



MEALS on WHEELS  
AMERICA



# IMPACT OF HOME MODIFICATIONS AND REPAIRS ON OLDER ADULTS' HEALTH AND WELL-BEING

EVALUATION AND  
RECOMMENDATIONS BASED ON  
EXAMINATION OF THE HELPING  
HOMEBOUND HEROES PROGRAM

## ACKNOWLEDGMENTS

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The Helping Homebound Heroes grant program is made possible through Meals on Wheels America's ongoing partnership with The Home Depot Foundation and has been a longtime flagship initiative of its in-home safety strategy. The purpose of the program is to honor those who have served their country while providing much-needed home modifications and/or repairs to support the safety of Meals on Wheels veteran clients.

The outcomes and recommendations shared in this report are based on findings from an analysis of existing data as well as interviews with home modification and/or repair recipients and can influence and support the larger field of home modifications and repairs. The purpose of this research was two-fold:

1. To better articulate perceived impacts on older adults' health and well-being associated with home repairs and home modifications conducted by Meals on Wheels programs that have received Helping Homebound Heroes grants, and
2. To identify recommendations for strengthening home modification/repair programs nationally.

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## INTRODUCTION

### IN-HOME SAFETY AND MORE THAN A MEAL®

Meals on Wheels programs provide older adults with the services they need to remain in their communities as they age. In addition to connecting older adults to food assistance, Meals on Wheels programs help support healthy and independent living through the four core domains of the *More Than a Meal*® service model (Exhibit 1).<sup>1</sup> Nutrition services include meals (hot, cold, chilled or frozen) available Monday-Friday, with hot delivery whenever possible. Additionally, meals are consistent with national dietary standards. Community connections include referrals to other community-based or healthcare services that may be helpful, as well as ongoing monitoring of changes in condition and reporting back to the program office and resolutions of identified changes. Socialization services include intentional face-to-face conversation during delivery. Finally, in-home safety services include a regular environmental safety check and an established approach for addressing identified hazards. However, programs routinely offer above and beyond the *More Than a Meal*® model. Many programs offer home assessments and repairs to address housing issues. In 2018, Meals on Wheels programs helped refer and/or serve an estimated 18,000 older adults with needed home repairs.



EXHIBIT 1:  
THE MORE THAN A MEAL® MODEL

### HELPING HOMEBOUND HEROES

As part of its mission to promote in-home safety, Meals on Wheels America partners with The Home Depot Foundation to offer home repairs and modifications to older veterans through the Helping Homebound Heroes (HHH) program.<sup>2</sup> Since the partnership began in 2015, the HHH program has provided services to over 1,500 veterans across the country.<sup>2</sup> As of 2020, eight local Meals on Wheels programs received HHH grants to implement critical home repairs and modifications (see Exhibit 2).

#### EXHIBIT 2: PARTICIPANTS

LOCAL PROGRAM	LOCATION
Chatham County Council on Aging	Pittsboro, NC
Family Services Rochester	Rochester, MN
LifeCare Alliance	Columbus, OH
Meals on Wheels Central Maryland	Baltimore, MD
Meals on Wheels Central Texas	Austin, TX
North Star Council on Aging/Fairbanks Senior Center	Fairbanks, AK
Osceola Council on Aging	Kissimmee, FL
Senior Neighbors	Grand Rapids, MI

## STUDY PURPOSE

The purpose of this qualitative study is to 1) review the existing literature on outcomes associated with home modifications and repairs and 2) assess the impacts of the HHH program through brief interviews with program recipients. This study will provide Meals on Wheels America with actionable insights that can inform considerations for the HHH program and future measurement of program impacts. This report begins with a thorough discussion of the literature, followed by the evaluation findings.

## THE ISSUE

Accessible and safe housing is essential to supporting healthy aging for older adults. Home modifications and repairs are promising approaches to supporting the evolving needs of adults as they grow older and develop limitations to safely moving around their home and completing daily tasks. While research on home modifications and repairs demonstrates benefits from these adaptations, some studies have reported mixed outcomes. Additional research is needed to address major evidence gaps related to the impact of home modifications and repairs.

## HOUSING AND OLDER ADULTS IN AMERICA

Housing challenges such as lack of accessible housing, poor housing quality and limited financial resources may affect the ability of older adults to successfully age in place.

### HOUSING AMONG OLDER ADULTS

The number of household heads age 65 or older in the United States has grown from 27 million in 2012 to 31 million in 2017, as the Baby Boomer generation continues to age.<sup>3</sup> By 2038, the number of household heads age 65 or older will account for more than one-third of all U.S. households.<sup>3</sup> Most older adults age 65 or older live alone or with a spouse or partner, and the percentage of adults who live alone rises substantially with age.<sup>3</sup>

### OLDER ADULTS AND AGING IN PLACE

America's aging population has expressed a strong desire to age in place, with over three-quarters of adults age 50 or older reporting a preference for remaining in their homes and communities for as long as possible.<sup>4</sup> A key barrier to aging in place is lack of accessible housing that enables individuals with functional limitations to live independently.

However, research indicates that the current housing stock in the U.S. does not meet the accessibility needs of older adults.<sup>5-8</sup> Less than one third of existing homes have basic accessibility features (no-step entry and entry-level bedroom and full bathroom), and only approximately one percent of residential units in the U.S. are accessible for people in wheelchairs.<sup>9,10</sup> Although newer housing is more likely to incorporate accessibility features, most older adult homeowners live in homes that are 40 years of age or older, many of which were not built to accommodate the mobility needs of older adults.<sup>1,11</sup> In addition, older adults who are unmarried, live alone, reside in rural areas or members of minority groups are significantly more likely to live in inadequate housing, as are those who live in homes constructed prior to 2000.<sup>12,13</sup> These homes pose health risks for older adults, including lack of running water, faulty plumbing and structural issues.<sup>12,13</sup>

Accessible, adequate housing is critical to meeting the needs of older adults with disabilities. As people age, the likelihood of developing a disability that affects mobility or the ability to perform activities of daily living (ADLs) increases.<sup>14</sup> By age 85, the majority of adults will have a disability and require some form of long-term care.<sup>5,11</sup> When older adults live in home environments that do not support their accessibility needs, they often restrict activity or rely on caregivers to help with ADLs.<sup>15</sup> The inability to complete ADLs places older adults at a greater risk for further health issues.<sup>8,15</sup>

Modifying the home environment to improve accessibility may enable older adults to remain in their homes longer and reduce the degree of caregiving needed, but it may also require expensive home repairs and maintenance.<sup>3,8,9,15,16</sup> As most adults age 65 and older no longer work for pay, they may have limited funds for needed home improvements.<sup>17</sup> In 2013, half of household heads aged 65 or older reported less than \$45,000 in assets (excluding home equity).<sup>17</sup> Moreover, as many as 55 million older adults and disabled individuals rely on Medicare, the largest source of health insurance in the U.S., for assistance with medical and wellness-related expenses.<sup>18</sup> Although home modifications for improving accessibility may improve safety and wellness, they are largely ineligible for coverage under Medicare and are not considered a deductible medical expense by the IRS.<sup>7,8</sup> Therefore, most home repairs and modifications are paid for out-of-pocket, with the burden resting on older adults and their informal caregivers.<sup>8</sup>

## HOUSING CONSIDERATIONS FOR OLDER VETERANS

Older adults who are veterans also face unique challenges to remaining in their homes as they age. The U.S. Census Bureau reports that veterans have a higher rate of disability than non-veterans at every age group, often as a result of service-related injuries or experiences.<sup>19,20</sup> Higher rates of disabilities may indicate increased need for accessibility features in the home. However, veterans are more likely to live in rural areas than non-veterans, which offer lower levels of accessible housing than urban areas.<sup>15</sup> In addition, most veterans are 55 years of age or older, and almost one-quarter of all households led by veterans in this age group spend 30 percent or more of their income on housing.<sup>21,22</sup> Older veterans also have lower labor force participation compared to non-veterans, and many older veterans live on limited incomes of less than \$20,000 per year.<sup>20</sup> Housing affordability and quality challenges, coupled with limited incomes and physical disabilities, suggest that older veterans need supportive services to successfully age in place.<sup>20</sup>

## HOME MODIFICATIONS

The literature uses different terms to describe the way that older adults can adapt their environment to meet their needs.

### HOME MODIFICATIONS, RENOVATIONS AND REPAIRS

Home modifications are key strategies that support the ability of older adults to stay independent, age in place and continue to perform ADLs, such as bathing, eating and performing self-care.<sup>23,24</sup> Home modifications refer to “retrofits or adjustments to existing homes that are undertaken to improve physical accessibility for people with disabilities or for older adults who choose to age in place.”<sup>25</sup> For example, changes to doors and hinges can help accommodate wheelchairs and movement with a cane or walker, and handrails on stairways and wall-mounted grab bars in bathrooms can facilitate balance.<sup>26</sup>

The terms “home renovation” and “home safety renovation” are often used interchangeably with home modification.<sup>27</sup> Home modifications and renovations can incorporate principles of universal design, a movement that promotes environments that are easily accessible for all people without need for adaptations for age, mobility or other abilities.<sup>28</sup> Improving accessibility can also involve “home repairs,” which typically involve restoring existing structures and performing maintenance within the home, such as fixing wobbly railings.<sup>29</sup>

### MITIGATING ENVIRONMENTAL HAZARDS AND IMPROVING ACCESSIBILITY

Home modifications often seek to remove environmental hazards that affect quality of life or present a health and safety risk. Hazards could include unsecured throw rugs, wires and cords on the floor, broken or uneven steps, and slippery tubs and showers, among many others. Home modifications may also seek to improve accessibility and mobility, for example, by making homes wheelchair accessible or reducing the height of kitchen cabinets.

## OUTCOMES OF HOME MODIFICATIONS INTERVENTIONS

While several home modifications studies have demonstrated positive impacts, some have also shown no outcomes associated with home modifications and repairs.

## FALLS PREVENTION

Research suggests that falls impact one in four older adults annually, resulting in negative health consequences for the individual and significant costs to the healthcare system.<sup>15,30</sup> Some home modification interventions seek to mitigate environmental home hazards in order to prevent falls. However, evidence of the association between environmental home hazards and falls is mixed.<sup>31,32</sup> Some studies have found that older adults who experience falls are more likely to live in homes with environmental hazards, such as uneven floors and no handrails.<sup>31</sup> Other studies have found no association between household hazards and falls.<sup>33</sup> Research also suggests that environmental hazards are moderated by the ability of the individual to cope with these hazards. For example, one study found that “person-environment fit,” or the adequacy of the fit between the individual and their environment, was a better predictor of falls among a sample of older adults than the number of environmental hazards in their homes.<sup>34</sup>

While research shows similar inconsistencies in the association between home modifications and falls prevention, there is evidence that home modifications can lead to reduced falls among older adults.<sup>35</sup> In 2012, a Cochrane systematic review analyzed data from 159 randomized controlled trials with a total of 79,193 participants to assess the effects of falls prevention interventions among older community-dwelling adults.<sup>36</sup> The review found that interventions focused on home safety assessment and modification were effective in reducing both the rate of falls and risk of falling.<sup>36</sup>

## ACTIVITIES OF DAILY LIVING

Evidence suggests that multifactorial falls prevention interventions that include home modifications can improve the ability of older adults to perform ADLs or contribute to slower declines in ADL function.<sup>37</sup> In addition, randomized controlled trials have shown that improving the functionality of the home environment and mitigating hazards can improve functional ability in older adults, including mobility and ability to perform self-care.<sup>35</sup> Functional independence not only contributes to greater adherence to medication regimens and exercise routines and performing ADLs, but also has the potential to reduce the need for caregiving and the costs associated with caregiving.<sup>15,16</sup>

However, some studies have found no significant changes in functional independence after home modifications.<sup>38,39</sup> Other research has indicated that the impact of home modifications on caregiving remains unclear.<sup>16</sup> In addition, studies have not shown a direct link between home modifications, functional independence and ability to age in place.<sup>40</sup>

## QUALITY OF LIFE AND WELL-BEING

Home modifications interventions have shown a range of effects on quality of life and well-being. For example, one study found that a home safety and modification intervention among older adults who had experienced a recent fall helped improve facets of quality of life, such as physical factors (e.g., mobility, ADLs) and environmental factors (e.g., freedom, physical safety and security).<sup>41</sup> Other studies have also found that home modifications lead to improved self-rated feelings of safety and independence.<sup>38,42</sup> However, some older adults who received home modifications spoke negatively about their experience, noting feelings of loss of home or lack of control related to the modification process.<sup>43</sup> Negative experiences with home modifications can also result when home modifications are not suitable for the older adult's needs, or when the client is not involved in decision-making processes.<sup>42</sup>

## HOME MODIFICATIONS AND VETERANS

The literature on home modifications among veterans is sparse. One program funded by the Durham VA Medical Center, Caring for Older Adults and Caregivers at Home (COACH), includes home modifications as part of a broader home-based dementia care program.<sup>44</sup> While the program has demonstrated promising results – including improved quality of life, reduced caregiver burden and fewer identified safety hazards in the home – the contributions and scope of home modifications to these outcomes are unclear.<sup>44</sup> While the VA's Home



Improvements and Structural Alterations (HISA) program has been providing veterans with access to home modifications since 1973, information about the effectiveness and outcomes of the program is not readily available.<sup>45,46</sup> From fiscal years 2011-2017, veterans were most likely to receive bathroom alterations through HISA, followed by doorway adjustments and railing installations.<sup>46</sup>

## GAPS IN THE LITERATURE

Studies focused on home modifications identify several gaps in the literature and suggestions for future research. These gaps include the following:

1. Additional research is needed to explore the relationship between home modifications and aging in place.<sup>11,15,16,47,48</sup> The decision to age in place may be affected by multiple factors beyond the home environment, such as the older adult's personal characteristics and sense of independence, their financial resources and their family and social support system.<sup>48</sup>
2. The impacts of housing design and home modifications on levels of caregiving are unclear.<sup>16</sup>
3. Research shows that older adults tend to have high satisfaction with their homes regardless of whether or not they have received home modifications, which raises questions about the role of home modifications in aging in place.<sup>24</sup> Additional research may be needed to understand how home modifications affect the ability of older adults to stay in their communities, and why.
4. Few falls prevention studies have focused on people with visual impairments, and existing interventions show no effect of home modifications on preventing falls among those with visual impairments.<sup>49</sup> Additional research is needed to understand the effectiveness of interventions like home modifications on those with permanent vision loss.<sup>50</sup>
5. The variability in home hazard assessments presents opportunities for identifying national models for assessments that incorporate person-environment fit.<sup>51</sup>
6. Research indicates that veterans are receiving home modifications services, but outcomes of these interventions have not been published.<sup>46</sup> Future research could investigate effects of home modifications on older veterans, especially those with disabilities and those who live in rural areas, with fewer opportunities for accessible housing.



## METHODOLOGY

This qualitative study sought to gain a deeper understanding of the impacts of the Helping Homebound Heroes (HHH) program, which provides aging veterans with home modifications and repairs. The study team conducted semi-structured telephone interviews with former program recipients.

### SAMPLE

The convenience sample of participants was identified by local HHH programs. Each HHH program was asked to select three program recipients for inclusion in the study: one between the ages of 60-74, one between the ages of 75-84 and one who was 85 years of age or older. HHH programs reached out to former recipients to gauge their interest in participating in the study. HHH provided contact information for interested recipients to the study team. Two interviewers called each potential participant to recruit them to the study. A total of 19 people agreed to participate in the study (Exhibit 3).

#### EXHIBIT 3: AGE RANGE OF PARTICIPANTS

AGE	# IN AGE RANGE
60-74 years of age	7
75-84 years of age	6
85 years of age or older	6

In some cases, another household member or caretaker – such as a spouse or child of a veteran – participated in the interview in place of the veteran. Typically, spouses of veterans who participated in an interview also had a disability and benefitted from the modifications and repairs.

### DATA COLLECTION

Data were collected using semi-structured protocols: one for program recipients and one for caregivers of program recipients. The protocols were developed based on a literature review of key outcomes associated with home modifications. Questions focused on 1) how participants learned about and engaged with the program, 2) their needs for home modifications and repairs, 3) the types of services they received, 4) the impact of the program on their lives and 5) how the program affected their plans for the future.

Interviews were conducted via telephone in November 2020. Interviews were approximately 20 minutes in length and audio recorded with permission. Interviewers also took notes as they conducted the interviews. All participants provided verbal consent to participate in an interview.

### DATA ANALYSIS

A professional transcription company prepared verbatim transcripts for each interview. Transcripts were reviewed by the interviewers for completeness and accuracy prior to being analyzed using NVivo (QSR International Pty Ltd., Melbourne, Australia). A codebook was developed to analyze the qualitative data in NVivo. Initial codes were deductively developed by research staff and inductively refined during coding. The final codebook included 30 codes.

## LIMITATIONS

The study used a small convenience sample of former recipients who were selected by HHH programs. Participants who had positive experiences may have been more willing to participate in the interview than participants who had negative experiences. In addition, all outcomes were self-reported, and the study did not control for other factors that may have affected perceptions of the program impact, such as health status before the intervention and household income. In addition, the data collection period occurred during the COVID-19 pandemic. Physical distancing restrictions related to the pandemic may have affected participants' perceptions of the extent to which the modifications and repairs affected their ability to leave their home, their quality of life or other outcomes.

## FINDINGS

### NEED FOR HOME MODIFICATIONS AND REPAIRS

#### **Participants noted multiple safety and livability concerns with their homes prior to receiving services from HHH.**

Most participants reported housing features that limited their mobility. Common issues included indoor or outdoor steps that were in disrepair or lacked adequate handrails to aid in balance; bathtubs that were difficult to step in and out of; and cracked or uneven flooring. Some participants also described major structural issues with their homes that posed safety concerns, including water damage, missing roofs, sagging porches and fire hazards. A few mentioned maintenance or repair issues that affected general habitability, including issues with plumbing or heating and air conditioning.

**Inadequate or hazardous housing affected participants' health and ability to complete everyday tasks.** Several participants said they feared falling or had already fallen as a result of safety risks in the home. Previous falls had resulted in hospitalizations for a few participants:

*"At one time a few months before all this, I did fall down the bottom step. I had to go to the hospital and have some pins and screws put in my right shoulder...it was very hard to maneuver those steps."*  
– Participant, 60-74 years old

Many participants reported issues with walking up and down steps because of mobility or balance issues, which required a few to make adjustments like leaning on garbage cans or jumping down a step to leave their home:

*"There were times when I was particularly going down them that I would lose my balance and have to take a big step or jump. Basically, the jump would end up with me sprawled on the ground."*  
– Participant, 60-74 years old

A few participants noted that lack of accessibility created functional limitations to daily living. In some cases, participants faced barriers to bathing due to difficulties with stepping in and out of the bathtub, structural damage to the bathroom or lack of heating in the bathroom. Others reported challenges with everyday tasks like walking their dog or carrying in groceries.

**Some participants could not address their need for home repairs and modifications without additional assistance.** A few participants noted that HHH made changes to their homes that they could not afford alone.

*"I didn't have any money to do anything. I just live off from the social security, and it's awful hard."*  
– Participant, 75-84 years old



*"We wanted to do things in the yard, and we didn't really have the excess money to do it, and we were unable to do it."*

*– Participant, 60-74 years old*

## CONNECTING TO HHH AND COMMUNICATING NEEDS

Most participants reported receiving an assessment or walk-through of their property to identify potential issues. Participants frequently said they showed program staff the key issues in their home. In a few cases, program staff conducted a home assessment that identified additional safety concerns that needed to be addressed. Some participants noted that program staff took pictures of their home or checked for issues, such as tripping hazards and barriers to maneuverability:

*"The representative who came to the house, she was real helpful. Like I said, she went step-by-step, and then did an entire assessment of the whole house, and then not only looked at my concerns, she also looked at the other concerns...She went through all the bathrooms. She went through all the rooms, made sure that we have no tripping hazards and the floor was still intact. She was real helpful in making sure all our needs were met and that we had no safety issues."*

*– Participant, 60-74 years old*

## TYPES OF HOME MODIFICATIONS AND REPAIRS

**Participants most frequently reported modifications to bathrooms, structural changes to the home, and repair or installation of railings along indoor or outdoor steps.** Changes to bathrooms typically included installing grab bars in the tub or by the toilet or converting a tub to a walk-in shower. Structural changes varied widely, from replacing siding or a wall, to creating an emergency exit, to building a new deck or porch. As shown in Exhibit 4, participants also received several other types of modifications and repairs.



**EXHIBIT 4: REPAIRS AND MODIFICATIONS REPORTED BY PROGRAM PARTICIPANTS**

TYPE OF CHANGE	CONCERN(S) ADDRESSED	# OF RECIPIENTS
<b>Made modifications to the bathroom</b> (e.g., installed grab bars, replaced tub with shower)	Fall risk, ADLs	9
<b>Made structural changes</b> (e.g., replaced siding, put in an emergency exit, replaced a porch)	Safety, health risk	8
<b>Fixed wobbly railings or installed new railings for steps (inside and outside)</b>	Mobility, fall risk	6
<b>Fixed flooring</b> (e.g., replaced cracked or uneven tile)	Fall risk	5
<b>Addressed plumbing concerns</b> (e.g., leaky faucet)	Maintenance, health risk	4
<b>Repaired steps or stairs</b>	Mobility, fall risk	4
<b>Fixed heating, air conditioner or electrical issues</b>	Maintenance	4
<b>Installed ramp</b>	Mobility, fall risk	3
<b>Patched ceiling</b>	Maintenance	3
<b>Plumbing work</b>	Maintenance	3
<b>Made cosmetic changes to house or yard</b> (e.g., paint, power washing)	Appearance	3
<b>Weatherization</b> (e.g., insulation or new windows)	Weatherization	3
<b>Replaced or repaired doors</b>	Maintenance	3
<b>Replaced gravel path with concrete</b>	Mobility, fall risk	2
<b>Installed fire safety features</b> (e.g., smoke alarms)	Safety	2
<b>Replaced stove</b>	Safety	1

**The number and types of modifications received varied widely by participant.** Some participants needed minor repairs, such as installation of railings and stair repairs. Others needed more substantial structural work, such as replacing siding on one or more rooms in their home. While most participants received help with two or three concerns, a few received extensive changes to multiple rooms:

*“They remodeled my whole house, bathroom, kitchen, living room – put a roof over my house.”  
– Participant, 75-84 years old*

## PROGRAM IMPACTS

HHH participants reported a broad range of program impacts, from decreased fear of falling to increased cost savings.

### FEAR OF FALLING

**Many participants reported that home modifications and repairs made them feel less likely to fall in or around their homes.** Participants described improvements in their sense of stability and balance after repairs to front steps, flooring and railings and installation of grab bars, ramps and showers:

*"I feel very safe, honestly, very secure on that ramp. I just go up and down and I don't just – No, I don't have no fear of [falling] at all now, it's just been awesome."*

*– Participant, 60-74 years old*

### PHYSICAL HEALTH

**A few participants noted some type of effect on their health as a result of the intervention.** One participant reported fewer visits to the doctor's office for arthritis shots after a ramp installation, and another described decreased hospitalizations due to falls after repairs to his steps:

*"For one thing, I'm not in a hospital every other month from falling down. I haven't fallen since [the modifications] as a matter of fact."*

*– Participant, 60-74 years old*

In addition, some participants reported that eliminating mold and mildew from their home would improve or already improved their health, including their breathing. Perceived physical effects from eliminating mold and mildew included reduced coughing and sinus issues.

A few participants said the program had no effects on their health, in one case because the participant was already "very careful" when navigating their shower because of fear of falling. One participant reported that their health was declining in general since receiving the home modifications, highlighting the many health problems that older adults may face outside of housing-related functional limitations:

*"Our health situation is going downhill but it's not because of the repairs or anything. Under different circumstances, it would be a different story but that's a hard question to answer. The health is deteriorating but it's not due to the modifications, it's due to life in general."*

*– Participant, 85+ years old*

### MENTAL HEALTH

**Most participants reported that home modifications and repairs helped relieve their worrying, increase their peace of mind and decrease their stress and anxiety:**

*"Repairing or replacing things that were outdated and just weren't adequate any longer [provided] a good, stable, warm environment in our house. Those kinds of things have helped us tremendously, emotionally, and mentally."*

*– Participant, 60-74 years old*

Some participants described relief from the physical toll of worrying about their home's safety. One participant said the changes from the program gave them "a new lease on life." A few noted that the home modifications relieved feelings of depression by restoring their ability to perform everyday tasks or providing them with a sense

of purpose:

*"I feel good. When I get up in the morning, I feel like getting up, straightening up. I used to lay around, and I try to keep my house as clean as I can, because it looks good."*  
– Participant, 75-84 years old

## QUALITY OF LIFE

**Most participants agreed that the intervention had increased their quality of life.** Factors that contributed to improved quality of life included greater mobility around the house and property; decreased worries about their living situations; and improved ability to leave the home to participate in social life (e.g., go to church). In addition, many participants described increased feelings of comfort, security and safety within their homes:

*"I feel safer because I know that I can get in and out even if I have to use my walker or anything else. Before, it was a major production to get my walker in and out and everything else because it had to be carried down the steps. Now I feel safer because I don't have any issues with that, I can do it by myself."*  
– Participant, 60-74 years old

Other participants described generally feeling better or happier as a result of the home repairs and modifications. A few others reported an improved sense of independence, including the ability to live independently and leave their home at their will. However, a few participants noted that the intervention *did not* affect their level of independence, though it did make them feel more at ease or less worried:

*"Well, I don't know if it's affected my independence or not, actually. It's been, for certain, an ease in my mind. I don't worry about some things because before the exit was a big thing. I really worried about being able to get out of the building."*  
– Participant, 75-84 years old

## FEELINGS OF SHAME AND PRIDE IN HOME

**Multiple participants said the home modifications and repairs made them feel proud of their home.** Some reported liking the aesthetic improvements to their homes, such as new paint jobs and updated railings. A few said they invited people into their homes after the repairs and modifications to show them the improvements. Others noted that improvements reduced the discomfort and shame they felt about their homes. One participant noted that their nephew, who also lives in the home, enjoyed greater socialization as a result of the home repairs:

*"He didn't bring people out because he knew it wasn't like it should have been and we couldn't afford to get it done the way it needed to be. Now, he doesn't have a problem with. Now inviting his friends to come over to watch a game or something and play a video game. Everybody's just happy with the way it looks, the total outcome."*  
– Participant, 60-74 years old

## ABILITY TO PERFORM ADLS AND EVERYDAY TASKS

Many participants described challenges with bathing before receiving services from HHH. These participants reported substantial improvements in their ability to bathe, often because they no longer had to lift up their legs to transfer in and out of the shower or bathtub. In addition, one participant reported improvements with toileting:

*"Getting off the water closet was almost a gamble every time I got out. The only way I could get out was to shove myself forward up on my – balance on my feet and hope I can stop before I run into the sink on the other side of the bathroom. The handrail they put up for me makes it so much easier."*  
– Participant, 75-84 years old



Others said that the intervention did not change their ability to perform ADLs like dressing, bathing, eating or self-care. However, many of these participants also mentioned that they had no issues with completing ADLs prior to receiving services. Some participants noted that home modifications helped them perform other day-to-day activities, such as walking their dogs, leaving their homes and carrying in groceries.

## IMPACTS ON CAREGIVERS

**A few recipients reported that home modifications and repairs decreased their caregivers' worries.** Caregivers, including spouses, children and siblings, also mentioned feeling a sense of relief when their loved ones were able to improve their housing situations. In some cases, caregivers also had mobility or safety concerns that were addressed by the home modifications. For example, one participant said both she and her spouse used mobility scooters and benefitted from a concrete path that the HHH program provided. In another case, the participant cared for her spouse who was experiencing a cognitive decline, while the modifications primarily addressed her physical limitations. The participant noted that her spouse's caregiving burden was lifted by the HHH program:

*"I don't have to hang on him and I don't have to say, 'Help. Please help [me] down.' I'm far more independent now. He is 93. Mentally, he's a little slower but at 93 he's physically good. He was able to do everything, but he'd have to help me. I couldn't get out the front door. I couldn't get outside. When we used to have a car, I couldn't get out. Now I just do it. I don't have to ask for help. I'm sure it makes him a lot happier."*

– Participant, 85+ years old

## COST SAVINGS

**While participants were not probed about cost savings associated with home modifications, a few noted financial impacts of the intervention on their heating bills.** Changes such as adding insulation and replacing old windows can affect energy use. Decreased costs may also influence levels of worry and stress:

*"We won't have a lot to worry about, 'Are we going to have enough money to take care of this, or is the oil bill going to be extreme because the house is not insulated well, the attic isn't insulated well, or it was done improperly at some point?'"*

– Participant, 60-74 years old

## FUTURE PLANS FOR AGING IN PLACE

**When asked about their future plans, all participants reported a desire to stay in their current homes.** Some participants noted that they would stay for as long as possible, or as long as they could care for themselves. Others said they were planning to live in their homes for the rest of their lives:

*"This house isn't very big, and it's very convenient for us. It has everything that we need...It's safe and it's near everything in town when I need rides. It's where I suppose I'll live until I die or I can't live here any longer."*

– Participant, 85+ years old

**All participants agreed that HHH helped them with their plans to stay in their homes.** Multiple participants said the program made it easier to move or get around, improved their mobility and increased their ability to do everyday tasks, such as carry in groceries. Many reported the program made them "feel better" or more safe and secure in their homes. A few discussed making plans to move before they received modifications through HHH:

*"I wasn't going to be able to do steps no more. We'd probably had to move or something, but I could not get up and down the steps, or we would've tried to do a ramp ourselves. We didn't have the money to do that and they funded that. That was the main thing because just going to have to do something because I just could not do the ramps and the landlord wouldn't do nothing like that."*

– Participant, 60-74 years old



One participant noted the importance of HHH in helping her spouse stay at home in light of the challenges created by the COVID-19 pandemic:

*“The program was to help keep veterans in their homes as long as they can be possibly be in their homes. [My husband] was in the hospital because he had fallen and he was there for two weeks simply because there wasn't any nursing home facilities available. With the COVID, all the nursing institutions around here are filled. I mentioned they're all over the United States but there wasn't any room for him in a nursing home. Best thing was to bring him home and the program is to keep [my husband] in this home for as long as possible.”*  
– Participant, 85+ years old

**Unmet needs may affect future plans to age in place.** Almost half of the participants discussed additional challenges that could impact their ability to remain in their current homes. Some also discussed additional services and changes to their house that were needed to improve accessibility and quality of life. Key challenges included:

- Needing a generator because of recurrent power losses, and fear of future hurricanes damaging the roof;
- Feeling concerned about future falls;
- Worsening issues with mobility due to health conditions like arthritis or knee problems;
- Remaining maintenance needs in the home, such as plumbing issues; and
- Needing help with caring for the house, such as assistance with cleaning.

## DISCUSSION

Overall, participants reported an overwhelmingly positive experience with the HHH program. The study showed that participants perceived several benefits from home modifications and repairs provided through HHH, including improved well-being, quality of life and sense of pride in their home. The study showed that types of home modifications ranged widely from regular maintenance issues (e.g., fixing a broken garbage disposal) to substantial health and safety concerns (e.g., missing roof sections). Some participants received help for more minor issues, such as installing a ramp, while others received renovations to multiple rooms in their homes. As all participants self-reported some positive outcomes from the intervention, the extent to which minor versus major repairs and modifications affected program outcomes was unclear.

A major finding from this study is the broad impact of HHH not only on veterans, but also on their household members and caregivers. Caregivers of program recipients – such as spouses, children and siblings – reported decreased worry and stress as a result of the modifications, often because they were less anxious about their loved one experiencing a fall. In several cases, individuals who lived in the veteran's household also had physical limitations that were alleviated by the home modifications and repairs. These findings have substantial implications for programs that aim to keep older adults in their homes. The ability of an older veteran to successfully age in place also depends on the physical and mental health needs of their household members. Interviews with HHH participants provided examples of older veterans caring for spouses or other household members with functional limitations, as well as examples of mutual caregiving between household members. Therefore, entire households may benefit from modifications and repairs that increase the accessibility and safety of the home.

Some participants noted no changes to their physical health, sense of independence or ability to perform ADLs after receiving home modifications. Multiple factors could contribute to these findings. First, outcomes were

often associated with type of repair or modification received. For example, participants who received help with addressing mold and mildew were likely to report that the intervention helped improve their health, while other participants who received other modifications were less likely to describe impacts to their physical health. Second, perceptions of health and accessibility may be influenced by an individual's ability to adapt to their environment and the person-environment fit.<sup>34</sup>

For example, one participant said the intervention did not affect their health because they had always managed their fall risk prior to receiving modifications:

*"I'm not sure it affected my health physically because I was very careful of going in and out [of the shower] to make sure I can do it. In the shower, being super careful."*  
– Participant, 85+ years old

In addition, some participants discussed housing quality issues that went beyond accessibility concerns. For example, a few participants described deteriorating roofing or siding, which led to water damage and mold. These cases suggest that some older adults who qualify for HHH may live in substandard housing conditions. While minor, low-cost modifications may provide some benefits to many older adults, others may need major assistance to ensure healthy and safe housing. One participant noted that her home may have been condemned before the HHH program re-sided walls that were crumbling. However, the same participant also reported that she did not perceive her housing issues as too severe, which underscores the importance of an objective review of each program recipient's needs and housing situation.

This study also helped illuminate some gaps in the literature related to the outcomes of home modifications and repairs. Additional research is needed to understand the relationship between modifications and aging in place. Several participants said they would have lacked funds to make necessary adaptations to their homes without the assistance of the HHH program. In addition, almost half of the participants discussed unmet needs that need to be addressed to successfully age in place. Future research should explore the extent to which home modifications can affect or delay an older adult's decision to move from their home.



## RECOMMENDATIONS

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Aging in place continues to be a critical focus area across a number of fields on a national level. Through an analysis of existing data combined with interviews with home repair and/or modification recipients, this report articulates perceived impacts on older adults' health and well-being associated with home repairs and home modifications. Additionally, this report identifies gaps and barriers for bridging existing academic literature and on-the-ground practice for the field in general and identifies recommendations for strengthening home modification/repair programs nationally. The recommendations presented here can be used by any organization looking to begin or strengthen a home modification/repair program.

**Collect data on a broad range of outcomes for the HHH program.** While the literature on home repairs and modifications has focused on outcomes related to falls and ADLs, this study showed that the HHH program improved participants' mental health and well-being across different types and levels of home modifications. Almost all participants reported decreased feelings of worry, anxiety or stress as a result of the intervention. These findings suggest that changes to mental health and well-being are key program measures to consider in future evaluations of the HHH program.

**Collect data from both recipients and other household members or caregivers.** HHH programs should seek to collect feedback from individuals who live in the home and any caregivers of the program recipient for two key reasons. First, the HHH program has broad impacts on some families, and in many cases, another household member with a physical limitation also benefitted from the home modifications and repairs. Second, in some cases where both a veteran and their spouse benefitted from the HHH program, the spouse was more likely to give the interview. This pattern indicates that some veterans may be reticent to share information about physical limitations that lead to loss of independence and diminished self-reliance. Collecting data from other household members and caregivers will provide program staff with additional perspectives about the impact of the program on veterans for future studies.

**Use standard measures to assess impact of HHH on program recipients at baseline and after receiving home modifications.** Measures should be subjective and objective to capture both the client's perception of their own limitations and an impartial assessment of person-environment fit.<sup>52</sup> Subjective measures could include a participant assessment of difficulties with conducting critical activities and perceived ability to perform those tasks. Objective measures could involve observation of the individual's person-environment fit by a trained professional, such as an occupational therapist. Other measures should also capture the wide range of outcomes described in this study, such as mental health, quality of life and cost savings.

**Implement a standardized approach for identifying home hazards and modification needs.** Participants provided limited information about the types of home assessments they received as part of the HHH program. There are a wide range of environmental assessment checklists used in home modifications studies, and some of these checklists exclude major areas of potential concern, such as structural hazards in bathrooms.<sup>51</sup> Using a common home assessment checklist could help make comparisons among HHH programs to better assess program impact. HHH programs should use an assessment that not only identifies home hazards, but also documents how the individual interacts with and adapts to those hazards. HHH may also seek to better understand the training and credentials of HHH staff who assess potential hazards and suggest modifications. Evidence shows that home modification interventions are more effective when delivered by occupational therapists than by those who are not.<sup>36</sup> Engaging an occupational therapist to conduct home assessments could help objectively identify repairs and modifications that would most greatly impact health and quality of life.

**Conduct additional research to explore the effectiveness of Certified Aging-in-Place Specialists (CAPS) in delivering home modification interventions.** While the literature supports the use of occupational therapists to carry out home modification interventions, no studies have explored whether non-therapists with CAPS designations are similarly effective. Using non-therapists with CAPS designations to identify and tailor home modification services may be



more feasible for HHH programs who do not employ or contract with occupational therapists.

**Implement strategies to avoid negative participant experiences.** Past home modification programs have reported that participants can have negative experiences when they sense a loss of control or when home adaptations substantially change the look and feel of their home. To avoid these issues, HHH programs can continue to promote the involvement of participants in decision-making processes and provide examples of how their home will look after the intervention.

**Explore opportunities for program sustainability.** The federal government offers grants for home repairs and weatherization for older adults with limited incomes, including the U.S. Department of Agriculture's Section 504 Home Repair program for rural residents. The VA's HISA program also provides funding for certain home modifications for older veterans. As of 2020, under the Creating High-Quality Results and Outcomes Necessary to Improve Chronic (CHRONIC) Care Act, Medicare Advantage plans can offer Special Supplemental Benefits for the Chronically Ill (SSBCI), including structural home modifications. In addition, some state Medicaid programs cover home modifications and adaptations, often through a Long-Term Services and Supports (LTSS) benefit. Local HHH programs could help participants apply for and navigate these services in order to help cover the cost of home modifications. However, to leverage state and federal funding, HHH staff will need to understand the specific eligibility and documentation requirements for each program. Participants should be aware that many federal home repair and modification programs have lifetime limits. In addition, some programs require the participant to receive more than one estimate from a contractor, or require a referral from a licensed professional, such as a physician or an occupational therapist.



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