

## Appendix E-2.33a: Evidence Portfolio

### Part D. Chapter 4: Food Environment and Settings

**What is the impact of worksite-based approaches on the dietary intake, quality, behaviors and/or preferences of employees?**

**Conclusion Statement:** Moderate evidence indicates that multi-component worksite approaches can increase vegetable and fruit consumption of employees.

**DGAC Grade:** Moderate

#### Key Findings

- This evidence portfolio includes two systematic reviews (Geaney, 2013 and Aneni, 2014), which collectively evaluated 35 studies by independent investigators with sufficient sample sizes published before November 2012. The systematic reviews examined the impact of worksite-based approaches targeting the dietary intake, quality, behaviors, and/or preferences of employees.
- The studies used a variety of intervention approaches targeting behaviors related to dietary intake; some were delivered in-person and others were delivered via the internet. Some inconsistencies are evident across studies and may be explained by differences in the populations sampled and methodologies used, including the types and durations of intervention and follow-up periods. Some approaches were multi-component, with a combination of interventions targeting employees and/or the food environment at the worksite. The primary dietary outcome of interest was fruit and vegetable intake.
- Among the body of evidence available, multi-component interventions, and in particular those that incorporated face-to-face contact and nutrition education, were more effective than single-component interventions for eliciting significant dietary improvements. Overall, worksite-based intervention programs moderately increase fruit and vegetable intakes, although the magnitude of the effect is difficult to assess. Nutrition education and internet-based programs appear to be promising approaches for eliciting desired dietary modifications when incorporated into multi-component interventions.

#### Description of the Evidence

This evidence portfolio includes 2 systematic reviews published in 2013 and 2014 (Geaney, 2013; Aneni, 2014). Collectively, the reviews included a total of 35 studies published prior to November 2012, with no overlap of studies between reviews. Study designs included randomized controlled trials (RCTs), non-randomized controlled trials, and pre/post studies. Geaney *et al* reviewed 6 non-randomized and randomized controlled trials. Aneni *et al* reviewed 29 studies consisting of 18 RCTs and 11 pre/post studies.

The systematic reviews had relatively low risk of bias, as evidenced by AMSTAR scores ranging from 8 to 9 points out of a possible 11. Aneni *et al* evaluated the quality of the studies included in their review based on two criteria: suitability of study design and methodological quality criteria. Each study was assessed for both components. High quality studies were those that received a grade A or B for study design and had at least 4 of 6 methodological criteria (representativeness, randomization, comparability, credibility of data collection instruments, attrition rate, and effects were

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attributable to intervention). No studies were excluded due to poor quality. Eighteen studies were rated high quality, one was intermediate, and ten were low quality.

## Population

The studies examined generally healthy employees defined as: 1) adults over the age of 18 in paid employment in public, voluntary, or private organizations (Geaney, 2013) and 2) employee/working populations taking part in interventions requiring access to the internet (Aneni, 2014). The sample sizes reported for individual studies ranged from 65 to 4,254 participants. Of the six studies included in Geaney *et al*, three were conducted in the United States and three were conducted in other highly developed countries. The Aneni *et al* review did not report the location for individual studies. The reviews did not assess or present results by gender or race/ethnicity (refer to the Overview Table for review-specific details).

## Exposures

The studies included in the reviews examined a variety of worksite approaches for targeting the dietary intake of employees and their behaviors related to nutrition. The studies included in the Geaney *et al* review evaluated interventions with at least one dietary modification (e.g., menu modifications, increased availability of fruits and vegetables, and point-of-purchase labeling) in the workplace, workplace canteens, and other food service establishments “on-site” at the workplace. Five of the six studies incorporated nutrition education programs at the worksite in addition to dietary modification. The Aneni *et al* review examined the impact of internet-based programs aimed at improving cardiovascular health.

## Outcomes

The primary outcome of the Geaney *et al* review was change in diet. Secondary outcomes included health status, self-efficacy, perceived health, nutrition knowledge, co-worker support, job satisfaction, economic cost outcomes, and food purchasing patterns. The studies included in the Aneni *et al* review assessed diet, weight, blood pressure, blood glucose, HbA1c, lipids, physical activity, and smoking.

## Evidence Synthesis

Geaney *et al* reviewed studies evaluating the effectiveness of workplace dietary modification interventions alone or in combination with nutrition education on employees' dietary behavior, health status, self-efficacy, perceived health, determinants of food choice, nutrition knowledge, co-worker support, job satisfaction, economic cost, and food-purchasing patterns. Four out of six studies demonstrated significant increases in fruit and vegetable consumption ( $\leq \frac{1}{2}$  serving per day); three of these studies included nutrition education interventions. Findings related to other outcomes were inconsistent. Due to the heterogeneity of interventions and outcomes and limited quantity of the studies, drawing conclusions is difficult. Yet, limited evidence suggests that workplace dietary modification interventions, alone and in combination with nutrition education, increase intakes of fruits and vegetables.

The Aneni *et al* review aimed to synthesize evidence from internet-based cardiovascular wellness programs in order to guide the implementation and future development of such programs. Consistent with Geaney *et al*, fruit and vegetable consumption was the dietary outcome with the most significant and consistent improvements. Four out of nine high-quality studies and all 3 studies deemed lower-quality demonstrated significant increases in fruit and vegetable intakes. Programs that included physical (face-to-face) contact in addition to strategies delivered via the internet appeared to be more effective than those that did not.

Collectively, despite the variability in worksite-based approaches (i.e., programs and interventions) targeting dietary intake and eating behaviors among employees, multi-component approaches effectively increase fruit and vegetable intake.

Overview Table

Summary of systematic review examining the impact of worksite-based approaches on the dietary intake, quality, behaviors and/or preferences of employees			
Author, Year Study Design AMSTAR Score* Number of Included Studies	Purpose of Review Subject Population Location of Included Studies	Independent Variable Outcomes	Results
<p><b>Aneni, 2014</b></p> <p>Systematic review</p> <p>AMSTAR Score: 9/11</p> <p>29 studies</p> <ul style="list-style-type: none"> <li>• 18 high-quality randomized controlled trials</li> <li>• 11 pre/post studies (1 intermediate quality, 10 low quality)</li> </ul>	<p>Synthesize evidence from internet-based cardiovascular wellness programs in order to guide the implementation and future development of such programs</p> <p>Employees/working population</p> <p><b>Location:</b> not reported</p>	<p><b>Independent variables:</b> internet-based programs aimed at improving cardiovascular health</p> <p><b>Outcomes:</b> weight, diet, blood pressure, blood glucose, HbA1c, lipids, physical activity, smoking</p>	<p>Of the 9 high-quality randomized controlled trials evaluated, 4 studies demonstrated significant improvements. Outcomes varied and included higher dietary self-efficacy, greater intake of FV in intervention (I) vs. control (C), lower sodium intake in I vs. C.</p> <p>All 3 low-quality, follow-up studies demonstrated increases in FV intake.</p>
<p><b>Geaney, 2013</b></p> <p>Systematic review</p> <p>AMSTAR Score: 8/11</p> <ul style="list-style-type: none"> <li>• 6 randomized controlled trials</li> </ul>	<p>Evaluate the effectiveness of workplace dietary modification interventions alone or in combination with nutrition education on employees' dietary behavior, health status, self-efficacy, perceived health, determinants of food choice, nutrition knowledge, co-worker support, job satisfaction, economic cost and food-purchasing patterns</p> <p>Adults (&gt;18 y) in paid employment working for public, private, and voluntary organizations</p> <p><b>Location:</b> 3 studies in the US 1 each in Brazil, Netherlands, Belgium</p>	<p><b>Independent variables:</b> interventions included ≥1 dietary modifications in the workplace, workplace canteens, and other "on-site" workplace food service establishments; some studies also included an education intervention</p> <p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>• Primary outcome: change in diet</li> </ul> <p>Secondary outcomes: health status, self-efficacy, perceived health, nutrition knowledge, co-worker support, job satisfaction, economic cost outcomes, food purchasing patterns</p>	<p>Four studies reported significant increases in FV consumption; effect size ≤ ½ serving per day.</p> <p>Out of 3 studies, fat intake decreased significantly in one.</p> <p>Other improvements (I vs. C)</p> <ul style="list-style-type: none"> <li>• Increase in self-efficacy to consume fruit (n=1)</li> <li>• Increase in nutrition knowledge (n=1)</li> <li>• Greater co-worker support (n=1)</li> </ul> <p>Out of 2 studies, purchasing of FV and low-fat foods did not change.</p>

\*Quality assessed by AMSTAR (Shea, 2007: <http://www.ncbi.nlm.nih.gov/pubmed/17302989>)

**Assessment of the Body of Evidence**

**Quality and Quantity:** Collectively, the evidence base includes 35 independent studies with 24 controlled studies evaluated in two rigorous systematic reviews. The reviews are of high-quality with AMSTAR scores of 8 and 9 out of 11 possible points.

**Consistency:** Across individual studies and reviews, worksite-based approaches fairly consistently increased fruit and vegetable intakes. Multi-component programs, in particular those incorporating face-to-face contact in addition to internet-based approaches or nutrition education programs in addition to dietary modification, were more effective than single-component programs.

**Impact:** Fruit and vegetable intakes increased significantly in most studies evaluating this outcome; however the potential health impact of this change was not evaluated in these reports. In Geaney *et al*, the change in consumption was demonstrated to be less than or equal to ½ serving per day. For reference, the *Dietary Guidelines for Americans, 2010* recommend between 1½ to 2 cups of fruit and 2 to 3 cups of vegetables per day for adults.

**Generalizability:** The studies included in the Geaney *et al* review were geographically diverse (both nationally and internationally), but information on the characteristics of the participants was very limited. Also, the Aneni *et al* review did not provide details regarding race, ethnicity, or geographic location for the included studies. Thus, the generalizability of the findings is not known with confidence.

**Limitations:** While the included reviews were of high quality, the authors of the individual reviews commented that the quality of the studies included in their assessments varied, with 24 controlled studies deemed to be of higher quality (out of 35 total studies).

### Implications\*

Existing evidence indicates that worksite approaches focused on dietary intake can increase fruit and vegetable intakes of employees. Multi-component programs targeting nutrition education in combination with dietary modification interventions are found to be effective. Additionally, environmental modifications in conjunction with a variety of worksite policies targeting dietary modification, including point-of-purchase information, catering policies, and menu labeling are effective. Thus, these evidence-based strategies should be implemented in worksites through a variety of means, such as corporate wellness programs, food service policies, and health benefits programs. Programs should emphasize multi-component approaches targeting diet and physical activity while policies should support behavior changes associated with improving health outcomes such as increasing the availability of healthy foods within the workplace and encouraging more physical activity throughout the workday. Given that approximately 64 percent of adults are employed and spend an average of 34 hours per week at work, the workplace remains an important setting for environmental and behavioral interventions for health promotion and disease prevention.

### Research Recommendation\*

Assessments of the effectiveness of worksite interventions that emphasize obesity prevention and weight control among workers across racially/ethnically diverse populations, blue and white collar employees, and at risk populations are needed. Scientifically rigorous studies (especially RCTs) addressing long-term health impact of worksite-based approaches and policies that improve employee diet, physical activity, and body weight control would have public health relevance.

**Rationale:** In light of the high rates of obesity and overweight, worksite interventions targeting obesity prevention and weight control, via enhanced dietary behaviors and increased physical activity among workers is important. The majority of the studies to date have been conducted for a relatively short period of time, and the long-term impact of these approaches and policies may prove beneficial.

\*Because the four worksite questions are complementary, the Dietary Guidelines Advisory Committee chose to develop only one implication statement and research recommendation for all of the questions.

## References

1. Aneni EC, Robertson LL, et al. A systematic review of internet-based worksite wellness approaches for cardiovascular disease risk management: outcomes, challenges & opportunities. PLoS One 2014; 9(1):e83594. PMID: 24421894 <http://www.ncbi.nlm.nih.gov/pubmed/24421894>
2. Geaney F, Kelly C, et al. The effectiveness of workplace dietary modification interventions: a systematic review. Prev Med 2013; 57(5):438-447. PMID: 23850518 <http://www.ncbi.nlm.nih.gov/pubmed/23850518>