Dorothy Nguyen

**Developing a Culturally Relevant Nutrition Education Curriculum for Low-Income, Community-Dwelling Older Adults**

A Capstone Report

Submitted in partial fulfillment of the requirements for the degree of

Master of Public Health in Public Health Nutrition Practice

University of Washington

2021

Capstone Advisors: Lina Pinero-Walkinshaw and Michelle Averill

Program Authorized to Offer Degree:

Nutritional Sciences Program

School of Public Health

# Acknowledgements

This project would not be possible without the support of my advisors, Lina Pinero-Walkinshaw and Michelle Averill. I am extremely appreciative of their ongoing support and advice throughout this project, and I cannot thank them enough for their help. A huge portion of the success of this project is also attributable to my wonderful project partner Sarah Perlin. Sarah’s support throughout this project, especially during the chaos of the COVID-19 pandemic and the ups and downs of our dietetic rotations, was immeasurable and I could not have done this without her.

I also want to extend a huge thank you to Elliot Swanson for his continued guidance and insight throughout this project. I am very grateful for the time he took before, during, and after his paternity leave to meet with Sarah and I to discuss the project, and mentor us as we developed the curriculum. I am also thankful to all of the Bellwether staff and residents who participated in this project. This project could not have been accomplished without their feedback and support.

Lastly, this project could not have been completed without the emotional support from my wonderful roommates Taylor, Emily, Khali, Tonks, Kobe, Anna, Elsa, Sifu Toph, Firelord Zuko, Appa, Jennie, Lisa, and Rosie.

Table of Contents

[Acknowledgements 2](#_Toc71988988)

[Chapter I: Introduction 5](#_Toc71988989)

[Chapter II: Older Adults and Nutrition Risk 7](#_Toc71988990)

[Physical Changes 7](#_Toc71988991)

[Mental Health 8](#_Toc71988992)

[Food Access, Food Security, and Chronic Disease 9](#_Toc71988993)

[Chapter III: Bellwether Housing – Mission and Residents 11](#_Toc71988994)

[Background and Mission 11](#_Toc71988995)

[Older Adult Residents 11](#_Toc71988996)

[Current Resources Available and Gaps in Supportive Services 12](#_Toc71988997)

[Chapter IV: Adult Learning Theories and Nutrition Education 14](#_Toc71988998)

[Social Cognitive Theory 14](#_Toc71988999)

[Theory of Planned Behavior 15](#_Toc71989000)

[Malcolm Knowles’ Andragogy 16](#_Toc71989001)

[Chapter V: Existing Nutrition Education Programs and Interventions 17](#_Toc71989002)

[Prior Theory-Based Interventions 17](#_Toc71989003)

[Additional Components of Successful Nutrition Interventions 19](#_Toc71989004)

[Discussion of the Literature 21](#_Toc71989005)

[Chapter VI: Methods 23](#_Toc71989006)

[Phase 1: Needs Assessment 23](#_Toc71989007)

[*Survey Development* 23](#_Toc71989008)

[*Survey Implementation* 24](#_Toc71989009)

[*Survey Analysis* 25](#_Toc71989010)

[Phase 2: Curriculum Development 27](#_Toc71989011)

[*Topic Selection* 27](#_Toc71989012)

[*Evidence-Based Class Development* 27](#_Toc71989013)

[*Pilot Classes* 28](#_Toc71989014)

[Chapter VII: Curriculum and Instructor Guide 30](#_Toc71989015)

[Overview 30](#_Toc71989016)

[Class Descriptions 30](#_Toc71989017)

[Chapter VIII: Curriculum Delivery and Next Steps 34](#_Toc71989018)

[Chapter IX: Conclusion 36](#_Toc71989019)

[Appendix 37](#_Toc71989021)

[Box 1. Nutrition and Activity Survey 37](#_Toc71989022)

[Table 1. Quantitative Survey Responses 42](#_Toc71989023)

[Table 2. Summary Statements and Qualitative Survey Results 45](#_Toc71989024)

[Table 3. Curricula Used to Inform Lesson Plans 48](#_Toc71989025)

[References 49](#_Toc71989026)

# **Chapter I: Introduction**

The purpose of this project was to create a resident-informed nutrition education and physical activity curriculum for senior residents of Bellwether Housing. The population of older adults within the United States is rapidly increasing. The U.S. Census Bureau defines older adults as adults over 65 years of age.1 Between 2010 and 2019, this population increased by 34.2% within the United States. In King County alone, the proportion of older adults increased by 16.6% during this time period.2 The growing proportion of older adults presents unique public health issues because older age is associated with increased nutrition risks. In addition, multiple socioeconomic factors can layer on to present additional health and nutrition-related challenges.3 These barriers must be addressed on systemic, community and individual levels in order to support healthy aging. Although systemic and community issues are important to recognize and discuss, this project will focus on individual level issues and interventions.

Nutrition education for older adults is particularly important to discuss because it is associated with many positive health outcomes. The Academy of Nutrition and Dietetics (AND) highlights the importance of tailored nutrition education for older adults that are appropriate for their respective medical conditions, cultural diversity, and unique needs and preferences.4 Positive changes in nutrition and dietary intake can also help to promote longevity and quality of life, two primary motivators for many older adults.5 An added benefit of improved nutrition is the alleviation of healthcare spending associated with chronic disease management.5 Therefore, nutrition education interventions present the potential for a multifaceted range of benefits among the older adult population and the country at large.

Bellwether Housing is the region’s largest non-profit low-income housing provider. They serve a diverse population of individuals and aim to increase access to opportunities by through affordable housing. This project and its accompanying nutrition education and physical activity curriculum was developed in collaboration with Sarah Perlin, as part of our Nutritional Sciences Master’s in Public Health capstone project. The focus of this project was to identify nutrition and physical activity risks for residents of Bellwether Housing, and to design a curriculum that addresses these issues at an individual level. This report will focus on nutrition issues related to aging, while Sarah Perlin’s report will explore the challenges related to physical activity in older adults.

The objectives of the overall project were to:

1. Perform a literature review of nutrition and physical activity risks that are common amongst older adults.
2. Conduct a needs assessment amongst residents of Bellwether Housing in order to elucidate gaps in nutrition and physical activity knowledge and identify topics to include in our curriculum.
3. Identify best practices from prior nutrition and physical activity education interventions aimed at older adult learners.
4. Develop a culturally appropriate and relevant nutrition and physical activity curriculum for older residents of Bellwether Housing.

The objectives of this report were to:

1. Identify different nutrition risks and concerns related to aging, with an emphasis on individual level concerns.
2. Discuss older adult learning theories.
3. Describe the process of creating a culturally relevant nutrition education curriculum for senior residents of Bellwether Housing.
4. Present the final curriculum and describe the final classes that were created for Bellwether Housing.

Definitions provided by the United Nations to describe the aging population that will be used throughout this report include:6

1. “Young old”: adults between 60 to 70 years

2. “Old”: adults between 70 to 80 years

3. “Oldest old”: adults are over 80 years.

Adults in the “young old” category are often more active and have better physical health, while adults in the “old” and “oldest old” categories are more affected by chronic diseases and disabilities.6

# **Chapter II: Older Adults and Nutrition Risk**

Nutrition risk is defined as the presence of different factors that can impair food intake and lead to malnutrition if not resolved.7 Nutrition risk is important to consider when discussing older adult health because many different factors can influence the nutritional status of this population. On an individual level, physical changes associated with aging, changes in mental state, and the development or progression of chronic disease can place older adults at higher levels of nutrition risk. On a systemic level, food access and food security can also significantly impact the health and nutrition status of older adults. This chapter will discuss different physical and mental health consequences associated with increased nutrition risk in older adults.

## *Physical Changes*

Common physical changes associated with aging include changes to body composition, changes in digestion and nutrient absorption, and difficulties with chewing and swallowing. Multiple cross-sectional studies have found that body weight often increases in young old adults but declines in old and oldest older adults.8 The specific mechanisms through which these changes occur may vary across individuals, but studies have demonstrated that in general, body weight increases as muscle mass decreases and fat increases. Many factors can influence these changes in body composition and the observed increase in fat deposition in older adults. For example, reductions in physical activity, changes in hormone levels, and declining metabolic rates can contribute to fat deposition.8 Although weight can naturally fluctuate as nutrient requirements change and individuals enter different phases of their life, fat deposition can be concerning if it occurs alongside muscle wasting. This concern is due to the fact that increased muscle loss is associated with increased risk for disability and injury in older adults, and can lead to functional dependence as well.9

Weight loss is a more common concern in old and oldest old adults. Studies have found that increased age is associated with declines in appetite and food consumption.8 According to a study by Wurtman and colleagues, the average daily intake of food declined as much as 30% in individuals at 80 years of age compared to those at 20 years of age.10 The causes of this decline are multifactorial, but the three most common etiologies for weight loss in older adults include wasting, cachexia, and sarcopenia.8 In addition, changes in the gastrointestinal tract can lead to nutrient malabsorption or a reduction in appetite. For example, studies have found that older adults are often deficient in selenium, vitamin B6, and vitamin B12 because of changes related to decreased digestive enzyme production and changes in gut composition and absorptive surfaces.11 Drug-nutrient interactions are also a common cause of concern for older adults and result in many different nutrient deficiencies.11 Issues with nutrient absorption are concerning because severe deficiencies in the aforementioned nutrients can lead to weakened immunity and impaired neurological function.12 Lastly, some older adults may experience dry mouth and difficulties with swallowing food, which can lead to decreased food intake as well.13 This is especially concerning if older adults are not able to consume enough protein to support their energy needs and prevent further muscle wasting.9

## *Mental Health*

Changes in mental state associated with social changes and isolation can also impact the nutrition risk of older adults. According to Algren and colleagues, social relationships are an incredibly important determinant of health, and social isolation is associated with worse health outcomes.14 This is particularly concerning for older adults because the rates of social isolation are highest amongst older adults. According to a cross sectional analysis by Cudjoe and colleagues, one out of every four adults living in a community dwelling in the United States is socially isolated.15 Rates of social isolation increase when factors such as geography, marriage status, gender, educational attainment, and socioeconomic status are considered. In particular, being unmarried, male, having lower educational attainment, and lower income are associated with increased risk of social isolation.

The mental toll of social isolation can translate to several nutrition risks. According to a longitudinal cohort study by Kobayashi and Steptoe, older adults who were socially isolated were less likely to eat five servings of fruits or vegetables per day and were more likely to be smokers.16 An additional study by Whitelock and Ensaff explored themes surrounding food intake and isolation through various focus groups conducted with participants attending community centers in the northern United Kingdom.17 The authors found that the degree to which participants had support with food and maintained independence were important determinants of their food intake. The authors also explored the psychology of isolation and reported reasons why eating and health behaviors change during periods of isolation. For example, multiple participants reported that a lack of support in purchasing or cooking food often led to participants consuming less food. Reasons for lack of support included a lack of transportation to purchase food and a lack of social settings to share the experience of eating. Many participants also reported that the experience of cooking for one was often disheartening because they were used to cooking for families or partners, and the loneliness that accompanied single meals led to losses of appetites. However, many participants maintained that they wanted to live independently and that they did not want others “arranging their lives.” Psychological and mental health factors can compound the nutrition risks caused by physical changes associated with aging.

## *Food Access, Food Security, and Chronic Disease*

Food security status is closely tied to nutritional risk; the ability to access nutrient dense foods and consume them is crucial to health maintenance. According to a study by Joseph Sharkey, homebound older adults who are food insecure are more likely to unintentionally lose weight over a 6-month period compared to homebound older adults who are food secure.18 In addition, older adults who are food insecure are more likely to consume fewer servings of fruits, vegetables, and milk per day compared to food secure older adults. Food insecurity is also shown to be positively associated with social isolation among seniors.19

Food insecurity can exacerbate challenges related to chronic disease management and increase the nutrition risk of older adults diagnosed with multiple chronic conditions. Currently, about 75% of older adults are diagnosed with two or more chronic health conditions. As the proportion of older adults in the United States increases and medical advances allow for increased longevity, the prevalence of chronic diseases such as hypertension, cardiovascular disease, kidney disease, and diabetes rises as well.20 The costs associated with managing chronic disease conditions can often put a strain on individual or household budgets.21 This is concerning because many older adults, particularly low income older adults, may be put in a position where they need to compromise on healthcare or food spending. A study by Jih et al found that chronic disease burdens can strain the budgets of low-income older adults, increase their risk of food insecurity, reduce their adherence to necessary medications, and ultimately contribute to worsening health status.21

Seligman and colleagues further explain food insecurity as a cycle; as difficult times arise for food insecure individuals, the foods that are most accessible and available are often foods high in refined carbohydrates and saturated fats.22 Although these energy dense choices satisfy hunger, they can significantly affect an individual’s ability to blood sugar and overall health status. In times of shortage, skipping meals and consuming smaller portions may also become necessary. In times when food is more abundant, patterns of consuming large portions may result in efforts to make up for previous shortages. When these patterns repeat consistently over time, stress hormone responses, including increased cortisol levels, and associated metabolic consequences can lead to increased disease development risk among older adults.

Although this capstone project does not directly address food insecurity, an awareness of food insecurity and its influence on health outcomes is necessary because it provides a framework for understanding the need for individual level nutrition education. A lack of knowledge of health management behaviors or skills can often exacerbate the observed cycle of food insecurity.22 Individual level nutrition education can provide older adults with the coping mechanisms and skills needed to manage the stress related to food insecurity, improve their overall mental health, and successfully control a variety of chronic disease conditions.23

# **Chapter III: Bellwether Housing – Mission and Residents**

 Bellwether Housing is uniquely equipped to provide nutrition education classes to older residents. In addition to having physical spaces and cooking equipment that can support nutrition education classes, Bellwether has several buildings dedicated to serving older adults and providing a variety of resources to residents. Additional information regarding Bellwether’s mission and population served is described in this chapter.

## *Background and Mission*

 Bellwether Housing was founded in order to provide affordable housing to low-wage workers in the Pacific Northwest. Bellwether currently serves over 3,500 residents living in 2,100 homes. Homes are located in apartment buildings strategically built near transit centers, workplaces, and schools in order to provide residents with increased opportunities. Residents of Bellwether are diverse and include low-income older adults, families, immigrants, individuals recovering from homelessness, and young professionals just starting in their careers.

The mission of Bellwether is to provide affordable housing and contribute to the creation of stable communities and access to opportunities. Bellwether also offers classes and outreach programs to help connect residents to a variety of different resources. In addition to providing individual-level opportunities, Bellwether is committed to anti-racism and is attempting to dismantle the region’s history of housing segregation and redlining. Bellwether recognizes that affordable housing and housing justice is racial justice, and their work addresses multiple levels of the socioecological model.

## *Older Adult Residents*

Bellwether currently operates three buildings, totaling around 300 units, dedicated to older adult residents – Meridian Manor, Security House, and First and Vine. In order to qualify to live in these buildings, applicants must earn less than 30% of the area median income and be 65 years of age or older or disabled. Most residents of these buildings are between 70 and 80 years of age. Residents also come from diverse ethnic backgrounds and cultures, and speak many different languages, including Mandarin, Ukrainian, Amharic, Korean, Russian, and more. All residents are very low income, and some currently have zero income. Many residents are currently living with chronic conditions such as diabetes, respiratory issues, and heart disease. Although these conditions are managed by their healthcare providers, residents have expressed interest in nutrition education classes in order to learn more about how to preserve their health and maintain their independence.

Maintaining independence in old age can be accompanied by a host of challenges. According to a qualitative study by Petroka and colleagues, older adults living in subsidized housing reported that food cost, accessibility, physical limitations, and a lack of motivation to change, coupled with a desire for convenience, often prevented them from consuming nutritious foods.24 Participants also reported that dietary recommendations for healthy eating provided by their practitioners often felt too restrictive and overwhelming. Additional barriers to meeting nutritional needs included lack of transportation, lack of accessible recipes, and difficulties in food preparation. However, participants in this study stated that they were interested in community-based classes and programs that were focused on nutrition, food, and health. In addition to addressing nutrition risk and food intake, the community nature of these classes can facilitate expanding social support networks for older adults. Many participants were also interested in learning how their cultural foods could be included in healthy and balanced diets. The authors suggested that incorporating cultural foods into meals can help to reinforce health promotion efforts. A separate AARP survey of older American adults found that a majority of community-dwelling adults over 65 years of age preferred to remain in their local community for as long as possible and avoid moving to assisted living facilities.25 Given Petroka et al’s findings, the results of the AARP survey, and the interest in nutrition education expressed by residents to Bellwether staff, Bellwether has an opportunity to expand the resources that it provides to older adults and help residents to continue living independently.

## *Current Resources Available and Gaps in Supportive Services*

 Bellwether currently offers a variety of classes geared towards helping older adults maintain their independence. The management of these classes is the responsibility of each building’s on-site service coordinator. Service coordinators provide referrals, connect residents to services that allow them to age in place with dignity, and organize community events such as piano concerts, bingo games, and birthday celebrations. Previous classes organized by resident services coordinators include entitlement program education classes, language classes, and citizenship classes. The entitlement program education classes have helped residents to understand the benefits of Medicare, Medicaid, Social Security, and other services. These courses have evolved over time, and service coordinators have helped residents to fill out enrollment forms and provide them with referrals for additional services. Similarly, language classes are offered for residents who do not speak English as their first language. Although the main goal of these classes is to teach English to residents, these classes have a secondary goal of connecting residents and fostering communication between residents in order to reduce feelings of isolation and strengthen the community. Most of the classes offered through Bellwether are intended to provide culturally relevant resources to residents while fostering a strong community.

 Despite the robust selection of resources that are available for older residents, Bellwether currently does not offer nutrition education classes for this population. Residents have repeatedly expressed interest in these types of classes to service coordinators, and research has identified several positive outcomes of nutrition education for older adults. Therefore, the goals of this capstone project were to identify the specific nutrition needs of Bellwether’s older adult residents, and to develop a culturally appropriate and relevant series of classes for residents.

# **Chapter IV: Adult Learning Theories and Nutrition Education**

To create a relevant nutrition education curriculum, adult learning theories were investigated. Research has found that curricula based in behavior change theory are more likely to encourage positive changes in health behavior compared to curricula that did not apply theory.26 Specifically, the Social Cognitive Theory, the Theory of Planned Behavior, and Malcolm Knowle’s Andragogy were commonly used to direct curricula development. A careful consideration of a population and different possible drivers of behavior change can help to determine which theory should be used to guide the planning process for a nutrition education program.

## *Social Cognitive Theory*

In educational settings for older adults, the Social Cognitive Theory (SCT) is commonly used. SCT is a theoretical framework that describes human behavior and learning as dependent on a combination of personal attributes and one’s surrounding environment.27 The core construct of social cognitive theory (SCT) is reciprocal determinism, which dictates that cognitive, behavioral, and environmental factors interact with one another in a dynamic and reciprocal manner to shape behavior.28 Personal characteristics that are highlighted by the SCT include self-efficacy, which is the confidence in one’s own ability to carry out a behavior, and behavioral capability, which is the acquisition of knowledge that is necessary for the performance of a specific behavior.27 Other constructs of SCT include observational learning, reinforcements, and expectations.29 Observational learning states that individuals can witness a behavior and reproduce it; reinforcements refer to different cognitive, behavioral, or environmental factors that affect the likelihood of an individual continuing a behavior; expectations are the anticipated consequences or benefits of a behavior.

SCT is a popular framework for adult learning interventions because it emphasizes multiple levels of the socioecological model[[1]](#footnote-1). SCT also takes social influence and an individual’s past experiences into consideration. The concepts of reciprocal determinism, self-efficacy, reinforcements, and expectations are important because they address different factors that may affect the way in which individuals acquire or maintain certain behaviors. In addition, SCT’s focus on behavior maintenance is important because the goal of many education and intervention programs is to see sustained change within a population. However, SCT does not directly address an individual’s motivation for behavior change. Intentions behind change can be powerful tools to initiate behavioral changes, and the following theories will further discuss the role of motivation in adult learning.

## *Theory of Planned Behavior*

The Theory of Planned Behavior (TPB) was also used to inform the development of several interventions, and focuses more on the motivations of individuals that influence behaviors.27 The TPB states that behavior change depends on both motivation and ability or behavioral control. An individual’s ability to control their behavior is dependent on the follow constructs:31

1. Attitudes: an individual’s consideration of the favorable or unfavorable outcomes of a behavior.
2. Behavioral intention: the motivational factors that drive an individual to perform a behavior.
3. Subjective norms: an individual’s beliefs about how they will be perceived for engaging in a certain behavior.
4. Social norms: normative codes of behavior in a group or larger cultural context.
5. Perceived power: factors that may encourage or hinder an individual’s ability to perform a certain behavior.
6. Perceived behavioral control: an individual’s perception of ease or difficulty in performing a certain behavior.

The TPB has been favored in adult learning interventions because it draws attention to the attitudes and motivators behind behavioral changes. In addition, it weighs the social risks and benefits of the outcomes of certain behavioral changes. However, the TPB does not address different levels of the socioecological model in the same manner as the SCT. Thus, many nutrition education interventions have used a combination of SCT and TPB to direct curricula development.

## *Malcolm Knowles’ Andragogy*

Compared to TPB and SCT, Malcom Knowle’s andragogy is a newer theory of behavior change, and is based off several important assumptions that are highly significant for adult learners. 26,32 Most notably, it assumes that adult learners are more independent and self-directed than younger learners. As a result, adults should be provided a safe learning environment where they can set their own goals and evaluate their progress. In addition, this theory assumes that adult learners have a wealth of life experiences that they can draw from. Other tenets of this model include the notion that learning should be geared towards a participant’s unique learning style and that the number of new concepts introduced in a class session should be limited.

These principles are important to keep in mind when designing curricula for adult learners because they imply that while the instructor holds the responsibility of providing resources to students, the resources and material are not imposed on students. Rather, the learning experience is self-directed.

# **Chapter V: Existing Nutrition Education Programs and Interventions**

The use of behavior change theories in nutrition education interventions highlights the strengths of considering human behaviors in curriculum development. This chapter will discuss how nutrition education has been delivered in previously developed interventions, and the tenets of different learning theories that allowed prior nutrition education interventions to be successful. Additional non-theory-based components that allowed for the successful delivery of various nutrition education and general health promotion interventions are also discussed in this chapter.

## *Prior Theory-Based Interventions*

A nutrition education intervention study by Anderson et. al found that one intervention based in SCT was successful in mediating the purchase and consumption of foods with higher nutrition content amongst a population of rural adults.33 The authors collected data on participants’ nutrition-related social support, self-efficacy, and outcome expectations, as well as their purchase and consumption of fat, fiber, fruits, and vegetables. Analyses revealed that participants’ social support, self-efficacy, outcome expectations, and self-regulatory behavior mediated their nutrition behavior and consumption of fat, fiber, fruits, and vegetables. The authors concluded that interventions aimed at promoting healthier food choices and providing nutrition education need to address social support, increase participants nutrition related self-efficacy and knowledge, and assist participants in overcoming negative outcome expectations.

The *5 a Day, the Rio Grande Way* website study by Buller et. al demonstrates how the values highlighted by Anderson et. al can be implemented in practice.34 The authors of this study evaluated whether a web-based intervention rooted in SCT and TPB could increase fruit and vegetable consumption in a population of rural, multicultural adults living in the Upper Rio Grande Valley.34 The website was designed to provide skills and knowledge regarding healthy eating, convince participants that fruits and vegetables could be easily incorporated into their lives, create beliefs and goals that could help to facilitate behavior change, produce perceptions that diet changes are normal and supported by local communities, motivate participants to act, and finally, connect dietary changes to current dietary habits. Participants in the intervention group received immediate access to the website, while participants in the control group received delayed access to the website. A food frequency questionnaire was administered at baseline and 4 months. The authors found that participants in the intervention group increased overall fruit and vegetable intake by a marginal amount compared to the control group. The delivery of the intervention, its online nature, and the minimal contact with study participants may have impacted the study outcomes. Nonetheless, the results suggest that the combination of SCT and TPB for certain nutrition education topics can successfully result in behavior change. Participants who explored the website in more depth – particularly the sections related to health benefits associated with fruit and vegetable consumption, seasonal fruits and vegetables, and buying, storing, and preparing fruits and vegetables – reported higher fruit and vegetable intake at the end of the study compared to participants who spent less time on the website.

Although the results of the studies by Anderson et. al and Buller et. al are promising, they are shorter-term studies that have not undergone rigorous evaluation. These studies are important because they highlight how SCT and TPB can be used in nutrition interventions, but the learning theories used in these studies are not applied to any type of curriculum or series of classes. A closer look at adult learning theories in nutrition education curricula is needed in order to understand how various tenets of adult learning theories are woven throughout a curriculum, and how different tenets are used to encourage behavior change over time.

A notable nutrition education program that has successfully incorporated tenets of SCT and Malcolm Knowle’s andragogy is the Expanded Food and Nutrition Education Program (EFNEP). The goal of EFNEP is to provide nutrition knowledge and facilitate behavior changes related to cooking and shopping for food in low-income adults and families.26,35 EFNEP’s Eating Smart ● Being Active (ESBA) curriculum is used nationally in rural and urban settings, and is taught by paraprofessionals at a variety of different locations. The program curriculum is composed of 8 lessons, and each lesson draws upon tenets of Social Cognitive Theory and Malcom Knowles andragogy. Some of the lesson topics include physical activity, smart shopping, fruits and vegetables, whole grains, proteins, and strong bones.

An evaluation of the ESBA curriculum used at various locations in California, Iowa, Colorado, and South Carolina found that the curriculum adhered to the core tenets of SCT (expectations, self-control, environment, overcoming emotional responses, use of reinforcements, self-efficacy, and observational learning), and Malcolm Knowle’s andragogy (learning is adapted to participants needs, learning is self-directed, the number of new concepts introduced are limited, learning built on prior experience, and the learning environment was safe).26 The evaluation and validation of the ESBA curriculum in relation to SCT and Malcom Knowles Andragogy demonstrates the strength of this program and its potential in educating adults and bringing about behavior changes. An additional evaluation of the Iowa EFNEP program further supports the effectiveness of the curriculum. According to a pre- and post- evaluation of the Iowa ESBA program, following the program, participants demonstrated improvements in dietary intake.36 Specifically, an increase in the number of servings of protein, dairy, vegetables, bread, and fruit were observed. Similarly, participants consumed more fiber, calcium, magnesium, potassium, and vitamins A and C following the intervention compared to before.

Separate studies further highlight how components of Malcolm Knowle’s andragogy can influence the delivery of nutrition education. In a diabetes intervention and nutrition education study, researchers Dambha-Miller et al highlighted the importance of limiting class content to several main ideas per session for subjects. Main ideas were reinforced in a variety of hands-on activities throughout the session to promote learning.37 Similarly, Thomas and colleagues found that participants that attended a rural congregate meal site preferred to learn through active learning strategies; many of the participants were unsatisfied with the use of a take-home booklet to receive nutrition information, which was the primary method of education in this intervention.38 Incorporating lessons throughout mealtime to encourage discussion and active participation may have helped make the material more interesting to participants. This focus on participants’ learning styles echoes the tenet from Malcolm Knowle’s andragogy that states that learning should be geared towards participants’ needs.

## *Additional Components of Successful Nutrition Interventions*

Several non-theory-based components of existing nutrition education interventions have contributed to successful outcomes for older adults. Method of content delivery and cultural relevance have been found to be crucial in facilitating behavior change.39

A study conducted by Parker and colleagues attempted to discern the preferred nutrition education delivery method for community living older adults in rural Oklahoma.40 All participants were enrolled in Oklahoma’s Community Nutrition Education Program (CNEP). Participants in this study were asked to review a lesson regarding Food Safety. This lesson was presented to all participants in three different formats: a video (which featured an older adult), a PowerPoint presentation, and a handout. Following these lessons, participants completed a questionnaire about their preferred educational delivery method. An analysis of the survey results found that participants preferred the video lesson over the PowerPoint presentation and the handout. Upon further investigation, the researchers found three main reasons why participants preferred the video lesson: greater ability to relate, more attention-grabbing aspects, and increased ability to engage multiple senses. The authors ultimately recommend that future educational interventions aimed at older adults should incorporate videos or images (that depict older adults in various real-life scenarios, if possible). In addition, lessons should involve multiple senses and be interactive. Lastly, handouts should be given as reinforcements to the lessons that adults can follow at home. The use of several modes of information delivery in this example highlights the necessity of considering the target population in curriculum planning and gearing lessons towards participants’ preferred learning styles. Strategies specifically targeted towards active learning have been shown to be successful in the older adult population to instill behavior change, while prioritization of the preferences of the target population will likely help improve investment in the material.40,41

Cultural relevance is also vital to consider in nutrition education interventions. Considering cultural beliefs and past experiences of audience members in the planning of sessions can help to make the material more relevant and accessible for audience members, and help them to take more out of the experience.5 Cultural relevance was considered in a diabetes management and nutrition intervention program conducted amongst participants at an Older Americans Act Nutrition Programs (OOANP) congregate dining site in Georgia. Redmond and colleagues developed culturally relevant pre- and post-tests to assess knowledge and behavior changes. The results of these tests were also used to develop a culturally relevant and appropriate curriculum for congregate dining participants. 42

In addition to incorporating cultural relevance into a curriculum itself, it is vital to consider the value of diverse lived experiences and knowledge bases. In a nutrition intervention related to cardiovascular disease risk, Klinedinst et. al included culturally sensitive ways to flavor food for participants. This inclusion ultimately prompted a discussion amongst subjects about creating delicious, flavorful, low-sodium, and low-fat dishes with spices and varying cooking techniques.43 By providing an inclusive environment, more diverse members of the community were able to contribute recipes and ideas for flavoring foods. The sharing of knowledge and social connection that resulted in this study highlights the importance of considering cultural relevance and the benefits of giving space for subjects to share their own unique knowledge and skills. This opportunity for discussion echoes tenets of Malcolm Knowle’s andragogy and highlights the importance of including active learning activities to enforce behavior changes. Taking cultural relevance into account will likely promote knowledge acquisition and behavior changes among participants, as the material will be more inclusive and relevant to those being targeted.

## *Discussion of the Literature*

Several important themes regarding the content and delivery of nutrition education arose through the review of the literature. First, interventions based in learning theory are often more successful in facilitating behavior change than interventions not rooted in learning theory. Specifically, tenets of SCT and Malcolm Knowles andragogy were successfully used in multiple interventions, such as the ESBA curriculum, Dambha-Miller et. al’s study, and Thomas et. al’s study, to encourage behavior change. Social support was provided to participants, self-efficacy and outcome expectations were discussed, learning was adapted to the participant’s needs, learning was self-directed, and learning was built on the participant’s prior experiences. In addition, the validation of the ESBA lessons highlighted the value of this curriculum as a model for this capstone project. Given that this curriculum is also targeted towards low-income adults who face food insecurity and increased health risks, a similarly designed curriculum will be particularly relevant for Bellwether residents.

In addition, specifying nutrition interventions based on the needs and interests of the target audience were key to successful outcomes. Parker et. al highlighted the importance of different methods of content delivery in their study. A consideration of both the nutritional status of a target population and their specific interests in the realm of food and nutrition were also demonstrated to help make nutrition education material more applicable to older adult audiences; this was best achieved through learning about the audience as much as possible prior to the intervention and incorporating aspects of cultural relevancy into the intervention.42–44 In addition, interventions and curricula that were designed to be interactive and encourage active learning resulted in the greatest degree of behavioral changes. 37,38,40,43

The nutrition and physical activity curriculum for Bellwether Housing was informed by the successful components of previously developed nutrition education curricula. In addition, given that Bellwether Housing serves a large population of diverse older adults, special consideration was given to the needs of this population. A survey was developed to elucidate resident needs, and the nutrition education curriculum was tailored towards preventing common nutrition risks within this population, addressing cultural relevancy, and providing social support.

# **Chapter VI: Methods**

This capstone project was completed in two phases: (1) a needs assessment, and (2) curriculum development. During the needs assessment phase, we developed, implemented, and analyzed a resident survey. During the curriculum development phase, we selected curriculum topics, and developed, piloted, and finalized classes.

## Phase 1: Needs Assessment

In Phase 1 of this project, we conducted a Needs Assessment with Bellwether Housing residents in order to understand nutrition preferences and interest in nutrition education classes.

### *Survey Development*

The needs assessment survey was developed after a review of validated, evidence-based nutrition risk and food security surveys. The goals of the needs assessment survey were to:

1. Learn about residents’ interests related to nutrition and physical activity.
2. Learn about the types of foods residents are able to access.
3. Identify resident’s functional capacities to prepare food.

Though the survey asked questions about both nutrition and physical activity, only the development of questions related to nutrition will be discussed in this chapter. A detailed overview of the development of questions related to physical activity can be found in Sarah Perlin’s report.

Multiple validated surveys were reviewed, and survey questions that aligned with the goals of the needs assessment were selected and adapted to the final survey. Surveys included in the review were the US Household Food Security survey, SCREEN II survey (Seniors in the Community: Risk Evaluation for Eating and Nutrition, Version II), DETERMINE survey, and the Dietary Screening Tool (DST).45–47 Although the US Household Food Security Survey, SCREEN II survey, and DETERMINE surveys are all robust screening tools, the questions asked in these surveys exceeded the scope of the needs assessment. As a result, the Dietary Screening Tool (DST) informed the majority of the components of the final needs assessment survey. Several questions from the US Household Food Security Survey were included as well to assess food access.

The purpose of the DST is to identify nutritional risks amongst community dwelling older adults. The DST is dividing into 7 categories: whole fruit and juice; vegetables; total and whole grains; lean proteins; added fats, sugars, and sweets; dairy; and processed meats. The DST asks about the frequency in which foods in these categories are consumed. Although the needs assessment developed for Bellwether housing was not intended to screen for nutrition risk, an understanding of how often residents ate certain foods provided a glimpse to resident’s eating patterns. Questions from the DST and US Household Food Security Survey provided insight to the types of foods that residents are able to access as well. DST questions were also adapted to ask about additional foods residents were interested in learning about, and their abilities to prepare those foods. The survey assessed both quantitative and qualitative measures of residents’ current eating patterns and their nutrition interests.

The nutrition questions included in the survey asked residents how often they consume fruits, vegetables, whole grains, and lean proteins; whether they were interested in learning more about different types of fruits, vegetables, whole grains, and lean proteins; and whether they were interested in different ways to prepare different fruits, vegetables, whole grains, and proteins. The food security questions included in the survey asked residents to describe the foods eaten in their household over the past 12 months, their abilities to prepare food for themselves, and their interests in learning how to prepare balanced meals using multiple kitchen appliances. A copy of the final needs assessment survey is provided in Box 1 in the appendix.

### *Survey Implementation*

 Once the survey was finalized, a copy was provided to Bellwether Housing. Bellwether Housing translated the surveys from English into four other languages: Korean, Amharic, Chinese, and Russian. Bellwether Housing staff then distributed paper copies of the survey to four buildings with senior residents – First and Vine, Bellevue Ave, Meridian, and Security House. Residents were entered into a raffle to win a $50 Safeway gift if they participated in the survey. A total of 115 surveys were returned. We received funding from the UW Nutritional Sciences Program to translate responses in other languages back to English. Results were analyzed by me and Sarah.

### *Survey Analysis*

 We used qualitative and quantitative methods to analyze the survey data. Survey results are provided in Table 1 in the appendix. All data were entered into a Google spreadsheet, and descriptive statistics were generated for questions with a multiple-choice answer. Some questions were left blank by residents, and so there are a different number of responses for each question. We consolidated residents’ write-in answers related to their interests in learning more about different types of fruits, vegetables, whole grains, and proteins, and ways to prepare them. Next, we wrote a summary statement for each of the aforementioned food categories. Key results highlighted by the survey included:

1. 112 residents (72%) responded ‘yes’ to the question “Are you interested in learning more about different types of fruits?” Residents who responded yes had an option to write-in the types of fruits they are interested in learning about. The most commonly reported fruit that residents reported wanting to learn more about was apples. There was also interest in a wide array of imported fruits, such as Asian fruits and tropical fruits like bananas, dragon fruit, and mangoes as well as notable interest in several types of melons and citrus. In addition, 107 residents (50%) responded ‘yes’ to the question “Would you like to learn more about different ways to prepare fruit?” Preparation techniques that residents were interested in learning included smoothie making (4 responses), how to stew fruit (3 responses), how to store fruit, and how to add more fruit to meals and cook with it.
2. 110 residents (64%) responded ‘yes’ to the question “Are you interested in learning more about different types of vegetables?” Types of vegetables that residents were interested in learning about included green vegetables (bok choy, spinach, cabbage, lettuce, kale, green beans, broccoli) and Asian vegetables (yu choy, long beans, Asian gourds). In addition,112 residents (53%) responded ‘yes’ to the question “Would you like to learn more about different ways to prepare vegetables?” 3 respondents requested to learn more about stir fry techniques, 6 respondents requested to learn about water-based cooking techniques (steaming, water sautéing, no fat), and 4 respondents requested more information about how to flavor vegetables.
3. 90 residents (49%) responded ‘yes’ to the question “Are you interested in learning more about different ways to prepare whole grains?” The main theme of the responses were that residents wanted to learn about a variety of grains. Two respondents requested to learn about grains that would not spike their blood sugar.
4. 32 residents (28%) answered the question “What cooking techniques would you like to learn more about to prepare proteins?” Responses were varied, however, several residents requested to learn how to improve the flavorful profile of protein, especially tofu. There was a demonstrated interest in learning about a variety of cooking techniques for proteins, including use of the microwave, stir fry, baked, boiled, and other ideas.
5. 101 residents (87%) answered the question about their household food security over the last 12 months. 48% of residents indicated that they have enough of the kinds of food they want to eat, and 44% reported they have enough, but not always the kinds of foods they want to eat. 68% of respondents reported that they were able to prepare meals independently
6. Several residents also requested information to help improve their confidence in the kitchen. For example, residents requested meal planning materials, tips for preparing food for one person, and information on how to store food.

Full summary statements that were developed for the survey analysis can be found in the appendix in Table 2.

## Phase 2: Curriculum Development

### *Topic Selection*

Based on the results of the needs assessment, we identified three different nutrition topics, and developed three unique classes to address residents’ needs. The three topics for nutrition education classes included:

1. Balanced Eating Patterns
2. Reading Nutrition Labels and Budgeting Meals
3. Cooking for One and Storing Foods

All classes addressed ways that residents can add more fruits and vegetables to their diet, but the different topics were selected to address residents’ main nutrition and food preparation concerns and interests.

### *Evidence-Based Class Development*

The classes developed for Bellwether Housing incorporated several themes that were highlighted in the literature review. All classes were rooted in Social Cognitive Theory and Malcolm Knowle’s Andragogy. Discussion-based activities were built into the curriculum to provide residents with social support and a space to discuss self-efficacy and outcome expectations. The class topics were also adapted to residents’ needs and interests. Key features of the curriculum were informed by best practices from prior studies. Multiple methods of delivery were incorporated into each class. Interactive slides, that include images of older adults engaging in physical activity and preparing meals, were created. Handouts were developed so that residents could take the information home with them after the class. Cultural relevancy was also woven into each class through cooking demonstrations. Interactive activities and discussions were also highlighted in each class.

Previous nutrition education curricula were also researched and used to inform the structure of the nutrition specific classes and activities. The ESBA curriculum was used to inform class content and ensure the topics covered in this curriculum aligned with residents’ needs and previously validated lesson plans. In addition, interactive activities and discussion questions were drawn from other nutrition education curricula such as the USDA Eat Smart, Live Strong intervention for older adults, and Leah’s Pantry Food Smarts nutrition education program for low-income adults. The USDA Eat Smart, Live Strong program follows the BEHAVE decision framework and focuses on motivators behind behavior change.48 Activities from this curriculum were adapted to emphasize social support, self-efficacy, and learning built on prior experiences. The Leah’s Pantry Food Smarts curriculum is an interactive and learner-centered curriculum.49 Activities from this curriculum were adapted to fit topics that residents were interested in learning about. A list of all curricula that were used to create our lessons can be found in Table 3 of the appendix.

The nutrition and physical activity classes were developed separately but were designed to integrate topics from one another. For example, topics discussed in a nutrition education class were highlighted again in a later physical activity class. The nutrition and physical education curricula built upon one another to provide residents with a robust, theory-based learning experience.

### *Pilot Classes*

The first physical activity and nutrition classes were piloted for a small group of residents. The final curriculum is intended to be delivered in person, however due to restrictions related to the COVID-19 pandemic, the pilot classes were adapted to an online environment and hosted over Zoom. A total of six participants joined the first pilot class, and five participants joined the second pilot class. The first class discussed physical activity basics and was hosted by Sarah Perlin. Additional details about the pilot class can be found in her report.

The second class discussed the basics for a balanced eating pattern and was hosted by the author of this report. The pilot nutrition class included an education portion about MyPlate, an interactive activity about different food groups, and a cooking demonstration. Residents reported enjoying the combination of learning about MyPlate and having a space to discuss their favorite foods from various food groups. Positive feedback was also reported about the cooking demonstration; residents stated they appreciated seeing the lessons they just learned applied to an easy recipe and expressed desires to join in on the cooking. However, residents asked for additional photos to be included in the education portion of the class, and resident services managers requested for the recipes to incorporate more foods from places such as food banks or food pantries. In addition, the interactive activity did not adapt well to the Zoom environment and was changed to a discussion-based activity during the class. Feedback provided by participants who attended the pilot classes were used to finalize the first two and inform the development of the rest of the classes in this curriculum.

# **Chapter VII: Curriculum and Instructor Guide**

## *Overview*

We developed an instructor guide as the final deliverable for Bellwether Housing, dividing into two parts: (1) Older Adult Physical Activity and Nutrition Topics and (2) Physical Activity and Nutrition Classes. The first part of the instructor guide provided background information about all topics included in the classes and notes to the instructors to help them navigate different topics with a sense of cultural humility. Additional resources from Healthy Aging – Aging and Disability Services Seattle and King County were also included in this section of the guide. The second part of the instructor guide included all class outlines. A list of classes topics is provided below:

Class 1: Let’s Get Active!

Class 2: Balanced Eating Patterns

Class 3: Fueling for Fitness

Class 4:  Reading Food Labels and Budgeting

Class 5: It’s All About Balance!

Class 6: Planning and Storing Meals for One

Classes were designed to support to one another, and concepts introduced in one class were re-emphasized in subsequent classes in order to reinforce learning. Three classes in the final curriculum addressed nutrition topics, and three classes addressed physical activity topics.

The nutrition classes will be summarized in this report (classes 2, 4, and 6), and the physical activity classes will be summarized in Sarah Perlin’s report (classes 1, 3, and 5). Full descriptions of all the classes can be found in the instructor guide.

## *Class Descriptions*

All nutrition classes include an education portion, at least one activity, and a cooking demonstration. The recipes chosen for the cooking demonstrations highlight foods that residents expressed an interest in learning about in the survey.

Class 2: Balanced Eating Patterns

The first nutrition class discusses balanced eating patterns. The objectives of the class are to enable participants to describe at least one reason why they should consume a balanced diet, identify the components of MyPlate, and prepare a balanced meal or snack. The class includes an education portion that reviews MyPlate and the benefits of eating a balanced diet, an activity that encourages residents to discuss different food groups, and a cooking demonstration.

The education portion of the session is accompanied by slides that portray images of older adults preparing fruits, vegetables, whole grains, and different proteins. A handout that summarizes the information in the presentation is also distributed to residents. Questions from residents are answered following the education session. A Food Group “Bingo” activity is used to encourage residents to discuss different food groups. Residents are given a bingo sheet, and each sheet contains different combinations of numbers and images of various food groups. If a participant’s number is called, they are encouraged to share which food group symbol is in their square, and to share their favorite food from that group. This activity is intended to encourage participants to discuss their experiences and get to know one another better. The cooking activity highlights an easy-to-prepare snack that includes multiple food groups. Residents indicated an interest in tropical fruits in the survey, and a recipe for a tropical fruit salad is included in this first class.

Class 4: Reading Food Labels and Budgeting

The second nutrition class reviews food labels and provided tips for budgeting. The objectives of the class are to enable residents to read a food label, identify nutrients in a food label, and encourage residents to share ways to prepare food on a budget or with other limitations. The class includes an education portion about the different parts of a food label, activities that encourage residents to discuss tips for food shopping and creating balanced meals on a budget or with other limitations, and a cooking demonstration. Peer support and communication are encouraged throughout the class.

The education component reviews the different parts of a nutrition label. A set of slides is provided, and a handout summarizing the main points from the presentation is given to residents. Following the education portion of the class, residents participate in a “Food Label Comparison” activity. Residents are provided with two different nutrition labels and asked to identify which label contained more added sugars, saturated fats, carbohydrates, proteins, and sodium. After this activity, the instructor leads the residents through a short discussion about their learning experience. The next portion of the class highlights different ways to build balanced meals on a budget, or with other limitations. This portion of the class is designed to be learner-centered and address different challenges to finding affordable, convenient, and culturally appropriate foods. Instructors are encouraged to allow residents to lead the discussion and facilitate where needed. The final portion of the class consists of a brief cooking demonstration. Residents indicated an interest in learning more about different Asian vegetables in the survey, and a recipe for Korean paejeon (vegetable pancake) is provided.

Class 6: Planning and Storing Meals for One

The third and final nutrition class reviews meal planning and storing meals for one. The objectives of the class are to enable residents to prepare a meal for one person, plan meals for the week, and describe different ways to store foods. The class includes a meal planning activity, an education portion about food storage, and a cooking demonstration. Peer support and communication are encouraged throughout the class.

The first part of the class consists of a discussion about challenges and solutions to planning meals for one person. Instructors are encouraged to facilitate a supportive and collaborative environment and encourage residents to talk with people they may not be familiar with. The second part of the class highlights different ways to store foods. A short presentation and accompanying handout highlighting storage tips is prepared. A meal prep activity is included to help residents start thinking about meals to plan for the week, ingredients to acquire, and ways to store their groceries. Residents are encouraged to discuss with one another and brainstorm meal ideas. The final cooking demonstration highlights tofu. In the survey, residents indicated an interest in ways to cook with plant-based proteins, such as tofu, and make them flavorful. The chosen recipe is a stir-fried tofu.

Given that this is the final class of the curriculum, instructors are also encouraged to close the series by summarizing the classes, the main messages of the curriculum, and thank residents for their participation in the series.

# **Chapter VIII: Curriculum Delivery and Next Steps**

Bellwether staff was given access to all background information, sources, class outlines, and curriculum materials that were included in the final instructor guide. Bellwether staff will share the resources with volunteer instructors, and classes will be led by volunteer instructors in an in-person environment. Bellwether will recruit volunteers and residents to participate, organize dates and times for classes, and provide space and materials for classes. Bellwether will also monitor the success of the classes and resident satisfaction with the curriculum material. Recommendations to track the success of the curriculum include creating post-surveys that ask residents about their satisfaction with the class material and whether the lessons helped them in their daily lives. Participation records can also indicate the popularity of the classes and provide a quantitative measure for the success of the curriculum.

The final instructor guide was presented to Bellwether Housing as a living document. Depending on resident feedback, Bellwether will be able to adjust the curriculum as needed. Although the class topics were intensively researched, and resident input was solicited through the survey and pilot classes, the curriculum was designed to be flexible. Activities can be changed depending on how they are received by residents. The intent of the curriculum is to provide culturally relevant nutrition and physical activity education for residents of Bellwether Housing. If residents find that their needs are not met by the curriculum in its current iteration, Bellwether Housing will have the ability to adapt the lessons as needed.

 The curriculum itself can also be used as a template, and classes can be added or changed in the future. Due to constraints with the class length, several topics of interest indicated by residents in the survey were not included in the final curriculum. In addition, each class was limited to only one or two main ideas per session per best practices identified in the literature review. Topics that residents may like to see discussed in future classes include: “Whole Grains and How to Prepare Them,” “Cooking with Fruit,” and “Easy Cooking Methods.”

Additional topics that residents may benefit from were elucidated in our literature review. However, these topics were excluded from the final curriculum because they were outside of the scope of this project. This project focuses specifically on nutrition education at an individual level, but other resources exist that can benefit residents at community and policy levels. Examples of these resources include senior nutrition programs such as the Congregate Nutrition Program, the Home Delivered Nutrition Program, and the Supplemental Nutrition Assistance Program (SNAP). Although these topics are not highlighted in this project, Bellwether staff and volunteers are currently involved in assisting residents with signing up for these programs. This curriculum contributes to the broader nutrition support provided by Bellwether Housing and provides an additional opportunity for community engagement.

# **Chapter IX: Conclusion**

#  This project was a culmination of the skills that I have acquired as Masters students at the University of Washington School of Public Health. The process of reviewing the literature allowed me to dive deeper into the topic of older adult nutrition and think critically about the specific issues that impact older residents of Bellwether Housing. My review of adult learning theories and the ways that different theories have been applied to prior nutrition education interventions taught me how to translate public health research into practice. Specifically, this process taught me how to create a deliverable that is culturally relevant and appropriate for the community that I am serving. In addition, the steps that I took to create, execute, and analyze the survey contributed to a final deliverable that is community-centered and community-directed. The experience of teaching the pilot class put me in the shoes of future instructors and helped me to structure clear class outlines and background resources for Bellwether volunteers.

The final curriculum presented to Bellwether Housing aims to improve nutrition literacy, reduce nutrition-related disease risks, and improve health outcomes for a diverse population of older adults. As the curriculum is presented to different cohorts of Bellwether residents, an evaluation of the curriculum can be developed and the impact on residents can be measured. The scope of this project can continue to be widened and the curriculum can evolve as the needs of the community change. The foundation for a culturally-relevant nutrition education curriculum has been established through the efforts of this capstone project, and I look forward to seeing the project grow and evolve with the community.

# **Appendix**

## Box 1. Nutrition and Activity Survey

|  |
| --- |
| **Food and Nutrition**Whole fruit:1. How often do you eat fruit (not including juice)?Daily5-6 times per week3-4 times per week0-2 times per week2. Are you interested in learning more about different types of fruit?Yes If yes, are there types of fruits that interest you? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_NoMaybe3. Would you like to learn more about different ways to prepare fruit?YesIf yes, what information would be helpful for you to prepare fruits? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_NoMaybeVegetables:1. How often do you eat vegetables?Daily5-6 times per week3-4 times per week0-2 times per week2. Are you interested in learning more about different types of vegetables?YesIf yes, are there types of types of vegetables that interest you?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_NoMaybe3. Would you like to learn more about different ways to prepare vegetables?YesIf yes, what information would be helpful for you to prepare vegetables? \_\_\_\_\_\_\_\_\_\_\_NoMaybe Whole grains1. How often do you usually eat whole-grain breads, cereals, rice, or pasta?Daily5-6 times per week3-4 times per week0-2 times per week2. Are you interested in learning more about whole grains?YesNoMaybe3. Would you like to learn more about different ways to prepare whole grains?YesIf yes, what information would be helpful for you to prepare whole grains? \_\_\_\_\_\_\_\_\_NoMaybe Proteins1. How often do you eat chicken or turkey?Daily5-6 times per week3-4 times per week0-2 times per wee2. Are you interested in cooking with chicken or turkey?YesNoMaybe3. How often do you eat fish or seafood?Daily5-6 times per week3-4 times per week0-2 times per week4. Are you interested in cooking with fish or seafood?YesNoMaybe5. How often do you eat non-meat sources of protein, such as tofu, eggs, milk, nuts, or beans?Daily5-6 times per week3-4 times per week0-2 times per week6. Are you interested in cooking with non-meat sources of protein?YesNoMaybe7. What cooking techniques would you like to learn more about to prepare proteins? \_\_\_\_\_\_\_\_Fats1. What kind of fat do you typically use in cooking?Olive OilCanola OilOther type of oil (please write in) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ButterLard/other type of animal fat (please write in) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2. Are you interested in learning more about using healthful sources of fat in cooking?YesNoMaybeWater1. How many cups of water do you drink per day approximately?0-2 glasses 3-4 glasses5-6 glasses 7+ glasses**Physical activity**1. How often do you do exercises to increase muscle strength and endurance, such as lifting weights or push ups, etc.?Daily5-6 times per week3-4 times per week0-2 times per week2. Are you interested in learning more about exercises that improve muscle strength and endurance?YesIf yes, what exercises interest you? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_NoMaybe 3. Have you ever participated in any other activities such as yoga, meditation, tai chi, stretching, etc.?YesIf yes, which activity or activities? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_NoIf not, are you interested in learning more about or trying any of these activities and which one(s)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**Food Access and Preparation**1. Which of these statements best describes the food eaten in your household in the last 12 months:I have enough of the kinds of food I want to eat.I have enough, but not always the kinds of food I want to eat.I sometimes do not have enough to eat.I often do not have enough to eat. 2. Where do you acquire the majority of your food from? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_3. Do you feel confident about your ability to prepare foods from the foods you acquire at these locations?YesNo4. What information might help improve your confidence to prepare balanced meals? \_\_\_\_\_\_\_5. Which of these statements best describes your ability to prepare food for yourself?I prepare meals independently, mostly using different kitchen appliances such as the oven, stovetop, etc.I prepare meals independently, mostly using a microwave oven or other quick preparation techniques.I need help from someone else to prepare my meals6. Are you interested in learning more about how to prepare balanced meals using multiple kitchen appliances (such as the oven, stove)?YesNoMaybe7. Are you interested in learning more about how to prepare balanced meals using a microwave or other quick preparation technique?YesNoMaybe~End of Survey~  |

## Table 1. Quantitative Survey Responses

|  |  |  |
| --- | --- | --- |
| **Fruit** | No. of Responses  | Percentage of Responses |
| Question 1: How often do you eat fruit? |
| 0-2 times per week  | 16 | 14 |
| 3-4 times per week  | 18  | 16 |
| 5-6 times per week  | 17 | 15 |
| Daily | 63 | 55 |
| Total responses | 114 |  |
| Blank responses  | 1 |  |
| Question 2: Are you interested in learning more about different types of fruits?  |
| Yes | 81 | 72 |
| No | 23 | 21 |
| Maybe | 8 | 7 |
| Total  | 112 |  |
| Question 3: Would you like to learn more about different ways to prepare fruit?  |
| Yes | 53 | 50 |
| No | 41 | 38 |
| Maybe | 13 | 12 |
| Total  | 107 |  |
| **Vegetables** | No. of Responses  | Percentage of Responses |
| Question 1: How often do you eat vegetables?  |
| 0-2 times per week  | 8 | 7 |
| 3-4 times per week  | 24 | 22 |
| 5-6 times per week  | 19 | 17 |
| Daily | 59 | 53 |
| Total responses | 110 |  |
| Blank responses  | 5 |  |
| Question 2: Are you interested in learning more about different types of vegetables? |
| Yes | 70 | 66 |
| No  | 32 | 29 |
| Maybe | 8 | 7 |
| Total  | 110 |  |
| Question 3: Would you like to learn more about different ways to prepare vegetables? |
| Yes | 60 | 54 |
| No  | 37 | 33 |
| Maybe | 15 | 13 |
| Total  | 112 |  |
| Blank  | 5 |  |
| **Grains** | No. of Responses  | Percentage of Responses |
| Question 1: How often do you usually eat whole-grain breads, cereals, rice, or pasta? |
| 0-2 times per week  | 12 | 10 |
| 3-4 times per week  | 23 | 20 |
| 5-6 times per week  | 14 | 12 |
| Daily | 66 | 57 |
| Total responses | 115 |  |
| Blank responses  |  |  |
| Question 2: Are you interested in learning more about different types of whole grains? |
| Yes | 60 | 58 |
| No  | 29 | 28 |
| Maybe | 14 | 14 |
| Total  | 103 |  |
| Question 3: Are you interested in learning more about different ways to prepare whole grains? |
| Yes | 44 | 49 |
| No  | 30 | 33 |
| Maybe | 16 | 18 |
| Total  | 90 |  |
| **Proteins** | No. of Responses  | Percentage of Responses |
| Question 1: How often do you usually eat chicken or turkey? |
| 0-2 times per week  | 41 | 37 |
| 3-4 times per week  | 50 | 45 |
| 5-6 times per week  | 9 | 8 |
| Daily | 10 | 9 |
| Total responses | 110 |  |
| Blank responses  | 5 |  |
| Question 2: Are you interested in cooking with chicken or turkey? |
| Yes | 56 | 50 |
| No | 37 | 33 |
| Maybe | 19 | 17 |
| Total  | 112 |  |
| Question 3: How often do you eat fish or seafood? |
| 0-2 times per week  | 69 | 64 |
| 3-4 times per week  | 73 | 25 |
| 5-6 times per week  | 6 | 8 |
| Daily | 8 | 6 |
| Total responses | 108 |  |
| Blank responses | 7 |  |
| Question 4: Are you interested in cooking with fish or seafood? |
| Yes | 64 | 58 |
| No | 34 | 31 |
| Maybe | 12 | 12 |
| Total  | 110 |  |
| Question 5: How often do you eat non-meat sources of protein, such as eggs, milk, nuts, or beans? |
| 0-2 times per week  | 10 | 9 |
| 3-4 times per week  | 25 | 22 |
| 5-6 times per week  | 21 | 19 |
| Daily | 57 | 50 |
| Total responses | 113 |  |
| Blank responses | 2 |  |
| Question 6: Are you interested in cooking with non-meat sources of protein? |
| Yes | 60 | 54 |
| No | 37 | 33 |
| Maybe | 15 | 13 |
| Total  | 112 |  |
| **Food Security** | No. of Responses | Percentage of Responses |
| Question 1: Which of these statements best describes the food eaten in your household in the last 12 months? |
| I have enough of the kinds of food I want to eat. | 48 | 48 |
| I have enough, but not always the kinds of food I want to eat. | 45 | 44 |
| I sometimes do not have enough to eat | 3 | 3 |
| I often do not have enough to eat | 0 | 0 |
| Total responses | 101 |  |
| Blank responses | 14 |  |
| Question 2: Which of these statements best describes your ability to prepare food for yourself?  |
| I prepare meals independently, mostly using different kitchen appliances such as the oven, stovetop, etc. | 82 | 68 |
| I prepare meals independently, mostly using a microwave oven or other quick preparation techniques. | 27 | 23 |
| I need help from someone else to prepare my meals. | 11 | 9 |
| Total | 120 |  |
| Question 3: Are you interested in learning more about how to prepare balanced meals using multiple kitchen appliances (such as the oven, stove)? |
| Yes | 41 | 39 |
| No | 40 | 38 |
| Maybe | 23 | 22 |
| Total responses | 105 |  |
| Blank responses | 10 |  |

## Table 2. Summary Statements and Qualitative Survey Results

|  |  |
| --- | --- |
| Category | Summary Statement |
| Fruits | 112 residents responded to the question “Are you interested in learning more about different types of fruits?” 72% of respondents were interested in learning more about different types of fruits. There were a variety of fruits that were of interest. However, the most commonly reported fruit that residents wanted to know more about was apples. In addition, there was interest in a wide array of imported fruits, such as Asian fruits and tropical fruits like bananas, dragon fruit, and mangoes as well as notable interest in several types of melons and citrus.107 residents responded to the question “Would you like to learn more about different ways to prepare fruit?” 49.5% responded yes. Preparation techniques that people were interested in learning included smoothie making (4 responses), how to stew fruit (3 responses), how to store fruit, and how to add more fruit to meals and cook with it.   |
| Vegetables | 110 residents responded to the question “Are you interested in learning more about different types of vegetables?” 64% said yes. Types of vegetables that residents were interested in learning about included green vegetables (bok choy, spinach, cabbage, lettuce, kale, green beans, broccoli) and Asian vegetables (yu choy, long beans, Asian gourds). However, many residents expressed interest in learning about a variety of vegetables, rather than specific ones.112 residents responded to the question “Would you like to learn more about different ways to prepare vegetables?” 53% said yes. 3 respondents requested to learn more about stir fry techniques, 6 respondents requested to learn about water based cooking techniques (steaming, water sautéing, no fat), and 4 respondents requested more information about how to flavor vegetables. 5 respondents requested this information to be delivered via the Internet and social media.  |
| Grains | 90 residents responded to the question “Are you interested in learning more about different ways to prepare whole grains?” 49% said yes. Several residents requested to learn more about ancient grains and gluten free grains. The main theme of the responses were that residents wanted to learn about a variety of grains. Two respondents requested to learn about grains that would not spike their blood sugar.   |
| Proteins | 32 residents answered the question “What cooking techniques would you like to learn more about to prepare proteins?” Responses were varied, however, several residents requested to learn how to improve the flavorful profile of protein, especially tofu. There was a demonstrated interest in learning about a variety of cooking techniques for proteins, including use of the microwave, stir fry, baked, boiled, and other ideas. |

## Table 3. Curricula Used to Inform Lesson Plans

|  |  |  |
| --- | --- | --- |
| Citation  | Curriculum Name | Curriculum Description  |
| Eat Smart, Live Strong Project Overview. Published online March 2013. Accessed March 26, 2021. https://snaped.fns.usda.gov/sites/default/files/documents/ProjectOverview19.pdf  | USDA: Eat Smart, Live Strong (ESBA) | This curriculum consists of four lessons designed to improve fruit and vegetable consumption for low income, community dwelling older adults (60-74 years). The curriculum follows the BEHAVE decision making framework and uses a variety of activities to promote behavior change.  |
| Food Smarts Curriculum. Leah’s Pantry. Published 2021. Accessed March 26, 2021. https://www.leahspantry.org/what-we-offer/cultivate-nourished-communities/food-smarts-curriculum/ | Leah’s Pantry: Food Smarts  | This curriculum offers multiple lesson plans suitable for low-income youth (K-12), adults, and older adults. The curriculum is very flexible and allows for different lesson plans (i.e. adult learners, 6 weeks, 90 minutes per class; adult learners, 5 weeks, 60 minutes per class, etc.) The lessons are designed to be learner centered and highly interactive.  |
| Natker E, Baker S, Auld G, McGirr K, Sutherland B, Cason K. Formative Evaluation of EFNEP Curriculum: Ensuring the Eating Smart • Being Active Curriculum Is Theory Based. *J Ext*. 2015;53(1):15. | USDA: Eating Smart • Being Active  | This curriculum consists of eight classes designed to encourage healthy eating and physical activity. All lessons follow tenets of Social Cognitive Theory and Malcolm Knowle’s andragogy, are learner-centered, and incorporate a variety of activities.  |

# References

1. Bureau UC. 65 and Older Population Grows Rapidly as Baby Boomers Age. The United States Census Bureau. Accessed February 7, 2021. https://www.census.gov/newsroom/press-releases/2020/65-older-population-grows.html

2. U.S. Census Bureau QuickFacts: Seattle city, Washington; United States. Accessed January 5, 2021. https://www.census.gov/quickfacts/fact/table/kingcountywashington,seattlecitywashington,US/PST045219

3. Lee JS, Frongillo EA. Factors Associated With Food Insecurity Among U.S. Elderly Persons: Importance of Functional Impairments. *J Gerontol B Psychol Sci Soc Sci*. 2001;56(2):S94-S99. doi:10.1093/geronb/56.2.S94

4. Dorner B. Position of the American Dietetic Association: Individualized Nutrition Approaches for Older Adults in Health Care Communities. *J Am Diet Assoc*. 2010;110(10):1549-1553. doi:10.1016/j.jada.2010.08.022

5. Chernoff R. Nutrition and Health Promotion in Older Adults. *J Gerontol Ser A*. 2001;56(suppl\_2):47-53. doi:10.1093/gerona/56.suppl\_2.47

6. Jaul E, Barron J. Age-Related Diseases and Clinical and Public Health Implications for the 85 Years Old and Over Population. *Front Public Health*. 2017;5. doi:10.3389/fpubh.2017.00335

7. Shlisky J, Bloom DE, Beaudreault AR, et al. Nutritional Considerations for Healthy Aging and Reduction in Age-Related Chronic Disease. *Adv Nutr*. 2017;8(1):17-26. doi:10.3945/an.116.013474

8. Ahmed T, Haboubi N. Assessment and management of nutrition in older people and its importance to health. *Clin Interv Aging*. 2010;5:207-216.

9. Volpi E, Nazemi R, Fujita S. Muscle tissue changes with aging. *Curr Opin Clin Nutr Metab Care*. 2004;7(4):405-410.

10. Wurtman JJ, Lieberman H, Tsay R, Nader T, Chew B. Calorie and nutrient intakes of elderly and young subjects measured under identical conditions. *J Gerontol*. 1988;43(6):B174-180. doi:10.1093/geronj/43.6.b174

11. Nutritional Requirements throughout the Life Cycle | Nutrition Guide for Clinicians. Accessed February 26, 2021. https://nutritionguide.pcrm.org/nutritionguide/view/Nutrition\_Guide\_for\_Clinicians/1342043/all/Nutritional\_Requirements\_throughout\_the\_Life\_Cycle?refer=true

12. Stover PJ. Vitamin B12 and older adults. *Curr Opin Clin Nutr Metab Care*. 2010;13(1):24-27. doi:10.1097/MCO.0b013e328333d157

13. Leslie W, Hankey C. Aging, Nutritional Status and Health. *Healthcare*. 2015;3(3):648-658. doi:10.3390/healthcare3030648

14. Algren MH, Ekholm O, Nielsen L, Ersbøll AK, Bak CK, Andersen PT. Social isolation, loneliness, socioeconomic status, and health-risk behaviour in deprived neighbourhoods in Denmark: A cross-sectional study. *SSM - Popul Health*. 2020;10. doi:10.1016/j.ssmph.2020.100546

15. Cudjoe TKM, Roth DL, Szanton SL, Wolff JL, Boyd CM, Thorpe RJ. The Epidemiology of Social Isolation: National Health and Aging Trends Study. Carr D, ed. *J Gerontol Ser B*. 2020;75(1):107-113. doi:10.1093/geronb/gby037

16. Kobayashi LC, Steptoe A. Social Isolation, Loneliness, and Health Behaviors at Older Ages: Longitudinal Cohort Study. *Ann Behav Med Publ Soc Behav Med*. 2018;52(7):582-593. doi:10.1093/abm/kax033

17. Whitelock E, Ensaff H. On Your Own: Older Adults’ Food Choice and Dietary Habits. *Nutrients*. 2018;10(4). doi:10.3390/nu10040413

18. Sharkey JR. Nutrition risk screening: the interrelationship of food insecurity, food intake, and unintentional weight change among homebound elders. *J Nutr Elder*. 2004;24(1):19-34. doi:10.1300/J052v24n01\_02

19. Brooks JM, Petersen CL, Titus AJ, et al. Varying Levels of Food Insecurity Associated with Clinically Relevant Depressive Symptoms in U.S. Adults Aged 60 Years and Over: Results from the 2005–2014 National Health and Nutrition Survey. *J Nutr Gerontol Geriatr*. 2019;38(3):218-230. doi:10.1080/21551197.2019.1611520

20. Drewnowski A, Evans WJ. Nutrition, Physical Activity, and Quality of Life in Older Adults: Summary. *J Gerontol A Biol Sci Med Sci*. 2001;56(Supplement 2):89-94. doi:10.1093/gerona/56.suppl\_2.89

21. Jih J, Stijacic-Cenzer I, Seligman HK, Boscardin WJ, Nguyen TT, Ritchie CS. Chronic disease burden predicts food insecurity among older adults. *Public Health Nutr*. 2018;21(9):1737-1742. doi:10.1017/S1368980017004062

22. Seligman HK, Laraia BA, Kushel MB. Food Insecurity Is Associated with Chronic Disease among Low-Income NHANES Participants. *J Nutr*. 2010;140(2):304-310. doi:10.3945/jn.109.112573

23. Kamp B. Position of the American Dietetic Association, American Society for Nutrition, and Society for Nutrition Education: Food and Nutrition Programs for Community-Residing Older Adults. *J Am Diet Assoc*. 2010;110(3):463-472. doi:10.1016/j.jada.2009.12.009

24. Petroka K, Campbell-Bussiere R, Dychtwald DK, Milliron B-J. Barriers and facilitators to healthy eating and disease self-management among older adults residing in subsidized housing. *Nutr Health*. 2017;23(3):167-175. doi:10.1177/0260106017722724

25. Keenan T, GfK Custom Research North America. Home and Community Preferences of the 45+ Population. *AARP*. Published online 2010:25.

26. Natker E, Baker S, Auld G, McGirr K, Sutherland B, Cason K. Formative Evaluation of EFNEP Curriculum: Ensuring the Eating Smart • Being Active Curriculum Is Theory Based. *J Ext*. 2015;53(1):15.

27. Baranowski T, Perry C, Parcel G. How Individuals, Environments, and Health Behaviors Interact. In: *Health Behavior and Health Education: Theory, Research, and Practice*. 3rd ed. Jossey-Bass; 2002:165-184.

28. Oyibo K, Adaji I, Vassileva J. Social cognitive determinants of exercise behavior in the context of behavior modeling: a mixed method approach. *Digit Health*. 2018;4. doi:10.1177/2055207618811555

29. The Social Cognitive Theory. Accessed March 17, 2021. https://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories5.html

30. Townsend N, Foster C. Developing and applying a socio-ecological model to the promotion of healthy eating in the school. *Public Health Nutr*. 2013;16(6):1101-1108. doi:10.1017/S1368980011002655

31. The Theory of Planned Behavior. Accessed March 17, 2021. https://sphweb.bumc.bu.edu/otlt/mph-modules/sb/behavioralchangetheories/BehavioralChangeTheories3.html

32. Abdulsalam NM. Application of an Andragogical Approach and Experiential Learning for Teaching Culinary Nutrition to Culinary Arts Students. Published online 2015.

33. Anderson ES, Winett RA, Wojcik JR. Self-regulation, self-efficacy, outcome expectations, and social support: Social cognitive theory and nutrition behavior. *Ann Behav Med*. 2007;34(3):304-312. doi:10.1007/BF02874555

34. Buller DB, Woodall WG, Zimmerman DE, et al. Randomized Trial on the 5 a Day, the Rio Grande Way Website, A Web-based Program to Improve Fruit and Vegetable Consumption in Rural Communities. *J Health Commun*. 2008;13(3):230-249. doi:10.1080/10810730801985285

35. About EFNEP | National Institute of Food and Agriculture. Accessed March 17, 2021. https://nifa.usda.gov/program/about-efnep

36. Hoover JR, Martin PA, Litchfield RE. Evaluation of a New Nutrition Education Curriculum and Factors Influencing Its Implementation. *J Online Ext*.:14.

37. Dambha‐Miller H, Day AJ, Strelitz J, Irving G, Griffin SJ. Behaviour change, weight loss and remission of Type 2 diabetes: a community-based prospective cohort study. *Diabet Med*. 2020;37(4):681-688. doi:https://doi.org/10.1111/dme.14122

38. Thomas L, Ghiselli R, Almanza B. Congregate meal sites participants: Can they manage their diets? *Int J Hosp Manag*. 2011;30(1):31-37. doi:10.1016/j.ijhm.2010.04.006

39. McNulty J. Challenges and Issues in Nutrition Education. In: FAO; 2013. Accessed March 17, 2021. http://www.fao.org/3/i3234e/i3234e.pdf

40. Parker S, Powell L, Hermann J, Phelps J, Brown B. Preferred Educational Delivery Strategies Among Limited Income Older Adults Enrolled in Community Nutrition Education Programs. *J Ext*. 2011;49(11):10.

41. Uemura K, Yamada M, Okamoto H. Effects of Active Learning on Health Literacy and Behavior in Older Adults: A Randomized Controlled Trial. *J Am Geriatr Soc*. 2018;66(9):1721-1729. doi:https://doi.org/10.1111/jgs.15458

42. Redmond EH, Burnett SM, Johnson MA, Park S, Fischer JG, Johnson T. Improvement in A1C levels and diabetes self-management activities following a nutrition and diabetes education program in older adults. *J Nutr Elder*. 2006;26(1-2):83-102. doi:10.1300/J052v26n01\_05

43. Klinedinst NJ. Effects of a Nutrition Education Program for Urban, Low-Income, Older Adults: A Collaborative Program Among Nurses and Nursing Students. *J Community Health Nurs*. 2005;22(2):93-104. doi:10.1207/s15327655jchn2202\_3

44. Higgins MM, Barkley MC. Tailoring nutrition education intervention programs to meet needs and interests of older adults. *J Nutr Elder*. 2003;23(1):59-79. doi:10.1300/J052v23n01\_05

45. Coleman-Jensen A, Nord M. U.S. Adult Food Security Survey Module. Published online September 2012.

46. Reimer H, Keller H, Tindale J. Learning you are “at risk”: seniors’ experiences of nutrition risk screening. *Eur J Ageing*. 2011;9(1):81-89. doi:10.1007/s10433-011-0208-2

47. DETERMINE Your Nutritional Health. Published online May 7, 2010. https://hhs.texas.gov/sites/default/files/documents/doing-business-with-hhs/providers/health/nra.pdf

48. Eat Smart, Live Strong Project Overview. Published online March 2013. Accessed March 26, 2021. https://snaped.fns.usda.gov/sites/default/files/documents/ProjectOverview19.pdf

49. Food Smarts Curriculum. Leah’s Pantry. Published 2021. Accessed March 26, 2021. https://www.leahspantry.org/what-we-offer/cultivate-nourished-communities/food-smarts-curriculum/

1. The socioecological model describes how individual, relationship, community, and societal factors are related to one another. Factors on one level of the socioecological model can influence factors at multiple other levels. The relationship between different levels are complex, and interventions aimed at single levels are often inadequate in mediating behavior change.30 [↑](#footnote-ref-1)