desirability and conformity bias. While the response to Round 1 (32%
203 of the 111 invited by CIs; 69% of the 51 who agreed to receive a formal invitation from
204 Clinvivo) is in keeping with previously reported response rates[27], we acknowledge that this
205 may have biased the findings. Some physiotherapists replied to the CIs and reported
206 ineligibility or an inability to commit to the study due to leave or workloads, and it is possible
207 that some of the emails from Clinvivo were directed to potential panel members' spam folder.
208 Although there were some physiotherapists invited from less developed countries, the
209 respondents were only from developed countries and thus may not reflect worldwide
210 physiotherapy views and practices. Additionally, we did not collect panel members' ethnicity
211 which may influence physiotherapists' views on the core capabilities physiotherapists need to
212 provide high quality care to people with dementia. Last, while we had a consumer on the
213 steering group, broader input and feedback from people with lived experience is needed.

214 Core skill or capability frameworks for professionals working with people with dementia do
215 exist, but inform dementia care more broadly by providing generic capabilities for a variety of
216 health care workers from different settings with varying skill levels, or they have been
217 developed specifically for other professions (e.g. nursing) [28-31]. There is some overlap of
218 domains / capabilities between our physiotherapist specific framework and existing
219 frameworks. For example domains from previous frameworks include: Awareness, knowledge
220 and understanding of dementia, Dementia risk reduction and prevention, Awareness and risk
221 reduction, Implementing therapeutic activities, and Communication, interaction and behaviour
222 in dementia care,[28-31] which are also found in our framework. However, these common
223 domains are framed within a physiotherapy perspective, and additional and unique domains
224 and capabilities specific to physiotherapists have been included, for example, Domain 2 -
225 'Assessment' includes the ability to assess items such as dual-task walking, balance and
226 community ambulation; and Domain 3 - 'Management, interventions and prevention' includes
227 interventions to reduce falls and maintain physical activity. Our framework also outlines
228 capabilities related to motor learning strategies specific to physiotherapists delivering therapy
229 to people with dementia. These physiotherapy specific capabilities enable physiotherapists to
230 deliver quality care when working with people with dementia and their families/caregivers.

231 Developing a physiotherapy specific framework with capabilities is important, as prior studies
232 have found physiotherapists and physiotherapy students have low knowledge and confidence

233 about dementia in general, and specifically around communication and behavioural
234 strategies.[15, 19] Physiotherapists are more likely to find and read a competency framework
235 specific to their profession. Including broad (e.g., communication and behaviour related) and
236 physiotherapy specific (e.g., assessment and intervention related) capabilities in one document
237 provides a comprehensive resource for physiotherapists. One prior study relevant to
238 physiotherapists, used a Delphi process to outline key factors for the assessment of mobility in
239 advanced dementia.[32] Although useful, it did not cover earlier stages of dementia or
240 treatments. Finally, our framework also included capabilities around self-management and
241 promotion of the profession acknowledging that there are unique demands and rewards in
242 providing physiotherapy in dementia care.

243 Dementia Action Plans around the world are calling for better dementia education and training
244 of health professionals.[33, 34] In some countries like Canada, physiotherapy curriculum
245 guidelines specify what students must learn about dementia,[35] whereas, for example in
246 Australia there is no dementia specific content outlined.[36] Our framework provides clear
247 capabilities for education and training purposes in both clinical and university settings.

248 For future work, this framework will need to be tested to determine its applicability as a
249 competency guide in clinical practice. How each capability should be objectively assessed in
250 real world clinical situations also needs to be determined. Further, the number of capability
251 items is large, and tiers may need to be created for more junior versus experienced
252 physiotherapists. Education facilities will need to decide if there is scope in their already full
253 entry level curriculum to include all capabilities. A selection of capabilities might be more
254 relevant to teach at an undergraduate level, with the full set only taught in specialised
255 postgraduate/post professional courses. Together with broader consumer input, iterative
256 research could consider ranking core capabilities by importance.

257 **Conclusion**

258 This study developed the first core capability framework for physiotherapists working with
259 people living with dementia in different settings and across the different stages of dementia.
260 Through the 137 included items of the framework, this study provides a comprehensive
261 overview of core capabilities for working in the field of dementia. The applicability of this
262 framework now needs to be tested in clinical and educational settings internationally.

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FIGURE LEGENDS

Figure 1. Flow of core capabilities physiotherapists need to provide high quality care to people with dementia and their families/caregivers in the e-Delphi study

Table 2. Panel members' characteristics

Characteristic, n(%)	Panel members (n=35)
Age group	
31-40 years	5 (14)
41-50 years	15 (43)
51-60 years	13 (37)
>60 years	2 (6)
Female	29 (83)
Country^a	
Australia	6 (17)
Belgium	1 (3)
Netherlands	5 (14)
Denmark	1 (3)
Norway	5 (14)
Sweden	4 (11)
United Kingdom ^a	3 (9)
England ^a	1 (3)
Scotland ^a	2 (6)
Ireland ^a	1 (3)
Canada	1 (3)
United States of America	5 (14)
Current roles^b	
Clinician	25 (71)
Lecturer	10 (29)
Researcher	14 (40)
Teaching/Research title	
Professor	3 (9)
Associate Professor	2 (6)
Assistant Professor	2 (6)
Lecturer	4 (11)
Senior Research Fellow	1 (3)
Research Fellow	2 (6)
Senior postdoctoral fellow	1 (3)
Postdoctoral fellow	1 (3)
PhD candidate	1 (3)
Entry level physiotherapy qualification^b	
Diploma	8 (23)
Bachelor's degree	25 (71)
Masters	4 (11)
Postgraduate physiotherapy-related qualifications^b	
Masters research (thesis)	13 (37)
PhD thesis	7 (20)
Doctor of physiotherapy/physical therapy	6 (17)
Other	1 (3)
Clinical experience	
5-10 years	5 (14)
11-15 years	6 (17)
16-20 years	10 (29)
>20 years	11 (31)

Clinical experience: settings^b

Community	18 (51)
Hospital	19 (54)
Emergency	1 (3)
Specialised care unit	9 (26)
Rehabilitation	18 (51)
Residential care/Long term care	29 (83)

Teaching dementia topics

5-10 years	6 (17)
11-15 years	5 (14)
16-20 years	3 (9)

Research experience

5-10 years	4 (11)
11-15 years	5 (14)

Research experience: settings^b

Community	10 (29)
Hospital	7 (20)
Emergency	1 (3)
Specialised care unit	2 (6)
Rehabilitation	5 (14)
Residential care/Long term care	11 (31)

^aThis was an open text field

^bMore than one response could be selected, therefore percentages do not add up to 100%

Table 3. Core capabilities needed to provide high quality physiotherapy care to people with dementia and their families/caregivers

1. DOMAIN: Knowledge and understanding	
Capability 1a: Risk factors and prevention	
<i>Physiotherapists should have a basic knowledge and understanding of:</i>	
Non-modifiable risk factors for dementia, e.g. age, genetic risk, family history	1
Modifiable risk factors for dementia, e.g. midlife hearing impairment, hypertension and obesity; later life smoking, depression and physical inactivity	2
Population health strategies to address modifiable risk factors	3
Individual strategies to address modifiable risk factors	4
Capability 1b: Diagnosis and symptoms	
<i>Physiotherapists should have a basic knowledge and understanding of:</i>	
The clinical diagnostic criteria for dementia	5
The most common dementia subtypes and their common symptoms	6
The most common dementia subtypes and their primary causes	7
The characteristics of the stages/severity of dementia	8
Cognition, including different cognitive domains (e.g. memory, working memory, attention, executive function, visuospatial function, processing speed, language)	9
How cognition impacts on function and safety	10
The behavioural and psychological symptoms ^a of dementia (e.g. apathy, depression and anxiety, agitation, purposeful/non-purposeful walking, changes in personality)	11
How behavioural and psychological symptoms ^a impact function, safety and daily life	12
The physical changes related to dementia (e.g. extrapyramidal signs/ Parkinsonian signs, changes to primitive reflexes, muscle tone, muscle strength, balance, gait, paratonia), including associations with specific sub-types of dementia and their progression	13
How physical changes related to dementia impact function and safety (e.g. falls risk)	14
How the interplay between cognition, physical impairments and behavioural and psychological symptoms ^a impact on function and safety	15
Differential and/or possible co-diagnoses (e.g. Mild Cognitive Impairment, delirium, depression, normal pressure hydrocephalus, psychiatric disorders)	16
How a diagnosis of dementia may impact a person's emotional wellbeing and personhood	17
How people with dementia can have varying levels of awareness of their diagnosis and abilities	18
Capability 1c: Assessment	
<i>Physiotherapists should have a basic knowledge and understanding of:</i>	
Different cognitive screening and assessment tools for cognitive function (global cognition, specific cognitive domains and dementia severity, gait performance)	19
Different assessment tools for behavioural and psychological symptoms of dementia ^a	20
Different assessment tools for pain in people with dementia	21
Different assessment tools for delirium (to aid in differential diagnosis and appropriate referral), e.g. Confusion Assessment Method (CAM), 4AT	22
Capability 1d: Treatment and management	
<i>Physiotherapists should have a basic knowledge and understanding of:</i>	
Available non-pharmacological treatments for dementia	23

Available pharmacological treatments for dementia and behavioural and psychological symptoms of dementia ^a and their potential side effects	24
The principles of rehabilitation, reablement and palliative care in relation to dementia	25
The possible challenges encountered by formal caregivers/ informal caregivers/ family/ friends	26
The stigma and stereotypes associated with dementia	27
The potential impact culture may have on a person's self perception and preferences for communication and care	28
The issues and challenges specific to people with younger onset dementia	29
How societal attitudes can impact access to services and wellbeing for a person with dementia	30
How dementia can impact a person's ability to access services	31
The care pathways for people with dementia	32
Capability 1e: Decision making and consent	
<i>Physiotherapists should have a basic knowledge and understanding of:</i>	
Ethics, consent and risk issues relating to dementia	33
Guardianship/mental capacity /substitute decision making guidelines and regulations in their country	34
Restrictive practises (i.e. any practice or intervention that has the effect of restricting the rights or freedom of movement of an individual or a chemical substance used with the primary purpose of influencing a person's behaviour; e.g. equipment used to inhibit movement, medication used with the intention of sedating), including negative effects	35
Restrictive practices and the laws surrounding them in their region	36
2. DOMAIN: Assessment	
Capability 2a: History-taking	
<i>Physiotherapists working with people with dementia should obtain a history from the person with dementia and caregivers and family (if available) including:</i>	
Demographics (e.g. age, gender, previous education, employment) and current living situation	1
Past medical history including fall history and medication use	2
Current abilities/difficulties, activities of daily living, activity limitations and restrictions on participation, leisure and social activities, physical activity levels, quality of life, and environmental considerations	3
Past ability to perform activities of daily living, leisure and social activities, physical activity levels	4
The acuity and/or progression of the identified changes/ impairment/ limitations in activity/function	5
The impact of dementia on family/caregivers, e.g. emotional, psychological, social, financial, health	6
Identifying social support and social networks	7
Identifying and establishing individual person-centred goals	8
Capability 2b: Assessment	
<i>Physiotherapists working with people with dementia should:</i>	
Appropriately obtain individuals' consent prior to physical examination, respect and maintain their privacy, dignity and comfort	9
Preferentially use assessment tools that are reliable and valid for use with people with dementia if available	10
Assess (in alphabetical order):	
acute changes in function e.g. associated with delirium, acute illness or fall-related injury	11
behavioural and psychological symptoms of dementia ^a	12

cognitive-motor function (e.g. dual-task)	13
co-ordination	14
fall risk	15
functional performance / activities of daily living	16
gait speed and other spatiotemporal gait variables	17
gait variability	18
health-related quality of life	19
impact of cognition on safety, mobility and function	20
indoor and community ambulation	21
leisure, wellbeing and occupation activities	22
manual handling of other health professionals and caregivers	23
mobility and transfers	24
motor planning and spatial navigation	25
muscle function/performance e.g. strength, power	26
muscle tone (including spasticity, rigidity and paratonia)	27
parkinsonian signs (e.g. bradykinesia, akinesia, tremor)	28
physical activity levels	29
problem solving ability	30
range of movement	31
reaction time/processing speed	32
sensation and pain (verbal and non-verbal)	33
static and dynamic balance	34
visuospatial function	35
Synthesise the subjective, cognitive, psychological, behavioural, physical and functional assessments and person's preferences to devise a treatment plan (where possible, involve the multidisciplinary team)	36
Assess how the level of social support a person receives may impact on:	
physiotherapy management	37
the person's ability to function in different environments	38
fall risk and safety	39

3. DOMAIN: Management, interventions and prevention

Capability 3a: Evidence-based interventions to improve physical function and participation, and reduce risk

Physiotherapists should demonstrate the ability to deliver/implement evidence-based interventions, integrating best available research evidence, clinical experience, and values/preferences of the person/patient to:

Improve, maintain or slow decline of physical function including strength, balance and mobility	1
Improve, maintain or slow decline in activities of daily living	2
Reduce the risk of falls	3
Increase or maintain physical activity	4
Reduce, manage and/or prevent precipitating factors of behavioural and psychological symptoms ^a	5
Reduce, manage and/or prevent pain	6
Prevent contractures	7
Improve, maintain or slow decline in cognition	8

Reduce or manage vascular risk factors	9
Facilitate purposeful, leisure, wellbeing and occupation activities	10
Ensure safe manual handling for caregivers and/or staff	11
Facilitate symptom relief and support at the end of life	12
Facilitate function with appropriate prescription/recommendation/training and follow-up for:	
gait/mobility aids (e.g. cane, walkers, crutches, wheelchair)	13
simple cognitive aids (e.g. calendar/diary, alarms, key finder and other assistive technologies)	14
Physiotherapists working with people with dementia should demonstrate the ability to educate:	
the person with mild to moderate dementia on ways to maintain as much independence as possible, remain physically active and stay socially connected	15
the caregiver on ways to encourage the person with dementia to maintain as much independence as possible, remain physically active and stay socially connected	16
the person with mild to moderate dementia on falls prevention strategies and what to do in the case of a fall	17
the caregiver on falls prevention strategies and what to do in the case of a fall	18
Support people with dementia to choose from a range of activities to promote wellbeing that are tailored to their abilities and preferences	19
Capability 3b: Tailoring interventions to the person	
<i>Physiotherapists working with people with dementia should demonstrate the ability to:</i>	
Tailor interventions based on the principles of motor learning in dementia (procedural vs declarative learning; errorless learning; spaced retrieval; part-whole practice; task specificity; constant vs variable practice, blocked vs random practice)	20
Work with the individual to achieve person-centred goals	21
Target and tailor interventions to the appropriate stage and disease/condition	22
Provide care across the spectrum from prevention, post-diagnostic support, rehabilitation and reablement to end-of-life and palliative care	23
Capability 3c: Tailoring the environment	
<i>Physiotherapists should understand how environmental factors impact functioning, including:</i>	
How the physical environment (including obstacles, clutter, lighting, colour contrasts):	
can influence choice and implementation of treatment	24
can positively or negatively influence functioning	25
may increase or reduce risk of falls and fall-related injuries and safety	26
How orientation and way finding around the physical environment:	
can influence choice and implementation of treatment	27
can positively or negatively influence functioning	28
may increase or reduce risk of falls and related injuries and safety	29
How the sensory environment (including sensory aids, sound, noise, lighting, temperature, distraction, use of sensory aids):	
can influence choice and implementation of treatment	30
can positively or negatively influence functioning	31
may increase or reduce risk of falls and related injuries and safety	32
Using different types of music to influence the person with dementia's performance during treatment (if appropriate and beneficial)	33

How to maximise treatment success utilising knowledge of environmental influences (physical and sensory)	34
Capability 3d: Referrals and collaborative management	
<i>Physiotherapists should be able to:</i>	
Recognise delirium/acute confusion and refer for urgent medical review	35
Work collaboratively and educate family members, caregivers, volunteers and other members of the multi-disciplinary team within their area of expertise	36
Recognise the need for other health professionals' input and make appropriate referrals	37
Understand available community resources and refer to community, social and advocacy supports and services where appropriate for both the person with dementia and the caregiver	38
Direct the person with dementia and/or their caregiver to appropriate and reputable written and online resources	39
Promote, co-ordinate and/or manage safe and timely care transitions over time	40
4. DOMAIN: Communication, therapeutic relationship and person-centred care	
Capability 4a: Communication	
<i>Physiotherapists should be able to:</i>	
Introduce themselves to the person with dementia and caregiver and explain their role and purpose of visit (at the start of each session, and if needed at any stage)	1
Anticipate how dementia affects language and communication skills of individuals with different types and stages of dementia, acknowledging that each person will be different	2
Actively listen, providing appropriate response time and respond with calmness and clarity	3
Use a repertoire of verbal communication strategies and adapt these to the individual (e.g. modulation of tone, pitch, pace, volume, repetition, sentence structure and single versus multi-stage commands)	4
Use a repertoire of non-verbal communication strategies and adapt these to the individual (e.g. body language, facial expression, purposeful gestures, demonstrations, positioning of self at eye level, strategic use of touch and tactile cues)	5
Tailor written material to the individual/caregiver and use images to augment communication as appropriate	6
Recognise that behaviours may be methods of communication	7
Understand how the communication and behaviour of others might affect a person with dementia	8
Actively investigate and resolve potential barriers to communication including sensory impairments (e.g. vision, hearing), impediments to speech (e.g. oral hygiene, dentures), unmet needs (e.g. hunger, thirst, toileting) or other elements (e.g. discomfort/pain)	9
Create an environment that is safe and calm and conducive to effective communication	10
Be patient and encouraging	11
Use feedback sensitively and appropriately to foster engagement and improvement	12
Establish a sense of familiarity, predictability and routine	13
Capability 4b: Therapeutic relationship and person-centred approach	
<i>Physiotherapists should be able to:</i>	
Provide person-centred care by prioritizing individual needs and preferences	14
Recognise how unique individual attributes, abilities, background, history, experiences, attitudes, social and cultural perspectives, and values may impact preferences, communication, behaviour and success of treatment	15
Understand the role of family and caregivers in person-centred care	16

Use a repertoire of therapeutic relationship building strategies and appropriately adapt these commensurate with the needs of the individual (e.g. incorporate knowledge of what is important to the individual, reminiscence strategies, empathy and sensitivity, explore and respect the individual's reality, avoid triggers and defuse, distract, and redirect)	17
5. DOMAIN: Physiotherapists self-management and improvement	
Capability 5a: Self-management	
<i>Physiotherapists should be able to:</i>	
Maintain their own wellbeing while acknowledging the specific challenges and rewards of working with people with dementia	1
Seek peer support as required (physiotherapist or other profession)	2
Capability 5b: Professional development and promotion of the profession	
<i>Physiotherapists should:</i>	
Seek relevant professional development opportunities	3
Promote their role in working with people with dementia	4
Advocate for inclusive and dementia friendly design and environment in their workplace and community	5
<p>^aPlease note: variable terminology is used for behavioural and psychological symptoms of dementia across the world. We have used the most common term used in the literature but appreciate that this may change over time. Behavioural and psychological symptoms of dementia have many precipitating factors (e.g. unmet needs, acute illness, environment, discomfort).</p>	

Note. n=137 total core capabilities

Table 4. Summary of qualitative data including wording change suggestions, new core capability suggestions and general comments

	Round 1 n=35 panel members n=129 items in 5 domains and 15 sections	Round 2 n=31 panel members n=35 items in 5 domains and 13 sections	Round 3 n=28 panel members n=6 items in 4 domains and 4 sections
Number of wording change suggestions by panel members:			
	Panel members, n(%)	Panel members, n(%)	Panel members, n(%)
None	15 (43)	14 (45)	23 (82)
One	4 (11)	7 (23)	3 (11)
Two to three	7 (20)	5 (16)	2 (7)
Four to five	0 (0)	3 (10)	0 (0)
Six to 10	4 (11)	1 (3)	0 (0)
11 to 20	3 (9)	1 (3)	0 (0)
31 to 40	2 (6)	0 (0)	0 (0)
1. DOMAIN: Knowledge and understanding			
Missing capability suggestions, n	15	3	1
Missing capability examples	paratonia (added to 1b,); special needs to access services (added 1d); medication use on fall risk (added to 2a, revised 1d); pain assessment (added to 1c); cultural considerations (added 1d, already included 4b)	dignity (already included in 2b); elder self neglect; anosognosia (added)	pain assessment and management (previously added)
Capability 1a: Risk factors and prevention			
Wording change suggestions, n	9	n/a, no items this Round	n/a, no items this Round
Capability 1b: Diagnosis and symptoms			
Wording change suggestions, n	28	3	3
Capability 1c: Assessment			
Wording change suggestions, n	5	1	n/a, no items this Round
Capability 1d: Treatment and management			

Wording change suggestions, n	7	3	n/a, no items this Round
Capability 1e: Decision making and consent			
Wording change suggestions, n	9	0	n/a, no items this Round
2. DOMAIN: Assessment			
Missing capability suggestions, n	8	0	1
Missing capability examples	how societal attitudes and accessibility can impact positively or negatively on well being (added to 1d); patients previous occupation, education, hobbies (added to 2a); ability to adapt communication (already included in 4a)	n/a	pain assessment (already included)
Capability 2a: History-taking			
Wording change suggestions, n	19	4	n/a, no items this Round
Capability 2b: Assessment			
Wording change suggestions, n	12	9	4
3. DOMAIN: Management, interventions and prevention			
Missing capability suggestions, n	7	2	2
Missing capability examples	Creating written materials for patients and carers tailored to their individual situation (already included 4a); I suggest that sensory aids are added to the list of aids (added to 3c); management of stress and distress (revised 3a)	memory/errorless learning (already included)	pain management (already included)
Capability 3a: Evidence-based interventions to improve physical function and participation and reduce risk			
Wording change suggestions, n	17	6	0
Capability 3b: Tailoring interventions to the person			
Wording change suggestions, n	9	1	n/a, no items this Round

Capability 3c: Tailoring the environment			
Wording change suggestions, n	11	3	n/a, no items this Round
Capability 3d: Referrals and collaborative management			
Wording change suggestions, n	6	2	n/a, no items this Round
4. DOMAIN: Communication, therapeutic relationship and person-centred care			
Missing capability suggestions, n	1	0	0
Example missing capability	it is important that we are recognisable, this could be due to context (where we see the patient), our uniform, name tag and introducing ourselves and our role every time (added to 4a)	n/a	n/a
Capability 4a: Communication			
Wording change suggestions, n	12	10	1
Capability 4b: Therapeutic relationship and person-centred approach			
Wording change suggestions, n	4	n/a, no items this Round	n/a, no items this Round
5. DOMAIN: Physiotherapists self-management and improvement			
Missing capability suggestions, n	4	0	0
Missing capability examples	Promote their role in the multiprofessional team around people with dementia (sufficiently covered in 5b); how important it is as a physiotherapist to influence national agenda, policies, guidelines, influence training curriculum and share knowledge	n/a	n/a
Capability 5a: Self-management			
Wording change suggestions, n	6	2	n/a, no items this Round
Capability 5b: Professional development and promotion of the profession			
Wording change suggestions, n	2	5	n/a, no items this Round

Total wording change suggestions for each round, n	156	49	8
Missing capability suggestions after completion, n	7	All were suggested after completion	All were suggested after completion
Total suggestions for new core capabilities, n	42	5	4
Uncategorised suggestions/comments, n	6	8 (3 positive comments about improvements)	1
Example of uncategorised comments	I feel I used high ratings overall - and wonder if it is possible to have the skills without specific training as bachelor in Physiotherapy often contain very little training in dementia specific topics.; The definition of a fall is not universal and currently does not take into consideration the views of people who fall and the experts in movement system science.	“I am thrilled you are doing this!!”; “great improvements and refinements this round, well done!”; suggested wording change to heading 3a (change accepted); suggestion to use ‘living with dementia’; ‘All capabilities seem important to me, but in my opinion not all are important for physiotherapists.’;	Requesting removal of stress and distress from footnote, or additional examples to be provided (stress and distress associated with dementia removed from footnote)

Note. n/a = not applicable