

# Interventions to Prevent or Delay Long-Term Nursing Home Placement for Adults with Impairments—a Systematic Review of Reviews



Wei Duan-Porter, MD, PhD<sup>1,2</sup>, Kristen Ullman, MPH<sup>1</sup>, Christina Rosebush, MPH<sup>1,3</sup>, Lauren McKenzie, MPH<sup>1</sup>, Kristine E. Ensrud, MD, MPH<sup>1,2,3</sup>, Edward Ratner, MD<sup>2,4</sup>, Nancy Greer, PhD<sup>1</sup>, Tetyana Shippee, PhD<sup>3</sup>, Joseph E. Gaugler, PhD<sup>3</sup>, and Timothy J. Wilt, MD, MPH<sup>1,2</sup>

<sup>1</sup>Center for Care Delivery and Outcomes Research, VAHSRD Minneapolis VA Health Care System, Minneapolis, MN, USA; <sup>2</sup>University of Minnesota Medical School, Minneapolis, MN, USA; <sup>3</sup>School of Public Health, University of Minnesota, Minneapolis, MN, USA; <sup>4</sup>Geriatric Research Education & Clinical Center, Minneapolis VA Health Care System, Minneapolis, MN, USA.

**BACKGROUND:** With continued growth in the older adult population, US federal and state costs for long-term care services are projected to increase. Recent policy changes have shifted funding to home and community-based services (HCBS), but it remains unclear whether HCBS can prevent or delay long-term nursing home placement (NHP).

**METHODS:** We searched MEDLINE (OVID), Sociological Abstracts, PsycINFO, CINAHL, and Embase (from inception through September 2018); and Cochrane Database of Systematic Reviews, Joanna Briggs Institute Database, AHRQ Evidence-based Practice Center, and VA Evidence Synthesis Program reports (from inception through November 2018) for English-language systematic reviews. We also sought expert referrals. Eligible reviews addressed HCBS for community-dwelling adults with, or at risk of developing, physical and/or cognitive impairments. Two individuals rated quality (using modified AMSTAR 2) and abstracted review characteristics, including definition of NHP and interventions. From a prioritized subset of the highest-quality and most recent reviews, we abstracted intervention effects and strength of evidence (as reported by review authors).

**RESULTS:** Of 47 eligible reviews, most focused on caregiver support ( $n = 10$ ), respite care and adult day programs ( $n = 9$ ), case management ( $n = 8$ ), and preventive home visits ( $n = 6$ ). Among 20 prioritized reviews, 12 exclusively included randomized controlled trials, while the rest also included observational studies. Prioritized reviews found no overall benefit or inconsistent effects for caregiver support ( $n = 2$ ), respite care and adult day programs ( $n = 3$ ), case management ( $n = 4$ ), and preventive home visits ( $n = 2$ ). For caregiver support, case

management, and preventive home visits, some reviews highlighted that a few studies of higher-intensity models reduced NHP. Reviews on other interventions ( $n = 9$ ) generally found a lack of evidence examining NHP.

**DISCUSSION:** Evidence indicated no benefit or inconsistent effects of HCBS in preventing or delaying NHP. Demonstration of substantial impacts on NHP may require longer-term studies of higher-intensity interventions that can be adapted for a variety of settings.

Registration

PROSPERO # CRD42018116198

**KEY WORDS:** long-term care services; home and community-based services; case management.

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## INTRODUCTION

US federal and state programs fund the majority of long-term services and supports (LTSS), with Medicaid accounting for 71% of government expenditures.<sup>1</sup> With continued growth in the older adult population, Medicaid spending on LTSS is projected to reach \$154 billion by 2025 and more than \$400 billion by 2050.<sup>1</sup> In 2015, institutional LTSS, or long-term nursing home care, accounted for 47% of overall Medicaid expenditures on LTSS, a proportion that continues to decrease, in part due to national policies (e.g., Balancing Incentive Program) that aim to shift funds to home and community-based services (HCBS).<sup>2</sup> However, there remains substantial uncertainty about the benefits of HCBS for community-dwelling adults with impairments, and concern that moving resources away from institutional LTSS may not lead to improved outcomes.<sup>3–6</sup>

Here, we present results from a larger review conducted by the Department of Veterans Affairs (VA) Evidence Synthesis Program (ESP),<sup>7</sup> focusing on effects of HCBS in preventing or delaying long-term nursing home placement (NHP) for

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community-dwelling adults with physical and/or cognitive impairments. VA costs for LTSS for eligible veterans is projected to be \$9.8 billion in fiscal year 2020, with over two thirds of these expenditures going to institutional care.<sup>8,9</sup> VA policymakers are also interested in increasing use of HCBS to help veterans with impairments remain in community settings;<sup>10,11</sup> thus, they sought evidence on whether HCBS can decrease the need for institutional care. To address a diverse set of interventions, and to provide summary effects for specific interventions, we conducted a systematic review of reviews.<sup>12</sup> We prioritized the highest-quality and most recently completed reviews for detailed results on individual interventions. We provide qualitative syntheses of these results, highlight gaps in the evidence base, and offer recommendations for future research and policy.

## METHODS

The review protocol was registered in PROSPERO (CRD42018116198).

### Conceptual Model and Scope

Collaboratively with VA stakeholders (representatives from VA Choose Home Initiative, Geriatrics and Extended Care, and Caregiver Support Program) and an advisory panel of experts in LTSS research, we developed a conceptual framework to organize the wide range of factors contributing to NHP and constituting the potential targets of interventions. We reviewed existing frameworks that have been applied in past research involving adults with impairments.<sup>13–16</sup> Our framework (Fig. 1) included 3 categories of factors that may interact: (1) *needs for care* due to physical or cognitive impairment, symptoms, and/or medical treatments; (2) *personal and social factors* that are resources or barriers to meeting needs; and (3) *systems and environmental factors* including access and quality of healthcare services and HCBS.

We applied our conceptual framework to formulate key questions, develop search terms, inform eligibility criteria, and determine elements of data abstraction. Given the complex array of factors that likely contribute to NHP for any given individual, we considered a broad range of HCBS, from interventions that sought to change modifiable risk factors (in community or outpatient settings) to programs that substituted services at home (for similar care provided at nursing facilities). Additionally, we considered that characteristics of adults with impairments (and often their caregivers) may impact effectiveness of various interventions.

### Key Questions (KQ)

For adults with physical and/or cognitive impairments:

*KQ1*—What is the effectiveness of HCBS for preventing or delaying NHP?

*KQ2*—Which characteristics of participants moderate the effectiveness of interventions in preventing or delaying NHP?

### Search Strategy

To balance a very broad scope of diverse interventions with determining effects of specific interventions, we focused on identifying relevant systematic reviews. We searched from inception: MEDLINE, Sociological Abstracts, PsycINFO, CINAHL, and Embase (through September 2018), and Cochrane Database of Systematic Reviews, Joanna Briggs Institute Database, Agency for Healthcare Research and Quality Evidence-based Practice Center reports, and VA ESP reports (through November 2018). Search terms included MeSH and free text for adults with impairments (or at high risk of developing impairments), range of HCBS, NHP, and systematic reviews (Appendix Table 1). Our expert advisory panel also provided referrals.

### Screening and Selection of Eligible Reviews

Duplicate results were removed and abstracts screened by 2 individuals using DistillerSR (Evidence Partners, Ottawa, Canada). Prespecified eligibility criteria (Appendix Table 2) included systematic reviews on community-dwelling adults with existing, or at risk of developing, impairments; HCBS, such as case management, caregiver support, and respite care; and explicit inclusion of NHP (or similar terms such as “institutionalization”). A preliminary list of HCBS helped guide search strategies, but other relevant interventions emerged and were included during screening and selection. If a review defined “nursing home admissions” as including short-term stays for rehabilitation, it was excluded. Included abstracts underwent full-text review by 2 individuals; eligibility at full-text review required consensus.

### Data Abstraction and Quality Assessment

All eligible reviews underwent independent data abstraction by 2 individuals for population characteristics (including country where study was conducted), dates of searches, number and characteristics of included primary studies, definition of NHP, and intervention characteristics.

Two reviewers independently assessed quality using criteria adapted from AMSTAR 2<sup>17</sup> (Appendix Fig. 1); overall quality was rated as high, medium, or low. Consensus on quality ratings was reached through discussion.

For specific effects on NHP, we selected the highest-quality and most recent eligible systematic reviews for each intervention. For example, we prioritized all 4 high-quality reviews on case management (2 conducted within the past 5 years and 2 published in 2013). From prioritized reviews, we further abstracted meta-analysis results (or qualitative summaries) of effects on NHP, moderation of effects by participant or intervention characteristics, ascertainment of NHP by included

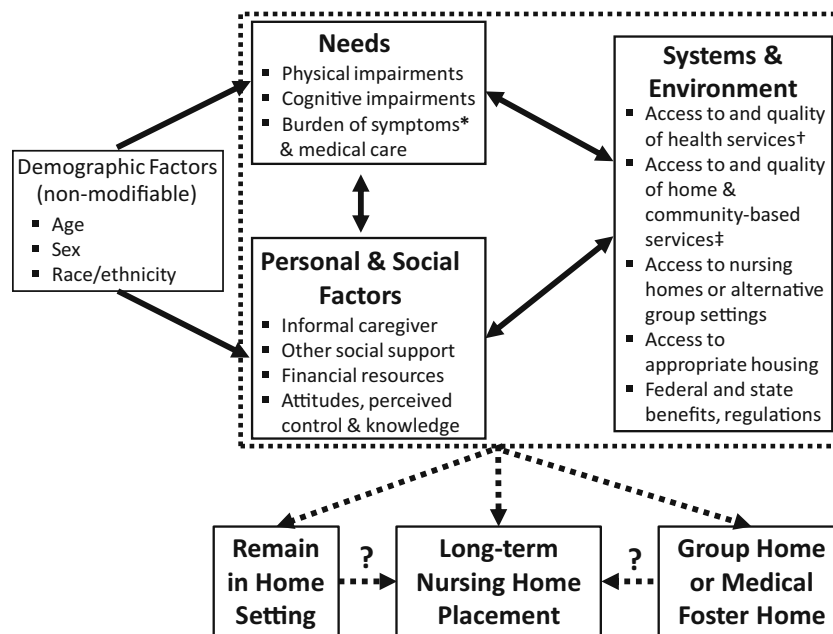


Figure 1 Conceptual model for long-term nursing home placement. \*Due to mental health and physical health conditions. †Includes outpatient and inpatient care. ‡Includes skilled health care at home (e.g., nursing, physical therapy) and personal assistance (e.g., home aides).

studies (abstracted directly from primary studies), quality ratings and strength of evidence (as reported by reviews), and total number of unique primary studies that examined NHP as an outcome.

## Data Synthesis

Given heterogeneity in populations and interventions, we undertook a qualitative synthesis.<sup>18,19</sup> First, we noted the number of eligible reviews addressing different interventions. To determine intervention categories, we primarily relied on review authors' descriptions and classifications of interventions. However, we also applied our conceptual framework to highlight when interventions have overlapping targets or components (e.g., case management and caregiver-focused interventions). We then summarized intervention effects abstracted from the prioritized subset of higher-quality, more recent, eligible reviews. We also determined the quantity of evidence underlying prioritized reviews of different interventions (i.e., number of unique primary studies), and described the quality of underlying studies and strength of evidence (as rated by reviews). We addressed KQ2 by summarizing participant characteristics associated with effectiveness of interventions, whether this was determined via quantitative subgroup analyses or qualitative summaries.

## RESULTS

### Overview of Eligible and Prioritized Systematic Reviews

Of 7014 unique citations, 336 articles underwent full-text review and 47 eligible reviews on interventions were

identified (Fig. 2). Most eligible reviews addressed older adults and/or those with dementia and evaluated caregiver support ( $n = 10$ ),<sup>20-29</sup> respite care and adult day programs ( $n = 9$ ),<sup>30-38</sup> case management ( $n = 8$ ),<sup>39-46</sup> or preventive home visits ( $n = 6$ )<sup>47-52</sup> (see Text Box 1 for descriptions of main intervention categories). The remaining reviews<sup>53-66</sup> were either very broad in scope (e.g., all nonpharmacologic interventions for dementia) or 1-2 reviews addressing an intervention (e.g., home-based primary care). Most eligible reviews included studies that were conducted in a variety of countries, including USA, Canada, Australia, and high-income countries in Europe and Asia.

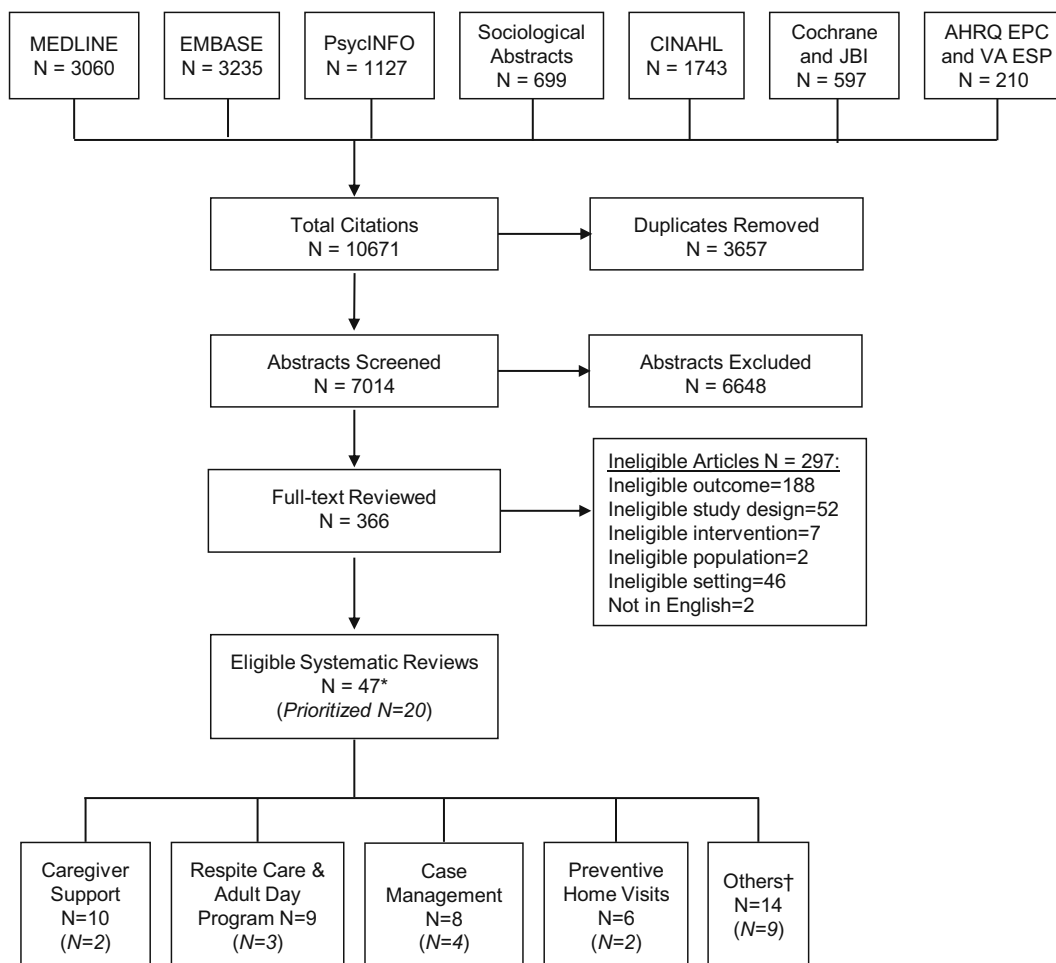
Text Box 1. Major categories of interventions to prevent or delay long-term nursing home placement

**Caregiver support**—Interventions focused on education, training, and supportive counseling for caregivers. Cognitive reframing is a specific type of counseling that aims to change problematic cognitions (e.g., meaning of disruptive behavior displayed by those with dementia) to help caregivers adopt improved strategies for managing difficult situations.

**Respite care and adult day programs**—Interventions that had a primary or major aim of relieving the burden of daily caregiving tasks. These involved providing a set of services, whether at home, in day clinics, or in residential settings, that partially or fully substituted for care provided by family and other social support.

**Case management**—Interventions involved a variety of components, and some specifically described management of common geriatric syndromes. Case managers had variable professional backgrounds (most commonly nursing), and used a variety of modalities for contact with participants. Most interventions provided education on local resources and coordination of services. Often, interventions also included some caregiver counseling and support.

**Preventive home visits**—In contrast to case management interventions, preventive home visits included older participants (e.g., from population registries) without known impairments or high-risk medical conditions. Interventions differed in number of visits (1 to 12). Nearly all included studies employed health professionals (nurses, physicians, and/or social workers) as visitors.



**Figure 2** Search, selection, and prioritization of eligible systematic reviews. JBI = Johanna Briggs Institute; AHRQ EPC = Agency for Healthcare Research and Quality Evidence-Based Practice Centers; VA ESP = Department of Veterans Affairs Evidence Synthesis Program. \*There were an additional 20 eligible reviews on risk factors for long-term nursing home placement; results on risk factors were described in the larger VA ESP report. †2 reviews—physical activity interventions; 2—home-based primary care; 2—any nonpharmacologic intervention for adults with dementia; 1—any intervention for falls prevention; 1—any intervention for patient or caregiver stress; 1—different settings for personal assistance; 1—in-home health care or personal assistance; 1—assistive technologies; 1—demonstration projects to integrate acute and long-term care in USA and Europe; 1—occupational therapy; and 1—light therapy.

**Table 1** Characteristics of 20 Prioritized Systematic Reviews (SRs) on Interventions to Prevent or Delay Long-Term Nursing Home Placement (NHP)

Interventions	# of SRs*	Recent†	Quality of SRs		SRs including			# of unique studies evaluating NHP§
			High	Medium	Only RCTs	Observational studies‡	US studies	
Caregiver support	2	1	2	—	2	—	1	7
Respite care and day programs	3	1	3	—	2	1	3	22
Case management	4	2	4	—	2	1	3	28
Preventive home visits	2	—	1	1	1	1	2	32
Others	9	6	5	3	5	4	6	11

RCTs randomized controlled trials, US United States

\*SR prioritized based on higher quality and more recent searches

†Search conducted 2013 or later

‡May have also included RCTs in addition to observational studies

§For each intervention, the total number of unique primary studies identified by SR as evaluating NHP

||2 reviews—physical activity interventions; 1—home-based primary care; 1—interventions for falls prevention; 1—different settings for personal assistance; 1—assistive technologies; 1—demonstration projects to integrate acute and long-term care in the USA and Europe; 1—occupational therapy; and 1—light therapy

**Table 2 Summary of Results on Interventions to Delay or Prevent Long-Term Nursing Home Placement (NHP) from Prioritized Systematic Reviews**

Interventions (# of prioritized reviews)	Effect on NHP	Description of results
13 systematic reviews that limited inclusion to RCTs <sup>†</sup>		
Caregiver support (2)	↔/↓	1 high-quality review <sup>21,67</sup> reported qualitative summaries, stating caregiver interventions “did not consistently improve...institutionalization for patients with memory-related disorders,” but also highlighted results from 2 studies that demonstrated delay in NHP
	?	1 high-quality review on cognitive reframing for caregivers found no RCTs reporting NHP <sup>27</sup>
Respite care and day programs (2)	↔	1 high-quality review reported quantitative meta-analysis for adult day programs and found no overall decrease in NHP (OR 0.84, 95% CI 0.58, 1.21) or when separated by type of comparator <sup>30</sup>
	?	1 high-quality review on all types of respite care identified only 1 RCT, which reported delay in combined outcome of NHP or death <sup>35</sup>
Case management (2)	↔	2 high-quality reviews reported quantitative meta-analyses for adults with dementia—1 review found inconsistent results across different follow-up intervals (reduction in NHP at 6 and 18 months, but not at 10–12 and 24 months); <sup>43</sup> 1 review found no overall decrease in NHP (RR 0.94 [95% CI 0.85, 1.03]) or delay in timing (WMD 77.8 days [95% CI – 70.5, 226.1]) <sup>44</sup>
Preventive home visits (1)	↔/↓	1 medium-quality review reported quantitative meta-analysis and found no effect overall (RR 0.91 [95% CI 0.76, 1.09]) but suggested more intensive interventions (> 9 visits) may decrease NHP <sup>51</sup>
Other (5)	?	2 medium-quality reviews on physical activity interventions for frail or pre-frail older adults found no RCT reporting NHP <sup>63,64</sup>
	↔	1 high-quality review on a variety of interventions for falls prevention reported qualitative summaries that multifactorial programs and exercise-focused interventions showed inconsistent effects <sup>53</sup>
	?	1 high-quality review on light therapy for adults with dementia found no RCT reporting NHP <sup>55</sup>
	?	1 high-quality review on assistive technologies for adults with dementia found no RCT reporting NHP <sup>60</sup>
7 systematic reviews that included observational studies		
Respite care and day programs (1)	↑/↓	1 high-quality review reported quantitative meta-analysis of “quasi-experimental” <sup>‡</sup> studies finding increased NHP (OR 1.79 [95% CI 1.02, 3.12]), but also provided qualitative summary of observational cohort studies, stating that there was “some support for the benefits of respite care...” <sup>37</sup>
Case management (2)	↔/↓	1 high-quality review reported qualitative summary for adults with dementia, stating that programs ≤ 2 years did not “confer clinically important delays in time to [NHP]” (moderate strength of evidence), but interventions for those with “in-home spouse caregivers and continued services for longer than 2 years” may be effective (low strength of evidence) <sup>46</sup>
	↔	1 high-quality review reported qualitative summary for adults with frailty or multimorbidity, stating no effect on NHP (low strength of evidence) <sup>46</sup>
	?	1 high-quality review on “reablement” interventions for older adults found only 1 study reporting NHP <sup>41</sup>
Preventive home visits (1)	↔	1 high-quality review reported quantitative meta-analysis and found no effect overall (RR 1.02 [95% CI 0.88, 1.18]) or by different follow-up intervals <sup>49</sup>
Other (4)	?	1 high-quality review on home-based primary care found no study reporting NHP <sup>66</sup>
	?	1 medium-quality review on occupational therapy found only 1 study reporting NHP <sup>54</sup>
	?	1 high-quality review on different settings or models of personal assistance found no studies reporting NHP <sup>57</sup>
	↓	1 low-quality review reported qualitative summary of demonstration projects to better integrate acute and long-term care, stating decreased NHP occurred in 2 projects <sup>62</sup>

↑ increased or accelerated NHP, ↔ no meaningful difference or effect, ↓ delayed or prevented NHP, ? reviews identified none or only 1 study, CI confidence interval, HR hazards ratio, OR odds ratio, RR relative risk ratio, RCT randomized controlled trial, WMD weighted mean difference

\*Reviews selected based on highest quality and most recent search

<sup>†</sup>These reviews explicitly allowed only RCTs as included study designs

<sup>‡</sup>Review authors defined these as observational studies with a comparison group

For specific intervention effects, we prioritized a total of 20 eligible reviews, including all 15 high-quality reviews.<sup>21,27,30,35,37,41,43,44,46,49,53,55,57,60,66</sup>

Characteristics of prioritized reviews are provided in Table 1 and intervention effects are summarized in Table 2 (see Appendix Table 3 for detailed quality ratings and Appendix 4 for detailed results). Overall, prioritized reviews found no benefit or inconsistent effects for caregiver support (2 reviews),<sup>21,27</sup> respite care and adult day

programs (3 reviews),<sup>30,35,37</sup> case management (4 reviews),<sup>41,43,44,46</sup> preventive home visits (2 reviews),<sup>49,51</sup> and interventions to prevent falls (1 review).<sup>53</sup> For caregiver support, case management, and preventive home visits, some reviews highlighted benefits in delaying NHP that were reported by a few studies of each intervention. Prioritized reviews on other interventions, including home-based primary care and physical activity programs, generally found a lack of studies examining NHP as an outcome.<sup>54,55,57,60,62–64,66</sup> We



provide more information below on effects of caregiver support, respite care and adult day programs, case management, and preventive home visits.

## Caregiver Support

Two high-quality prioritized reviews<sup>21,27</sup> focused on caregiver interventions, included only RCTs, and collectively identified 7 studies that addressed NHP. One review<sup>27</sup> specifically evaluated cognitive reframing for caregivers of adults with dementia, but was unable to identify trials that reported effects on NHP (despite aiming to examine NHP). The other review, conducted by VA ESP,<sup>21,67</sup> evaluated diverse interventions for caregivers of adults with dementia or cancer, and found 7 trials which examined NHP.<sup>68–74</sup> All studies focused on caregivers of adults with dementia, and review authors reported that these interventions “did not consistently improve...institutionalization for patients with memory-related disorders.”<sup>19</sup> However, authors highlighted results from 2 studies that showed delays in NHP; both studies evaluated the same high-intensity model of caregiver support, including 6 tailored in-person counseling sessions over the first 4 months, and ad hoc contacts by counselors via different modalities throughout the follow-up period.<sup>70,74</sup> Review authors rated low strength of evidence for all patient outcomes, including institutionalization.

## Respite Care and Adult Day Programs

Three high-quality reviews<sup>28,33,35</sup> examined respite care and/or adult day programs, and together identified 22 unique studies. The first review included only RCTs and focused on adult day programs for individuals with a variety of different medical conditions;<sup>30</sup> quantitative meta-analysis using data from 13 trials<sup>75–87</sup> found no overall benefit for decreasing institutionalization (pooled OR 0.84 [95% CI 0.58, 1.21]) or by different comparators (e.g., OR 0.91 [95% CI 0.70, 1.19] for day program vs. comprehensive geriatric care). Review authors reported “the quality of the body of evidence to be low for ... death or institutional care...” The second review examined respite care for adults with dementia in any setting (e.g., at home or at day clinics) and identified only one RCT;<sup>35</sup> this trial showed more days (i.e., a combined outcome of not experiencing institutionalization or death) for the intervention group.<sup>88</sup> The third review included both RCTs and observational studies of respite care in any setting for adults with a variety of conditions.<sup>37</sup> This review identified one RCT,<sup>89</sup> 4 “quasi-experimental” studies (nonrandomized prospective studies with any comparative control),<sup>90–93</sup> and 3 observational cohort studies (without comparators)<sup>94–96</sup> that evaluated NHP. Review authors conducted meta-analysis using data from 3 quasi-experimental studies,<sup>90–92</sup> and found increased NHP in the respite care groups (OR 1.79 [95% CI 1.02, 3.12]). However, review authors reported that the 3 cohort studies<sup>94–96</sup> showed “some support for the benefits of respite care...”

Review authors did not indicate overall strength of evidence but noted the role of unmeasured confounders in contributing to these inconsistent results.

## Case Management

Four prioritized high-quality reviews<sup>41,43,44,46</sup> included 28 unique studies that evaluated effects of case management on NHP. Two reviews focused on adults with dementia,<sup>43,44</sup> included only RCTs, and collectively identified 22 unique trials that reported NHP outcomes. One of these reviews<sup>43</sup> conducted meta-analyses of data from 9 trials,<sup>97–105</sup> stratifying by follow-up interval; there were lower odds of NHP with case management at 6 months (OR 0.82 [95% CI 0.69, 0.98]) and 18 months (OR 0.25 [95% CI 0.10, 0.60]), but not at 10–12 months (OR 0.95 [95% CI 0.83, 1.08]) or 24 months (OR 1.03 [95% CI 0.52, 2.03]). Review authors assessed the strength of evidence as low. The second review<sup>44</sup> pooled data for NHP from 16 studies<sup>69,71–73,89,97,101,102,106–113</sup> and reported “no statistically significant effect of dementia [case management] compared to usual care” (risk ratio [RR] 0.94 [95% CI 0.85, 1.03]). Additionally, meta-analysis using data on time to NHP from 5 studies<sup>69,73,89,110,111</sup> found no statistically significant difference for case management compared with control (weighted mean difference 78.0 days [95% CI – 70.5, 226.1]). Review authors did not provide an assessment of overall strength of evidence.

Two additional reviews addressed older adults with various health conditions and included observational studies in addition to RCTs.<sup>41,46</sup> One of these reviews<sup>46</sup> found 10 studies that evaluated NHP for adults with dementia<sup>74,97,99–102,105,114–116</sup> and 2 that focused on frailty or multimorbidity.<sup>117,118</sup> Due to substantial heterogeneity of studies, review authors provided qualitative syntheses. For dementia, programs lasting 2 years or less did not “confer clinically important delays in time to nursing home placement...” (moderate strength of evidence), but those participants “who have in-home spouse caregivers and continue services for longer than 2 years” may benefit from delayed NHP (low strength of evidence). For adults with frailty or multimorbidity, case management did not decrease NHP (low strength of evidence). The other review<sup>41</sup> addressed a high-intensity, time-limited case management intervention oriented towards optimizing function, termed “reablement,” for older adults. This review identified only one trial that reported NHP; this trial found no difference in NHP between intervention and control groups.<sup>119</sup>

## Preventive Home Visits

Two prioritized reviews examined preventive home visits and collectively identified 32 unique studies evaluating NHP.<sup>49,51</sup> A medium-quality review<sup>51</sup> conducted quantitative meta-analysis using data from 13 RCTs<sup>120–132</sup> and found overall “reduction in the risk of [NHP] was modest and nonsignificant” (RR 0.91 [95% CI 0.76, 1.09]). In stratified analyses by number of visits (over follow-up of 1–4 years for all studies),

interventions with more than 9 visits<sup>123,125,127,131</sup> showed an “estimated reduction [of NHP]... 34% (RR, 0.66; 95% CI, 0.48–0.92) and the typical risk difference was 2.3%.” Review authors did not report strength of evidence. The other review<sup>49</sup> was high quality and included both RCTs and observational studies using “quasi-random methods that approximated the characteristics of randomization”. Quantitative meta-analysis using data from 26 studies<sup>117,121,122,124–128,131,133–149</sup> showed no overall effect of home visits (RR 1.02 [95% CI 0.88, 1.18]). Stratified analyses found similar results across different follow-up intervals (e.g., RR 0.96 [95% CI 0.69, 1.33] for 8 studies with at least 3 years of follow-up).<sup>121,125,127,128,131,134,139,147</sup> Review authors concluded there was “moderate quality evidence of no clinically important difference” between intervention and control.

## DISCUSSION

We conducted a systematic review of reviews to examine evidence on interventions that may prevent or delay NHP for adults with, or at risk for, impairments. Caregiver support, respite care and adult day programs, case management, and preventive home visits showed inconsistent effects or no benefit for preventing or delaying NHP. Other interventions, such as home-based primary care and physical activity, had very limited to no evidence to address their effects on NHP.

Existing interventions to support adults with impairments often varied in targeted populations, from participants at earlier stages of chronic conditions to individuals with substantial impairments. While interventions addressing those with less impairments may be able to prevent progression of disability, such programs often require large-scale, long-term investments across a population to see appreciable benefits. In contrast, interventions for adults with substantial care needs will have limited ability to alter trajectories of decline. Current interventions for these individuals have largely sought to improve coordination of services and caregiver support, aiming to bolster informal support networks. However, some individuals with substantial needs do not have social support, and even for those who do, these resources can change quickly and dramatically (e.g., death of a spouse). Our results suggest that many existing interventions help meet the needs of adults with impairments only if there is adequate caregiver support.

Addressing NHP in the USA is made more difficult by fragmentation and complexity of the financial and regulatory environment for healthcare and LTSS. These larger environmental factors make early investment (to reap long-term benefits) not financially viable for many healthcare entities and community organizations. They also shape local access (or lack thereof) to services and limit the potential impact of individual interventions, such as case management, that must work with existing resources. Demonstration projects of new financial benefits or incentives<sup>150</sup> must also operate within existing local barriers, including availability and quality of

service providers. While changes in state and/or national policies may incentivize improved access and/or higher quality of HCBS,<sup>2,151</sup> it will likely take time to change the landscape of local resources.

## Evidence Gaps and Future Research

In addition to lack of evidence for certain types of interventions, there was great complexity and variability in multicomponent interventions, such as case management. Additionally, review authors noted that underlying primary studies ranged in participant characteristics and setting. These sources of heterogeneity contributed to challenges in categorizing studies and determining summary results across a body of evidence. In some cases, participants’ low risk for NHP contributed to concerns about inadequate power for detecting intervention effects.

To improve the design and evaluation of complex interventions for adults with impairments, future studies should employ strategies or frameworks that explicitly consider which intervention components may be most appropriate for whom and in which settings.<sup>152,153</sup> Applying such strategies to inform selection of intervention components, and to describe whether those components were successfully implemented in particular settings, will facilitate future efforts to summarize and interpret results for complex interventions with similar goals. Therefore, we recommend the following:

- Randomized evaluations of complex interventions that compare models which differ in only 1–2 key components or setting characteristics (e.g., similar types of services at home vs. in clinic)
- Randomized evaluations with longer follow-up (likely > 2 years) and larger sample size, particularly for individuals at lower overall risk of NHP
- Application of strategies and frameworks for selecting components and evaluating implementation of interventions, to inform interpretation of results of complex interventions

## Implications for Policy

Due to wide variation in local availability of LTSS,<sup>154</sup> coordinating care and services remains a key challenge for adults with impairments and their caregivers.<sup>155,156</sup> Therefore, case management may offer other substantial benefits, despite our results suggesting the lack of effectiveness for delaying NHP. Successful case management interventions may need to have relatively high-frequency contacts that are initiated early in the course of chronic conditions (e.g., dementia) and extend for several years. Most US adults with impairments, including veterans, do not have access to this level of longitudinal support and care coordination. Implementing and sustaining such high-intensity case management will require better alignment of LTSS programs at state and federal levels.

Additionally, it remains unclear whether (and which) outcomes are improved with HCBS.<sup>5</sup> Some have questioned whether the shift of funding to HCBS (and away from nursing homes) is wise, or if this will lead to worse outcomes for those with substantial needs that cannot be met in community settings.<sup>4,6</sup> Our results support concerns that increased utilization of existing HCBS may not lead to appreciable changes in NHP, thus indicating the importance of understanding how HCBS may impact other outcomes. We agree with others who have encouraged policymakers to also consider the value of HCBS for improving patient and family-centered outcomes.<sup>3,5</sup>

## Limitations

We focused on NHP and only included reviews that specified NHP as an outcome of interest. Reviews that exclusively addressed other outcomes, such as quality of life or caregiver burden, were ineligible. Therefore, our findings do not indicate that interventions were not effective for these other outcomes. We relied on review authors' descriptions of interventions, quality ratings for studies included in reviews, and determination of overall strength of evidence. We also included subgroup analyses reported by reviews, some of which relied on observed characteristics of interventions (e.g., average number of follow-up visits), instead of study design elements. To determine how included studies assessed NHP, we examined primary studies included by prioritized reviews. We found that most studies used participant reports of NHP; few confirmed NHP with additional data sources, such as state or federal administrative data on LTSS utilization. No eligible reviews restricted included studies to only those conducted in the USA, and some studies were conducted > 20 years ago. It may be that evidence from outside the USA is less directly applicable to addressing needs of the US population, but we note that the primary difference between the USA and other high-income countries (that were locations of included studies) is funding of LTSS and not the general availability of various services, whether HCBS or long-term institutional care.<sup>157</sup> Older studies may also be less applicable, due to changes in availability of HCBS and growth in assisted living facilities.<sup>158</sup>

## Conclusions

Caregiver support, respite care and adult day programs, case management, and preventive home visits generally do not prevent or delay NHP for adults with (or at risk for) impairments, although a few studies suggested benefit for some higher-intensity models. Demonstration of substantial impacts on NHP may require longer-term studies of high-intensity interventions that can be adapted for a variety of settings.

**Corresponding Author:** Wei Duan-Porter, MD, PhD; Center for Care Delivery and Outcomes Research VAHSRD Minneapolis VA Health Care System, Minneapolis, MN, USA (e-mail: wei.duanporter@va.gov).

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