Community Preventive Services Task Force

Nutrition, Physical Activity, and Obesity: Effectiveness of Home-delivered and Congregate Meal Services for Older Adults

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Finding and Rationale Statement
Ratified December 2021

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CPSTF Finding and Rationale Statement

Context

Older adults are at greater risk of malnutrition, which is defined as inadequate nutritional intake or absorption (Norman et al., 2021). Malnutrition among older adults results from physiological changes that occur with aging and may include changes in cognitive functioning, metabolism, body composition, chronic diseases and conditions, and use of multiple medications that may affect intake and absorption of nutrients (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2020). Additionally, social factors associated with aging may include reduced social connectedness, loneliness, and depression (Krondl et al., 2008).

Older adults living on fixed incomes may be forced to choose between paying for rent, utilities, or medication versus paying for groceries (Mabli et al., 2010). This may put older adults at risk for food insecurity (Goldberg et al., 2014).

The Older Americans Act Nutrition Programs address these needs by providing home-delivered meal and congregate meal services to reduce hunger, food insecurity and malnutrition; enhance socialization; and promote health and well-being among older Americans (U.S. Department of Health and Human Services, 2021). Both programs target older adults who have lower incomes, live in rural communities, speak limited English, or are at risk for institutional care.

Home-delivered meal services

Home-delivered meal services bring meals to older adults in their homes. These programs differ in how they operate, the specific services offered, eligibility requirements for participants, and the types of meals delivered to older adults.

Congregate meal services

Congregate meal services provide meals in congregate settings and in addition to offering a balanced meal, they provide opportunities for socializing.

Home-delivered and congregate meal services consider special dietary needs and are typically subsidized or offered at no cost.

Intervention Definition

Meal services provide nutritious meals to adults 60 years and older who are living independently (i.e., not residents of senior living or retirement community centers). Interventions prioritize older adults with greater social and economic needs and are delivered in one of two ways:

- Home-delivered meal services bring meals to older adults in their homes.
- Congregate meal services are provided in group settings, such as senior centers, allowing older adults the opportunity to socialize.

Prepared meals may be modified to meet cultural- or health-related needs, such as vegetarian, diabetic, low sodium, or modified texture. Meals typically follow nutritional guidelines and are provided five days per week.

CPSTF Finding (December 2021)

The Community Preventive Services Task Force (CPSTF) recommends home-delivered and congregate meal services for older adults living independently (i.e., not residents of senior living or retirement community centers) based on sufficient evidence of effectiveness showing reductions in malnutrition.

For home-delivered meal services, CPSTF also finds sufficient evidence of effectiveness for increasing energy intake and improving health-related quality of life and well-being.

For congregate meal services, additional research is needed to determine whether these services improve energy and protein intake and health-related quality of life and well-being.

Rationale

Basis of Finding

The CPSTF recommendation is based on evidence from a systematic review of 20 studies. Studies were identified from a published systematic review (Walton et al. 2020, 12 studies with 13 study arms, search period through January 2019) and an updated search (8 studies with 11 study arms, search period through May 21, 2021). Study arms assessed the effectiveness of home-delivered meal services (19 study arms), congregate meal services (4 study arms), or the provision of home-delivered meal services or congregate meal services (1 study arm).

To assess intervention effectiveness, a team of specialists in systematic review methods and subject matter experts synthesized outcomes for dietary intake (i.e., percent meeting recommended daily allowances for energy and protein, intake of energy and protein, intake of fruit and vegetables, fiber, and low nutrient foods, and intake of vitamins and minerals); food and nutrition security (percent malnourished, food insecurity); frailty (i.e., handgrip strength, fat free mass); anemia; and health-related quality of life (HRQoL) and well-being (e.g., satisfaction with life, depressive symptoms). Researchers used instruments with demonstrated validity and reliability for this population.

In this body of evidence, none of the studies aimed to reduce energy or protein intake. Among older adults it is not desirable to promote low energy and protein intake because of physiological changes that may decrease lean body mass and place older adults at higher risk for malnutrition (Morley 2007). The review team considered increases or maintenance of energy and protein intake as favorable if baseline levels were below or meeting recommended daily allowances. Additional dietary outcomes the review team considered favorable were increases in select measures of dietary behaviors (i.e., fruit and vegetable and fiber intake) and decreases in low nutrient food intake. The review team considered as favorable decreases in percent malnourished, reductions in food insecurity, improvements in frailty and anemia, increases in HRQoL and well-being, and decreases in depressive symptoms.

Evidence from the included studies showed both home-delivered and congregate meal services intervention approaches reduced malnourished status among older adults (Tables 1 and 2). Home-delivered meal services also increased the percentage of participants who met recommended daily allowances for energy intake, and improved energy intake, HRQoL, and well-being. Neither intervention approach demonstrated meaningful changes in all measured outcomes.

Table 1. Effectiveness of Home-delivered Meal Services

Outcome	Studies (arms)	Effect	Direction of effect
Dietary Intake			

Outcome	Studies (arms)	Effect	Direction of effect
Percent meeting Recommended Daily Allowances (RDA): Energy	6 studies	Median increase of 7.1 percentage points (pct pts) (IQI: -3.2 to 11.9 pct pts)	Favors the intervention
Percent meeting RDA: Protein	6 studies	Median increase of 5.9 pct pts (IQI: -5.5 to 22.3 pct pts)	Favors the intervention
Energy intake	12 studies (13 arms)	Median increase of 113.7 kilocalories/day (IQI: -26.5 to 163.0 kilocalories/day)	Favors the intervention
Protein intake	10 studies (11 arms)	Median increase of 4.0 grams/day (IQI: -1.4 to 10.3 grams/day)	Favors the intervention
Fruit and vegetable intake	3 studies	All favorable	Favors the intervention
Fiber intake	4 studies	3 studies favorable, 1 study no change	Favors the intervention
Low nutrient food intake	3 studies	2 studies favorable, 1 study unfavorable	Inconsistent Effects
Vitamin and mineral intake	10 studies (11 arms)	Vitamins D, E, B3, Calcium, Magnesium, Sodium	Favors the intervention
		Vitamins A, B1, B2, B6, B12, C, K, Folate, Iron, Magnesium, Potassium	Inconsistent Effects
Food and Nutrition Security			
Percent Malnourished	9 studies (10 arms)	Median decrease of 15.5 pct pts (IQI: -28.8 to -9.5 pct pts)	Favors the intervention
Food insecurity*	2 studies (2 arms)	Both studies showed statistically significant reductions in food insecurity	Favors the intervention
Frailty			
Handgrip strength, Short Physical Performance Battery, Fat Free Mass	4 studies (5 arms)	3 arms favorable, 2 arms no change	Inconsistent Effects
Health-related Quality of Life (HRQoL) and Well-being			
HRQoL (satisfaction with life, well-being)	4 studies (5 arms)	3 studies with 4 arms favorable, 1 study no change	Favors the intervention

Outcome	Studies (arms)	Effect	Direction of effect
Depressive symptoms	2 studies (2 arms)	Both studies showed statistically significant reductions in depressive symptoms	Favors the intervention

IQI: interquartile interval

Pct pts: percentage points

*There is limited or uncertain availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways (Blumberg et al. 1999).

Table 2. Effectiveness of Congregate Meal Services

Outcome	Studies (arms)	Effect	Direction of effect
Dietary Intake			
Energy intake	2 studies (3 arms)	Median decrease of 47.0 kilocalories/day (Range: -108.9, 36.0 kilocalories/day)	Inconsistent Effects
Protein intake	2 studies (3 arms)	Median decrease of 2.8 grams/day (Range: -4.9, 0.0 grams/day)	Inconsistent Effects
Vitamin and mineral intake (direction)	2 studies (3 arms)	Vitamins B3, Calcium	Favors the intervention
		Vitamins A, B1, B2, C, Iron	Inconsistent Effects
Food and Nutrition Security			
Percent Malnourished	2 studies (3 arms)	Median decrease of 9.0 pct pts (Range: -17.6, -4.1 pct pts)	Favors the intervention
Anemia			
Hemoglobin	2 studies (3 arms)	No difference between groups	Inconsistent Effects

Pct pts: percentage points

Applicability and Generalizability Issues

Based on evidence from the systematic review, this finding should be applicable to all older adults who receive home-delivered or congregate meal services. Results for the applicability and generalizability assessment were combined for both services unless there were differences in outcomes between the two types of services.

Included studies were conducted in the United States (11 studies), Australia (2 studies), Canada (2 studies), the United Kingdom (2 studies), Finland (1 study), the Netherlands (1 study), and South Korea (1 study). Ten studies reported on population density. Studies were conducted in urban and rural populations (5 studies), urban populations (4 studies), and rural populations (1 study). Across all studies, participants had a mean age of 78.0 years (IQI: 75.9 to 80.7 years). Studies reported higher proportions of females than males (median 68.0% female).

All eleven studies from the United States reported racial and ethnic distributions. Studies included participants who self-identified as White (median 63.4%; 13 studies), Black or African American (median 30.9%; 10 studies), Hispanic or Latino

(median 16.1%; 6 studies), Asian (median: 1.7%; 2 studies), American Indian or Alaska Native (0.7%; 3 studies), or other race/ethnicity (median 11.1%; 2 studies). None of the studies included participants who self-identified as Native Hawaiian or other Pacific Islander. The two studies that assessed congregate meal services reported that more than 90% of participants self-identified as White.

Eleven studies (14 arms) reported a measure of income. The median proportion of participants with low levels of socioeconomic status was 68.0% (IQI: 45.2% to 75.3%). The same eleven studies asked about living circumstances and reported the median proportion of participants living alone was 56.2% (IQI: 16.7% to 73.9%). Living alone status differed when home-delivered and congregate meal services were separated. Congregate meal services had a greater proportion living alone (58.0%, 2 studies [3 arms]) compared to home-delivered meal service participants (41.0%, 10 studies [13 arms]).

Twelve studies reported the number of meals participants received each week. Participants received five or more meals per week (8 studies) or less than five meals per week (4 studies).

Data Quality Issues

Study designs included randomized controlled trials, (1 study, 2 study arms: home-delivered meal service), other design with concurrent comparison (5 studies, 6 study arms: 5 arms home-delivered meal service, 1 arm congregate meal service), retrospective self-controlled (3 studies, 3 study arms: home-delivered meal service), retrospective cohort (5 studies, 6 study arms: 3 arms home-delivered meal service, 3 arms congregate meal service), and single group pre-post (6 studies, 7 study arms: home-delivered meal service).

The most common study limitations, according to Community Guide quality scoring methods were confounding (intervention group less healthy than the control group), and other (content of meals not provided).

Other Benefits and Harms

CPSTF considered potential benefits and harms from exposure to either intervention approach. CPSTF noted potential benefits for both intervention approaches could include reductions in cooking-related injuries due to less meal preparation; reductions in food expenditures (which would make it easier to purchase other necessities, such as medications); and reductions in number of trips to the grocery store (which could reduce risk of injury from falls, exposure to communicable diseases, and crime).

None of the included studies reported any potential harms for either intervention approach. CPSTF noted potential harms for both intervention approaches could reduce the number of trips to the grocery store, which may have benefits but could reduce opportunities for social connectedness. In addition, there could be increased risk of foodborne illnesses due to improper food handling or temperature control. Congregate meal service participants may also be at increased risk for exposure to communicable diseases.

Considerations for Implementation

The following considerations for implementation are drawn from studies included in the evidence review, the broader literature, and expert opinion, as noted below.

CPSTF does not endorse any specific meal service intervention.

- Programs are encouraged to follow nutrition standards such as the Dietary Guidelines for Americans (U.S. Department of Health and Human Services and U.S. Department of Agriculture 2020), even when not required,

to ensure continued health benefits for participants. Additionally, policy makers designing or allocating funding to state or local policies may consider ensuring nutrition standards are met in menu policy requirements.
- Programs may provide nutrition education or supplementary foods that include nutrients of concern for older adults, based on the Dietary Guidelines for Americans (U.S. Department of Health and Human Services and U.S. Department of Agriculture 2020).
- Programs may incorporate nutrition education on healthy food and beverage intake for the unique needs of older adults including proper caloric intake based on participants' current weight and activity level.
- It is important to develop policies on food safety and sanitation to minimize risk for foodborne illnesses. This may also include food safety education for those involved in food preparation and delivery.

Home-delivered meal services

- When considering the frequency of meal delivery, programs may want to balance interest in addressing participants' loneliness and exposure to communicable diseases. Meaningful connections between persons who deliver meals and participants may be feasible via non-contact methods (e.g., phone) to supplement less frequent in-person meal delivery.
- Programs may consider serving meals that allow for delayed consumption, for example ready-to heat or frozen meals rather than hot meals.
- Programs may consider incorporating an educational component and packaging that supports proper storage of leftovers.

Congregate meal services

- In addition to serving meals, programs may consider opportunities for socialization. An evaluation of congregate meal services funded by the Administration for Community Living reported participants had greater satisfaction with their socialization opportunities compared to nonparticipants (Mabli et al., 2017).
- Programs may consider balancing socialization and providing meals with protecting older adults against communicable diseases.

The following publicly available resources provide guidance on implementation:

- National Resource Center on Nutrition and Aging [https://acl.gov/senior-nutrition]
- Older Americans Act [https://acl.gov/about-acl/authorizing-statutes/older-americans-act]
- Older American Act Nutrition Services from Administration on Aging [https://acl.gov/programs/health-wellness/nutrition-services]
- Nutrition.gov Food Safety Resources [https://www.nutrition.gov/topics/food-safety/food-safety-go]

Evidence Gaps

The CPSTF identified several areas that have limited information. Additional research and evaluation could help answer the following questions and fill existing gaps in the evidence base.

- How does intervention effectiveness vary by the following:
  - Race or ethnicity?
  - Extent of participants' support systems (e.g., friend networks, children)?
  - Participants' literacy level, education, and English proficiency?
  - Access to food (proximity to grocery stores)?

  - Frequency of meals provided?
- What is the impact of nutrition education in addition to providing meals on dietary intake?
- Are participants more likely than those who do not participate to be referred to other community-based supports and programs?
- Does participation affect medication adherence or the number of reported activities of daily living or instrumental activities of daily living?
- Do interventions demonstrate improvements for aging in place? Long term studies would be beneficial.
- Does participation lead to any negative consequences?
- Do these interventions lead to institutional care or healthcare cost savings in the future?
- How can studies consistently measure outcomes of meal services interventions? Future research may consider using consistent measures of overall diet quality, food and nutrition security, health-related quality of life, and overall well-being.

Home-delivered meal service

- How do the social interactions between the people who receive and deliver meals affect the intervention?
- What effect do training programs for meal deliverers (e.g., nutrition education, risk identification, etc.) have on the health of recipients?
- Will program delivery models permanently change as a result of the COVID-19 pandemic? If so, are the new models more or less effective? Long term studies would be necessary.

Congregate meal service

- What is the effect of congregate meal services on measures of participants' dietary intake, loneliness, and social connectedness?

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Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. Task Force evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and policies best meet the needs, preferences, available resources, and constraints of their constituents.

Document last updated March 28, 2022