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Implementing healthier foodservice guidelines in hospital and federal worksite cafeterias: barriers, facilitators and keys to success

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Abstract

Background: Healthy foodservice guidelines are being implemented in worksites and healthcare facilities to increase access to healthy foods by employees and public populations. However, little is known about the barriers to and facilitators of implementation. The present study aimed to examine barriers to and facilitators of implementation of healthy foodservice guidelines in federal worksite and hospital cafeterias.
Methods: Using a mixed-methods approach, including a quantitative survey followed by a qualitative, in-depth interview, we examined: (i) barriers to and facilitators of implementation; (ii) behavioural design strategies used to promote healthier foods and beverages; and (iii) how implementation of healthy foodservice guidelines influenced costs and profitability. We used a purposive sample of five hospital and four federal worksite foodservice operators who recently implemented one of two foodservice guidelines: the United States Department of Health and Human Services/General Services Administration Health and Sustainability Guidelines ('Guidelines') in federal worksites or the Partnership for a Healthier America Hospital Healthier Food Initiative ('Initiative') in hospitals. Descriptive statistics were used to analyse quantitative survey data. Qualitative data were analysed using a deductive approach.
Results: Implementation facilitators included leadership support, adequate vendor selections and having dietitians assist with implementation. Implementation barriers included inadequate selections from vendors, customer complaints and additional expertise required for menu labelling. Behavioural design strategies used most frequently included icons denoting healthier options, marketing using social media and placement of healthier options in prime locations.
Conclusions: Lessons learned can guide subsequent steps for future healthy foodservice guideline implementation in similar settings.

Introduction

Obesity remains a major public health conundrum, contributing to excess morbidity and mortality [1,2]. Employers incur significant healthcare costs associated with obesity-related disease among employees [3]. Participation in individually-based traditional worksite health promotion programmes that require active participation varies [4]. Thus, worksite wellness programmes that do not require active participation (e.g. making healthy changes to worksite cafeteria selections) may be an alternative obesity prevention strategy in the workforce. Compared with other fields, employees in the healthcare and public administration fields have the highest prevalence of obesity [5]. Cafeteria settings in these worksites may be important for promoting healthy food and beverage consumption because they could influence employees to make healthier selections both when at work and away from work [6].

As a result of the promise of such worksite initiatives, organisations such as the Partnership for a Healthier America (PHA) created the Hospital Healthier Food Initiative (HHFI) [7] and the United States Department of Health and Human Services (HHS)/General Services Administration (GSA) created the Health and Sustainability Guidelines for Federal Concessions and Vending Operations [8]. Creation of the Health and Sustainability Guidelines was a joint effort of the Centers for Disease Control and Prevention and other federal agencies, and was part of a larger effort to maintain a strong and healthy federal workforce [8–10]. Both the Initiative and the Guidelines take a similar approach to prompt the implementation of healthier food and beverage strategies in hospital and federal worksite cafeterias. For example, the Initiative has sites 'remove all fryers and deep fat fried products on the cafeteria menu', whereas the Guidelines require 'no more than one deep-fried entree option per day [that] must not be marketed or promoted as the special or feature of the day'. Common elements between the Initiative and Guidelines include mechanisms to increase fruit and vegetable sales, point of purchase menu labelling, and a variety of specific requirements for items available that encourage the purchase of healthy foods and beverages, at the same time as limiting trans-fat, sodium and refined sugar [6–8] (for a complete list of the HHFI Commitment Elements and Guidelines, see Table 1). Learning about barriers to and facilitators of healthy foodservice guideline implementation among early adopters can inform future implementation and maintenance efforts.

Although initiatives to improve worksite cafeteria offerings have proliferated, little research to date has been conducted aiming to determine the successes and challenges faced by foodservice operators when attempting their implementation. In a report to Senator Tom Harkin, the Chairman of the Committee on Health, Education, Labor and Pensions of the United States Government Accountability Office stated that conflicts between maximising profits and offering healthier foods and beverages, as well as the limited availability of and information about foods and beverages that meet the Guidelines, were commonly faced challenges [9]. Additionally, cost concerns, meeting sodium requirements and customer acceptance of healthier options were reported as challenges to implementation in a pilot study in one federal worksite [10].

Eating is often an automated decision [11] and cognitive depletion can hinder efforts to eat healthfully [12]; therefore, foodservice operators may use behavioural design strategies that nudge consumers toward making healthier choices, focusing on product pricing, placement, labelling and promotion. Strategies that have shown promise include pricing healthy foods and beverages at equal or lower cost than their less healthy counterparts [13], placing healthy foods and beverages at key locations, such as on the checkout aisle [14] and signage/displays for healthier foods, including traffic light labelling [15,16]. However, to our knowledge, little research has been conducted to study the overall use and success of such behavioural design strategies in hospital and federal worksite cafeterias.

To inform future efforts for the promotion of healthier foods and beverages within hospital and worksite cafeterias, we conducted a mixed-methods study using data collected from five hospital and four federal worksite foodservice operators throughout the USA who had recently implemented the healthier foodservice Guidelines or Initiative. We began with a quantitative survey aiming to determine the barriers to and facilitators of implementation; the financial impact of implementation; and behavioural design strategies used to promote healthier foods and beverages. We then conducted qualitative interviews with these operators to elicit additional, in-depth information about the above topics. Thus, the present study aimed to examine: (i) barriers to and facilitators of implementation, (ii) behavioural design strategies used to promote healthier foods and beverages in cafeteria settings; and (iii) effects on costs and profits of implementation of the healthier foodservice Guidelines or Initiative.

Materials and methods

Foodservice managers and operators of four federal government worksites and five hospitals who were most knowledgeable about implementing the Guidelines or Initiative participated in a quantitative survey and subsequent in-depth qualitative interview ($n = 9$). The respondents

Table 1 Partnership for a Healthier America Hospital Healthier Food Initiative and US Department of Health and Human Services (HHS)/General Services Administration (GSA) Health and Sustainability Guidelines

Partnership for a Healthier America Hospital Healthier Food Initiative (HHFI)
The HHFI is comprised of nine Commitment Elements outlined below:
Offer at least 60% healthier entrees and side dishes in the cafeteria that meet the nutrition and food profiles
Remove all fryers and deep fat fried products on the cafeteria menu
Increase the percentage of healthier beverage dollar purchases for use throughout the hospital to 80% of total beverage dollars
Collect baseline data on fruit and vegetable purchases and total food purchases
Achieve fruit and vegetable dollar purchases of 10% of total food dollars
Label all items available in the cafeteria at point of purchase/service with calorie per serving
Display only healthier food options in all advertising/pictorials in cafeteria
Offer only healthier food options within 5 feet of all cash register stations within the cafeteria footprint
Offer one Child Wellness Meal in the cafeteria that meet the following nutrient, food and affordability profiles:
Nutrient Profile*:
(a) ≤ 560 calories
(b) ≤ 10% calories from saturated fat
(c) No artificial trans-fat
(d) ≤ 665 mg of sodium
Food Profile†:
(a) 1¾ oz serving equivalent lean meat/poultry/fish or alternative
(b) 1¾ oz serving equivalent whole grain rich grain
(c) ½ cup serving equivalent fruit
(d) ¾ cup serving equivalent nonfried vegetable
(e) One cup serving equivalent low-fat dairy
Affordability Profile:
Priced less than or equal to other available meal options.
Offer Adult Wellness Meals in the cafeteria that meet the following nutrient, food and affordability profiles:
Nutrient Profile†:
(a) ≤ 700 calories
(b) ≤ 10% calories from saturated fat
(c) No artificial trans-fat
(d) ≤ 800 mg of sodium
Food Profile§:
(a) 2 oz serving equivalent lean meat/poultry/fish or alternative
(b) 2 oz serving equivalent whole grain rich grain
(c) ¾ cup serving equivalent fruit
(d) ¾ cup serving equivalent nonfried vegetable
(e) One cup serving equivalent low-fat dairy
Affordability Profile:
Priced less than or equal to other available meal options
US Department of HHS/GSA Health and Sustainability Guidelines
All items must be listed with total calories as prepared and offered for sale, at point of choice for foods on display or on the menu or menu board
All food items must contain 0 g of trans-fats per serving as defined by the Food and Drug Administration
All food items must meet the following sodium requirements:
• Snack items contain < 230 mg sodium, as served
• Individual food items contain < 480 mg sodium as served
• Vegetable and vegetable juice offerings contain < 230 mg sodium as served
• All cereal, bread, and pasta offerings contain < 230 mg sodium as served
• Processed cheeses contain < 230 mg sodium as served
• Canned or frozen tuna, seafood and salmon contain < 290 mg sodium as served
• All meals contain < 900 mg sodium, as served
Offer a variety of at least three whole or sliced fruit options daily
All canned or frozen fruit packaged in 100% water or unsweetened juice, with no added sweeteners
Offer a variety of seasonally available fruits
When cereal grains (e.g. rice, bread and pasta) are offered then a whole grain option is offered for that item as the standard choice
At least 50% of breakfast cereals contain at least 3 g of fibre and less than 10 g of total sugars per serving
Only low fat (2% or less) or fat-free options when cottage cheese is offered

Table 1 Continued

Only low fat (2% or less) or fat-free yogurt is offered
Lean meat, poultry, fish or low-fat vegetarian options when protein entrees are offered
Entree with vegetarian protein source offered at least twice per week
Only 2%, 1% and fat-free options when milk is offered
100% juice with no caloric sweeteners when juice is offered
No more than one deep-fried entree option per day and must not be marketed or promoted as the special or feature of the day
Drinking water, preferably chilled tap, offered at no charge at all meal service events
Eliminate use of partially hydrogenated oil, shortenings or margarines for frying, pan frying, grilling, baking or as a spread unless label reads 0 g of trans-fat per serving
Half- or reduced-sized choices available for some meals and concession items
When value meal combinations are offered, fruit or a nonfried vegetable is the default side dish
Offer daily, at least one raw, salad-type vegetable
Offer at least one steamed, baked or grilled vegetable seasoned without fat or oil
Only yogurt with no added sugar or labelled as reduced or less sugar according to Food and Drug Administration labelling standards is offered

*Based on 2010 US Dietary Guidelines daily intake for 1600 calorie (8-year-old male/female moderately active) total, distributed as: 20% Breakfast, 35% Lunch, 35% Dinner and 10% Snack, with this being a lunch or dinner meal.

†For additional information on equivalents, refer to the 2010 Dietary Guidelines for Americans or the USDA MyPlate equivalents.

‡Based on 2010 US Dietary Guidelines daily intake for 2000 calorie total, distributed as: 20% Breakfast, 35% Lunch, 35% Dinner and 10% Snack, with this being a lunch or dinner meal.

§For additional information on equivalents, refer to the 2010 Dietary Guidelines for Americans or the USDA MyPlate equivalents.

were contacted via e-mail and told that the North Carolina Institute for Public Health was working with Partnership for a Healthier America and the Centers for Disease Control and Prevention to better understand the experiences of foodservice operators' with the implementation of healthy food service guidelines. Phenomenology was the theoretical underpinning of this research, where we aimed to learn about foodservice operators' perceptions of the phenomenon of implementation of healthy foodservice guidelines [17]. The University of North Carolina at Chapel Hill Institutional Review Board determined that this was not human subjects research and did not warrant institutional review board approval.

Quantitative survey

The online, quantitative survey was administered via Qualtrics (https://www.qualtrics.com). The respondent first provided information about his/her role within the foodservice operation and his/her agency, including job title, agency name, number of employees, type of foodservice provided, contractual arrangements and the date when the Guidelines or Initiatives were first implemented. Next, respondents noted whether they were 'not doing', 'currently doing' or 'considering' each of several changes to implement the Guidelines or Initiative. Participants were also asked to rate the difficulty or ease of implementation for each of the Guidelines or Initiative Commitment Elements, as well as if they had used a range of behavioural design strategies. The final section covered additional costs required to implement the Guidelines or Initiative, overall profitability, tracking sales of healthy versus less healthy options and the main challenges faced regarding implementation of the Guidelines or Initiative.

Qualitative, in-depth interview

In-depth, qualitative interviews were conducted over the telephone (by either SP or JG) with all survey respondents to provide greater detail on survey responses. Both interviewers have a terminal research degree (PhD) and have been trained in qualitative interviewing skills. The interview guide included five sections, with the first focused on the background of the Guidelines or Initiative at the agency or hospital. Subsequent sections focused on facilitators of and barriers to implementation, behavioural design strategies to promote healthier options and the financial impact of implementation. The interview guide was pilot tested and revised before being used in the present study. Interviewers familiarised themselves with responses from the quantitative survey before conducting the qualitative interview. Interviews lasted approximately 60–90 min and were audio recorded and transcribed verbatim by an external company (NoNotes.com). Interviewers made hand-written notes on a blank copy of the interview guide as the interviews progressed. Data saturation was achieved for major themes related to barriers to and facilitators of implementation of healthy foodservice guidelines.

Data analysis

To increase the credibility of findings [17], two researchers (JG and SP) selected three data-rich transcripts from which to independently draft initial codebooks. They began with a deductive approach, including themes that

were anticipated based upon survey and interview guide questions, and then moved to an inductive approach, including codes and operational definitions that emerged from the data-rich transcripts. They then met to review their respective versions of the codebook and created a consensus codebook. The remainder of the study team then reviewed the consensus codebook and suggested modifications. Four nutrition graduate research assistants (GRAs) independently coded one transcript, and then met with the study team to discuss coding decisions and to revise the codebook. The GRAs then split into pairs, divided the transcripts, and double-coded all of the transcripts to extract quotes relevant to themes [17]. ATLAS.ti (http://atlasti.com) was used to manage data, and to generate initial and final analyses and reports. The main themes followed those noted as study aims.

Results

Participant and agency characteristics

Between 28 May and 9 October 2015, we interviewed representatives from four federal worksite cafeterias based in the eastern USA. One was employed by the federal worksite and the other three were employed by contracted foodservice companies. Federal worksites implemented the Guidelines between January 2011 and September 2014. All worksite cafeterias were contracted with a broadline distributor: two with Sysco, one with US Foods and one with 'other'. Three had a standard rotating menu and one did not. Between 25 June and 17 September 2015, we interviewed representatives from five hospitals: one located in the northeast, two in the Midwest and two located in the western USA. All but one participant was employed by the hospital. These cafeterias implemented the Initiative between September 2012 and March 2013. All hospital cafeterias were contracted with a broadline distributor: four with US Foods and one with 'other'. All five had a standard rotating menu. All nine participants reported that they could obtain 'some' or 'all' nutrition facts from the broadline distributor, all inquired about lower sodium options from the distributor, and all purchased locally grown foods.

Changes that were made to meet the goals of the Guidelines and Initiative

Respondent goals included meeting and exceeding the terms of their contracts, as well as creating products that not only met or exceeded the Guidelines or Initiative, but also pleased customers. Several changes were made by all sites to implement the Guidelines or Initiative, including adding healthier items, purchasing more fresh fruits and vegetables, and using recipes modified to meet the Guidelines. Changes that were not made as frequently in federal worksites included purchasing 100% juice, having at least 50% of cereals with 3 g of fibre and < 10 g of sugar, removing salt from cooking water for pasta, vegetables, etc., and removing all fryers and deep fat fried products. In hospitals, changes that were made less frequently included decreasing the purchase of pre-fried, par-fried and flash-fried foods, and removing salt from cooking water for pasta, vegetables, etc. (for the complete list of changes, see Table 2).

Easiest and most difficult guidelines/Hospital Healthier Food Initiative commitment elements to implement

In general, participants perceived most of the Guidelines/HHFI Commitment Elements as 'very easy' or 'somewhat

Table 2 Changes introduced by all federal agencies and hospitals represented

Federal agencies	Hospitals
Purchased more fresh vegetables*	Purchased more fresh vegetables*
Purchased more fresh fruits*	Purchased more fresh fruits*
Purchased more lower sodium products*	Purchased more lower sodium products*
Developed product specifications for healthier food items*	Developed product specifications for healthier food items*
Purchased more nonfat or low-fat dairy products*	Purchased more nonfat or low-fat dairy products*
Purchased more lean meats*	Purchased more lean meats*
Purchased more whole grain products*	Purchased more whole grain products*
Purchased more low calorie beverages	Removed less healthy food items
Reduce salt by working with spices, herbs, citrus to enhance flavours*	Reduce salt by working with spices, herbs, citrus to enhance flavours*
Decreased the purchase of pre-fried, par-fried or flash-fried foods	Serve smaller portions
Purchased more low calorie beverages	Added new healthier food items that meet profiles
Provided free drinking water, preferably chilled tap	Added adult wellness meals that meet profiles
Provided more vegetarian entrees	–
Purchased only foods free of synthetic sources of trans-fat	–
Used recipes that have been modified to meet the nutrient/food profiles	–

*Changes made by both federal worksites and hospitals.

Table 3 Easiest and most difficult Health and Human Services (HHS)/General Services Administration (GSA) Guidelines and Healthier America Hospital Healthier Food Initiative (HHFI) Commitment Elements to implement

Easiest HHS/GSA Guidelines to implement (all four respondents said 'very easy')
When value meal combinations are offered, fruit or a nonfried vegetable is the optional side dish
Offer daily, at least one raw, salad-type vegetable
Only low fat (2% or less) or fat-free options when cottage cheese are offered
Most difficult HHS/GSA Guidelines to implement (at least two of four respondents said 'somewhat' or 'very difficult')
At least 50% of breakfast cereals contain at least 3 g of fibre and less than 10 g of total sugars per serving
All items must be listed with total calories as prepared and offered for sale, at point of choice for foods on display or on the menu or menu board
All food items must meet the following sodium requirements
100% juice with no caloric sweeteners when juice is offered
Easiest HHFI Commitment Elements to implement (at least four of five respondents said 'somewhat' or 'very easy')
Display only healthy food options in advertising/pictorials in the cafeteria
Offer only healthier food options within 5 feet of all cash register stations within the cafeteria footprint
Achieve fruit and vegetable dollar purchases of 10% of total food dollars
Most difficult HHFI Commitment Elements to implement (at least three of five respondents said 'somewhat' or 'very difficult')
Offer Adult Wellness Meals that meet nutrient, food and affordability profiles
Offer healthier entrees and side dishes that meet nutrient and food profiles
Label all items with calories per serving
Collect baseline data on fruit and vegetable and total purchases

easy' to implement (for a summary of these quantitative survey results, see Table 3). Major challenges with implementation as reported on the quantitative survey included customer dissatisfaction with changes; concerns about cost implications; lack of dedicated foodservice staff; and contracts, permits and obligations that are difficult to change.

Major themes regarding easy implementation of the Guidelines in federal agencies included the following:

- Agency/client support: *Wellness is important to our client. I think it improved our relationship with the client . . . to show that we are on board.*
- Health conscious consumers: *I think it's a generational thing, it's with the media and social media, they see disease prevention . . . I think more people get it now than got it even 10 years ago.*
- Vendors with appropriate selections: *Yeah, now they (have a) better selection. So it's not as hard as it was 5 years ago.*
- Health education (e.g. a registered dietitian to explain the Guidelines): *. . . we do have some point of purchase education [and] one of our dietitians has a plate and (has) weighed out one ounce of some popular items . . .*

Implementation difficulties in federal agencies included the following:

- Training staff on preparation: *then we have to train the management team and then, train the associates so that becomes a little bit more consuming.*
- Inadequate vendor selections: *One of the issues . . . was about the cereals and the request to purchase more high fibre, low sugar cereal, [XXX Brand] has a wellness pack . . . In that wellness pack, [xxx] is the only cereal that meets the GSA Guidelines . . . a lot of these items don't necessarily exist in the packages and the quantities that we need for foodservice.*
- Customer complaints: *Who cares, you're not my mother to tell me what to eat!', well I'm sorry but we have to follow the guidelines.*
- Menu labelling can be time-consuming and difficult: *But our nutritional labelling at the buffet is per ounce because I believe the guideline is to display the nutrition information as served . . .*

Themes regarding easy implementation of the Initiative in hospitals were similar to those for federal agencies; unique facilitators are as follows:

- Communication among stakeholders: *Communication and buy-in. Making sure that everybody knew all along the way what we were doing, what was expected of them and of their team.*
- Dietetic interns: *[We have] interns coming from the University of Kansas . . . so a lot of times we utilise those dietetic interns to help us develop new marketing materials.*
- HHFI Commitment Elements were already being implemented: *10% purchases being fresh fruits and vegetables, we had that in the first year because we were already there . . . healthier beverages, that's because we'd already done it so everybody was used to having sugar free and a lot of water. . .*

Themes related to difficult implementation in hospitals were similar to those of federal agencies. Two themes specific to implementing the Initiative in PHA hospitals included the difficulty of developing and selling wellness meals, and the fact that hospitals often present high-stress situations where customers want comfort foods.

- Difficulty developing and selling wellness meals: *I always say the most difficult thing was the wellness meals in*

that we have to design those meal . . . we've spent 6 months basically in product development for those meals but they were highly successful when we implemented them.

- Comfort foods: *The two items with most resistance are sodas and we've pulled a lot of sodas, we don't carry any sugared drinks anymore. And the deep fried items . . . especially are comfort items.*

Behavioural design and marketing strategies

Federal agencies used several behavioural design strategies to market healthier foods and beverages:

- Marketing via digital menu boards with calorie counts: *There's LED screens, in the front, screens that are in the units that we can use to give different information too . . ..*
- Clear signage and icons denoting healthier foods: *Sensible Selection on Tuesday and it's always bundled with water . . . We'll do bundles, we'll do signage . . .*
- Social media promotions: *We're starting social media with Twitter and Instagram and things of that nature to drive people to communicate with the customers here of what's healthy in the cafe.*
- Physical placement of healthier options: *. . . moving the diet drinks or sugar free drinks at eye level and putting at the bottom the regular drinks.*
- Registered dietitian onsite to promote healthy eating: *A dietitian is on site at least one day per week, doing everything from cooking demonstrations, nutrition education, to working back in the kitchen with staff.*
- Informal price leveraging: *. . . this happens on the salad bar and other bars with the quinoa the same price as white rice, and the white and wheat pastas the same price.*

PHA hospitals used similar strategies as federal worksites, as shown below:

- Nutrition labels: *Because the calories started being listed, you could see that most of the people who were reviewing the items that were being offered, were going oh that has, I didn't know it has that many calories. Maybe I'll pick something else . . .*
- Icons to denote healthy options: *. . . so we have posters and signs with the system that we have called 'Check Plus'.*
- Placement of healthier options at prime locations: *Another item that was pretty easy was just healthy check out because it really was just reorganising a couple of items.*
- Marketing only healthier items: *I also think the marketing, by making sure that the marketing that we were doing, showed only healthy items.*
- Smaller display plate: *We'll display the specials of the day on plates and we switched over to the smaller display plates . . . And that's a good selling tool; it's a perception of a lot of food. And it is a lot of food, don't get me wrong! It's just the perception of much more.*

Behavioural design strategies commonly reported as used among participants are shown in Table 4.

Implementation costs and profitability

Participants noted increased costs in terms of training, labour, inventory, and equipment necessary to implement the Guidelines or Initiative:

- Additional training and labour costs: *We have to also look at the labour involved in a lot of these items . . . You need some more culinary experience, a little more training, a little more hand work like cutting up all the vegetables and things like that. It does increase the cost of these items . . .*
- Equipment costs: *. . . we are currently waiting for new equipment to come in so as the deep fryer goes out, we need another piece of equipment to replace it . . . if we are not going to serve French fries as a side item we need to replace them with different items.*
- Price increases introduced to offset higher food costs: *. . . we figured out if we are going to introduce these new items, we're going to be distributing a lot of these products in the cafeterias and the food costs associated with it . . . So, before we even start the program, we requested a price increase . . .*

Despite these costs, most participants noted increased customer volume, healthier patients and employees, profitability, and/or added benefits for the foodservice providers.

- Additional customer volume and healthier population: *. . . the system succeeded because we have increased revenue, we have increased customer base and we have healthier patients and employees because of this.*
- Increased revenue and sales since implementation: *[XXX] will tell you when he removed the deep fat fryers, there was a little difference in income, but it didn't last very long. In fact, over the past 3 years we've seen a steady increase . . . in the revenue that's been coming into the retail section.*

Discussion

In the federal worksites and hospitals studied, barriers to implementation included customer complaints and a shortage of foods and beverages from vendors that met Guidelines and HHFI Commitment Elements, similar to barriers found in other studies [9,10]. Primary facilitators and keys to successful implementation included leadership support, a corporate commitment to healthy changes, collaborative vendor partnerships, open communication with vendors and foodservice workers, and registered dietitians to provide health education and coordinate and conduct programme activities, as well as to manage monitoring and implementation of the Guide-

Table 4 Commonly used behavioural design strategies from the quantitative survey

Federal worksites: frequently used behavioural design strategies to promote healthier foods/beverages (used by all four federal worksites)
Create flow paths that emphasise healthy choices
Move or rearrange items to help encourage sales
Use signage and point-of-purchase displays to promote healthier food items (e.g. posters, table tents)
Place healthier items at eye level or just below eye level
Use menu labelling (i.e. calorie labelling)
Work with worksite wellness programmes or other employee organisations to promote healthy options
Offer a variety of healthier entrees and other options
Host taste-testing events to introduce new products and let customers try samples before buying
Establish healthier options as the default standard throughout the menu. For example, offer a piece of fruit instead of potato chips, a side salad instead of French fries, brown rice instead of white rice or whole grain bread instead of white bread
Federal worksites: less frequently used behavioural design strategies to promote healthier foods/beverages (used by only one or none of the worksites)
Place less healthy items where they require a foodservice worker to hand them to customers
Use pricing difference between more and less healthful food/beverages
Offer temporary price reductions for 'buy one, get one free' discounts
Have sales/pricing specials on healthier options
Specifically not have sales or specials on less healthy items
Hospitals: frequently used behavioural design strategies to promote healthier foods/beverages (used by all five hospitals)
Create flow paths that emphasise healthy choices (i.e. put healthy choices in prime selling locations)
Move or rearrange items to help encourage sales
Use signage and point-of-purchase displays to promote healthier food items (e.g. posters, table tents)
Use menu labelling (i.e. calorie labelling)
Offer a variety of healthier entrees and other options
Establish healthier options as the default standard throughout the menu. For example, offer a piece of fruit instead of potato chips, a side salad instead of French fries, brown rice instead of white rice or whole grain bread instead of white bread
Use pricing difference between more and less healthful food/beverages
Offer the healthier food and beverages at an equal or a lower price than the less healthy items
Hospitals: less frequently used behavioural design strategies to promote healthier foods/beverages (used by one or none of the hospitals)
Use lighting to draw attention to healthier items, such as spotlights on grab-and-go healthier items or cafeteria displays that feature healthier items
Use tongs and smaller serving spoons in the foodservice operations and at any self-service points
Offer healthy buying programmes, such as 'buy *x*-number healthy items and get one free'
Place less healthy items where they require a foodservice worker to hand them to the customer and more healthy items within hands reach of customer
Offer temporary price reductions for 'buy one, get one free' discounts on newly introduced food and beverage items to encourage customers to try them
Specifically not have sales or specials on less healthy items

lines or Initiative. Many respondents noted that investments related to training, personnel, inventory and equipment were necessary for success, although customer volume and sales had increased subsequent to the implementation of the guidelines, which helped offset these initial investments. Participating facilities suggested that others hoping to implement the Guidelines or Initiative should ensure similar facilitators are in place before beginning this process.

Limitations of the present study include the fact that we did not return the transcripts to the interview respondents to obtain their feedback on accuracy. However, for four of the foodservice operators, case study reports were drafted to create 'success stories' and each of those four respondents had the opportunity to comment on the success stories. Our sample size was small ($n = 9$); however, we obtained detailed qualitative data on the experiences of each respondent. Strengths include the national sample of both hospital and federal worksite cafeterias and the mixed methods approach, which provided triangulation of quantitative and qualitative data.

Our findings support other studies that cited challenges to implementing the Guidelines, including conflicts between maximising profits and offering healthier options, as well as a limited availability of Guideline-sanctioned foods and beverages [9,10]. However, most of our respondents noted that, over time, they were able to overcome these challenges. Similarly, barriers were reported by participants in the study by Mackison *et al.*[18], who noted that, although vendor selection of healthy products was still a challenge for some products, the industry has been shifting toward provision of healthier food and beverage selections that meet Guidelines and/or the Initiative. Participants reported using behavioural design strategies such

as clear signage indicating healthier options, as well as the placement of healthier options in prime locations, which have been used successfully in prior studies to promote healthy foods and beverages in cafeteria settings [15,16]. Overall, the Guidelines and Initiative were feasible to implement and have not negatively impacted profitability. Future studies should evaluate the impact of implementation on sales, profits, as well as customer dietary and health outcomes [6,18].

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Conflict of interests, source of funding and authorship

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SBJP, JG and AM contributed to the study design and data collection and analysis. SBJP drafted the manuscript. JG and AM contributed to revising the manuscript for intellectual content. LS, MW, CS, JM, MP and OW assisted with data analysis and interpretation, and revised the paper for important intellectual content. PM assisted with data analysis and helped to revise the paper for critically important intellectual content. AB and CS helped with data acquisition and interpretation, and helped to revise the paper for intellectual content. All authors critically reviewed the manuscript and approved the final version submitted for publication.

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