



**THE CASE FOR MEALS ON WHEELS:**  
**AN EVIDENCE-BASED  
SOLUTION TO SENIOR  
HUNGER AND ISOLATION**

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SEPTEMBER 2023



MEALS on WHEELS  
AMERICA

## ACKNOWLEDGMENTS

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- Eve Anthony, CEO, Athens Community Council on Aging (*Athens, GA*)
- Stephanie Archer-Smith, Executive Director, Meals on Wheels of Central Maryland (*Baltimore, MD*)
- Chris Culak, Vice President, Chief of Strategy and Development, Visiting Nurse Association of Texas (*Dallas, Texas*)
- Meghan Grady, Executive Director, Meals on Wheels of Rhode Island (*Rhode Island*)
- Shon Earl Gress, Executive Director/CEO, Meals on Wheels Guernsey County (*Cambridge, Ohio*)
- Steve King, Executive Director, Meals on Wheels of Tampa (*Tampa, FL*)
- Judith Pelot, Nutrition Services Director, Community Action Committee, Mobile Meals (*Knoxville, TN*)

### WE ALSO THANK THE FOLLOWING REVIEWERS FOR THEIR FEEDBACK ON THIS REPORT.

- Craig Gundersen, Snee Family Endowed Chair, Baylor Collaborative on Hunger and Poverty (BCHP), Professor, Department of Economics, Baylor University, Baylor Collaborative on Hunger and Poverty
- Lisa Juckett, Assistant Professor, Occupational Therapy Division, School of Health & Rehabilitation Sciences, College of Medicine, The Ohio State University



## TABLE OF CONTENTS

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<b>EXECUTIVE SUMMARY</b> .....	<b>4</b>
ABOUT MEALS ON WHEELS.....	4
PURPOSE AND METHODS.....	4
FINDINGS.....	4
RECOMMENDATIONS.....	5
CONCLUSIONS.....	6
<b>BACKGROUND</b> .....	<b>7</b>
WHAT MEALS ON WHEELS PROGRAMS DELIVER.....	7
PARTICIPANT PROFILE.....	10
<b>PURPOSE AND METHODS</b> .....	<b>12</b>
STUDY SEARCH AND SELECTION.....	12
STUDY DATA COLLECTION.....	14
QUALITY OF EVIDENCE APPRAISAL.....	14
QUALITY OF THE OVERALL EVIDENCE.....	14
ADDITIONAL LIMITATIONS OF THE STUDIES.....	17
<b>FINDINGS</b> .....	<b>18</b>
REDUCED USE OF COSTLY HEALTH CARE SERVICES.....	18
REDUCED NURSING HOME USE AND INCREASED ABILITY TO AGE IN PLACE.....	21
REDUCED HEALTH CARE COSTS.....	23
INCREASED FOOD SECURITY.....	25
IMPROVED DIET QUALITY.....	28
REDUCED OR SLOWED DECLINE IN NUTRITIONAL RISK.....	31
REDUCED SOCIAL ISOLATION AND LONELINESS.....	32
REDUCED FALLS AND INCREASED HOME SAFETY.....	35
ADDITIONAL IMPACTS IDENTIFIED.....	38
<b>RECOMMENDATIONS</b> .....	<b>42</b>
RECOMMENDATIONS FOR EXPANDING MEALS ON WHEELS SERVICES.....	42
RECOMMENDATIONS FOR ENHANCING MEALS ON WHEELS SERVICES.....	44
RECOMMENDATIONS FOR FUTURE RESEARCH.....	45
<b>LIMITATIONS OF THIS REVIEW</b> .....	<b>46</b>
<b>CONCLUSIONS</b> .....	<b>47</b>
<b>APPENDIX A: SUMMARY OF INCLUDED STUDIES</b> .....	<b>48</b>
<b>APPENDIX B: MEALS ON WHEELS AMERICA ENGAGEMENT IN ONGOING RESEARCH</b> .....	<b>58</b>
PCORI STUDY.....	58
NIA STUDY.....	58
<b>REFERENCES</b> .....	<b>59</b>

## EXECUTIVE SUMMARY

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### ABOUT MEALS ON WHEELS

Meals on Wheels America is the leadership organization supporting the network of more than 5,000 community-based programs across the country that are dedicated to addressing senior hunger and isolation. Through the delivery of healthy meals tailored to the needs of older adults, the door opens to address social connection, safety and much more – all of which is proven to help America’s seniors to live nourished lives with independence and dignity. By providing funding, leadership, education, research and advocacy support, Meals on Wheels America supports its local member programs to strengthen their communities, one senior at a time.

### PURPOSE AND METHODS

To secure the vital public policy support, partnerships and funding necessary for their success, senior nutrition programs must provide concrete evidence of their impact. In this comprehensive review, our aim is to consolidate and convey existing research on the profound effects of Meals on Wheels on participants' health and well-being. By harnessing this invaluable information, the network of community-based senior nutrition programs can effectively advocate for the essential services it provides.

### FINDINGS

This comprehensive research review highlights a set of meaningful and consistent findings regarding the impacts of Meals on Wheels programs. These findings underscore the critical contributions of home-delivered meals in improving the health, safety and social connections of individuals' lives, promoting well-being and fostering independent living.

Throughout our investigation, we employed diverse search strategies to identify numerous studies exploring the impacts of Meals on Wheels. A total of 38 selected studies, spanning from 1996 to 2023 (excluding those cited for background), examined the impacts of Meals on Wheels on clients' health and well-being, health care utilization and health care costs. Of the 38 studies reviewed, 37 found evidence of positive effects of Meals on Wheels on one or more outcomes. This review synthesizes this large and varied body of literature, compiling findings from diverse studies such as randomized controlled trials, statistical modeling studies and qualitative studies that support the immense value of home-delivered meal programs. We classified impacts as “primary findings” if we uncovered evidence of substantive positive impact of Meals on Wheels service on that outcome from three or more studies. We classified impacts that did not meet this threshold as “additional impacts.” These are potential areas for further research.



Combined, these diverse sources of evidence support eight primary findings:



Reduced use of costly health care services



Reduced nursing home use and increased ability to age in place



Reduced health care costs



Increased food security



Improved diet quality



Improvement or reduced decline in nutritional status



Reduced social isolation and loneliness



Reduced falls and increased home safety

A few additional benefits were reported in fewer studies: improved physical health, improvements in mental health and well-being, financial benefits for participants (e.g., affordability) and benefits for volunteers and staff. These are potential impacts to explore in further research.

## RECOMMENDATIONS

In addition to synthesizing and assessing the study findings, we also synthesized the recommendations expressed by the study authors.

**Recommendations for expanding Meals on Wheels** to serve more people:

- Form partnerships between health care organizations and Meals on Wheels providers
- Increase federal and state investment in meals services, including funding for outreach, serving more people and enhancing services
- Assess older adults' service needs and find ways to engage them in services to meet those needs

**Recommendations for enhancing home-delivered meals services** to provide greater impact for people served:

- Ensure opportunities for social contact and volunteer presence
- Ensure that meals meet participants' preferences and needs
- Focus services on participants who need them most
- Provide medically tailored meals for participants who need them
- Provide additional meals/food assistance for participants who need them

**Recommendations for future research** to demonstrate and increase the effectiveness of Meals on Wheels:

- Conduct stronger impact studies with local programs to confirm results from smaller studies and improve precision of estimates with subgroups
- Use existing datasets to measure impact
- Examine specific service types (e.g., social connection opportunities, daily hot vs. weekly frozen meals) and specific outcomes (e.g., quality of life impacts, effects on frequency of falls, long-term effects on health care utilization and health care costs)
- Conduct research to enhance the understanding of the mechanisms behind impacts and how to maximize their effectiveness (e.g., research on older adults' experiences, preferences and needs to inform service planning and research for understanding the meal program components affecting outcomes)

## CONCLUSIONS

The comprehensive review of 38 studies presented here establishes Meals on Wheels as an evidence-supported, cost-effective solution. The extensive body of research consistently demonstrates the efficacy of Meals on Wheels in reducing health care utilization, preventing nursing home admissions and generating substantial health care cost savings. These remarkable outcomes are attributed to the profound impact of Meals on Wheels on critical aspects of older adults' well-being, including food security, diet quality, nutritional status, social isolation, loneliness and falls/home safety—factors that significantly contribute to health care costs. By fostering social connections, providing safety checks and delivering nutritious meals, Meals on Wheels supports older adults to maintain their health, independence and ability to age in their own homes and communities.

The noteworthy insights derived from these study findings will support the Meals on Wheels network to effectively communicate their value to funders, donors, policymakers, partnering organizations and volunteers. Moreover, the recommendations outlined in this report offer guidance for program planning, encouraging the expansion and enhancement of services, as well as inspiring future studies. Our commitment is to continually update and add to these findings, conducting further research to explore the transformative impact of Meals on Wheels services on the lives of the older adults we serve.



## BACKGROUND

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Meals on Wheels America is the oldest and largest national organization representing the more than 5,000 community-based senior nutrition programs across the country.

### WHAT MEALS ON WHEELS PROGRAMS DELIVER

Meals on Wheels service starts with the meal and enables local programs to deliver so much more. The delivery of a nutritious meal creates the opportunity to build a relationship with the individual senior, opening the door for Meals on Wheels providers to identify and deliver valuable services that promote independence and well-being. Regular meal delivery from Meals on Wheels, whether in the comfort of the home or at a community dining site, provides tailored nutrition, social connection, safety and more to those with the greatest social and economic need. This review focused on impacts of home-delivered meals. A review of studies on the impacts of community dining is a topic for future research.

Nutrition programs that receive funding from the Older Americans Act (OAA) Title III Nutrition Program served 251 million meals (home-delivered meals and congregate meals) to 2.2 million seniors in fiscal year 2021.<sup>1</sup>

Our 2023 Meals on Wheels America Member Benchmarking Survey<sup>2</sup> shows local programs are providing an array of services. Respondents were members of Meals on Wheels America who completed the survey and might not represent all home-delivered meal programs nationwide. Below you'll find data from programs that completed the survey between March 3 and July 11, 2023 combined with the most current available economic impact data from outside sources.



## Food Security

Seniors with food insecurity reported three more days a month of being in poor physical or mental health compared to food secure seniors, in an analysis of nationally representative data.<sup>3</sup> Compared to food secure seniors, seniors with food insecurity were:

- Almost 3 times more likely to have depression
- Over twice as likely to report fair or poor general health
- 89% more likely to report having gum disease
- 78% more likely to have asthma
- 74% more likely to have diabetes
- 71% more likely to have congestive heart failure
- 64% more likely to have experienced a heart attack

Food insecurity is associated with an estimated \$77 billion in health care costs annually.<sup>4</sup> Based on the latest research, the projected additional yearly health care expenses linked to food insecurity for adults aged 50 and above with particular chronic conditions varied from \$530 (for those with cancer) to \$1,740 (for those with arthritis) in 2015 US dollars.<sup>5</sup>

Older Americans Act (OAA) nutrition services are intended to reduce food insecurity, as they “reduce hunger, food insecurity and malnutrition; enhance socialization; and promote health and well-being.”<sup>6</sup> Nearly all local Meals on Wheels programs (97%) provide at least five meals a week to participants who want or need them.

Many local programs provide one or more nutrition services beyond daily meals: 82% provide emergency meals or storm packs, 67% provide weekend meals and 54% provide more than one meal per day to at least some seniors. Nineteen percent of programs provide grocery delivery services beyond emergency bags.

Over half of the home-delivered meal programs (52%) deliver meals tailored to address the nutritional needs of an older adult’s medical condition, such as diabetes or a renal condition. Twenty-five percent provide specific home-delivered meal menus aligned with local client dietary practices.

## Healthy Diet

Unhealthy diet patterns in the U.S. cost an estimated \$50.4 billion a year in health care costs associated with coronary heart disease, stroke and type 2 diabetes.<sup>7</sup> An estimated 18% of the total cost for these conditions was attributable to a suboptimal diet. Disease-associated malnutrition among seniors age 65 and older is associated with health care costs of \$51.3 billion a year (in 2010 dollars).<sup>8</sup>

Almost all (94%) local programs provide home-delivered meals that align with state or national standards for Older Americans Act (OAA) meals to all participants, meaning that the meals are specifically designed to meet the nutritional needs of older adults.<sup>9</sup>



## Social Connection

A meta-analysis of 148 studies showed that the odds of mortality from lack of social relationships rivaled that of several risk factors associated with mortality.<sup>10</sup> Social connections were associated with a 50% reduced risk of early death in that study. Another review revealed the increased likelihood of death was 26% for reported loneliness, 29% for social isolation and 32% for living alone across 70 studies that accounted for multiple covariates.<sup>11</sup> Additionally, higher loneliness or social isolation was associated with a 29% increase in risk of coronary heart disease and a 32% increase in risk of stroke, according to a review across 23 studies.<sup>12</sup>



An AARP study found that social isolation cost Medicare an estimated \$6.7 billion annually (2012 dollars) and was associated with greater Medicare spending of \$1,644 per beneficiary per year, controlling for demographics and socio-economic and health status.<sup>13</sup> This additional spending was comparable to what Medicare pays for certain chronic conditions, such as high blood pressure and arthritis.<sup>14</sup>

Meals on Wheels programs provide a variety of social connection opportunities for participants. Almost universally (93%), home-delivered programs provide direct and purposeful face-to-face conversation with willing clients during meal delivery. Nine in ten (91%) local programs train their drivers to chat with clients personally.

Ninety-three percent of programs provide one or more social connection opportunities beyond conversations with meals. For example, 64% provide socialization opportunities with other seniors, 56% provide friendly visiting via phone or social calling, 52% provide opportunities for clients to also be volunteers (e.g., mentoring, tutoring, social calling), 45% provide in-person group classes or group activities, and 44% provide pet assistance or pet food delivery (helping clients to keep their pets, who are an important source of social companionship for many older adults).

## Home Safety

Falls among seniors are a major health care cost, at an estimated \$50 billion annually in medical costs (in 2015).<sup>15</sup>

Meals on Wheels programs assess and address participant home safety in a variety of ways. Nearly all (97%) home-delivery programs train their drivers and home delivery volunteers to keep an eye out for the senior’s well-being and general levels of health.

Many programs provide various home safety services. For example, 54% provide minor home modifications or repairs (e.g., smoke detectors, light bulbs, grab bars). Fifty-four percent of programs provide cooling fans, heat or energy assistance, etc. Additionally, 42% provide durable medical equipment (e.g., canes, walkers, blood sugar test strips, hospital beds, oxygen equipment and accessories and CPAP devices) and 36% provide major home modifications or repairs (e.g., ramps, shower conversions, roofs).

## Participant Profile

The tables below highlight socio-demographic characteristics and health needs of older adults who receive home-delivered meals. 56% of home-delivered meal participants live alone,<sup>16</sup> compared to one in four Americans age 60 and older.<sup>17</sup>

SOCIO-DEMOGRAPHIC CHARACTERISTICS	HOME-DELIVERED MEAL PARTICIPANTS
Are women	66%
Are age 75 or older	58%
Have annual household income below \$20,000	58%
Live alone	56%
Are people of color	33%
Live in rural areas	28%

Source: Administration for Community Living (ACL), 2023.<sup>18</sup>

Many home-delivered meal participants have difficulty securing adequate food due to economic and/or functional barriers. Approximately 10 million U.S. seniors face hunger or the threat of it.<sup>19</sup> Of U.S. adults age 60 and older, 7% experience food insecurity,<sup>20</sup> based on the standard U.S. Department of Agriculture (USDA) measure that defines food insecurity as ranging from “reports of reduced quality, variety, or desirability of diet” to “reports of multiple indications of disrupted eating patterns and reduced food intake.”<sup>21</sup> The incidence of food insecurity is considerably higher among home-delivered meal participants, at 29%.<sup>22</sup>

About two in three (65%) home-delivered meal participants have 6 or more medical conditions.<sup>23</sup> Almost 95% of older adults have at least one of nine chronic conditions, with almost 80% having two or more chronic conditions.<sup>24</sup>

HEALTH AND FUNCTIONAL INDICATORS	HOME-DELIVERED MEAL PARTICIPANTS
Have 6 or more medical conditions	65%
Take 5 or more medications daily	61%
Report fair or poor health	45%
Have difficulty in 2 or more Activities of Daily Living (ADLs) <sup>25</sup>	43%
Have difficulty in 3 or more Instrumental Activities of Daily Living (IADLs) <sup>26</sup>	36%
Stayed overnight in a hospital, nursing home or rehabilitation center in the past 12 months	30%
Fell in the past month	19%

Source: Administration for Community Living (ACL), 2023.<sup>27</sup>



## PURPOSE AND METHODS

To secure the vital public policy support, partnerships and funding necessary for their success, meals programs must provide concrete evidence of their impact. In this comprehensive review, our aim is to consolidate and convey existing research on the profound effects of Meals on Wheels on participants' health and well-being. By harnessing this invaluable information, the network can effectively advocate for the essential services it provides. We also report study recommendations and insights that can help programs enhance and expand their services and increase their beneficial impacts for older adults in their communities.



## STUDY SEARCH AND SELECTION

Throughout our investigation, we employed diverse search strategies to identify studies exploring the impacts of Meals on Wheels. These studies encompassed research previously identified by Meals on Wheels America, studies referenced in published reviews,<sup>28</sup> citations within relevant studies, curated research collections and thorough internet searches. We diligently pursued new findings until redundancy prevailed and novel studies became scarce. We also asked reviewers to let us know any research studies they noticed were missing that were important to add.

Our review encompasses a broad spectrum of research designs and publication formats, including peer-reviewed journal articles and organizational reports. While focusing on studies germane to most Meals on Wheels programs, we excluded those narrowly focused on only participants with specific medical conditions (e.g., studies that included only meals participants with diabetes) or specific supplementary services that are not part of typical meals programs (for example, produce delivery with meals or a specific telehealth treatment provided to home-

delivered meals participants). Such topics, ripe for future exploration, lay outside the scope of this review. The table below details the types of studies included and not included in our review. Our inclusivity extended across time and geography, without imposing restrictions on study dates or locations.

A total of 38 selected studies, spanning from 1996 to 2023 (excluding those cited for background), examined the impacts of Meals on Wheels on clients’ health and well-being, health care utilization and health care costs. For a comprehensive overview of these 38 studies, please refer to Appendix A.

STUDY ASPECT	WE INCLUDED	WE DID NOT INCLUDE
Study topic	<ul style="list-style-type: none"> <li>• Studies assessing impact of Meals on Wheels home-delivered meals</li> </ul>	<ul style="list-style-type: none"> <li>• Publications that do not assess impact for participants’ health or well-being</li> </ul>
Study design	<ul style="list-style-type: none"> <li>• Studies that examined association between Meals on Wheels and client impacts, regardless of study design (e.g., comparison group study, statistical modeling study, pretest-posttest, interviews or surveys to assess how participants believe the program affected them)</li> </ul>	<ul style="list-style-type: none"> <li>• Studies that did not assess impact</li> <li>• Systematic reviews and other review studies (as noted, we used these as background and as a source for finding original studies that met our criteria)</li> </ul>
Types of services in study	<ul style="list-style-type: none"> <li>• Studies of meals delivered to the home by community programs such as Meals on Wheels</li> <li>• Studies of Meals on Wheels in care transition programs</li> <li>• Studies of home-delivered meals tailored for medical conditions (“medically tailored meals”)</li> </ul>	<ul style="list-style-type: none"> <li>• Studies of congregate meal programs only</li> <li>• Studies of specific supplemental services provided with home-delivered meals that are not commonly provided</li> <li>• Studies of meal models that are not Meals on Wheels (e.g., meal delivery to patients while they are in a hospital, meal delivery to the home by for-profit businesses)</li> </ul>
Participant population	<ul style="list-style-type: none"> <li>• Studies focused on populations commonly served by Meals on Wheels (e.g., older adults, people with nutritional risk, people recently discharged from a hospital)</li> </ul>	<ul style="list-style-type: none"> <li>• Studies of programs serving participants with a specific medical condition(s) only (e.g., studies that included only meals participants with diabetes)</li> </ul>
Published	<ul style="list-style-type: none"> <li>• Published studies (government reports, journal articles, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Unpublished sources (e.g., internal documents)</li> </ul>

## STUDY DATA COLLECTION

We extracted the following information from each study

- **Study bibliographic information:** citation including authors, title, publisher, publication date, web link, etc.
- **Study details:** participant population (e.g., meals participants age 60 and older, older adults with a recent hospitalization and nutritional risk), type of Meals on Wheels services (e.g., medically tailored home-delivered meals, home-delivered meals in care transitions), study geographic area and study design and methods
- **Study results,** findings about Meals on Wheels impacts on each outcome examined in the study: 1) health care costs, 2) health care utilization, 3) nursing home use or ability to remain living at home, 4) physical health or mental health, 5) management of chronic conditions (none of the included studies examined this outcome), 6) food security or access to healthy food, 7) diet quality/healthy eating, 8) nutrition status/malnutrition, 9) falls/home safety, 10) social isolation/social connection/loneliness, 11) other impacts reported not listed above.
- **Study recommendations** presented by the study authors, including 1) study recommendations for expanding Meals on Wheels services, 2) study recommendations for enhancing Meals on Wheels services and 3) study recommendations for future research
- **Study limitations** reported in the study

## QUALITY OF EVIDENCE APPRAISAL

We classified impacts as “primary findings” if we uncovered evidence of substantive positive impact of Meals on Wheels service on that result from three or more studies. We classified impacts that did not meet this threshold as “additional impacts.” These are potential areas for further research.

Based on our review of the studies and the focus of our review, we identified three aspects of evidence quality as particularly relevant:

- Ability of study design to demonstrate causality
- Generalizability of results to programs outside the study
- Understanding of participants’ perspectives

We used the information to summarize the quality of the overall evidence.

## QUALITY OF THE OVERALL EVIDENCE

Based on our evidence appraisal described in the previous section, we identified eight primary impacts and four secondary impacts of Meals on Wheels, as detailed in the table below.

37 of the 38 studies found evidence of substantive positive impact of Meals on Wheels on at least one outcome. Some of the studies did not find substantive impact on every outcome examined, often citing methodological issues that made it difficult to detect the impact. One study that was a part of an evaluation of Older Americans Act (OAA) nutrition programs was not able to assess clear evidence of substantive impact on the outcomes examined in that study.<sup>29</sup> Still, the studies’ explanations for why impacts were not detected provide useful insight for future research and practice and are included in the findings section.

OUTCOME EXAMINED	# OF STUDIES FINDING EVIDENCE OF SUBSTANTIVE POSITIVE BENEFITS OF MEALS ON WHEELS ON OUTCOMES	# OF STUDIES FINDING LITTLE OR NO EVIDENCE OF SUBSTANTIVE FINDING
Studies finding positive impacts of Meals on Wheels on any outcome	37	1
<b>PRIMARY FINDINGS</b>		
Reduced use of costly health care services	10	2
Reduced nursing home use and increased ability to age in place	10	3
Reduced health care costs	5	1
Increased food security	7	1
Improved diet quality/healthy eating	15	1
Improvement or reduced decline in nutritional status	6	0
Reduced social isolation and loneliness	9	2
Reduced falls and increased home safety	5	1
<b>ADDITIONAL BENEFITS</b>		
Improved physical health or physical functioning	3	2
Improved mental health and well-being	4	4
Benefits for volunteers and staff	2	0
Financial benefits for participants (e.g., affordability)	1	1

Finding 37 studies from reliable sources that provide evidence of positive client impacts that are likely attributable to Meals on Wheels makes it clear that Meals on Wheels is an evidence-supported solution.

The 37 studies varied in aspects of evidence quality, such as ability to demonstrate causality, generalizability to programs outside the study and understanding of participants' perspectives. **By synthesizing the best available evidence from many studies, we build an evidence base that is stronger than any one study.**

## Ability To Demonstrate Causality

Several studies reported the lack of a comparison group or use of a comparison group that was not randomly assigned as a limitation that constrained the studies' ability to determine the extent to which changes were a result of the meals program versus other causes. Of the 37 studies that found evidence of substantive positive impacts of Meals on Wheels on at least one outcome:

- Five studies were small randomized controlled trials, in which people who agreed to be in the study were randomly assigned to receive meals services or no meals (or to different amounts of meals). Findings from these study designs generally provide more certainty about causal relationships. The randomized studies we reviewed were based on small samples and pilot studies, making their results preliminary and less precise or generalizable than they would be with a larger study.
- Seven studies used statistical models and four used a matched comparison group to measure impact and rule out other factors to the extent possible given lack of a randomized comparison group. These studies also provide evidence of causality, although the results may be of varying certainty or generalizability.
- 13 studies measured impacts for participants with no comparison group (e.g., compared outcomes before and after enrolling in meals), or used a convenience comparison group that may not have resembled meals participants. These studies show impacts that are associated with and plausibly attributable to Meals on Wheels, rather than demonstrating causality. Based on the best available evidence, it appears likely that the improvements these studies found were at least partially because of Meals on Wheels.
- Eight studies involved surveys and/or interviews assessing participants' perceptions of impacts. In addition, two of the randomized controlled trial studies also collected participant feedback about their perceptions of impacts. These studies provide an important additional perspective to ensure that the impacts measured are relevant.

## Generalizability of Findings

Another aspect of evidence quality to consider is the degree to which the included samples represent a broad population of participants and programs. Of the 37 studies that found evidence of substantive impact:

- Seven studies used nationally representative data, such as a nationally representative survey or national administrative program datasets, providing the greatest applicability to the whole Meals on Wheels network.
- Seven studies used data from one or more programs in a few different states, providing a somewhat diverse and representative sample.
- 18 studies were based in one organization or in one state. While their findings provide evidence of impact at the study program, their findings may not be typical of all programs.
- Four studies were based outside the U.S. (two in Canada, one in Australia and one in the U.K.). While these studies add to the evidence for the Meals on Wheels model, results may be different in the U.S., which has different health care and social services systems.

Several studies cautioned that their samples may not represent typical Meals on Wheels participants. For example, participants in some studies may have had fewer functional limitations than Meals on Wheels participants generally.<sup>30</sup> Several of the studies cautioned that the findings were based on a specific state or local geographic area or organization and may not apply to all geographies, Meals on Wheels programs or partnering health care organizations. Studies also noted that participants who respond to a survey or agree to participate in a study may be different from other participants.<sup>31</sup>



## Understanding of Participants' Perspectives

The perspectives of people, such as older adults receiving meals and volunteers and staff who deliver meals, add another important component. Of the 37 studies that found impacts of Meals on Wheels:

- 10 studies included surveys and/or interviews to assess the perspectives of participants and/or others close to the program, such as meal delivery drivers, and found substantial numbers of people reporting one or more positive impacts of Meals on Wheels. A couple of studies also found additional impacts that were mentioned spontaneously by a few people; these add additional examples to the studies that measured those impacts more directly and found more substantive findings.
- 27 studies did not collect data on people's perspectives of program impacts. Findings that are not reinforced with participant feedback from any studies are areas where feedback from participants and programs may be useful to confirm if the findings match their experience.

## Additional Limitations of the Studies

The studies pointed out a variety of additional limitations that may affect the reliability or usefulness of the findings. Limitations of particular relevance to this review include the following:

- **Small sample sizes**, which limit the ability to detect program effects with certainty and rule out the effects of random chance. For example, one pilot study had 19 participants.<sup>32</sup> Of the 37 studies finding impacts of Meals on Wheels, we found nine studies reported small sample size as an important limitation. These small studies show which outcomes appear likely and are worth exploring in larger confirmatory studies.
- **Limitations of self-reported data.** Several studies relied on self-reported data for health care utilization or other outcomes. While the perspectives of people are valuable, self-reported data also have limitations. Participants may have difficulty recalling events<sup>33</sup> and social desirability could affect responses.<sup>34</sup>
- **Other limitations of data and measures.** Studies noted limitations to other data sources, for example, state-reported data on nursing home expenditures may vary by state.<sup>35</sup> For studies relying on data collected by local Meals on Wheels programs, data may be collected differently at different sites.<sup>36</sup>
- **Attrition.** Several publications noted that attrition—participants discontinuing participation in the meals program and the study for various reasons—may have led to underestimating results.

While acknowledging the study limitations, many study authors discussed that the available evidence points to the value of home-delivered meals programs.



## FINDINGS

This comprehensive research review highlights a set of meaningful and consistent findings regarding the impacts of Meals on Wheels programs. These findings underscore the essential contributions of home-delivered meals in improving various aspects of individuals' lives, promoting well-being and fostering independent living.

**The studies consistently reported the following impacts of home-delivered meals:**

1. **Reduced use of costly health care services**
2. **Reduced nursing home use and increased ability to age in place**
3. **Reduced health care costs**
4. **Increased food security**
5. **Improved diet quality**
6. **Reduced or slowed decline in nutritional risk**
7. **Reduced social isolation and loneliness**
8. **Reduced falls and increased home safety**

### REDUCED USE OF COSTLY HEALTH CARE SERVICES

Several studies found Meals on Wheels was associated with reduced use of costly services, particularly showing a decrease in emergency department visits and hospital stays.

#### Reduced Emergency Department Visits and Use of Emergency Transportation

Among adults dually eligible for Medicare and Medicaid at nutritional risk:

- In a study conducted with Community Servings in Massachusetts,<sup>37</sup> participants who received six months of **non-medically tailored meals** delivered daily had fewer average emergency department visits (0.90 average emergency department visits) compared to those who did not receive meals (1.59 average emergency department visits). Additionally, the group receiving non-tailored meals showed lower usage of emergency transportation compared to a matched group not receiving meals (1.06 vs. 1.70 average emergency transportation events).
- Adults receiving **medically tailored meals** delivered weekly experienced fewer average emergency department visits (0.63 average emergency department visits) than the comparison group not receiving meals (2.10 average emergency department visits), in the same study.<sup>38</sup> Usage of emergency transportation was also lower for medically tailored meal participants compared to the matched comparison group (0.46 vs. 1.60 emergency transportation events).

In a study with Meals on Wheels of Tarrant County,<sup>39</sup> it was observed that among individuals recently discharged from the hospital, the average number of emergency department visits decreased to less than a third of the previous count (from 5.03 average emergency department visits in the six months before meals to an average of 1.45 emergency department visits after receiving meals). Furthermore, the research found that participants who received more meals over a 12-month period experienced fewer emergency department visits and hospitalizations, after controlling for demographic characteristics and levels of physical functioning.

## Reduced Hospital Admissions and Readmissions

Several studies found that receiving Meals on Wheels was associated with reduced use of costly health care services like hospital visits.

### AMONG PERSONS RECENTLY DISCHARGED FROM HOSPITAL:

- The average number of hospitalizations significantly decreased in the study with Meals on Wheels of Tarrant County (1.3 to 0.8).<sup>40</sup> The average length of stay per hospitalization also decreased from 5.5 days to 2.3 days. Receiving more meals over 12 months was associated with reduced likelihood of experiencing hospitalizations as well as emergency department visits, after controlling for demographic characteristics and levels of physical functioning.

#### IMPACT OF MEALS ON WHEELS ON HOSPITALIZATIONS: A SIGNIFICANT DECREASE IN TARRANT COUNTY



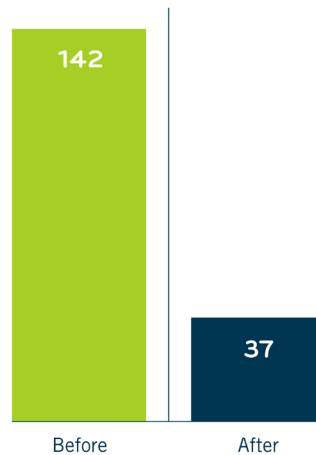
The **AVERAGE NUMBER OF HOSPITALIZATIONS** and **LENGTH OF STAY** decreased significantly in a study with Meals on Wheels of Tarrant County.

Source: Frequency of Hospital Use Before and After Home-Delivery Meal by Meals On Wheels, of Tarrant County, Texas. *The Journal of Nutrition, Health & Aging, 22(4), 519–525.*

- The hospital readmissions rate declined (12% to 10%) after receiving meals services for 24 months as part of a community-based care transition program from the Maine Medical Center and the Southern Maine Agency on Aging.<sup>41</sup>
- In a care transition program conducted with Meals on Wheels of Tarrant County (Texas),<sup>42</sup> client-reported hospital readmissions at three months and six months were lower than anticipated based on client characteristics. At three months, 75% of clients who were at high risk of emergent care reported no additional hospitalizations and 90% reported no additional emergency department visits. Among clients who provided data at the six-month point, 80% had no hospitalizations and 90% had no emergency department visits.

- After enrolling in the care transition program, Together in Care, participants experienced a significant decline in hospitalizations when comparing the three months before and after enrollment (142 before enrollment versus 37 after enrollment).<sup>43</sup> The number of emergency room visits that did not result in admissions increased (41 emergency room visits before meals versus 122 emergency room visits after).

### HOSPITALIZATION TRENDS WITH TOGETHER IN CARE: A POSITIVE SHIFT



After enrolling in the Together in Care transition program, participants experienced a **SIGNIFICANT DECLINE IN HOSPITALIZATIONS** when comparing the three months before and after enrollment.

*Source: Together in Care: An Enhanced Meals on Wheels Intervention Designed to Reduce Rehospitalizations among Older Adults with Cardiopulmonary Disease—Preliminary Findings. International Journal of Environmental Research and Public Health, 19(1), 458.*

#### AMONG PEOPLE RECEIVING MEDICALLY TAILORED MEALS:

- Receiving medically tailored meals was associated with an average of 519 fewer inpatient admissions per 1,000 people per year, in an analysis of data from Community Servings matched to health care claims data.<sup>44</sup>

#### AMONG PEOPLE RECEIVING MEDICAID:

- Receiving more than 11 home-delivered meals per month was associated with a 10% lower risk of hospital admissions in an analysis of Indiana Medicaid data.<sup>45</sup>

#### AMONG MEALS ON WHEELS PARTICIPANTS GENERALLY:

- Receiving Meals on Wheels was associated with a lower risk of hospitalization for older adults who were partly homebound in a statistical analysis of national longitudinal survey data.<sup>46</sup> This association was largest for male older adults and for white older adults.
- Fewer individuals who received meals were hospitalized during the study period, compared to those who did not receive meals (14% vs. 20%) in the Meals on Wheels America *More Than a Meal*® study with eight local programs.<sup>47</sup>

- After adjusting for age and BMI, poorly nourished older adults receiving Meals on Wheels were like well-nourished older adults in the proportion that reported being hospitalized, duration of admission and average number of days in hospital, in an Australian study.<sup>48</sup> In contrast, compared with well-nourished older adults, poorly nourished older adults who were not receiving Meals on Wheels had a 2.4 times greater likelihood of falling, a 2.2 times greater likelihood of being admitted to a hospital over 12 months, a 2.9 times greater proportion who reported a hospital stay of more than 2 weeks and a 5 days longer average length of hospital stay.
- In the evaluation of the Older Americans Act (OAA) Nutrition Program, findings about impacts on health care utilization were inconclusive due to methodological issues.<sup>49</sup> Home-delivered meal participants experienced more hospital admissions, readmissions and outpatient emergency department visits than a matched group of nonparticipants. However, this may have been due to differences in characteristics between the two groups. In particular, OAA home-delivered meals are provided to homebound older adults with declining function, like mobility limitations, and their spouses. A greater proportion of meal participants may have been homebound than nonparticipants, and this could explain differences in hospital use between the two groups.



## REDUCED NURSING HOME USE AND INCREASED ABILITY TO AGE IN PLACE

Both medically tailored meals and Older Americans Act (OAA) Title III home-delivered meals have been associated with reduced nursing facility use, promoting aging in place, or the ability to live in one's own home rather than relocating to a nursing facility.

- Receiving medically tailored meals was associated with fewer skilled nursing facility admissions (average of 913 fewer admissions per 1,000 people per year), in addition to fewer inpatient admissions, in the analysis of data from Community Servings matched to health care claims data.<sup>50</sup>
- An increase of 1% in the proportion of adults ages 65 and older receiving OAA Title III home-delivered meals was associated with an estimated 0.2% decrease in the state's population of nursing home residents with functional capacity to live in the community.<sup>51</sup> Nationally, an estimated 1,722 older adults would no longer require nursing home care, but instead be able to age in place while receiving home-delivered meals in 2009. While these numbers may seem small, the study noted that this was a conservative estimate and did not take into account prioritizing services to people who need them the most, as is required under the OAA.

- Every \$25 a state spent per year per older adult on home-delivered meals resulted in an estimated 1% decrease in the population of “low-care”<sup>52</sup> nursing home residents, who have the functional capacity to live in the community.<sup>53</sup>
- In a study analyzing OAA data from four states and from the National Health and Retirement Study, the findings showed a decreased risk of nursing home placement with the increased use of services across all data sets, except for two counties.<sup>54</sup>

In one study conducted as part of the OAA nutrition program evaluation, more home-delivered meal participants than non-participants experienced nursing home admission over 12 months, but this appeared to be due to existing differences between the two groups.<sup>55</sup>

## Participant Perspectives: The Role of Meals on Wheels in Maintaining Independence

Surveys and interviews with participants and with meal deliverers support findings that home-delivered meals help participants remain at home and avoid or delay entering a nursing home.

In several surveys, participants said the meals help them either stay in their homes or worry less about staying in their homes.

- Nearly all (92%) home-delivered meal participants say that the meals help them continue to live independently (to stay living where they desire, such as in their current homes), in the 2022 National Survey of Older Americans Act (OAA) Title III home delivered meal participants.<sup>56</sup>
- Over 97% of respondents reported the home-delivered meals service helped them to continue to live at home, in a 2011 survey of Meals on Wheels clients in the state of Florida.<sup>57</sup>
- Over three-quarters (79%) of Meals on Wheels clients surveyed said the program was “extremely important” in helping them remain independent in their home and in supporting their daily well-being, in a 2009 HealthTrust study.<sup>58</sup>
- Comparing participants’ ratings of how often they worried about being able to remain in their homes before and after meals, a third of participants receiving daily-delivered meals (32%) worried less often about their ability to remain in their homes, in the Meals on Wheels America *More Than a Meal*® Pilot Research Study.<sup>59</sup> Smaller percentages of persons on the waiting list for meals (21%) and in the frozen, once weekly meals group (18%) worried less often.

In interviews, many clients shared that they signed up for Meals on Wheels as a way to take care of themselves independently and avoid burdening their families, in a Meals on Wheels Central Texas study.<sup>60</sup>

**“I know I can depend on Meals on Wheels. If I can’t cook, I can call them and get the whole week. It feels good that I can depend on something like that. That way my family doesn’t have to come from out of town to bring me this and that. Because they have their jobs too.”**

– *Meals on Wheels participant (Bonagurio et al., 2022)*

In response to the interview question, “What would you do if you didn’t have the Meals on Wheels program?” participants reported that without Meals on Wheels they would be unable to buy groceries, they would be unable to cook their own meals and they would have to move out of their home, in the 2009 HealthTrust study.<sup>61</sup> Twenty percent of the 20 clients interviewed said they would have to move (for example, to live with family or to a nursing facility) if they did not have Meals on Wheels.

In a couple of studies, a small number of older adults mentioned the benefits of independence in response to open-ended questions about how the meals helped them. These comments add context to data from the other studies and confirm that at least some older adults see this as a benefit, even if not one they most frequently mention unprompted. A couple of older adults noted that Meals on Wheels helps them to maintain their independence in the 2021 NORC at the University of Chicago (NORC) COVID-19 and Older Adults study.<sup>62</sup> For example, one older adult who was receiving meals said, referring to assisted living or a nursing home, “Meals on Wheels is keeping me out of that situation.”

In response to the open-ended question asking how the home-delivered meals service has helped them, a few described it as a solution to lack of support, in a survey of participants served by 23 meal providers in Cook County, Illinois.<sup>63</sup> For example, one couple said it helped them stay more independent.

**“My wife and I are handicapped. We can handle things better and stay at home longer with home-delivered meals.”**

– Home-delivered meal participant (Lee & Raiz, 2015)

Drivers who deliver meals also reported that Meals on Wheels helps clients to remain at home, in interviews with drivers and staff at six programs.<sup>64</sup>

**“A lot of them will tell me, ‘I just could not live alone if you weren’t bringing my meals to me.’”**

– Driver in Texas (Thomas et al., 2020)

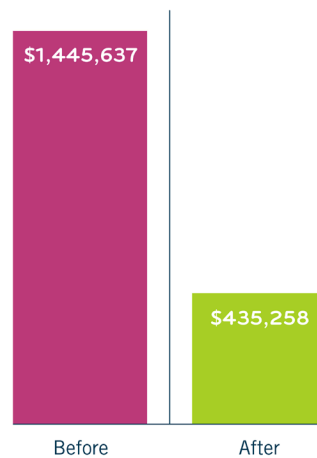


## REDUCED HEALTH CARE COSTS

Several studies found associations between receiving Meals on Wheels and lower health care costs, due to reduced health care use or reduced need for nursing home care.

### Reduced Medical Expenditures

#### TRANSFORMATIVE IMPACT: HOSPITAL EXPENDITURES PLUNGE WITH TOGETHER IN CARE



**In the Together in Care partnership, participant hospital expenditures plummeted \$1 MILLION during the three months of enrollment compared to the prior three months.**

*Source: Together in Care: An Enhanced Meals on Wheels Intervention Designed to Reduce Rehospitalizations among Older Adults with Cardiopulmonary Disease—Preliminary Findings. International Journal of Environmental Research and Public Health, 19(1), 458.*

Among people recently discharged from a hospital:

- Driven by reduced hospital utilization and a decreased need for intensive care among recently discharged individuals, the Together in Care partnership between a local Meals on Wheels program in Baltimore, Maryland, a hospital and Meals on Wheels America<sup>65</sup> resulted in a significant cost reduction of over \$1 million. Participant hospital expenditures plummeted from \$1,445,637 in the three months prior to enrollment to \$435,258 during the three months of enrollment.
- The Maine community care transitions program study reported a return on investment of \$3.87 for every \$1.00 spent on meals, based on 13 fewer readmissions.<sup>66</sup>

Participants dually eligible for Medicare and Medicaid with nutritional risk who received non-medically tailored home-delivered meals had \$156 lower average monthly medical expenditures, compared to a matched group who did not receive meals (\$1,007 vs. \$1,163).<sup>67</sup> Similarly, individuals receiving medically tailored meals had \$570 lower average monthly medical expenditures than a matched group not receiving meals (\$843 vs. \$1,413). After accounting for the costs of providing the meals, the net monthly savings per person amounted to \$10 for the non-tailored meals program and \$220 for the medically tailored meals program.



Among people receiving medically tailored meals, an analysis using data from Community Servings matched to data from a health care claims database found cost savings associated with receiving meals.<sup>68</sup> The study estimated average monthly health care costs (from medical and pharmaceutical claims) would have been reduced by 16% (\$3,838 vs. \$4,591) had everyone in the matched group also received medically tailored meals compared to if no one received meals.

## REDUCED NURSING HOME SPENDING

### A PATH TO \$109 MILLION IN STATE MEDICAID SAVINGS



Using national data, an analysis projected that if all states had increased the number of adults aged 65 or older who received home-delivered meals in 2009 under Title III of the Older Americans Act by 1 PERCENT, state medicaid programs could **SAVE OVER \$109 MILLION ANNUALLY.**

*Source: Providing More Home-Delivered Meals Is One Way To Keep Older Adults With Low Care Needs Out Of Nursing Homes. Health Affairs, 32(10), 1796-1802.*

Using national data, an analysis projected that if all states had in 2009 increased the number of adults aged 65 or older who received home-delivered meals under Title III of the Older Americans Act (OAA) by one percent, state Medicaid programs could save over \$109 million annually.<sup>69</sup> The analysis made this savings estimate by accounting for at least 1,722 older adults who could have remained in their homes and avoided Medicaid services by participating in Meals on Wheels programs. The impact would likely be greater with prioritization of services to older adults who need them the most, the study noted.

## INCREASED FOOD SECURITY

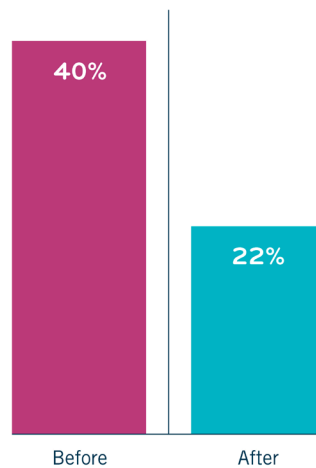
In several studies, home-delivered meal participants showed improvement in food security. The U.S. Department of Agriculture (USDA) defines food security as “access at all times to enough food for an active, healthy life.”<sup>70</sup> Studies indicated that the effects on food security could be improved by delivering breakfast in addition to lunch and by delivering at least five meals a week for older adults who need them.

- In a study at a Meals on Wheels program in Central Florida<sup>71</sup>, the percentage of senior participants experiencing low or very low food

Food insecurity costs health care **\$77.5 BILLION** a year.<sup>72</sup>

security decreased by nearly half, from 40% before meals to 22% after two months of home-delivered meals. Conversely, the proportion of participants with high food security increased from 60% prior to the program to 78% after two months of meal provision. Notably, 41% of participants experienced an improvement in their food security level, with 16% transitioning from very low to high food security.

### MEALS ON WHEELS IMPACT: REDUCTION IN FOOD INSECURITY



**In a study at a Meals on Wheels program in central Florida, the percentage of senior participants experiencing LOW OR VERY LOW FOOD SECURITY DECREASED BY NEARLY HALF after two months of home-delivered meals.**

*Source: The Impact of a Home-Delivered Meal Program on Nutritional Risk, Dietary Intake, Food Security, Loneliness, and Social Well-Being. Journal of Nutrition in Gerontology and Geriatrics, 34(2), 218–227.*

- In a study conducted in three counties of upstate New York, researchers examined the food security status of individuals receiving home-delivered meals. Initially, 23% of home-delivered meal participants were identified as food insecure, but this figure decreased to 13% after six months among participants in the study for that duration.<sup>73</sup> For participants involved in the study for 12 months, their initial food insecurity rate of 29% declined to 13% after 12 months.
- A study conducted in Georgia on the Older Americans Act (OAA) Nutrition Program meals services compared the likelihood of achieving food security over a four-month period between participants in home-delivered meal programs and those on waitlists.<sup>74</sup> The findings revealed that significantly more home-delivered meal participants became food secure over four months compared to older adults on a waitlist for home-delivered meals (17.7% vs. 12.2%). Home-delivered meal participants were also more likely than older adults on a waitlist to be persistently food secure over the four months (40.5% vs. 30.8%).

The impact on food security was significantly greater for participants who received breakfast and lunch than those who received lunch-only, in a study with five senior nutrition programs.<sup>75</sup>

In a study examining OAA nutrition programs, it was found that participants who received meals five days a week had a similar rate of very low food security compared to nonparticipants.<sup>76</sup> However, among participants who received meals fewer than five days a week, home-delivered meal recipients had higher rates of very low food security compared to nonparticipants. The authors of the study noted that the lack of difference in food insecurity between participants and nonparticipants indicated that some individuals receiving home-delivered meals may not be receiving an adequate number of meals per week to improve their level of food security.

## Participant Perspectives: The Role of Meals on Wheels in Improving Food Security

Participant feedback in several studies reinforced the findings that Meals on Wheels has a transformative impact on participants' food security.

In a survey conducted by AgeOptions, an Area Agency on Aging in suburban Cook County, Illinois, food security was the benefit of the home-delivered meals program that participants most frequently mentioned in response to an open-ended question of how the program helped them.<sup>77</sup> More than one third of the respondents (34% of older adults living alone and 42% of older adults living with others) reported that home-delivered meals effectively reduced their hunger or food insecurity.

**“Without home-delivered meals, I would not have lunch.”**

– Older adult living alone and receiving home-delivered meals (Lee & Raiz, 2015)

Similarly, about half of older adults who received Meals on Wheels indicated that the services helped them to enjoy quality meals despite physical limitations, in interviews conducted in the study COVID-19 and Older Adults.<sup>78</sup> Some older adults reported that it was “not safe” for them to cook, while some said physical limitations or surgery made it difficult for them to cook. Additionally, older adults in the study commented on the affordability and dependability of the meals.

**“If we didn't have Meals on Wheels...we'd be spending everything we have on food... [it would be] not a question of having a couple extra dollars in the bank... but having no extra dollars in the bank.”**

– Older adults who used Meals on Wheels services since COVID-19 (NORC-2021)

In a 2009 HealthTrust study, two-thirds (65%) of the 20 clients interviewed said they would not have enough to eat if they did not have the Meals on Wheels program.<sup>79</sup> Many clients reported they would not be able to afford to buy food if they were not receiving Meals on Wheels. Almost 40% of participants who completed the survey said they would be interested in receiving free weekly groceries from a food bank, suggesting a need for additional support beyond the usual home-delivered meals.



## SENIORS' VOICES: RELYING ON MEALS ON WHEELS



In a 2009 HealthTrust study, 65% of the 20 clients interviewed said **THEY WOULD NOT HAVE ENOUGH TO EAT** if they did not have the Meals on Wheels program.

*Source: Nutrition & Social Connection for Older Adults." Health Trust Evaluation Brief*

Fifty-seven percent of Older Americans Act (OAA) home-delivered meal participants say the meals make up half or more of the foods they eat on the days they receive meals.<sup>80</sup>

**"If I didn't have the program, I'd go hungry."**

– Home-delivered meal participant (HealthTrust, 2009)

## IMPROVED DIET QUALITY

Several studies found that home-delivered meals were associated with improved diet quality, as measured by intake of nutrients, calories, vitamins and other indicators of a healthy diet. Participant feedback reinforces these findings that the meals play a pivotal role in helping them eat healthier and more nourishing foods.

- Receiving home-delivered meals was associated with improvement in daily intake of nutrients, except for increasing sodium intake, in a study using nationally representative survey data.<sup>81</sup> The study did not give a reason for the increased sodium, the one exception to Meals on Wheels promoting a healthier diet. Participants with home-delivered meals had a higher daily intake of protein, fiber, calcium, copper, magnesium, potassium and selenium.
- An early national study of Older Americans Act (OAA) Title III meals programs revealed that home-delivered meal participants exhibited higher average intakes of 18 nutrients compared to program-eligible non-participants.<sup>82</sup> The differences were significant, ranging between

Poor diet costs health care an estimated **\$50.4 BILLION** a year.<sup>83</sup>

5% and 30% for 12 of the nutrients. Notably, the largest disparities were observed in intakes of Vitamin D (30%), calcium (25%), magnesium (12%), and zinc (8%). These patterns held true across various subgroups, including income, race and ethnicity, age and disability. Additionally, home-delivered meal participants had slightly higher average food energy intake compared to non-participants.

- 66% of participants consumed more calories and grams of protein two months after meal delivery service began than they did before the meals in a pilot study at a Meals on Wheels program in Central Florida.<sup>84</sup>
- With receipt of home-delivered meals in a study in New York State, participants' intakes increased significantly for fruit and vegetable variety, vegetable servings, beta carotene, vitamin E and magnesium.<sup>85</sup>
- Between enrollment and three months after enrollment in home-delivered meals, diet quality improved for participants, in a small study at a Meals on Wheels program in Austin, Texas.<sup>86</sup> Significant decreases were found in vitamin D, total fat, saturated fat, monounsaturated fat, percent calories from fat and percent calories from sweets/desserts. Significant increases were found in intakes of beta-carotene and percent calories from protein. Of 30 participants who completed the survey, seven reported skipping meals less often and three reported eating less fast food since receiving meals.
- Caloric intake during the intervention period was significantly greater for participants who received 10 days of home-delivered meals and nutrition education after hospital discharge compared with those who received usual care and nutrition education only (1,595 vs 1,235 calories), in a pilot randomized controlled trial study with 21 older patients from the University of Alabama at Birmingham Hospital's Acute Care for Elders.<sup>87</sup>

The group that received breakfast and lunch had greater energy/nutrient intakes than the group who received lunch only, in a study with five nutrition programs.<sup>88</sup>

Home-delivered meals contributed substantially to participants' daily intakes of calories and nutrients in the evaluation of the OAA nutrition program.<sup>89</sup> There was no significant difference between home-delivered meal participants and nonparticipants in overall diet quality scores as measured by the Healthy Eating Index (HEI-2010).

In one study, participants not eating all the meals may have lessened the benefits on healthy eating. In a Canadian study, after receiving Meals on Wheels for eight weeks, the group who received meals showed significantly more positive changes in energy, protein, total fat and thiamin intakes than the comparison group.<sup>90</sup> However, average intakes of some vitamins and nutrients were still below the recommended level at eight weeks. Eight (40%) participants said they threw away parts of their meal or gave them to another person on a regular basis.

Although nutritional scores improved in the study with two Texas Meals on Wheels programs, intake of most nutrients did not change significantly over three months, except for modest improvement in zinc and magnesium intake.<sup>91</sup> The researchers indicated this may have been because the questionnaire used was not the most accurate way to assess diet.

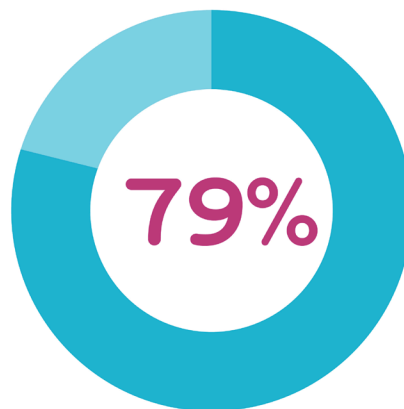
## Participant Perspectives: The Role of Meals on Wheels in Improving Diet Quality

Participants in several studies reported that home-delivered meals help them eat healthier foods.

- Seventy-nine percent of home-delivered meal participants reported that the meals help them eat healthier foods in the National Survey of OAA Participants.<sup>92</sup>
- Sixty percent of people receiving daily delivered meals said the meals helped them eat healthier foods in the *More Than a Meal*® study.<sup>93</sup> This was a significantly greater percentage than among those receiving frozen, weekly delivered meals (41%).

- Ninety-six percent of respondents in a 2011 survey of home-delivered meals participants in Florida reported that home-delivered meals helped them eat healthier foods.<sup>94</sup>
- Half of survey respondents indicated that they were eating more fruits and vegetables since they started receiving home-delivered meals, and 48% said they were eating about the same amount of fruits and vegetables, in the HealthTrust study.<sup>95</sup> Interviews showed that the Meals on Wheels program helped promote healthy eating. Participants described how their diet would be negatively impacted if they did not have Meals on Wheels. Participants said they would eat less overall; eat more junk food and fast food; eat more canned food; or rely on dry staples such as cereal, noodles, and peanut butter, thereby consuming fewer fruits and vegetables, whole grains and healthy proteins.
- In response to the open-ended question, “How has the home-delivered meals service helped you?” better nutrition was the second most frequently mentioned benefit (after food security), in a study by an Area Agency on Aging in Illinois.<sup>96</sup> An older adult shared, “I now eat spinach and Brussels sprouts, which I did not used to eat.”

### NUTRITIONAL IMPACT: HOME-DELIVERED MEALS AND HEALTHIER EATING



Seventy-nine percent of home-delivered meal participants reported that the meals **HELP THEM EAT HEALTHIER FOODS**, in the National Survey of Older Americans Act Participants.

Source: U.S. Department of Health and Human Services, Administration for Community Living (ACL). (2023). 2022 OAA Participants Survey Frequency Tables

Most older adults who received Meals on Wheels mentioned nutritional benefits in interviews conducted as part of a NORC at the University of Chicago (NORC) study of COVID-19 and Older Adults conducted for Meals on Wheels America.<sup>97</sup>

**“I don’t think I’d eat so many vegetables on my own. When you retire you get kind of spoiled. Ice cream starts looking like a vegetable. So, I’m staying healthy in many ways because of the balanced diet.”**

– Home-delivered meal participant (NORC 2021)

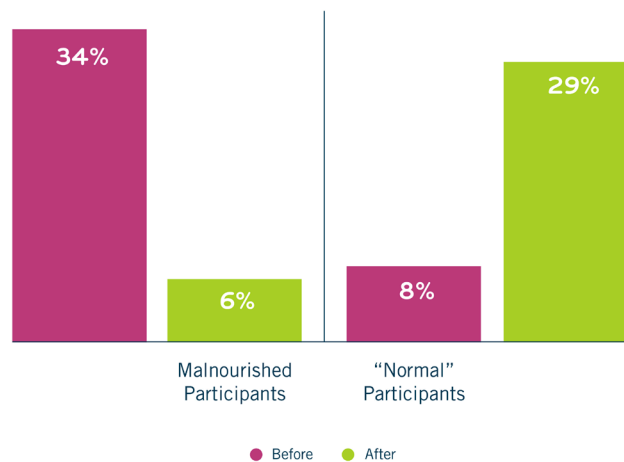
## REDUCED OR SLOWED DECLINE IN NUTRITIONAL RISK

In six studies, participants' nutritional status significantly improved after receiving meals, as indicated by various measures of nutritional risk (level of risk for malnutrition). These improvements in nutritional risk scores could be attributed to both improved dietary intake and improved food security.

- Two separate measures showed decline in participants' nutritional risk, in a study with Meals on Wheels Central Texas and Meals on Wheels of San Antonio.<sup>98</sup> Prior to receiving home-delivered meals, 80% of participants were identified as malnourished, but after three months of meal provision, the percentage decreased to 59%. This assessment was conducted using the Nutrition Screening Initiative (NSI) measure to evaluate nutritional risk. Additionally, when utilizing the Mini Nutrition Assessment-Short Form (MNA-SF) measure, 42% of participants were found to be malnourished before meals, which significantly decreased to 8% after three months of meal consumption.
- After two months of meals from a Meals on Wheels program in Central Florida, the percentage of participants who were malnourished dropped from 34% to 6% and those with "normal" nutritional status (MNA-SF) grew from 8% to 29%.<sup>100</sup> The study noted that both the improvement in dietary intake and improved food security could contribute to the improvement in nutritional status.

Malnutrition among adults age 65+ costs health care **\$51.3 BILLION** a year.<sup>99</sup>

### POSITIVE OUTCOMES: MALNUTRITION REDUCTION WITH MEALS ON WHEELS



After two months of meals from a Meals on Wheels program in central Florida, the percentage of **MALNOURISHED PARTICIPANTS DROPPED** and those with **"NORMAL" NUTRITIONAL STATUS GREW**.

Source: *The Impact of a Home-Delivered Meal Program on Nutritional Risk, Dietary Intake, Food Security, Loneliness, and Social Well-Being. Journal of Nutrition in Gerontology and Geriatrics, 34(2), 218-227*

- The mean MNA score significantly increased from 24.3 before meals to 26.4 after meals in a small pilot UK study.<sup>101</sup> Out of the 19 participants, nine had an initial score indicating they were "at risk" of malnutrition (23.5 or below) before meals. However, following the delivery of meals (three meals a day for 21 days, delivered twice weekly), six out of these nine participants were no longer considered at risk of malnutrition.

- Meals on Wheels participants had significantly better nutritional scores (measured with SCREEN questionnaire) at follow-up than did senior service agency participants who did not receive meals in a study in Ontario, Canada.<sup>102</sup> However, nutritional scores declined over 18 months, perhaps due to health conditions. The meals prevented further declines, the study reported, as receiving meals was independently associated with higher SCREEN scores (i.e., less nutritional risk) at follow up.
- Approximately two-thirds of nutritionally “at-risk” participants moved to a “well-nourished” MNA score at six months in both the “traditional Meals on Wheels” (5 meals a week) and “New Meals on Wheels” (21 meals and 14 snacks a week) models, in a Mecklenberg County, North Carolina study.<sup>103</sup> However, MNA scores improved faster in the New Meals on Wheels group. Among participants who were “malnourished” and those who were nutritionally “at-risk,” those in the New Meals on Wheels model gained significantly more weight than those in the Traditional Meals on Wheels model (average of 2.78 pounds vs. 1.46 pounds at three months and 4.30 pounds vs. 1.72 pounds at six months).
- Using the MNA-SF to measure nutritional risk, 13 of the 40 participants were in the malnourished category at baseline, declining to three participants classified as malnourished at follow-up, in a study with a Meals on Wheels program in Austin, Texas.<sup>104</sup>

## REDUCED SOCIAL ISOLATION AND LONELINESS

Social isolation and loneliness are related but distinct conditions.<sup>105</sup> Social isolation generally refers to a factual state of limited social interaction and support, while loneliness is a negative feeling caused by a person having less social connection than they would prefer.

Several studies found associations between receiving home-delivered meals and a reduction in social isolation and/or loneliness among participants, particularly for people living alone. These findings were supported by client and driver feedback affirming that the program provides social benefits for participants. Notably, 56% of Older Americans Act (OAA) Nutrition Program participants live alone, further emphasizing the importance of addressing social isolation in this context. These social benefits were a result of contact with drivers during meal delivery and other social connection opportunities provided by Meals on Wheels programs.

“ Social isolation costs health care **\$6.7 BILLION** a year.<sup>106</sup> ”

### Reduced Social Isolation

Studies found reduced social isolation by a variety of measures:

Participants in the *More Than a Meal*<sup>®</sup> pilot study highlighted the significance of daily delivered meals in providing valuable daily contact with people.<sup>107</sup> Approximately two-thirds (65%) of those receiving daily delivered meals expressed that they would have limited daily contact with others if they did not receive home-delivered meals. In comparison, only 35% of participants who received frozen meals reported a similar lack of daily contact.

Home-delivered participants experienced an increase in the number of social contacts per month compared to eligible nonparticipants, with an average of 16 more social contacts (99 vs. 83 social contacts per month), in an early study of the OAA.<sup>108</sup> Additionally, it was noteworthy that even when the meal delivery person did not engage in lengthy conversation with them, the majority of home-delivered clients reported that the contact with the delivery person was important to them socially.



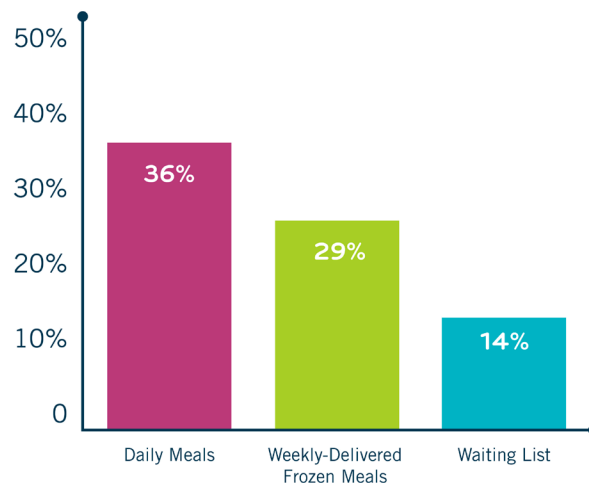
## Reduced Loneliness

Several studies found signs that home-delivered meals services helped participants feel less lonely, by a variety of measures.

### IMPROVED LONELINESS SCORES:

- Among people living alone, those receiving daily delivered meals were significantly more likely to show improvement in feelings of social isolation over 15 weeks (36%), compared to those receiving frozen, weekly-delivered meals (29%) or those on the waiting list (14%) in the Meal on Wheels America *More Than a Meal*® pilot study.<sup>109</sup> Results were not significantly different between meal participants and nonparticipants for people living with others.
- Participants showed a significant decrease in loneliness from an average score of 4.05 before the program to 2.69 two months after enrollment on a loneliness scale where lower scores indicate less loneliness in a pilot study with a Meals on Wheels program in Florida.<sup>110</sup>

### MEALS ON WHEELS PILOT STUDY: THE POWER OF DAILY DELIVERIES



Among people living alone, those receiving daily-delivered meals were more likely to show **IMPROVEMENT IN FEELINGS OF SOCIAL ISOLATION** than those receiving weekly-delivered, frozen meals or those on the waiting list, in a Meals on Wheels America study over 15 weeks.

Source: *More Than a Meal*® Pilot Research Study: Results From a Pilot Randomized Control Trial of Home-Delivered Meal Programs. Meals on Wheels America.

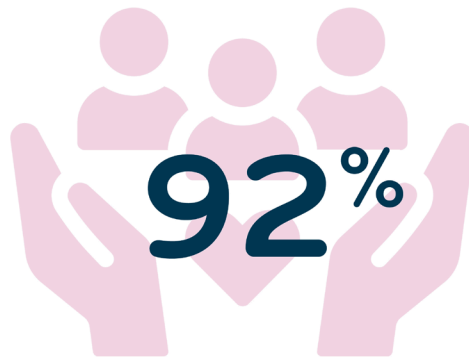
## Participant Perspectives: The Role of Meals on Wheels in Companionship and Social Connection

### IN SURVEYS, PARTICIPANTS REPORTED THAT THE SERVICES HELP THEM FEEL LESS LONELY:

- About two-thirds (64%) of respondents in a survey of clients of Meals on Wheels Central Texas reported feeling close to their delivery drivers, of whom 92% specifically felt the interactions with volunteers made them feel less lonely.<sup>111</sup>

- The *More Than a Meal*® study found that seniors who received daily delivered meals were significantly more likely to report that home-delivered meals reduced their loneliness (77%) compared to those receiving weekly-delivered frozen meals (65%).<sup>112</sup>

### IMPACTFUL CONNECTIONS: MEALS ON WHEELS DRIVERS REDUCE LONELINESS



In a survey of Meals on Wheels Central Texas, clients reported feeling close to their delivery drivers, with 92% reporting the interactions with volunteers **MADE THEM FEEL LESS LONELY.**

*Source: Bonagurio, C., Brunson, E., Marceaux, S., & Sasser, L. (2022). Meals on Wheels Central Texas: Addressing loneliness and isolation through client-volunteer interaction. Working with Older People, 26(1), 8–21.*

Ninety-two percent of clients surveyed were extremely satisfied with the services provided by their Meals on Wheels driver and about two-thirds said that they looked forward to visiting with the driver all the time in a study by HealthTrust.<sup>113</sup> When asked about their interactions with drivers, about half the clients said their driver spent a minimal amount of time with them, but they appreciated the interactions with drivers. Many clients spoke positively about their drivers and described the drivers as being caring and helpful.

In interviews with clients of Meals on Wheels, when asked to identify the benefits of using Meals on Wheels services, several respondents described the social benefits of Meals on Wheels services.<sup>114</sup> For example, participants mentioned making “very, very good friends” with Meals on Wheels volunteers and telephone companions.



**“Even before the virus, I didn’t always have people at my house anyways, so [Meals on Wheels volunteers] were the majority of the people that I saw daily”**

– *Meals on Wheels participant (NORC, 2021)*

Drivers and staff at six sites shared that clients looked forward to the companionship that drivers provided.<sup>115</sup>

**“By talking to them, I sense that I’m making their day.”**

– *Meals on Wheels driver from California (Thomas et al., 2020)*

Social connection programs provided by Meals on Wheels had positive impacts on social isolation and loneliness for all study participants, including Meals on Wheels clients, volunteers and staff, in a study with six programs.<sup>116</sup>

**“I love this program. It makes me feel alive, like someone cares. And I know I’m not the only lonely senior.”**

– *Friendly Visitor program client (Brown University, 2023)*

The benefits of social connection appeared to depend on the number of delivery visits and the time spent in conversation during each visit. Among participants who received fewer than five meals per week, home-delivered meal participants were less likely to be satisfied with their social connection opportunities compared to nonparticipants in a study of Older American Act meal programs.<sup>117</sup> No difference was seen for those receiving five meals a week. The authors explained that this could be because social connection outcomes may be affected by how often the delivery person spends time talking with the participant and/or by the number of days per week that the person receives a meal delivery.

## REDUCED FALLS AND INCREASED HOME SAFETY

Several studies found evidence of Meals on Wheels helping to reduce falls, particularly among older adults with a history of falling, while also enhancing home safety. This increased safety can be attributed to three key factors.

First, the safety checks provided at meal delivery play a role. Second, the meals themselves contribute to participant safety by promoting practices that reduce risk, such as minimizing the need for potentially hazardous cooking activities in the kitchen. Third, participants attributed feeling safer to receiving a dependable, healthy meal. Home-delivered meals may prevent falls by reducing nutritional risk, as older adults who are malnourished or at risk for malnourishment have a higher risk of experiencing a fall than were those who are well-nourished.<sup>118</sup>

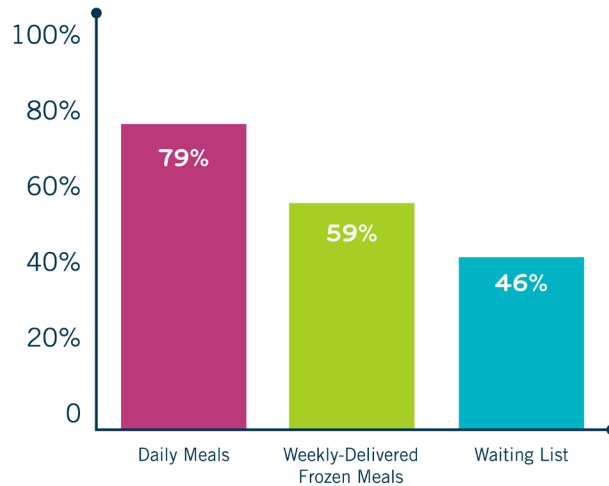
Senior falls cost health care **\$50 BILLION** a year.<sup>119</sup>

### Reduced Falls

During our *More Than a Meal*® pilot study, a striking finding emerged: Among participants who received daily delivered meals and had experienced a recent fall, an impressive 79% did not experience any subsequent falls.<sup>120</sup>

This percentage was significantly higher compared to those receiving weekly-delivered frozen meals (59%) or individuals on the waiting list (46%).

### MEALS ON WHEELS PILOT STUDY: REDUCING FALLS AMONG SENIORS



Among participants who received daily-delivered meals and had experienced a recent fall, **79% DID NOT EXPERIENCE ANY SUBSEQUENT FALLS**, an improvement over those receiving weekly-delivered, frozen meals or those on a waiting list.

Source: *More Than a Meal® Pilot Research Study: Results From a Pilot Randomized Control Trial of Home-Delivered Meal Programs*. Meals on Wheels America.

For older adults who were categorized as high-risk due to previous falls, a significant reduction in falls was observed among those receiving daily delivered meals. However, no such reduction was evident for the once-weekly frozen meals group.<sup>121</sup> Exploratory estimates indicated that for every three seniors with a history of falls who are provided daily meals over 15 weeks, one additional fall on average could be prevented.



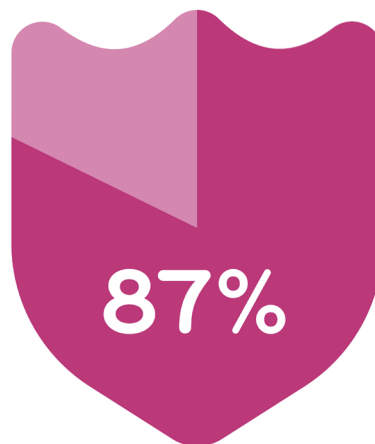
## Participant Perspectives: Meals on Wheels Role in Enhancing Safety and Security

In several studies, Meals on Wheels participants, drivers, staff and program leaders reported that the meals services helped participants remain safer at home.

### PARTICIPANTS SAY THE MEALS HELP THEM FEEL SAFER:

- Nationally, 87% of Older Americans Act (OAA) Nutrition Program home-delivered meal participants say knowing they will receive regular visits by the meals volunteer or driver has made them feel safer at home.<sup>122</sup> Eighty-five percent say they feel more secure because of the services they receive.
- When asked, “Does having home-delivered meals help you to feel safe in your home?” 80% of people receiving daily delivered meals said that they did, compared to 70% of people receiving frozen, weekly delivered meals in the *More Than a Meal*® pilot study.<sup>123</sup>
- Ninety-one percent of clients surveyed reported feeling safer in their homes because of the meal deliveries, in a Meals on Wheels Central Texas study.<sup>124</sup>

### SAFETY AND CONNECTION: MEALS ON WHEELS VISITS BRING PEACE OF MIND



**87% of OAA home-delivered meal participants say knowing they will receive regular visits from the meals volunteer or driver has **MADE THEM FEEL SAFER AT HOME.****

Source: Administration for Community Living, 2023. Nutrition and Aging Resource Center, OAA Nutrition Services Basics

In open-ended comments for the Meals on Wheels America *More Than a Meal*® Pilot Research Study, participants attributed the increased safety to check ins during meal delivery, receiving a dependable and healthy meal, and the ability to avoid potentially unsafe activities (e.g., ability to stay out of the kitchen).<sup>125</sup>

In that same study, when asked how the meals help them feel safe, among the group receiving daily delivered meals, almost half (49%) mentioned aspects of the delivery that helped them feel safer, compared with 24% of respondents receiving frozen meals.<sup>126</sup> Examples include “Someone will see me daily” and “Because someone is

coming over.” Respondents also indicated that receiving a dependable and healthy meal, being able to stay out of the kitchen and avoiding the need to leave their home all contributed to their increased sense of safety.<sup>127</sup>

Participants indicated that receiving home-delivered meals helped them reduce physical risks from cooking due to mobility issues in interviews conducted for a Meals on Wheels Central Texas study.<sup>128</sup>

Meal deliverers and program staff both noted that the program helped clients feel safe, in a study with six Meals on Wheels programs.<sup>129</sup> Drivers noted that their relationships with participants helped them identify safety issues and concerns about changes in participants’ health or well-being.

**“You get to know the people on your route ... as you get to know the people, you can tell just from talking to them for a few minutes whether they’re doing well or not doing well.”**

– Driver in Wisconsin (Thomas et al., 2020)

A few home-delivered meal participants (less than 5%) mentioned safety benefits when asked, “How has the home-delivered meals service helped you?” in a study with the Area Agency on Aging in suburban Cook County, Illinois.<sup>130</sup> These comments add context to the studies that examined this outcome directly and had more substantive findings. Although only one older adult who lived with others mentioned safety as a benefit of the program, six respondents who lived alone said home-delivered meals were helpful for keeping them safe in the kitchen.

**“I fall easily. I shouldn’t be at the stove.”**

– Home-delivered meal participant (Lee & Raiz, 2015)

## ADDITIONAL IMPACTS IDENTIFIED

A few additional benefits of Meals on Wheels were identified in at least one study but were less frequently reported. These may be areas for further research.

### Improved Physical Health or Physical Functioning

Although participants frequently said that the meals helped improve their health, few studies have confirmed substantial effects on this outcome with other data sources.

Participants who were “malnourished” and taking part in the “New Meals on Wheels” model (21 meals and 14 snacks a week) were significantly less likely to decline in instrumental activities of daily living (IADLs) over six months, compared to those receiving traditional Meals on Wheels (5 meals a week), according to a study based in Mecklenberg County, North Carolina.<sup>131</sup> Eight of 22 (36%) of participants receiving the additional meals exhibited a decline in IADLs versus 16 of 24 (67%) participants receiving traditional meals services. Those participants who were classified as “malnourished” took longer to improve in nutritional measures in both groups.

The relationship between receipt of meals and improvement in self-rated health was modest in the *More Than a Meal*® study.<sup>132</sup> When comparing self-rated health before and after meals, 29% of participants receiving daily delivered meals group improved in self-rated health during the study period, compared to 24% of individuals in the weekly frozen meals group and 23% in the control group.

No measures of physical well-being (balance test, sedentary time, hours spent walking per week) changed significantly among participants in a UK study, perhaps due to the short time period and small sample size of the 19-participant three-week study.<sup>133</sup>

However, home-delivered meals participants and local programs have tended to report that the meals help participants improve their health.

Nationally, three out of four home-delivered meal participants report that “eating meals or food from the meals program” helps them improve their health (see Table below).<sup>134</sup> Nine out of 10 clients said they feel better “as a result of receiving home delivered meals.”

PARTICIPANTS SAY THE MEALS HELP THEM...	HOME-DELIVERED MEAL CLIENTS
Improve their health	77%
Feel better	90%

Source: Administration for Community Living, 2023.

In a 2011 survey by the Florida Department of Elder Affairs of Meals on Wheels clients in the state of Florida, nearly all clients reported positive effects on their health:<sup>135</sup>

- 97% of participants said the meals helped them achieve or maintain a healthy weight.
- 96% said the meals helped them improve their health.
- 96% reported they feel better because of the meals they receive.

## Improved Mental Health and Well-Being

One study found a positive impact from Meals on Wheels on emotional well-being. Emotional well-being and quality of life improved significantly (from an average of 13.1 before the program to 16.9 on a 0-25 scale where 25 is good quality of life) after two months of receiving meals in the study with a Meals on Wheels program in Central Florida.<sup>136</sup>

In a study involving five older adult nutrition programs, researchers found a positive impact on depression among participants who received both breakfast and lunch through home delivery.<sup>137</sup> Comparatively, the group that received lunch only had a higher number of depressive symptoms. The data also indicated that participants in the breakfast group tended to experience greater enjoyment in the mornings and reported lower frequencies of feeling bored, worthless and hopeless.

However, several studies assessed changes in mental health due to Meals on Wheels and detected little or no effect:

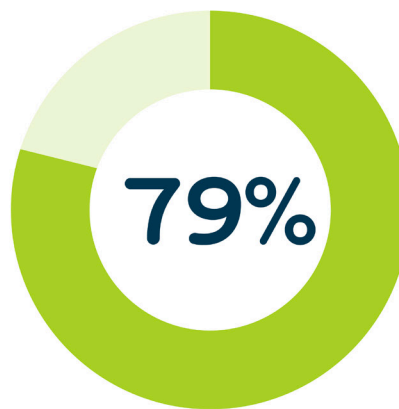
- The *More Than a Meal*<sup>®</sup> pilot study did not detect any effects of Meals on Wheels on participants’ mental health.<sup>138</sup> When comparing changes in rates of depression over the 15-week study period among persons

receiving daily delivered meals, weekly delivered frozen meals and no meals, results were similar across the three groups. Similarly, differences in improvement in anxiety were small.

- The likelihood of screening positively for depression did not significantly differ between home-delivered meal participants and non-participants, with similar depression screener scores for both groups, in an evaluation of the Older Americans Act (OAA) Title III-C nutrition program.<sup>139</sup>
- Participants in a UK study reported a decrease in depressive symptoms, from 2.2 before meals to 1.8 after meals.<sup>140</sup> However, there were no significant changes observed in levels of contentment, stress, loneliness, life satisfaction, and social capital and belonging.

Perceptions of clients and staff suggest that Meals on Wheels has benefits for the well-being and quality of life for many participants. About 79% of Meals on Wheels clients said the program was extremely important “for their daily well-being,” in the HealthTrust study.<sup>141</sup>

### CLIENT TESTIMONIALS: THE IMPACT OF MEALS ON WHEELS



**In the HealthTrust study, 79% of Meals on Wheels clients said the program was EXTREMELY IMPORTANT FOR THEIR DAILY WELL-BEING.**

*Source: Nutrition & Social Connection for Older Adults.” Health Trust Evaluation Brief*

Quality of life and stress reduction were among the positive benefits that participants reported in the NORC study with older adults during COVID-19.<sup>142</sup> Several respondents expressed that Meals on Wheels provided peace of mind because it is “dependable” and ensures that they do not “have to worry about having food.”

A few older adults (6% of older adults living alone, 5% of older adults living with others) mentioned benefits of home-delivered meals for their emotional well-being in the AgeOptions study.<sup>143</sup> These included comments about being happy and feeling less worried about what they had to eat.



**“I don’t have to worry about fixing something for myself. I can’t anyway because I am getting dementia.”**

– Older adult receiving home-delivered meals (Lee & Raiz, 2015)

## Benefits for Volunteers and Staff

Drivers frequently mentioned that they obtained benefits from delivering meals, such as feeling fulfilled and opportunities to give something back to their communities, in a study with six Meals on Wheels programs.<sup>144</sup> Social connection programs provided by Meals on Wheels had positive impacts on social isolation and loneliness for all study participants, including Meals on Wheels clients, volunteers and staff, in another study with six Meals on Wheels programs.<sup>145</sup>

## Financial Benefits for Participants

In the NORC study of older adults, one-third of client respondents commented on the affordability of meals and pet assistance, indicating that Meals on Wheels provides “affordably priced” meals and that they “wouldn’t be able to afford [their pets] without Meals on Wheels.”<sup>146</sup>

A small number of participants commented that the home-delivered meals program financially benefited them, in a survey conducted by an Area Agency on Aging in suburban Cook County Illinois.<sup>147</sup> The percentage of comments related to finances was three times higher among older adults living alone than those who live with others (12% of older adults living alone vs. 4% of older adults living with others).



## RECOMMENDATIONS

The authors of the reviewed studies provide valuable insights and recommendations for optimizing the positive impact of Meals on Wheels. These recommendations from the studies highlight the importance of expanding the program's reach to a larger number of seniors and enhancing the services offered, as well as direction for future research.



### RECOMMENDATIONS FOR EXPANDING MEALS ON WHEELS SERVICES

Studies suggested increasing the scale of Meals on Wheels through health care collaborations and government investment to serve more older adults who can benefit from them.

**Form partnerships between health care organizations and social programs like Meals on Wheels,** based on research findings from such partnerships showing that the meals services helped decrease the use of costly health care services.

**“...we believe health systems overall should invest in such transitions of care”**

*(Galiatsatos et al., 2022)*

**“This work also supports the overall approach of increasing the integration between the health care and social service sectors”**

*(Berkowitz et al., 2018)*

**Boost federal and state investments in meal services** by allocating funds towards outreach, expanding the scope of beneficiaries, and improving service quality. These recommendations are underpinned by the proven cost-saving effects of home-delivered meals on federal and state health care expenditures, as well as the potential benefits to program participants. Moreover, these investments would support the implementation of the service enhancement recommendations outlined below.

**“It is important for policy makers and state officials to recognize both the importance of investing in this relatively affordable program and its potential to save federal and state dollars that would otherwise be spent on institutional care.”**

*(Thomas & Mor, 2013a)*

**“Dieticians... have expressed concern with a multiple meal model [more than one meal a day for older adults who need them] in the presence of a waiting list for service. ...We feel it is time to work toward higher levels of reimbursement for those clients who have been identified as being at-risk or malnourished, so that these clients are better served without sacrificing numbers served.”**

*(Kretser et al., 2003)*

**Assess older adults’ service needs and find ways to engage them in services** to meet those needs, based on findings that Meals on Wheels positively impacted older adults’ social connectedness, nutrition and risk of needing hospital or nursing home care.

**“The results suggest that identifying at-risk [of nursing home placement] persons and moving them into the service system would have positive effects on the quality of life for most of these older persons.”**

*(Brock et al., 2011)*

**“The home-delivered meals program should receive increased funding to target outreach to isolated older adults and to provide quality meals and services to meet their personalized needs.”**

*(Lee & Raiz, 2015)*



## RECOMMENDATIONS FOR ENHANCING MEALS ON WHEELS SERVICES

Studies also identified ideas for enhancing meal services to deliver even greater impact for people served.

**Ensure opportunities for social contact and volunteer presence**, based on research demonstrating benefits of that social contact to reducing social isolation and loneliness and to clients' overall well-being.

**“The impact of the volunteer presence on the lives of the clients was found to be significant.”**

*(Bonagurio et al., 2022)*

**“...these findings provide additional support for the value of regular interactions between drivers and clients during meal delivery service.”**

*(Thomas et al., 2020)*

**Ensure that meals meet participants' preferences and needs**, based on research suggesting that impacts for some clients may have been reduced because they received too few meals a week to meet their needs or did not eat all the meals because they didn't meet their preferences.

**“It is also important to support service providers in conducting a client satisfaction survey to regularly examine participant demographic data to identify service gaps and to listen to participants' valuable ideas and opinions on the program.”**

*(Lee & Raiz, 2015)*

**Focus services on participants who need them most**, based on the limited resources of home-delivered meal programs and research documenting the varied needs of people who apply for home-delivered meals.

**Provide medically tailored meals for participants who need them**, based on research finding benefits of medically tailored meals on participants' lives and for reducing health care expenditures.

**“Home delivered meals, and particularly medically-tailored meals, show promise for helping to improve the use of health services in Medicare-Medicaid dually eligible adults, a medically and socially complex population where effective interventions can be hard to come by.”**

*(Berkowitz et al., 2018)*

**Provide additional meals/food assistance for participants who need them**, based on research finding that some participants could benefit from enhanced services, such as two or three meals a day rather than the usual one meal or free grocery delivery in addition to meals.

## RECOMMENDATIONS FOR FUTURE RESEARCH

The reviewed studies suggested several recommended directions for future research to demonstrate and increase the effectiveness of Meals on Wheels, including:

- Conduct stronger impact studies with local programs, to confirm results from smaller studies and improve precision of estimates with subgroups
- Use existing datasets to measure impact
- Examine specific service types (e.g., social connection opportunities, daily hot vs. weekly frozen meals) and specific outcomes (e.g., quality of life impacts, effects on frequency of falls, long-term effects on health care utilization and health care costs)
- Conduct research to enhance the understanding of factors leading to better or worse outcomes for Meals on Wheels participants. For example, studies recommended more research on older adults' experiences, preferences and needs, to inform service planning. Studies also recommended research for understanding the meal program components affecting outcomes for participants.



## LIMITATIONS OF THIS REVIEW

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A few limitations to this review are important to note:

- Although an extensive study search and selection process was conducted allowing many studies to be identified that examined Meals on Wheels impacts, additional studies may exist that were missed. This review will be reviewed and updated periodically.
- This review keenly focused on studies that provided information on the impacts of Meals on Wheels on participants' health and well-being outcomes. It did not delve into additional areas of research that are useful for Meals on Wheels programs, such as process studies to understand program components and strategies or research on the causes of food insecurity and social isolation among older adults. We also did not examine studies of the impacts of meals provided at congregate dining sites.
- Each of the reviewed studies had its limitations. However, when several studies find the same outcome using different methods, this increases confidence in the overall finding.
- Only published studies were included. It is possible that additional unpublished research was conducted that may have obtained different results. In particular, there is a potential bias against publishing null findings (not finding any effects).
- Reviewer error in documenting the information from the studies is a possibility. We attempted to minimize this potential bias by having two researchers review much of the study information.



## CONCLUSIONS

The comprehensive review of 38 studies presented here establishes Meals on Wheels as an evidence-supported, cost-effective solution. The extensive body of research consistently demonstrates the efficacy of Meals on Wheels in reducing health care utilization, preventing nursing home admissions and generating substantial cost savings. These remarkable outcomes are attributed to the profound impact of Meals on Wheels on critical aspects of older adults' well-being, including food security, diet quality, nutritional status, social isolation, loneliness and falls/home safety—factors that significantly contribute to health care costs. By fostering social connections, providing safety checks and delivering nutritious meals, Meals on Wheels supports older adults to maintain their health, independence and ability to live in their homes and communities.

The meaningful insights derived from these study findings will assist the Meals on Wheels network to effectively communicate their value to funders, donors, policymakers, partnering organizations and volunteers. Moreover, the recommendations outlined in this report offer guidance for program planning, encouraging the expansion and enhancement of services, as well as inspiring future studies. Our commitment is to continually update and expand upon these findings, conducting further research to explore the transformative impact of Meals on Wheels services on the lives of the older adults we serve.



## APPENDIX A: SUMMARY OF INCLUDED STUDIES

AUTHOR & PUBLICATION YEAR	STUDY PUBLICATION	TYPES OF MEALS SERVICES	METHODS	IMPACTS EXAMINED
ACL, 2023	Older Americans Act (OAA) Title III home-delivered meal services clients	Home-delivered meals: Older Americans Act (OAA) Title III home-delivered meal services	Survey of participants	<ul style="list-style-type: none"> <li>• Health (physical and/or mental health), well-being and/or quality of life</li> <li>• Reduced nursing home use/ increased ability to remain at home/live independently</li> <li>• Diet quality/healthy eating</li> <li>• Falls/ home safety</li> </ul>
An, 2015	145 home-delivered meal participants who completed the National Health and Nutrition Examination Survey (NHANES)	Home-delivered meals	Statistical modeling analysis of existing data (National Health and Nutrition Examination Survey 2003–2012 waves)	<ul style="list-style-type: none"> <li>• Diet quality/healthy eating</li> </ul>
Berkowitz et al., 2018	Adults dually eligible for Medicare and Medicaid at nutritional risk	Medically tailored meals & home-delivered meals (not medically tailored)	Matched comparison group study of Members of Commonwealth Care Alliance (CCA), a health plan	<ul style="list-style-type: none"> <li>• Health care costs</li> <li>• Health care utilization</li> </ul>
Berkowitz et al., 2019	Individuals captured in the Massachusetts All-Payer Claims Database (MA-APCD)	Home-delivered meals	Statistical modeling analysis using data for meals participants and a matched cohort from the Massachusetts All-Payer Claims database	<ul style="list-style-type: none"> <li>• Health care costs</li> <li>• Health care utilization</li> <li>• Reduced nursing home use/ increased ability to remain at home/live independently</li> </ul>
Bonagurio et al., 2022	Meals on Wheels Central Texas clients who received home-delivered meal services	Home-delivered meals	Interviews and survey of meals participants	<ul style="list-style-type: none"> <li>• Reduced nursing home use/ increased ability to remain at home/ live independently</li> <li>• Falls/ home safety</li> <li>• Social isolation/social connection/loneliness</li> </ul>



AUTHOR & PUBLICATION YEAR	STUDY PUBLICATION	TYPES OF MEALS SERVICES	METHODS	IMPACTS EXAMINED
Brock et al., 2011	OAA service participants	OAA meal services	Statistical modeling analysis of existing state-level administrative service client data from four states and data from the Health and Retirement Study (HRS)	<ul style="list-style-type: none"> <li>• Reduced nursing home use/ increased ability to remain at home/live independently</li> </ul>
Brown University, 2023	116 Meals on Wheels program staff, volunteers and clients across six programs	Meals on Wheels services	Interviews with Meals on Wheels program staff, volunteers and participants	<ul style="list-style-type: none"> <li>• Social isolation/social connection/loneliness</li> <li>• Other impacts and findings</li> </ul>
Buys et al., 2017	21 participants in the University of Alabama at Birmingham Hospital's Acute Care for elders (ACE) unit, who were at risk for malnutrition and diagnosed with one of four medical conditions	Home-delivered meals	Two-arm randomized control trial	<ul style="list-style-type: none"> <li>• Health care utilization</li> <li>• Diet quality/healthy eating</li> </ul>
Cho et al., 2015	121 participants who were recently discharged from a hospital or emergency department	Home-delivered meals & medication management services in care transitions	Pre-post longitudinal study (intake, 3 month and 6 months) of meals participants (no comparison group)	<ul style="list-style-type: none"> <li>• Health care utilization</li> <li>• Other impacts and findings</li> </ul>
Cho et al., 2018	120 clients recently discharged from an inpatient hospital stay or from an emergency department (ED) visit	Meals services in care transitions	Statistical model using Meals on Wheels service data for 120 clients and data from a regional all claims database	<ul style="list-style-type: none"> <li>• Health care utilization</li> </ul>

AUTHOR & PUBLICATION YEAR	STUDY PUBLICATION	TYPES OF MEALS SERVICES	METHODS	IMPACTS EXAMINED
Frongillo & Wolfe, 2010	69 persons newly referred for HDM or other community-based long-term care services	Home-delivered meals & other services	Longitudinal study, using data at 6 months and 12 months of receiving home-delivered meals. Also compared changes for participants to those of persons receiving non-home-delivered meals services	<ul style="list-style-type: none"> <li>• Food security/access to healthy food</li> <li>• Diet quality/healthy eating</li> </ul>
Galiatsatos et al., 2022	84 participants who were 60 years or older and had a hospitalization in the past 12 months OR had 2 prior emergency department visits in the past 12 months. Participants had high Charlson Co-Morbidity and were living in a neighborhood with a high area deprivation index	Meals and other services in care transitions	Pre-/post study of a pilot program with follow-up for one year, with data collected from the Meals on Wheels program and from medical records	<ul style="list-style-type: none"> <li>• Health care costs</li> <li>• Health care utilization</li> </ul>
Gollub & Weddle, 2004	381 participants ranged in age from 60 to 100 years, were racially/ethnically diverse, had functional limitations, and were at high nutritional risk	Home-delivered meals	Compared two groups of older adults: a breakfast group (n=167) who received a home-delivered breakfast and lunch, 5 days a week, and a comparison group (n=214) who received home-delivered lunch 5 days a week. Data were collected from clients and from agency records	<ul style="list-style-type: none"> <li>• Health (physical and/or mental health), well-being and/or quality of life</li> <li>• Food security/access to healthy food</li> <li>• Diet quality/healthy eating</li> </ul>

AUTHOR & PUBLICATION YEAR	STUDY PUBLICATION	TYPES OF MEALS SERVICES	METHODS	IMPACTS EXAMINED
HealthTrust, 2009	Older adults who are MOW clients in Silicon Valley/ Santa Clara County	Home-delivered meals	Client survey and interviews	<ul style="list-style-type: none"> <li>• Health (physical and/or mental health), well-being and/or quality of life</li> <li>• Reduced nursing home use/ increased ability to remain at home/ live independently</li> <li>• Food security/ access to healthy food</li> <li>• Diet quality/ healthy eating</li> <li>• Social isolation/socialconnection/ loneliness</li> </ul>
Keller, 2006	367 vulnerable (requiring informal or formal supports for activities of daily living to remain in the community) seniors. Seniors were recruited from agencies providing services to the elderly such as Meals on Wheels	Home-delivered and congregate meals	Cohort study (18-month follow-up) with multiple linear regression model	<ul style="list-style-type: none"> <li>• Nutrition status/malnutrition</li> </ul>
Kretser et al., 2003	202 persons with nutritional risk between 60 and 90 years old, who were recruited from waitlists, referrals by hospital discharge planners, and response to local advertisements about the study	Home-delivered meals	Randomized control trial that compared physical health outcomes and nutrition status between two groups of clients (with an older or newer Meals on Wheels model), at enrollment and after 3 and 6 months	<ul style="list-style-type: none"> <li>• Physical health/functioning</li> <li>• Nutrition status malnutrition</li> </ul>

AUTHOR & PUBLICATION YEAR	STUDY PUBLICATION	TYPES OF MEALS SERVICES	METHODS	IMPACTS EXAMINED
Lee et al., 2011	717 persons receiving OAA home-delivered meals or congregate meals and those on a waitlist	Home-delivered and congregate meals	Longitudinal study with data collected at 4 months, compared with people on waitlists; data were collected via mailed surveys of participants	<ul style="list-style-type: none"> <li>• Food security/ access to healthy food</li> </ul>
Lee, K., & Raiz, L. (2015)	199 older adults living alone and those living with others	Home-delivered meals	Client survey	<ul style="list-style-type: none"> <li>• Health (physical and/or mental health), well-being, and/or quality of life</li> <li>• Reduced nursing home use/ increased ability to remain at home/ live independently</li> <li>• Food security/access to healthy food</li> <li>• Diet quality/healthy eating</li> <li>• Falls/ home safety</li> <li>• Social isolation/ social connection/ loneliness</li> <li>• Other impacts and findings</li> </ul>
Luscombe-Marsh et al., 2014	250 South Australian domiciliary care recipients	Home-delivered meals	Retrospective analysis of data collected for a prior study	<ul style="list-style-type: none"> <li>• Health care utilization</li> <li>• Nutrition status/ malnutrition</li> </ul>
Mabli et al., 2018	OAA Title III home-delivered meals and congregate meals participants	Home-delivered meals and congregate meals	Analysis of Medicare claims data and surveys of congregate and home-delivered meal participants and a matched comparison group of eligible nonparticipants	<ul style="list-style-type: none"> <li>• Health care costs</li> <li>• Health care utilization</li> <li>• Reduced nursing home use/ increased ability to remain at home/live independently</li> </ul>

AUTHOR & PUBLICATION YEAR	STUDY PUBLICATION	TYPES OF MEALS SERVICES	METHODS	IMPACTS EXAMINED
Mabli et al., 2017	OAA Title III home-delivered meals and congregate meals participants	Home-delivered meals and congregate meals	Matched comparison group study of participants and a matched comparison group of eligible non-participants	<ul style="list-style-type: none"> <li>• Health (physical and/or mental health), well-being and/or quality of life</li> <li>• Food security/ access to healthy food</li> <li>• Diet quality/healthy eating</li> <li>• Social isolation, social connection, loneliness</li> </ul>
Marceaux, 2012	40 meals participants, over the age of 65 who are free of cognitive impairments	Home-delivered meals	Quasi-experimental (one-group pretest-posttest) design, with participants' dietary intake and nutritional risk followed for 3 months	<ul style="list-style-type: none"> <li>• Diet quality/healthy eating</li> <li>• Nutrition status/malnutrition</li> </ul>
Martin et al., 2018	High-risk Medicare patients already enrolled in a Community-based Care Transition Program	Home-delivered meal services in care transitions	Compared the impact of a care transitions program with and without an add-on meals program	<ul style="list-style-type: none"> <li>• Health care costs</li> <li>• Health care utilization</li> </ul>
NORC at the University of Chicago, 2021	1,535 survey respondents, 24 interviewees. Older adults (60+)	Meals on Wheels generally (home-delivered and/or congregate)	Nationally representative survey of U.S. adults age 60 and older. Interviews with adults age 60 and older who were clients of Meals on Wheels and who were not clients	<ul style="list-style-type: none"> <li>• Reduced nursing home use/ increased ability to remain at home/ live independently</li> <li>• Food security/ access to healthy food</li> <li>• Diet quality/healthy eating</li> <li>• Social isolation, social connection, loneliness</li> <li>• Other impacts and findings</li> </ul>
O'Leary et al., 2020	A UK population of adults age 65 and older (19 older adult participants)	Home-delivered meals	Data were collected in participants' homes before and after the intervention	<ul style="list-style-type: none"> <li>• Health (physical and/or mental health), well-being and/or quality of life</li> <li>• Nutritional status/malnutrition</li> </ul>

AUTHOR & PUBLICATION YEAR	STUDY PUBLICATION	TYPES OF MEALS SERVICES	METHODS	IMPACTS EXAMINED
Ponza et al., 1996	OAA Title III meals participants	Older Americans Act Title III home-delivered meals and congregate meals	Quasi-experimental (one-group pretest-posttest) design, with participants' dietary intake and nutritional risk followed for 3 months	<ul style="list-style-type: none"> <li>• Diet quality/healthy eating</li> <li>• Nutrition status/malnutrition</li> </ul>
Roy & Payette, 2006	Participants were applicants to Meals on Wheels services who either received Meals on Wheels on a weekly basis or who did not sign in or withdrew before any meal delivery and therefore did not receive Meals on Wheels	Home-delivered meals	Quasi-experimental design	<ul style="list-style-type: none"> <li>• Diet quality/healthy eating</li> </ul>
State of Florida Department of Elder Affairs, Bureau of Planning & Evaluation, 2012	271 persons receiving home-delivered meals in six Florida Department of Elder Affairs programs that provide home-delivered meals	Home-delivered meals	Telephone survey of a random sample of home-delivered meal participants	<ul style="list-style-type: none"> <li>• Health (physical and/or mental health), well-being and/or quality of life</li> <li>• Reduced nursing home use/ increased ability to remain at home/live independently</li> <li>• Diet quality/ healthy eating</li> </ul>

AUTHOR & PUBLICATION YEAR	STUDY PUBLICATION	TYPES OF MEALS SERVICES	METHODS	IMPACTS EXAMINED
Thomas & Dosa, 2015	626 participants, age 60 years of age and older, selected from waiting lists at eight sites across the United States with an average waitlist times of six months or more. The comparison group were 7,197 survey respondents (excluding those in residential care facilities), 65-years or older, from the National Health and Aging Trends Study (NHATS)	Home-delivered meals	Randomized controlled trial with 3 groups: a) daily-delivered meal delivery, b) frozen, once-weekly meal delivery, and c) a control group who were people on a waiting list for meals. The study also used comparison data from the National Health and Aging Trends Study (NHATS)	<ul style="list-style-type: none"> <li>• Health care utilization</li> <li>• Health (physical and/or mental health), well-being and/or quality of life</li> <li>• Reduced nursing home use/ increased ability to remain at home/ live independently</li> <li>• Diet quality/healthy eating</li> <li>• Falls/home safety</li> <li>• Social isolation/social connection/loneliness</li> </ul>
Thomas & Mor, 2013a	OAA Title III C2 home-delivered meals program and data on nursing home residents in U.S. age 65 and older	OAA Title III home-delivered meals and congregate meals	Statistical analyses of existing datasets: state program data matched to data from LTFocUS.org and Medicare data	<ul style="list-style-type: none"> <li>• Health care costs</li> <li>• Reduced nursing home use/ increased ability to remain at home/live independently</li> </ul>
Thomas & Mor, 2013b	National data on adults age 65+	OAA Title III home-delivered meals and congregate meals	Statistical analysis of existing national data from the OAA nutrition program and data from <i>LTCFocUS.org</i>	<ul style="list-style-type: none"> <li>• Reduced nursing home use/ increased ability to remain at home/live independently</li> </ul>
Thomas et al., 2016	626 seniors on waiting lists at eight Meals on Wheels programs across the United States	Home-delivered meals	Using data from the <i>More Than a Meal</i> <sup>®</sup> randomized trial at eight sites, compared outcomes for 3 groups: (i) daily meal delivery; (ii) once-weekly meal delivery; or (iii) on the waiting list	<ul style="list-style-type: none"> <li>• Social isolation/social connection/loneliness</li> </ul>

AUTHOR & PUBLICATION YEAR	STUDY PUBLICATION	TYPES OF MEALS SERVICES	METHODS	IMPACTS EXAMINED
Thomas et al., 2020	A total of 84 Meals on Wheels staff, 56% (47) of whom were drivers	Home-delivered meals	Site visits and interviews with Meals on Wheels staff and drivers at 6 programs	<ul style="list-style-type: none"> <li>• Reduced nursing home use/ increased ability to remain at home/live independently</li> <li>• Falls/home safety</li> <li>• Social isolation/social connection/loneliness</li> <li>• Other impacts and findings</li> </ul>
Thomas et al., 2018	371 older adults on seven Meals on Wheels programs' waiting lists from the <i>More Than a Meal</i> ® randomized study	Home-delivered meals	Using data from the <i>More Than a Meal</i> ® Pilot Research Study conducted for Meals on Wheels America, this study examined the impact of home-delivered meals on risk of self-reported falls	<ul style="list-style-type: none"> <li>• Falls/home safety</li> </ul>
Ullevig et al., 2018	49 home-delivered meal participants, age 60 and over, and free of cognitive impairment and terminal illness	Home-delivered meals	Pre-post-test design, with data collected before and after 3 months of home-delivered meals services	<ul style="list-style-type: none"> <li>• Diet quality/healthy eating</li> <li>• Nutrition status/malnutrition</li> </ul>
Weaver et al., 2022	Medicare enrollees aged 65 and over, from NHATS data	Meals on Wheels generally	Statistical modeling analysis using data from the 2014-2020 National Health and Aging Trends Study (NHATS)	<ul style="list-style-type: none"> <li>• Health care utilization</li> </ul>
Wright et al., 2015	51 home-delivered meal participants, age 55+	Home-delivered meals	Pre-post-test design, with data collected before and after 3 months of home-delivered meals services	<ul style="list-style-type: none"> <li>• Health (physical and/or mental health), well-being and/or quality of life</li> <li>• Food security/access to healthy food</li> <li>• Diet quality/healthy eating</li> <li>• Nutrition status/malnutrition</li> <li>• Social isolation/social connection/loneliness</li> </ul>



AUTHOR & PUBLICATION YEAR	STUDY PUBLICATION	TYPES OF MEALS SERVICES	METHODS	IMPACTS EXAMINED
Xu et al., 2010	1,354 people from the Indiana Medicaid enrollment and claims and Insite databases were used in the study. 537 were <74 years and 817 were 75 years and older	Home-delivered meals	Statistical modeling study using Medicaid data	<ul style="list-style-type: none"><li>• Health care utilization</li></ul>



## APPENDIX B: MEALS ON WHEELS AMERICA ENGAGEMENT ONGOING RESEARCH

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Meals on Wheels America is engaged in the following ongoing research projects.

### PCORI STUDY

**Project Title:** Evaluating the Effectiveness of Mode of Meal Delivery on the Ability of Homebound Older Adults to Remain in the Community, also known as DeliverEE: Evaluating Effects of Meal Delivery<sup>148</sup>

**Project Funder:** Patient-Centered Outcomes Research Institute (PCORI). Funding for the meals is being provided by AARP and AARP Foundation.

**Principal Investigator:** Kali Thomas, Brown University, School of Public Health

**Project Purpose:** Brown University and Meals on Wheels America are collaborating on this three-year research initiative to investigate the most effective mode of meal delivery to support older adults' ability to age in place in their homes. The study will compare the impact of daily Meals on Wheels home-delivered meal service – complete with socialization and a wellness check – with bi-weekly frozen drop-ship meals. Researchers will examine differences in health care utilization, healthy days in community, feelings of loneliness and overall quality of life.

**Participation:** Anticipated 2,300 older adults from waitlists of eight or more Meals on Wheels programs.

**Anticipated Completion Date:** October 2024

### NIA STUDY

**Project Title:** Home-delivered Meals for Persons With Dementia: Which Model Delays Nursing Home Placement?<sup>149</sup>

**Project Funder:** National Institute on Aging (NIA)

**Principal Investigator:** Kali Thomas, Brown University, School of Public Health

**Project Purpose:** This study will test whether the type of meal delivery (frozen vs. daily-delivered meals) delays the time to nursing home placement for adults with Alzheimer's disease and related dementias (ADRD). Individuals with ADRD who are on the waiting lists at three Meals on Wheels programs will be randomly assigned to receive either 1) meals that are delivered multiple times per week by a Meals on Wheels volunteer or paid driver and include socialization and a wellness check or 2) frozen meals that are mailed to participants' homes every two weeks. The study will measure time to nursing home placement within six months.

**Participation:** Anticipated 2,300 individuals from six Meals on Wheels programs.

**Anticipated Completion Date:** August 2023

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<sup>22</sup> Ibid.

<sup>23</sup> The survey asked participants about 21 different medical conditions: arthritis or rheumatism; high blood pressure or hypertension; heart disease; high cholesterol; diabetes or high blood sugar; emphysema, allergies, asthma, or chronic bronchitis; cancer; stroke; anemia; osteoporosis; kidney disease; glaucoma, cataracts, macular degeneration, or other eye or vision conditions (excluding glasses); hearing problems; emotional, nervous or psychiatric problems; memory related disease such as Alzheimer’s disease or dementia; seizures or epilepsy; Parkinson’s disease; persistent pain, aching, stiffness or swelling around a joint; multiple sclerosis; serious problem with urinary incontinence; something else.

<sup>24</sup> National Council on Aging. Chronic Inequities: Measuring Disease Cost Burden Among Older Adults in the U.S. A Health and Retirement Study Analysis. April 2022. <https://ncoa.org/article/the-inequities-in-the-cost-of-chronic-disease-why-it-matters-for-older-adults>

<sup>25</sup> Have difficulty in 2 or more Activities of Daily Living (ADLs)” includes participants who reported difficulty in two or more of the following: 1) bed/chair transfer, 2) bathing, 3) dressing, 4) walking, 5) eating (feeding self), or 6) toileting.

<sup>26</sup> Have difficulty in 3 or more Instrumental Activities of Daily Living (IADLs)” includes participants who reported difficulty with three or more of the following: 1) going outside the home, 2) money management, 3) preparing meals, 4) light housework, 5) medication management, 6) using the telephone, or 7) driving a car/using public transportation.

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