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Impact of canine-assisted interventions on the health and well-being of older people residing in long-term care: a mixed methods systematic review protocol

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1 **The experiences and effectiveness of canine-assisted interventions (CAIs) on the health and well-being of**  
 2 **older people residing in long-term care: A mixed methods systematic review protocol**

3  
 4 **Abstract**

5  
 6 **Objective:** To synthesize and integrate the best available evidence on the experiences and  
 7 effectiveness of canine-assisted interventions (CAIs) on the health and well-being of older people  
 8 residing in long-term care.

9 **Introduction:** Canine-assisted interventions (CAIs) are commonly used as an adjunct therapy to  
 10 enhance health and well-being and are often implemented in long-term care facilities. The number of  
 11 studies undertaken in this area has increased substantially over the last five years; therefore, an  
 12 update of two previous systematic reviews is warranted.

13 **Inclusion criteria:** This review will consider older people who reside in long-term care facilities and  
 14 who receive CAIs. For the quantitative component, CAIs will be compared to usual care, alternative  
 15 therapeutic interventions or no interventions and outcomes will be grouped under the following  
 16 headings: biological, psychological and social. For the qualitative component, the experiences of older  
 17 people receiving CAIs as well as the views of people directly or indirectly involved in delivering CAIs  
 18 will be explored. Quantitative, qualitative and mixed methods studies published from 2009 to the  
 19 present will be considered.

20 **Methods:** A search of 10 bibliographic databases and other various resources for published and  
 21 unpublished English language studies will be undertaken. Study selection, critical appraisal, data  
 22 extraction and data synthesis will be undertaken following the segregated JBI approach to mixed  
 23 methods reviews.

24 **Systematic review registration number:** PROSPERO XXXXX.

25 **Review questions**

26 The aim of this mixed methods review is to synthesize and integrate the best available evidence on  
 27 the experiences and effectiveness of canine-assisted interventions (CAIs) on the health and well-  
 28 being of older people residing in long-term care. More specifically the review questions are:

- 29 • What are the experiences of older people residing in long-term care who receive CAIs?
- 30 • What are the views of people directly or indirectly involved in delivering CAIs to older  
 31 adults (such as family and friends of the residents, healthcare workers and volunteers)  
 32 regarding CAIs for older people residing in long-term care facilities?
- 33 • What is the effectiveness of CAIs on the health and well-being of older people residing in  
 34 long-term care facilities?

35 **Introduction**

36 The term 'human-animal bond' refers to the connection people and animals experience, considered to  
 37 be mutually beneficial and enhancing health and well-being.<sup>1</sup> This two-way relationship (which some

38 consider links to Bowlby's attachment theory)<sup>2,3</sup> has led to the introduction of animals being used in  
39 therapeutic roles such as animal-assisted interventions (AAI, the focus of this review) and service  
40 animals.<sup>4</sup> Animal-assisted interventions refers to the "utilization of various species of animals in  
41 diverse manners beneficial to humans"<sup>5para4</sup> and are often further grouped into animal-assisted  
42 therapies (AAT), animal-assisted activities (AAA) and animal-assisted education (AAE) (See Table 1  
43 for explanation of terms).

#### 44 <Table 1. Types of animal-assisted interventions<sup>5</sup>>

45 Commonly used as an adjunct to both pharmacological and non-pharmacological therapies, AAI can  
46 be delivered one-on-one or in group formats with a range of animals being used. Shen and  
47 colleagues suggest AAI are highly accepted interventions across different populations, conditions  
48 and settings<sup>6</sup> with the most common species utilized being canines<sup>6-8</sup> The holistic nature of AAI  
49 suggests potential benefits may extend across the physical, emotional and social spectrum however  
50 results are varied.<sup>6,7,9-18</sup> Nimer and Lundahl showed AAI produced moderate effect sizes to improve  
51 emotional well-being, behavioural problems, medical difficulties as well as autism spectrum  
52 symptoms.<sup>8</sup> In this meta-analysis, dogs were consistently associated with moderate effect sizes  
53 which did not occur in the other animals examined.<sup>8</sup> Reviews in this area generally indicate some  
54 small benefit in outcomes but go on to acknowledge that the lack of methodological rigour in studies  
55 impacts on the results of research. Despite these limitations, popularity of AAI continues to increase  
56 with the number of published studies rising. A search of "animal-assisted therapy" in PubMed  
57 produced close to 450 results with over 50% of papers being published over the last five years  
58 (search undertaken 9th May 2019).

59 One population and setting where AAI are used is with older people in long-term care facilities. With  
60 an increasingly ageing population<sup>19,20</sup> there is a demand for high quality long-term care. Additionally  
61 once a person enters a care facility, increases in physical and psychosocial morbidities can occur.<sup>21</sup>  
62 Animal-assisted interventions may be able to play a role in improving health and well-being of  
63 residents for example by reducing depression and improving quality of life.<sup>7</sup> This type of intervention  
64 seems particularly relevant to older people living in long-term care facilities as human animal-  
65 interactions are not dependent on a high level of cognitive function<sup>22</sup> nor high physical and functioning  
66 ability.<sup>23</sup> Further Maclean suggests that people with mental health issues that may be reluctant to use  
67 conventional treatment may prefer alternative treatments such as AAI.<sup>24</sup>

68 Two systematic reviews undertaken in 2011<sup>23,25</sup> focused exclusively on canine-assisted interventions  
69 (CAIs) for this population. The first looked at the effects of CAIs while the other explored the  
70 experiences of residents involved in CAIs. Heterogeneity across interventions and outcomes  
71 prohibited pooling of studies in the quantitative review however, results from individual studies  
72 indicated some physical and emotional short-term benefits. The review went on to acknowledge that  
73 CAIs were no more effective than other interventions that were provided such as visits from people.<sup>23</sup>  
74 The qualitative synthesis included only two studies with meta-aggregation producing two synthesized

75 findings. The first indicated that residents involved in CAI's may experience a range of mental,  
 76 emotional, physiological and social benefits while the second finding related to the practical and  
 77 safety concerns associated with CAI's.<sup>25</sup> With popularity of CAI's increasing (as demonstrated by the  
 78 rise in primary research recently undertaken), the ageing population and the potential of these  
 79 interventions to improve the health and well-being of residents in long-term care facilities, it is  
 80 considered appropriate to strengthen the evidence by updating the original reviews. This aligns to the  
 81 decision framework developed by Garner et al to assess systematic reviews for updating.<sup>26</sup> The  
 82 importance of keeping reviews as current as possible has been recognized<sup>26,27</sup> with Garner and  
 83 colleagues highlighting that by not updating reviews, authors are compromising a review's integrity,  
 84 potentially misleading readers about the current state of the science.<sup>26</sup>

85 New guidance for the conduct of mixed methods reviews<sup>28</sup> provides the opportunity to combine the  
 86 two reviews into one thereby allowing the integration of qualitative and quantitative evidence. Mixed  
 87 methods reviews bring together the findings of effectiveness (quantitative evidence) and patient,  
 88 family, staff or other's experiences (qualitative evidence) to enhance their usefulness to clinicians and  
 89 clinical, policy or organizational decision-makers.<sup>28</sup> They broaden the focus of a systematic review  
 90 allowing for a more in-depth exploration of healthcare phenomena thereby maximizing the findings  
 91 that one method alone could not achieve.<sup>29</sup>

92 A preliminary search of PubMed, CINAHL, PROSPERO, *The JBI Database of Systematic Reviews*  
 93 *and Implementation Reports* and The Cochrane Database of Systematic Reviews indicated a number  
 94 of single method reviews have been conducted since the original reviews were published however  
 95 most have not focused specifically on this population (older people), the setting (long-term care) and  
 96 the intervention (canines).<sup>6,7,9,10,12-15,17,18</sup> Cipriani et al (2013) did examine the effect of canine-assisted  
 97 therapies (CAT) on older adults residing in long-term care however the search was undertaken up  
 98 until 2010.<sup>11</sup> Out of the 19 studies included in the review, twelve demonstrated statistically significant  
 99 improvement in outcomes for residents. No mixed methods reviews were located in the search. A  
 100 PROSPERO record registered in 2017<sup>30</sup> indicates a systematic review containing both qualitative and  
 101 quantitative evidence is in progress which focuses on older people in long-term care however the  
 102 review is not restricted to canines and the approach to bringing the results together is not clearly  
 103 detailed. The authors have been contacted for additional information regarding the approach being  
 104 taken to integration and when the review is anticipated to be completed (since the expected date  
 105 provided has passed); however, no further details were provided. Therefore the overall aim of this  
 106 review is to update and combine two previous systematic reviews to explore the experiences and  
 107 effectiveness of CAIs on the health and social care of older people who reside in long-term care.

108 **Keywords**

109 animal-assisted; canine, dog; pet therapy; mixed methods; qualitative; quantitative

110 **Inclusion Criteria**

111 **Participants**

112 The review will consider studies that include older people (60 years and older) who reside in long-  
 113 term care facilities and who receive CAIs. **Studies that contain people younger than 60 will be**  
 114 **included as long as the mean age is 60.** There will be no exclusions based on medical conditions or  
 115 co-morbidities.

116

117 Additionally for the qualitative component, the views of people directly or indirectly involved in  
 118 delivering CAIs to older adults such as family and friends of the residents, healthcare workers and  
 119 volunteers will also be considered

120 **Intervention**

121 The quantitative component of the review will consider studies that evaluate CAIs. Interventions will  
 122 be grouped as either canine-assisted activities (CAAs) or canine-assisted therapies (CATs). For the  
 123 purpose of this review definitions will be based on those provided by the American Veterinary Medical  
 124 Associations.<sup>5</sup> Canine-assisted activities “provide opportunities for motivational, educational, and/or  
 125 recreational benefits to enhance quality of life.”<sup>5para7</sup> Canine-assisted therapies are “a goal directed  
 126 intervention directed and/or delivered by a health/human service professional with specialised  
 127 expertise, and within the scope of practice of his/her profession.”<sup>5para5</sup> Canine-assisted education will  
 128 not be considered since this intervention is rarely measured in studies in this area. There will be no  
 129 limitations to the duration of interventions or the required follow-up.

130 **Comparator**

131 The quantitative component of the review will consider studies that compare the intervention to usual  
 132 care, alternative therapeutic interventions or no intervention.

133 **Outcomes**

134 The quantitative component of this review will consider studies that include **outcomes related to health**  
 135 **and well-being including but not limited to: loneliness, depression, anxiety, well-being, quality of life,**  
 136 **mood, satisfaction, morale, self-esteem, activity participation/involvement, activities of daily living,**  
 137 **blood pressure, and social interaction. Where possible review outcomes will be grouped under the**  
 138 **biopsychosocial model<sup>31</sup> e.g.:**

- 139• **Biological (e.g. blood pressure)**
- 140• **Psychological (e.g. depression)**
- 141• **Social (e.g. social interaction)**

142 Outcomes can be measured using any validated instrument, via observation or by self-report, and  
 143 measured during or immediately after the intervention or at a follow-up period.

144 **Phenomena of interest**

145 The qualitative component of this review will consider studies that investigate the experiences of older  
 146 people receiving the CAIs as well as the views of people directly or indirectly involved in delivering  
 147 CAIs to them such as family and friends of the residents, healthcare workers and volunteers.

148 **Context**

149 The review will consider studies undertaken in long-term care facilities **which will include any setting**  
 150 **for older people who are unable to manage independently in the community including nursing homes,**  
 151 **skilled aged care facilities, assisted living facilities and hostels for the aged.** There will be no limits  
 152 regarding cultural factors or geographical location.

153 **Types of studies**

154 This review will consider quantitative, qualitative and mixed methods studies. Quantitative studies will  
 155 include experimental and quasi-experimental study designs, analytical observational studies,  
 156 analytical cross-sectional studies and descriptive observational study designs. Randomized controlled  
 157 trials (RCTs) will be considered as the primary focus however in their absence other research designs  
 158 will be considered. Qualitative studies will include designs such as phenomenology, grounded theory,  
 159 ethnography, qualitative description, action research and feminist research. Mixed method studies will  
 160 be considered if data from the quantitative or qualitative components can be clearly extracted. Where  
 161 data is not reported, authors will be contacted.

162 Studies published in English will be included. Studies published from April 2009 to the present will be  
 163 included as this is an update of two previous systematic reviews.<sup>23,25</sup>

164 **Methods**

165 The proposed systematic review will be conducted in accordance with the Joanna Briggs Institute  
 166 (JBI) methodology for Mixed Methods Systematic Review (MMSR).<sup>28</sup> This review title has been  
 167 registered in PROSPERO, registration number XXX.

168 **Search strategy**

169 The search strategy will aim to find both published and unpublished studies. An initial limited search  
 170 of MEDLINE and CINAHL was undertaken to identify articles on the topic. The text words contained in  
 171 the titles and abstracts of relevant articles, and the index terms used to describe the articles were  
 172 used to develop a full search strategy for CINAHL (see Appendix I). The search strategy, including all

173 identified keywords and index terms will be adapted for each included information source. The  
 174 reference list of all studies selected for critical appraisal will be screened for additional studies.

175 **Information Sources**

176 The databases to be searched include: PubMed, CINAHL (EBSCO Host), EMBASE (Elsevier),  
 177 PsycINFO (Ovid), PsycARTICLES (Ovid), AUSThealth (Informit), Scopus (Elsevier), Web of Science  
 178 (Web of Science Core Collection; CABI; Current Contents Connect), OT seeker and PEDro.

179 The trial registers to be searched include: Cochrane Central Register of Controlled Trials,  
 180 Clinicaltrials.gov (For quantitative studies only)

181 The search for unpublished studies and gray literature will include: Trove, The Networked Digital  
 182 Library of Theses and Dissertations (NDLTD), Proquest Dissertations and Theses (Global), Delta  
 183 Society Australia website (<https://www.deltasociety.com.au>), Pet Partners website  
 184 (<https://petpartners.org/>) (previously known as the Delta Society)

185 **Study selection**

186 Following the search, all identified citations will be loaded into EndNote version 8 (Clarivate Analytics,  
 187 PA, USA) and duplicates removed. Titles and abstracts will then be screened by two independent  
 188 reviewers for assessment against the inclusion criteria for the review. Potentially relevant studies will  
 189 be retrieved in full and their citation details imported into the Joanna Briggs Institute's System for the  
 190 Unified Management, Assessment and Review of Information (JBI SUMARI; Joanna Briggs Institute,  
 191 Adelaide, Australia). The full text of selected citations will be assessed in detail against the inclusion  
 192 criteria by two independent reviewers. Reasons for exclusion of full text studies that do not meet the  
 193 inclusion criteria will be recorded and reported in the systematic review. Any disagreements that arise  
 194 between the reviewers at each stage of the study selection process will be resolved through  
 195 discussion, or with a third reviewer. The results of the search will be reported in full in the final review  
 196 and presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA)  
 197 flow diagram.<sup>32</sup>

198 **Assessment of methodological quality**

199 Quantitative papers (and quantitative component of mixed methods papers) selected for retrieval will  
 200 be assessed by two independent reviewers for methodological validity prior to inclusion in the review  
 201 using standardized critical appraisal instruments from JBI SUMARI based on study design e.g. RCT,  
 202 quasi-experimental studies etc.<sup>33</sup>

203 Qualitative papers (and qualitative component of mixed methods papers) selected for retrieval will be  
 204 assessed by two independent reviewers for methodological validity prior to inclusion in the review  
 205 using the standard JBI critical appraisal checklist for Qualitative Research available in JBI SUMARI.<sup>34</sup>

206 Authors of papers will be contacted to request missing or additional data for clarification, where  
 207 required. Any disagreements that arise between the reviewers will be resolved through discussion, or  
 208 with a third reviewer. The results of critical appraisal will be reported in narrative form and in a table.

209 All studies, regardless of the results of their methodological quality, will undergo data extraction and  
 210 synthesis (where possible) and the impact of methodological quality will be considered when  
 211 developing conclusions and recommendations for practice.

212 **Data extraction**

213 For the quantitative component, data will be extracted from quantitative and mixed methods  
 214 (quantitative component only) studies included in the review by two independent reviewers using the  
 215 standardized Joanna Briggs Institute data extraction tool in JBI SUMARI.<sup>33</sup> The data extracted will  
 216 include specific details about the populations, study methods, interventions, and outcomes of  
 217 significance to the review objective.

218 For the qualitative component, data will be extracted from qualitative and mixed methods (qualitative  
 219 component only) studies included in the review by two independent reviewers using the standardized  
 220 Joanna Briggs Institute data extraction tool in JBI SUMARI<sup>34</sup> The data extracted will include specific  
 221 details about the population, context, culture, geographical location, study methods and the  
 222 phenomena of interest relevant to the review objective. Findings, and their illustrations will be  
 223 extracted and assigned a level of credibility using the JBI ranking scale available through JBI  
 224 SUMARI.

225 Any disagreements that arise between the reviewers will be resolved through discussion, or with a  
 226 third reviewer. Authors of papers will be contacted to request missing or additional data, where  
 227 required.

228 **Data synthesis**

229 This review will follow a convergent segregated approach to synthesis and integration according to  
 230 the JBI methodology for MMSR using JBI SUMARI.<sup>28</sup> This will involve separate quantitative and  
 231 qualitative synthesis followed by integration of the resultant quantitative evidence and qualitative  
 232 evidence.

233 **Quantitative synthesis**

234 Studies will, where possible, be pooled with statistical meta-analysis using JBI SUMARI. Effect sizes  
 235 will be expressed as either odds ratios (for dichotomous data) or weighted (or standardized) final  
 236 post-intervention mean differences (for continuous data) and their 95% confidence intervals will be  
 237 calculated for analysis. Heterogeneity will be assessed statistically using the standard chi squared  
 238 and I<sup>2</sup> tests. The choice of model (random or fixed effects) and method for meta-analysis will be



239 based on the guidance by Tufunaru et al.<sup>33</sup> Subgroup analyses will be conducted where there is  
 240 sufficient data to investigate CATs and CAAs and morbidities. Sensitivity analyses will be conducted  
 241 to test decisions made regarding methodological quality. Where statistical pooling is not possible the  
 242 findings will be presented in narrative form including tables and figures to aid in data presentation,  
 243 where appropriate. A funnel plot will be generated to assess publication bias if there are 10 or more  
 244 studies included in a meta-analysis. Statistical tests for funnel plot asymmetry (Egger test, Begg test,  
 245 Harbord test) will be performed where appropriate.

246 Qualitative synthesis

247 Qualitative research findings will, where possible be pooled using JBI SUMARI with the meta-  
 248 aggregation approach.<sup>34</sup> This will involve the aggregation or synthesis of findings to generate a set of  
 249 statements that represent that aggregation, through assembling the findings and categorizing these  
 250 findings based on similarity in meaning. These categories are then subjected to a synthesis to  
 251 produce a comprehensive set of synthesized findings that can be used as a basis for evidence-based  
 252 practice. Where textual pooling is not possible the findings will be presented in narrative form.

253 Integration of quantitative evidence and qualitative evidence

254 The findings of each single method synthesis included in this review will then be configured according  
 255 to the JBI methodology for mixed methods systematic reviews.<sup>28</sup> This will involve quantitative  
 256 evidence and qualitative evidence being juxtaposed together and organized/linked into a line of  
 257 argument to produce an overall configured analysis. Where configuration is not possible the findings  
 258 will be presented in narrative form

259 **References**

- 260 1. American Veterinary Medical Association (AVMA). Human-Animal Bond; [internet]. [cited  
 261 Available from: [https://www.avma.org/KB/Resources/Reference/human-animal-](https://www.avma.org/KB/Resources/Reference/human-animal-bond/Pages/Human-Animal-Bond-AVMA.aspx)  
 262 [bond/Pages/Human-Animal-Bond-AVMA.aspx](https://www.avma.org/KB/Resources/Reference/human-animal-bond/Pages/Human-Animal-Bond-AVMA.aspx) accessed 9th May 2019.
- 263 2. Cookman CA. Older people and attachment to things, places, pets, and ideas. *Image J Nurs Sch*  
 264 1996; 28(3): 227-231.
- 265 3. Zilcha-Mano S, Mikulincer M and Shaver PR. Pet in the therapy room: an attachment perspective  
 266 on Animal-Assisted Therapy. *Attach Hum Dev* 2011; 13(6): 541-561.
- 267 4. Ernst L. Animal-Assisted Therapy: An Exploration of Its History, Healing Benefits, and How Skilled  
 268 Nursing Facilities Can Set Up Programs. *Annals of Long-Term Care: Clinical Care and Aging* 2014;  
 269 22(10): 27-32.
- 270 5. American Veterinary Medical Association (AVMA). Animal-Assisted Interventions: Definitions;  
 271 [internet]. [cited Available from: [https://www.avma.org/KB/Policies/Pages/Animal-Assisted-](https://www.avma.org/KB/Policies/Pages/Animal-Assisted-Interventions-Definitions.aspx)  
 272 [Interventions-Definitions.aspx](https://www.avma.org/KB/Policies/Pages/Animal-Assisted-Interventions-Definitions.aspx) accessed 9th May 2019.
- 273 6. Shen RZZ, Xiong P, Chou UI and Hall BJ. "We need them as much as they need us": A systematic  
 274 review of the qualitative evidence for possible mechanisms of effectiveness of animal-assisted  
 275 intervention (AAI). *Complement Ther Med* 2018; 41: 203-207.
- 276 7. Farid A. 111REVIEW OF ANIMAL ASSISTED THERAPY WITH VISITING DOGS IN DEMENTIA. *Age and*  
 277 *Ageing* 2019; 48(Supplement\_1): i32-i35.
- 278 8. Nimer J and Lundahl B. Animal-assisted therapy: A meta-analysis. *Anthrozoös* 2007; 20(3): 225-  
 279 238.

- 280 9. Charry-Sanchez JD, Pradilla I and Talero-Gutierrez C. Animal-assisted therapy in adults: A  
 281 systematic review. *Complement Ther Clin Pract* 2018; 32: 169-180.
- 282 10. Charry-Sanchez JD, Pradilla I and Talero-Gutierrez C. Effectiveness of Animal-Assisted Therapy in  
 283 the Pediatric Population: Systematic Review and Meta-Analysis of Controlled Studies. *J Dev Behav*  
 284 *Pediatr* 2018; 39(7): 580-590.
- 285 11. Cipriani J, Cooper M, DiGiovanni NM, Litchkofski A, Nichols AL and Ramsey A. Dog-Assisted  
 286 Therapy for Residents of Long-Term Care Facilities: An Evidence-Based Review with Implications for  
 287 Occupational Therapy. *Physical & Occupational Therapy In Geriatrics* 2013; 31(3): 214-240.
- 288 12. Hoagwood KE, Acri M, Morrissey M and Peth-Pierce R. Animal-Assisted Therapies for Youth with  
 289 or at risk for Mental Health Problems: A Systematic Review. *Appl Dev Sci* 2017; 21(1): 1-13.
- 290 13. Hu M, Zhang P, Leng M, Li C and Chen L. Animal-assisted intervention for individuals with  
 291 cognitive impairment: A meta-analysis of randomized controlled trials and quasi-randomized  
 292 controlled trials. *Psychiatry Res* 2018; 260: 418-427.
- 293 14. Jones MG, Rice SM and Cotton SM. Incorporating animal-assisted therapy in mental health  
 294 treatments for adolescents: A systematic review of canine assisted psychotherapy. *PLoS One* 2019;  
 295 14(1): e0210761.
- 296 15. Lundqvist M, Carlsson P, Sjobahl R, Theodorsson E and Levin LA. Patient benefit of dog-assisted  
 297 interventions in health care: a systematic review. *BMC Complement Altern Med* 2017; 17(1): 358.
- 298 16. Stern C and Chur-Hansen A. Methodological Considerations in Designing and Evaluating Animal-  
 299 Assisted Interventions. *Animals (Basel)* 2013; 3(1): 127-141.
- 300 17. Yakimicki ML, Edwards NE, Richards E and Beck AM. Animal-Assisted Intervention and Dementia:  
 301 A Systematic Review. *Clinical Nursing Research* 2019; 28(1): 9-29.
- 302 18. Zafra-Tanaka JH, Pacheco-Barrios K, Tellez WA and Taype-Rondan A. Effects of dog-assisted  
 303 therapy in adults with dementia: a systematic review and meta-analysis. *BMC Psychiatry* 2019; 19(1):  
 304 41.
- 305 19. Australian Bureau of Statistics. 2071.0 - Census of Population and Housing: Reflecting Australia -  
 306 Stories from the Census, 2016 2017.
- 307 20. United Nations. World Population Prospects. Key findings and advance tables. In: Division  
 308 DoEaSAP editor. New York 2017. p. Working Paper No. ESA/P/WP/248.
- 309 21. Richards S. The experiences of older people permanently relocating from their home in the  
 310 community to a long term care facility: a systematic review. Faculty of Health Science. Adelaide:  
 311 University of Adelaide; 2011.
- 312 22. Marx MS, Cohen-Mansfield J, Regier NG, Dakheel-Ali M, Srihari A and Thein K. The impact of  
 313 different dog-related stimuli on engagement of persons with dementia. *Am J Alzheimers Dis Other*  
 314 *Demen* 2010; 25(1): 37-45.
- 315 23. Stern C and Konno R. The effects of Canine-Assisted Interventions (CAIs) on the health and social  
 316 care of older people residing in long term care: a systematic review. *JBI Libr Syst Rev* 2011; 9(6): 146-  
 317 206.
- 318 24. MacLean B. Equine-assisted therapy. *Journal of Rehabilitation Research & Development* 2011;  
 319 48(7): xi-xii.
- 320 25. Stern C. The meaningfulness of Canine-Assisted Interventions (CAIs) on the health and social care  
 321 of older people residing in long term care: a systematic review. *JBI Libr Syst Rev* 2011; 9(21): 727-  
 322 790.
- 323 26. Garner P, Hopewell S, Chandler J, MacLehose H, Schunemann HJ, Akl EA, et al. When and how to  
 324 update systematic reviews: consensus and checklist. *BMJ* 2016; 354: i3507.
- 325 27. Higgins JPT, Green S and Scholten RJPM. Chapter 3: Maintaining reviews: updates, amendments  
 326 and feedback. In: T HJP and Green S, eds. *Cochrane Handbook for Systematic Reviews of*  
 327 *Interventions*, 2011.
- 328 28. Lizarondo L, Stern C, Carrier J, Godfrey C, Rieger K, Salmond S, et al. Chapter 8: Mixed methods  
 329 systematic reviews. In: Aromataris E and Munn Z, eds. *Joanna Briggs Institute Reviewer's Manual*,  
 330 The Joanna Briggs Institute, 2017.

- 331 29. Bressan V, Bagnasco A, Aleo G, Timmins F, Barisone M, Bianchi M, et al. Mixed-methods research  
 332 in nursing - a critical review. *Journal of Clinical Nursing* 2016; 26(19-20): 2878-2890.  
 333 30. Orr N, Bethel A, Whear R, Abbot R, Garside R, Thompson-Coon J, et al. What are the effects of  
 334 human-animal interaction on the health and wellbeing of residents in care homes? A synthesis of  
 335 qualitative and quantitative evidence; [internet]. [cited Available from: PROSPERO 2017  
 336 CRD42017058201 Available from:  
 337 [http://www.crd.york.ac.uk/PROSPERO/display\\_record.php?ID=CRD42017058201](http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017058201) accessed.  
 338 31. Engle G. The clinical application of the biopsychosocial model. *American Journal of Psychiatry*  
 339 1980; 137(5): 535-544.  
 340 32. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gotzsche PC, Ioannidis JP, et al. The PRISMA  
 341 statement for reporting systematic reviews and meta-analyses of studies that evaluate health care  
 342 interventions: explanation and elaboration. *J Clin Epidemiol* 2009; 62(10): e1-34.  
 343 33. Tufanaru C, Munn Z, Aromataris E, Campbell J and Hopp L. Chapter 3: Systematic reviews of  
 344 effectiveness. In: Aromataris E and Munn Z, eds. *Joanna Briggs Institute Reviewer's Manual*,  
 345 2015/09/12 edn. The Joanna Briggs Institute, 2017.  
 346 34. The Joanna Briggs Institute, Lockwood C, Porrit K, Munn Z, Rittenmeyer L, Salmond S, et al.  
 347 Chapter 2: Systematic reviews of qualitative evidence. In: Aromataris E and Z. M, eds. *Joanna Briggs*  
 348 *Institute Reviewer's Manual* 2017.

349

## 350 **Appendix I - Search Strategy**

351 CINAHL - search conducted 16th May 2019

352 S1 ( (MH "Aged") OR (MH "Frail Elderly") OR (MH "Aged, 80 and Over") ) OR TI ( "aged" OR "elderly"  
 353 OR "senior" OR "older people" OR "geriatric" OR "older person" ) OR AB ( "aged" OR "elderly" OR  
 354 "senior" OR "older people" OR "geriatric" OR "older person" ) OR ( (MH "Nursing Home Patients") OR  
 355 (MH "Residential Facilities") OR (MH "Long Term Care") OR (MH "Residential Care") OR (MH  
 356 "Nursing Homes") OR (MH "Housing for the Elderly") OR (MH "Gerontologic Care") ) OR TI ( "nursing  
 357 home resident" OR "residential facilit\*" OR "long term care" OR "residential care" OR "nursing home"  
 358 OR "aged care" ) OR AB ( "nursing home resident" OR "residential facilit\*" OR "long term care" OR  
 359 "residential care" OR "nursing home" OR "aged care" ) **(879,304)**

360 S2( (MH "Animal Assisted Therapy (Iowa NIC)") OR (MH "Pet Therapy") OR (MH "Dogs") ) OR TI ( "  
 361 animal-assisted" OR "pet therapy" OR "animal facilitated therapy" OR "pet facilitated therapy" OR  
 362 "dogs" ) OR AB ( "animal-assisted" OR "pet therapy" OR "animal facilitated therapy" OR "pet  
 363 facilitated therapy" OR "dogs" ) **(10,518)**

364 S3 S1 AND S2 **(851)**

365 S4 S1 AND S2 Limiters - Published Date: 20090401-20190531; English Language **(480)**

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