

# Key Characteristics of Public Health Interventions Aimed at Increasing Whole Grain Intake: A Systematic Review

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## ABSTRACT

**Objective:** To identify characteristics of successful public health interventions aimed at increasing whole grain consumption.

**Methods:** The Preferred Reporting Items for Systematic Reviews and Meta-analyses framework, guided by higher-quality interventions with greatest effect size, was adopted to conduct a systematic literature review.

**Results:** Of 8,500 initial records, only 8 interventions with demonstrated reach (up to national populations) and effectiveness (increasing consumption 8–27 g/d) were eligible for synthesis. Their characteristics included multiple stakeholder involvement, specified target intakes in dietary guidelines, manufacturer codes of practice, product reformulation, evidence-based educational resources, social media, and community events with tasting and preparation opportunities. Empowerment of food service providers was also linked to success.

**Conclusions and Implications:** Successful interventions require multifaceted strategies across multiple aspects of the food system, underpinned by multiple stakeholder partnerships. Uniform capture of interventions using an online, searchable, public domain resource may provide a strategy to enable health professionals globally to plan local interventions across cultural settings, drawing on best practice guidelines developed from interventions with demonstrated reach and effectiveness.

**Key Words:** consumption, increase, intervention, public health, whole grain (*J Nutr Educ Behav.* 2018; 50:813–823.)

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## INTRODUCTION

A risk assessment of the Global Burden of Disease<sup>1</sup> attributed 71% of deaths in 2015 to behavioral risks, with 53% of these risks attributable to dietary risks.<sup>1</sup> The authors suggested that a policy focus to promote increased intake of vegetables, fruit, whole grain (WG), nuts and seeds, and  $\omega$ -3 from seafood may have a comparatively larger effect than focusing on the sugar and fat components of diets.<sup>1</sup> In support of such a focus, large observational studies<sup>2</sup> suggested that WG consumption

may mitigate cardiovascular disease (CVD), weight gain, type 2 diabetes, and cancer and enhance the gut microbiome. In 2016 alone, at least 6 meta-analyses<sup>3–8</sup> were published reviewing WG consumption and reduced risk of noncommunicable diseases and all-cause mortality. In quantifying a dose-response of WG intake to mortality, Zong et al<sup>8</sup> showed that for every 16-g/d increase in WG, the relative risks of CVD, cancer, and total mortality decreased.<sup>8</sup>

Despite strong evidence of the health benefits of WG for many

years, consumption in most countries remains below recommendations. For example, intake in Australia and the US ranges from 20 to 27 g/d,<sup>9,10</sup> with recommended intakes at 48 g/d.<sup>11,12</sup> These recommendations are not new; initiatives to improve WG intake exist<sup>13–19</sup> yet it remains low. Evidence-based health promotion initiatives are needed.

This systematic literature review aimed to determine key characteristics of public health interventions that increased WG consumption at a national level, to inform government agencies and other groups that promote WG intake.

## METHODS

This review used the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines<sup>20</sup> and was registered with PROSPERO (Registration No. CRD42017056563). Researchers included a student researcher (RS), an expert working with a nonprofit

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organization promoting grains (MB), and an academic researcher with significant experience in grains research and systematic reviews (EB). Cochrane Library, the Cumulative Index to Nursing and Allied Health Literature, MEDLINE, Science Direct, Scopus, PubMed, and Web of Science databases were searched using the terms (grain OR “whole grain” OR wholegrain OR whole-grain) AND (“public health” OR epidem\* OR population OR community OR cohort OR “health promotion”) AND (increas\* OR rais\* OR escalat\* OR improv\* OR promot\* OR chang\*) AND (eat\* OR diet\* OR consum\* OR intake OR input) in February, 2017. In addition, gray or unpublished literature meeting the search criteria was sourced as referenced. Although original PROSPERO registration included a review of purchase intent, the lack of quantifiable measures of intent meant that this aspect was not included.

### Eligibility Criteria

The characteristics of population (humans) intervention (public health initiatives aimed at increasing WG intake), comparator (no intervention), outcome (change in WG consumption), and study design (not specified) formed the basis for the research question *What are the key characteristics of public health initiatives aimed at increasing WG intake?* Inclusion criteria were (1) reported in English, (2) humans, (3) grain related, and (4) published in peer-reviewed journals or independent gray literature. Studies were excluded if (1) participants were provided with food (such as randomized control trials) with no subsequent assessment for elective WG intake; (2) the intervention was aimed at reducing another macronutrient (eg, fat), inadvertently resulting in increased WG consumption; (3) WG as 1 of many foods or nutrients included in the intervention was not quantified in the outcome; (4) the study tested the acceptability of WG reformulated foods (5) or only assessed an increase in knowledge of WG after the intervention; (6) they were not scalable to a public health level; and (7) WG consumption was

not recorded at both baseline and after the intervention.

### Study Selection, Data Collection, and Synthesis

The identified studies were screened (based on the title for the first screening and the abstract for the second screening) by the primary author (RS) and checked for eligibility (full article) by 2 independent reviewers (RS and EB) as per the Preferred Reporting Items for Systematic Reviews and Meta-analyses process.<sup>20</sup> Eligible studies were reviewed in full and characteristics were extracted into a predesigned table. All authors reviewed the summary and synthesis of results. The quality of the studies was assessed using the Critical Appraisal Skills Program: Cohort Studies checklist.<sup>21</sup> Data were qualitatively synthesized on a narrative basis at a group level. Higher-quality studies guided the discussion and were used to develop recommendations for future interventions. When possible, effect size was reported.

## RESULTS

### Study Selection

Initial electronic database searches retrieved 8,496 records (Figure). Gray literature searches retrieved a further 20 interventions. After screening, 8 interventions were included in the final synthesis (Table 1). All interventions were published in peer-reviewed journals,<sup>22–28</sup> except for a Danish intervention.<sup>29,30</sup>

### Study Characteristics

Interventions dated from 1991<sup>25</sup> to 2016<sup>22</sup> and were conducted in Australia,<sup>25</sup> the US,<sup>22,24,26,27</sup> the UK,<sup>23</sup> The Netherlands,<sup>28</sup> and Denmark.<sup>29,30</sup> The number of participants varied between 80<sup>26</sup> and national populations (the US<sup>27</sup> and Denmark<sup>29,30</sup>). When settings were specified, they included primary schools,<sup>24,28</sup> colleges,<sup>22,26</sup> and a retirement community.<sup>25</sup> One intervention was conducted with overweight adults who consumed <1 serving/d of WG (20 g in that study).<sup>23</sup>

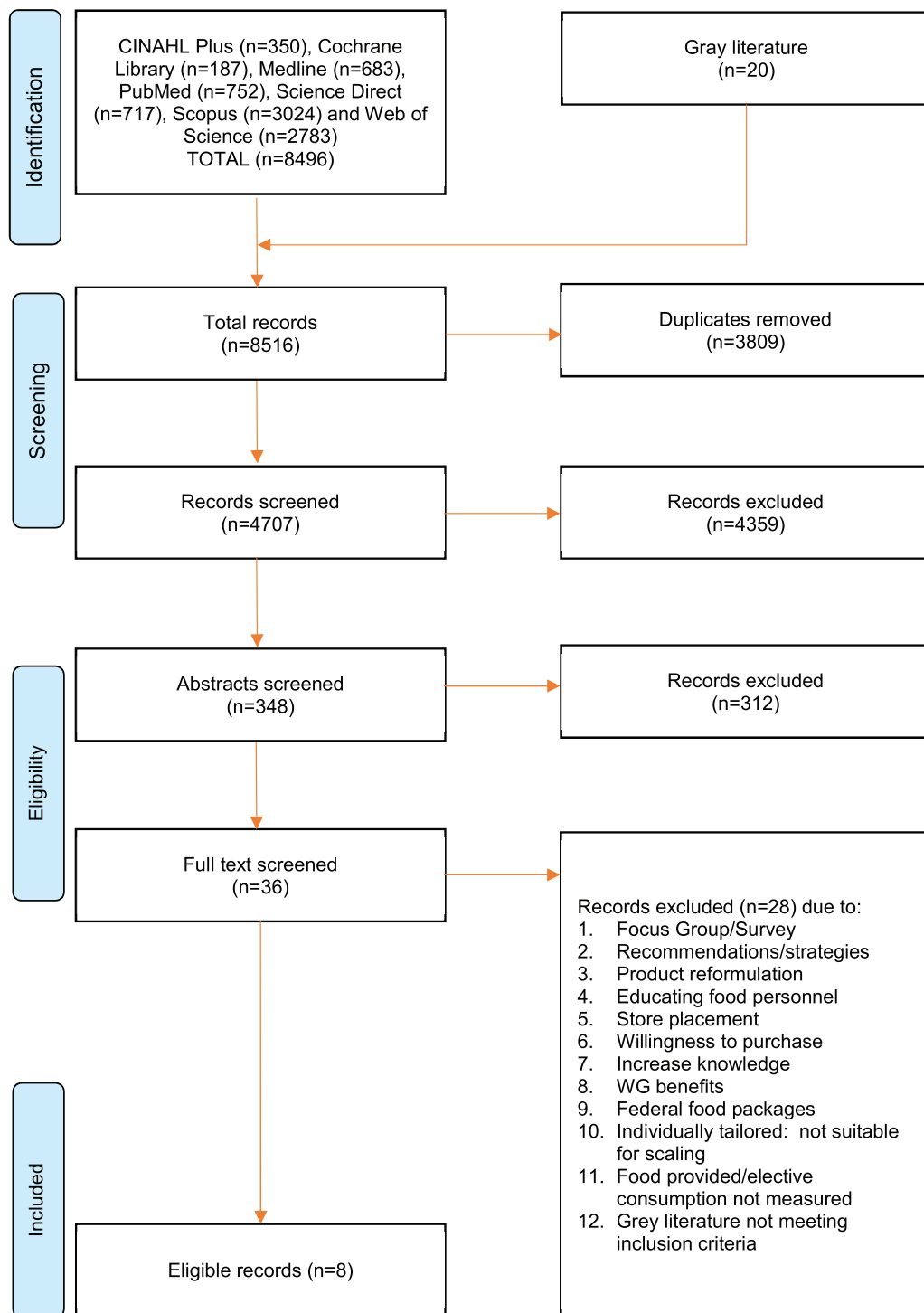
Some interventions focused on education, using point of selection signage and text messaging,<sup>22</sup> extension of the knowledge base on WG (through lessons and hands-on activities); influenced the surrounding environment, and created supporting networks.<sup>24,26</sup> Other interventions prescribed WG foods for a time to familiarize consumers with WG-containing foods,<sup>23</sup> made consuming WG foods fun,<sup>28</sup> or promoted other beneficial effects.<sup>25</sup> Interventions influencing increased WG consumption on a national scale were multifactorial, incorporating multiple stakeholders and multiple strategies.<sup>29,30</sup> Policy reformulation and increased product availability that influenced WG availability<sup>27,29–31</sup> were part of the solution, but many other factors such as regulated specific target intakes in national dietary guidelines, codes of practice for manufacturers, and clear and consistent public relations and communication activities were employed in the Danish Wholegrain Public Private Partnership (Danish PPP).<sup>29,30</sup>

### Whole Grain Intake Outcomes

Two study outcomes were presented as increased sales in bread and WG products<sup>25,27</sup> and another as increased consumption of bread rolls.<sup>28</sup> Five interventions demonstrated an increase in WG intake (grams per day). The college awareness intervention resulted in an 8-g/d (0.5-serving) increase from baseline to 31 g/d at 6 months' follow-up (after a 6-week intervention).<sup>22</sup> The 16-week prescribed WG<sup>23</sup> and *Power of 3* school intervention<sup>24</sup> both resulted in an increased intake of approximately 16–36 g/d (1 serving) at 12 months' follow-up. Meanwhile, the college nutrition course<sup>26</sup> increased consumption by 23–33 g/d (about 1.5 servings) and the Danish PPP<sup>29,30</sup> resulted in a national average increase in consumption from 36 g/10 MJ/d in 2000–2004 to 63 g/10 MJ/d in 2014.

### Quality Assessment

Based on an assessment using the Critical Appraisal Skills Program quality rating tool<sup>21</sup> (Table 2), the



**Figure.** Preferred Reporting Items for Systematic Reviews and Meta-analyses flow diagram detailing the review filtering process. CINAHL indicates Cumulative Index to Nursing and Allied Health Literature; WG, whole grain.

intervention by Burgess-Champoux et al<sup>24</sup> was the most robust, meeting all rating criteria including accounting for confounding factors. Three further studies met other cohort rating criteria: a college-based intervention increasing awareness,<sup>22</sup> a prescription

of WG via a 16-week intervention,<sup>23</sup> and the Danish PPP.<sup>29,30</sup>

## DISCUSSION

Characteristics of successful interventions include multiple stakeholder

involvement, specified target intakes in dietary guidelines, codes of practice for labeling WG foods, reformulation of foods to contain more WG, evidence-based educational resources, social media campaigns to increase awareness and extend the

**Table 1.** Characteristics of Eligible Research Studies Aimed at Increasing Whole Grain Intake (n = 8)

Reference	Title	Participants Country	n	Type	Intervention Details	Outcomes
Arts et al <sup>22</sup>	A nutrition intervention to increase WG intake in college students	US	98	College students (aged 18–24 y, BMI > 18.5 kg/m <sup>2</sup> )	Increased awareness: point of selection signage and text messaging. 6-wk intervention, 6-mo follow-up	WG intake increased from baseline to follow-up (23 ± 31 to 31 ± 43g; P = .008) (40%)
Brownlee et al <sup>23</sup>	The impact of a 16-wk dietary intervention with prescribed amounts of WG foods on subsequent, elective WG consumption	UK	266	Aged > 18 y, BMI > 25 kg/m <sup>2</sup>	Prescribed WG 16-wk intervention (group 1: 60 g/d for 16 wk; group 2: 60 g/d for 8 wks followed by 120 g/d for 8 wk) on subsequent, elective WG consumption (1, 6, and 12 mo after intervention)	Control: 16–19 g WG intake (baseline, 1, 6, and 12 mo); intervention: WG intake at 47.1, 44.2, and 36.3 g/d (1, 6, and 12 mo). WG consumption significantly higher (approximately double) (P < .001) after intervention
Burgess-Champoux et al <sup>24</sup>	Healthy WG choices for children and parents: a multi-component, school-based pilot intervention	US	150	Parent–child pairs (child aged 10 y)	<i>Power of 3: Get Healthy with Whole Grain Foods:</i> 5-lesson classroom curriculum (identify WG foods, enhance selection, tasting and preparation, menu-planning skills, goal-setting, and advocacy for peers and family members School cafeteria menu modifications to increase availability of WG foods (menu planning, product procurement, training, and quality control) Family-oriented	WG consumption increased by 1 serving (P < .001), more WG foods were available in the cafeteria (P < .001), the ability to identify WG foods increased (P = .06), parenting role modeling increased (P < .001), and enabling behaviors (P < .05) were significantly greater

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**Table 1.** (Continued)

Reference	Title	Participants Country	n	Type	Intervention Details	Outcomes
					activities (newsletters and bakery and grocery store tours) to increase availability in home environment	
<b>Egger et al</b> <sup>25</sup>	Bread: it's a great way to go: increasing bread consumption decreases laxative sales in an elderly community	Australia		Retirement community, aged >55 y	Community organization strategy: media, community events, bread pricing, social marketing campaign Patient education strategy: pamphlet distributed to all patients aged >55 y attending general practitioner medical practice	58% increase in whole-meal/WG bread sales ( $\chi^2 = 67$ ; $P < .010$ ).
Ha, and Caine-Bish <sup>26</sup>	Interactive introductory nutrition course focusing on disease prevention increased WG consumption by college students	US	80	Healthy college students (aged 18–24 y)	Interactive introductory nutrition course focusing on disease prevention Three 50-min/wk sessions for spring session Lectures, interactive feedback, hands-on activities. Approximately 4 h spent on <u>WGs</u>	WG intake increased from 10 to 33 g ( $P < .001$ ) whereas total grain intake remained the same (87 g)
<b>Mancino et al</b> <sup>27</sup>	Getting consumers to eat more WG: the role of policy, information, and food manufacturers	US		US population	Quantification of WG consumption in 2005 Dietary Guidelines for Americans, media attention, increased availability, and reformulation of existing products to include more WG	23% increase in sales of WG breads and baked goods and 27% increase in sales of WG pasta

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**Table 1.** (Continued)

Reference	Title	Participants Country	n	Type	Intervention Details	Outcomes
Mejborn et al <sup>30</sup> and Greve and Nees <sup>29</sup>	WG intake of Danes 2011–2012 and the Evolution of the Whole Grain Partnership	Denmark		Danish population	WG PPP between regulatory authori- ties (legitimacy, specified target intakes of WG in dietary guidelines, codes of practice for product label- ing, educational materials), national nongovernmental organizations (legitimacy, research, evi- dence, awareness, public relations, and communica- tion activities) and industry (increased availability of new/ reformulated prod- ucts with higher WG, clear, consis- tent product label- ing, marketing, and communications).	WG consumption increased from 36 to 63 g/d/10 MJ (75%)
Van Kleef et al <sup>28</sup>	Nudging children toward whole wheat bread: a field experiment on the influence of fun bread roll shape on breakfast consumption	The Netherlands	1,113	Schoolchildren (aged 9–13 y)	National School breakfast event in which schoolchil- dren were free to choose type (white/ whole wheat) and number or bread rolls in regular/fun shapes, respectively	Presenting fun- shaped whole- wheat bread rolls alongside regular- shaped white bread rolls almost doubled consump- tion of whole-wheat bread ( $P = .001$ )

BMI indicates body mass index; WG, whole grain.

Note: Bolded references in the first column show intervention outcome measured in increased sales (which does not necessarily correlate with increased consumption).



WG knowledge base, and community events that provide tasting and preparation opportunities. Empowerment of food service providers, both in the home and outside it, is also paramount.

Successful interventions include multiple stakeholder involvement, specified target intakes in dietary guidelines, and codes of practice for labeling WG foods.

Public health interventions aimed at increasing WG intake have been undertaken in a variety of settings and employed various strategies. Interventions in education settings (schools<sup>24,28</sup> and colleges<sup>22,26</sup>) took advantage of a captive audience and recognized that lifelong eating habits may be instilled in young learners. Contrary to adult perceptions, children were accepting of WG foods,<sup>32</sup> with equal<sup>33</sup> or greater<sup>28</sup> enjoyment of WG foods when they were made more appealing. The characteristics of successful interventions in education settings included curriculum modifications to extend the WG knowledge base, tasting and preparation opportunities, menu planning, and involvement of both peers and family members.<sup>24</sup> Equally important characteristics of successful school interventions were education and capacity building of food service personnel and families who provided food.<sup>24,34,35</sup> Finally public relations campaigns such as family activities and WG events that normalized WG consumption contributed to the success of these interventions.<sup>36</sup>

In other settings, successful interventions provided WG foods to low-WG consumers, enabling familiarization with different WG foods.<sup>23</sup> Although this approach increased long-term elective consumption,<sup>23</sup> the cost and involvement of health professionals and/or food industry professionals (distribution of promotions and free samples) are unrealistic at a national level.

Changes in policy and manufacturing codes of practice have led to increased WG foods entering the

food supply.<sup>27,37</sup> However, increased awareness and engagement of industry alone do not necessarily correlate with increased WG consumption. For example, in Australia, the proportion of the population who met target intakes appeared to have remained at 30% over the past 5 years<sup>38,39</sup> although nonprofit and industry partners promoted daily target intakes for the past decade,<sup>12</sup> and more recently (July, 2013), a voluntary Code of Practice for WG Ingredient Claims was provided to the food industry.<sup>31</sup> In the US, changes to dietary guidelines, media attention, a WG stamp, and reformulation of products resulted in greater availability of WG products.<sup>27</sup> A small but significant increase in WG intake was realized from 17 g/d in 2003–2004 to 26 g/d in 2013–2014.<sup>40</sup> A combination of initiatives appears to be required for improvement.

Based on this review, the most successful intervention to increase WG consumption was the Danish PPP, which increased national WG consumption from 36 g/d/10 MJ (2000–2004) to 63 g/d/10 MJ (2014):<sup>29,30</sup> a 75% increase over a decade. The Danish PPP was a multifactorial, multiple-stakeholder intervention with multiple characteristics that proved to be successful. Specifically, this success included 3 types of stakeholders in the partnership:

1. Regulatory authorities responsible for specifying target intakes of WG in dietary guidelines; and codes of practice for manufacturers to abide by with product labeling and educational materials;
2. Nongovernmental organizations responsible for maintaining the evidence base supporting the health benefits of WG and raising awareness through public relations campaigns and communication activities;<sup>29</sup> and
3. Industry responsible for the increased availability of new or reformulated products with higher WG content, clear and consistent product labeling, specified by regulatory authorities, and marketing and communications.

The Danish PPP operated within the 5 key action areas of health promotion as specified in the Ottawa Charter<sup>41</sup> but differed from other interventions in this review in that the goal of building healthy public policies was critical to the success of that public health intervention on a national scale. Not only did a specified target intake in dietary guidelines prove beneficial, a code of practice endorsed by the government rather than industry or nongovernment organizations alleviated consumer skepticism.<sup>42</sup>

A final characteristic of successful interventions to increase WG intake was the use of social media and the Internet.<sup>22,43</sup> Internet-based interventions were convenient and flexible and enabled the instantaneous and inexpensive distribution of nutrition education; many people already used it as a source of health information.<sup>44</sup>

Any WG intervention needs a coordinated and comprehensive integrated contribution from all sectors (academia, government, trade and industry, and advocacy groups), disciplines (from plant geneticists through growers, product developers, distributors, and food service personnel), and, importantly, consumers.<sup>45,46</sup> Together, these stakeholders can influence the food supply chain, resulting in successfully developing healthier products with taste, convenience, and culture characteristics that the consumer demands while product innovation and renovation costs are minimized and risks are shared.<sup>45,46</sup> Viewed from the perspective of food systems, a fully functional supply chain influences the food environment, which ultimately influences consumer behavior;<sup>47</sup> hence, this approach needs to be adopted when considering public health interventions. However, a national food strategy would be required to provide a coordinated and comprehensive improvement in the food system to serve the health needs of the population better while making it economically viable, equitable, and resilient.<sup>48</sup>

This review yielded limited published information on successful public health interventions aimed at increasing WG consumption.

**Table 2.** Critical Appraisal Skills Program Cohort Study Checklist

Broad Issue	Appraisal Question	Arts et al <sup>22</sup>	Brownlee et al <sup>23</sup>	Burgess-Champoux et al <sup>24</sup>	Egger et al <sup>25</sup>	Ha, and Caine-Bish <sup>26</sup>	Mancino et al <sup>27</sup>	Mejborn et al <sup>30</sup> and Greve and Nees <sup>29</sup>	Van Kleef et al <sup>28</sup>
<i>Are the results of the study valid?</i>	1. Did the study address a clearly focused issue?	Yes	Yes	Yes	<b>Yes</b>	Yes	<b>Yes</b>	Yes	Yes
	2. Was the cohort recruited in an acceptable way?	Yes	Yes	Yes	<b>Yes</b>	No	<b>Yes</b>	Yes	Yes
	3. Was the exposure accurately measured to minimize bias?	Yes	Yes	Yes	<b>Yes</b>	Cannot tell	<b>Yes</b>	Yes	Yes
	4. Was the outcome accurately measured to minimize bias?	Yes	Yes	Yes	<b>Yes</b>	Yes	<b>Yes</b>	Yes	Yes
	5. (a) Have the authors identified all important confounding factors?	No	Cannot tell	Yes	<b>Cannot tell</b>	Cannot tell	<b>No</b>	Cannot tell	Yes
	(b) Are confounding factors considered in the design/analysis?	No	Cannot tell	Yes	<b>No</b>	No	<b>No</b>	Cannot tell	No
	6. (a) Was the follow-up of subjects complete enough?	Yes	Yes	Yes	<b>Cannot tell</b>	Yes	<b>No</b>	Yes	No
	(b) Was the follow-up of subjects long enough?	Yes	Yes	Yes	<b>Yes</b>	Yes	<b>Yes</b>	Yes	No
<i>What are the results?</i>	7. What are the results of this study?	40% ↑ WG ( <i>P</i> = .008) (to 31 g/d)	100% ↑ WG ( <i>P</i> < .001) (to 36 g/d)	100% ↑ WG (1 serving) (to 16 g/d) ( <i>P</i> < .001)	<b>58% ↑ WG bread sales</b> ( <i>P</i> < .010)	> 200% ↑ WG ( <i>P</i> < .001) (to 33 g/d)	<b>23% and 27% ↑ WG bread and pasta sales</b>	> 75% ↑ WG (to 63 g/d/10 MJ)	100% ↑ whole-meal bread rolls
	8. How precise are the results?	Low	Low	Low	<b>Low</b>	Low	<b>Low</b>	Low	Low
	9. Do you believe the results?	Yes	Yes	Yes	<b>Yes</b>	Yes	<b>Yes</b>	Yes	Yes
<i>Will the results help locally?</i>	10. Can the results be applied to the local population?	Yes	Yes	Yes	<b>Yes</b>	Yes	<b>Yes</b>	Yes	Yes
	11. Do the results of this study fit with other available evidence?	Yes	Yes	Yes	<b>Yes</b>	Yes	<b>Yes</b>	Yes	Yes
	12. What are the implications of this study for practice?	Education setting, age 18–24 y	Unrealistic: food provision	Education setting, school, good, detailed protocol	<b>Elderly population, laxation as driver</b>	Education setting, age 18–24 y	Policy important driver to ↑ WG supply	Public private partnerships show success	Education setting, school

↑ indicates increase; WG, whole grains.

Notes: Bolded values indicate interventions whose outcome is measured by an increase in sales (which does not necessarily correlate with an increase in consumption).



Furthermore, there was a lack of consistent and standardized measurement of WG intake, both at baseline and after the intervention. Without a measurable outcome, some interventions were unable to be included in the synthesis, although many organizations around the globe worked hard to promote WG intake. For example, in the US, Oldways Whole Grains Council holds WG challenges,<sup>13</sup> sampling days,<sup>14</sup> and conferences<sup>15</sup> to promote WG intake (C. Harriman and K. Toups, written communication, 2017), and in the Philippines, partnerships to make brown rice more affordable<sup>16</sup> and campaigns<sup>17,18</sup> have been undertaken to promote WG intake actively. Singapore has also undertaken various initiatives such as the *Healthier Hawker Centre Program*.<sup>19</sup> However, the effectiveness and reach of these interventions were unclear; hence, it was difficult to ascertain their level of success and draw on the relevant characteristics to achieve positive outcomes.

## IMPLICATIONS FOR RESEARCH AND PRACTICE

Interventions aimed at increasing WG consumption may benefit from incorporating all components of the food system: the food supply chain, surrounding environment and consumers, with partnerships including public and private, or with multiple stakeholders forming the basis for the collaboration between stakeholders and targeting multiple points in the socioecological food provision system.

Interventions aimed at increasing WG consumption should incorporate all components of the food system.

To ensure interventions can be measurable, scaled, and available to multiple groups for use, evaluated interventions might be captured in a standardized manner in a searchable

online database. This would include a consistent measurement of WG intake (grams per day or a consistent definition of WG foods and their intake) performed at baseline and after the intervention. Such information sharing would enable health professionals globally to plan local interventions across different cultural settings, by drawing on best practice adopted elsewhere. The dissemination and technology transfer module of the HEALTHGRAIN project<sup>49</sup> may provide such a platform.

Evaluated interventions should be captured in a standardized manner in a searchable online database. This would include consistent measurement of WG intake.

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## Call for SNEB Position Paper Topics

Position papers provide a comprehensive discussion of SNEB's policy on one or more topics. Containing extensive background information and analysis, the position paper provides a more complete understanding of the issues and the reason behind the positions(s) set forth by the organization.

To have a topic considered for next year, send a proposal with the following information:

- Statement of position (in one or two sentences)
- Background and rationale for proposed position (~1.5 pages, single spaced)
- Objectives (eg, "to provide evidence for effectiveness of school cafeteria-based interventions on increasing fruit and vegetables intake among children and youth.) Typically, multiple objectives are submitted targeting major segments of the proposed topic.
- Key points (to serve as an outline for the position; accompanying peer-reviewed citations for each point should be included)
- Reference list
- Suggested authors
- Collaborating organizations and type of collaborations, if applicable (eg, joint development with another society)

to JNEB's Editor-in-Chief, Karen Chapman-Novakofski, PhD, RDN ([kmc@illinois.edu](mailto:kmc@illinois.edu)) by **October 1, 2018**.

The position paper committee will review each submitted topic and rationale and decide on topics that will be forwarded to the SNEB Board of Directors (BOD) for vote. Once topics are approved by the BOD, authors and reviewers will be invited. SNEB position papers will be peer reviewed and published in JNEB.