

ASSESSING FOOD AVAILABILITY AND VARIETY AT A HOMELESS YOUTH  
DROP-IN CENTER

An Undergraduate Thesis

In Partial Fulfillment of the Requirements for Graduation with Non-Honors Research  
Distinction in the College of Education and Human Ecology from The Ohio State  
University

By  
Emily Ann Yarcusko  
Bachelor of Science in Human Nutrition  
The Ohio State University  
May 2017

Committee:

Faculty Advisor, Committee Member

---

Irene Hatsu, Ph.D., RD

Date

Second Committee Member

---

Joshua Bomser, Ph.D.

Date

Copyrighted by  
Emily Ann Yarcusko  
May 2017

## TABLE OF CONTENTS

<b>LIST OF TABLES .....</b>	<b>4</b>
<b>LIST OF FIGURES .....</b>	<b>4</b>
<b>ABSTRACT.....</b>	<b>5</b>
<b>CHAPTER 1: INTRODUCTION AND STATEMENT OF PROBLEM .....</b>	<b>7</b>
<b>Specific Aims .....</b>	<b>8</b>
<b>CHAPTER 2: LITERATURE REVIEW .....</b>	<b>10</b>
<b>Homelessness in the United States .....</b>	<b>10</b>
<b>Homeless Youth .....</b>	<b>11</b>
<b>Nutrition Related Challenges among Homeless Individuals .....</b>	<b>12</b>
<b>Resources for Homeless Youth.....</b>	<b>13</b>
<b>Diet Quality .....</b>	<b>14</b>
<b>Nutrition Knowledge .....</b>	<b>14</b>
<b>Summary .....</b>	<b>16</b>
<b>CHAPTER 3: MATERIALS AND METHODS .....</b>	<b>17</b>
<b>Study Design, Sample and Setting .....</b>	<b>17</b>
<b>Assessment Measures .....</b>	<b>18</b>
<i>Nutrition Knowledge .....</i>	<i>19</i>
<i>Dietary Intake.....</i>	<i>19</i>
<i>Home Food Inventory .....</i>	<i>20</i>
<b>Statistical Analysis.....</b>	<b>21</b>
<b>CHAPTER 4: RESULTS .....</b>	<b>22</b>
<b>Sociodemographic and Homeless Characteristics .....</b>	<b>22</b>
<b>Diet Quality .....</b>	<b>25</b>
<b>Nutrition Knowledge .....</b>	<b>26</b>
<b>Food Inventory.....</b>	<b>28</b>
<b>Chapter 5: DISCUSSION &amp; CONCLUSION .....</b>	<b>31</b>
<b>REFERENCES.....</b>	<b>35</b>
<b>APPENDIX 1.....</b>	<b>38</b>
<b>Detailed Food Inventory.....</b>	<b>38</b>
<b>APPENDIX 2.....</b>	<b>40</b>
<b>Participation Questionnaire.....</b>	<b>40</b>
<b>APPENDIX 3.....</b>	<b>46</b>
<b>Home Food Inventory.....</b>	<b>46</b>

## LIST OF TABLES

Table 1. Sociodemographic Characteristics of youth utilizing the drop-in center (N=95).....	23
Table 2. Locations where Homeless Youth Spend their Nights. ....	23
Table 3. Frequency of Homeless Youth Substance Use.....	24
Table 4. Homeless Youth HEI-2010 Scores (Diet Quality Assessment).....	25
Table 5. Dietary Intake: Food Groups Intake .....	26
Table 6. Participant response to knowledge questionnaire items. ....	27
Table 7. Food Inventory Major Categories.....	29
Table 8. Obesogenic Food Availability Score .....	30

## LIST OF FIGURES

Figure 1. MyPlate.....	33
------------------------	----

## ABSTRACT

**Purpose:** The purpose of this study was to assess the food supply of a drop-in center, located in central Ohio that specifically serves homeless youth and how this relates to the diet quality of homeless youth. Another purpose was to assess the youth's knowledge as related to dietary intake and behavior.

**Study Design and Methodology:** This was an observational study that used surveys to collect socio-demographic and homeless experience data. Validated surveys were used to measure food inventory of the drop-in center, as well as the nutrition knowledge and diet quality of the homeless youth. Data was analyzed using SPSS Software. The analysis described homeless youth nutrition knowledge, the food inventory of the drop-in center, and explore (using univariate and multivariate method) the associations between the foods available at the drop-in center and diet quality.

**Results:** A majority of the youth were male (60%), and nearly 73% had a high school diploma or less. The mean age for youth was 21.19 (1.76), while the average age of homelessness onset was 17.98 (3.31). HFI scores: Dairy: M = 5.33, SD = 1.37, (range 3-7); vegetables: M=12.17, SD = 2.86, (range 7-14); fruit: M = 10.83, SD = 2.23, (range 8-14); meat and other non-dairy protein: M= 9, SD =2.61, (range 5-10). The mean obesogenic food availability score was  $31 \pm 4.18$ , (range 23-34). Of the participants, 47% reported daily visit to the drop-in center, and 63% reported eating at the drop-in center one or two times each visit. The average nutrition knowledge score of the youth was 11.4 (2.94), and the average healthy eating index (HEI) score was 54.92 (10.8). There was no significant correlation between the HEI score and the frequency of drop-in center visits, or frequency or eating at the drop-in center.

**Conclusion:** The drop-in center is providing a variety of healthy food options such as fruits and vegetables. In addition, there are limited unhealthy food options provided by the facility. However, the youth are not consuming the healthy food options provided by the drop-in center. This suggest there is another source, or way in which youth are acquiring the fruits and vegetables they are consuming.

## CHAPTER 1: INTRODUCTION AND STATEMENT OF PROBLEM

Homeless youth, similar to the general homeless population, face several challenges including that of access to food. Several studies have reported a food insecurity prevalence rate of between 33%-96% among the homeless youth population (Dachner and Tarasuk 2002). Homeless youth rely on multiple sources to acquire food, and many of these food sources themselves face barriers such as lack of control over food donations (Antoniades and Tarasuk 1998, Tarasuk and Eakin 2005, Tse and Tarasuk 2008). This in turn effects the variety and quality of food the various sources are able to provide to those individuals they serve. The foods available to homeless youth have been found to be nutritionally inadequate and unable to meet their nutritional needs (Li, Dachner et al. 2009). The inadequate food sources, in combination with coping strategies used by the youth to combat food insecurity, predisposes them to poor nutritional outcomes (Richards and Smith 2006). Consequently, this negatively affects their long-term health status and overall well-being. Interventions designed for this population have mainly focused on other health concerns without any focus on dietary intake and its effect on health. In addition, little to no literature exists about the food resources specifically available to homeless youth that describe the variety and quality of foods provide. One resource used by homeless youth to help meet basic needs of shelter, food, clothing, showers and laundry are drop-in centers. These centers are usually funded by private donors, charitable foundations, as well as local, state or federal governments (Slesnick, Dashora et al. 2009). Other services provided by drop-in-centers include assistance with finding jobs or housing. The philosophy of a drop-in center is critical to its success and usually aligns with the premise of “the development of

a genuine, empathic relationship with unconditional positive regard, between the youth and the drop-in service workers” (Slesnick, Glassman et al. 2008).

While the food services provided by drop-in centers are exceptionally important in meeting the physiological needs of homeless youth, barriers such as funding and lack of control over donated foods limits the ability of the facility to provide nutritious and healthy foods. Many studies have linked dietary intake and practices to the availability of foods in the home (Campbell, Crawford et al. 2007). For most homeless youth, the drop-in centers are considered their “homes”, as such it is important to determine if the food available to them at drop-in center environment contributes to their dietary intake and behavior. The purpose of the study was, therefore, to assess the variety and quality of food resources available at the only drop-in center that serves homeless youth in central Ohio, and determine if the frequency with which youth visit and or consume food at the drop-in center relates to their diet quality. Another purpose was to assess the youth’s knowledge as related to dietary intake and behavior to establish any gaps in the nutritional knowledge of the youth.

### **Specific Aims**

*Specific Aim 1:* Describe the quality and variety of foods available to homeless youth at a local drop-in center in central Ohio

*Hypothesis 1:* The majority of foods available will be unhealthy foods associated with obesity, such as those high in simple sugars, fat and sodium.

*Specific aim 2:* Determine the relationship of frequency of visit of youth to the drop-in center and their frequency of food consumption at the drop-in center with their diet quality.

*Hypothesis 2:* Youth frequency of visit to the drop-in center, as well as their frequency of food consumption at the drop-in center will be significantly and directly associated with their diet



quality. The drop-in center acts as a main source of food for homeless youth and thus may play a role in their diet quality.

*Specific Aim 3:* Assess the nutritional knowledge of homeless youth and how this relates to their diet quality.

*Hypothesis 3:* Homeless youth will have low nutrition knowledge scores which will be directly and significantly related to their diet quality.

## CHAPTER 2: LITERATURE REVIEW

### Homelessness in the United States

The National Coalition for the Homeless (NCH) defines homelessness based on the following categories: chronic, transitional, and episodic homelessness. Chronic homelessness consists of those individuals who are “likely to be entrenched in the shelter system and for whom shelters are more like long-term housing rather than an emergency arrangement”, these individuals tend to be older, 76.8% are above 30 years of age. Transitional homeless are those individuals that enter the shelter system for one, short stay. These individuals tend to be younger, 36.1% are under the age of 30, and represent a larger percentage of the total homeless population. Finally, episodic homelessness are those individuals that experience frequent periods of homelessness and tend to be chronically unemployed like chronic homeless individuals (Kuhn and Culhane 1998). In addition to these definitions, homeless individuals can further be categorized into homeless adults, and homeless youth. Homeless youth can be even further categorized by whether or not they are under adult supervision. Youth who are not experiencing family homelessness and are therefore not living under adult guardianship are referred to as ‘unaccompanied youth’ (Aratani 2009). Homeless youth, unaccompanied or otherwise, may experience chronic, transitional, or episodic homelessness.

According the Annual Homeless Assessment Report to Congress (AHAR), on a single night in January 2016 in the United States, 549,928 individuals experienced homelessness (Henry, Watt et al. 2016). However, this estimate is only a snap shot of the homeless crises and it is limited because it excludes episodic and transitional homeless individuals who have found temporary shelter. In addition, this count could also possibly miss individuals who seek shelter

by staying in unconventional places such as abandoned buildings. Other sources measure the national estimates of homeless individuals in the United States ranges from 1.6-3.6 million (Homeless 2009). Despite some promising decreases in the estimated homeless populations, the number individuals remain without permanent shelter continues to be high (Henry, Watt et al. 2016).

### **Homeless Youth**

Another definition of homeless is provided by the McKinney-Vento Homeless Assistance Act, and defines homeless youth as “ individuals who lack fixed, regular, and adequate nighttime residence” (Act 2002). This included the following groups 1) “children and youths who share the housing of other persons because of loss of housing, economic difficulties, or other similar reasons; those living in motels, hostels, trailer parks, or camping grounds because they lack alternative adequate accommodations; those living in temporary housing such as emergency or transitional shelters; being abandoned in hospitals; are waiting to be placed in foster care; 2) children and youths whose primary nighttime residence is a public or private place not designed for or generally used as a regular sleeping accommodation for human beings; 3) children and youths who are living in automobiles, public spaces such as parks, bus or train stations, or other type of public areas, abandoned buildings, substandard housing, or similar settings; and 4) migratory children who qualify as homeless because they are living in circumstances described in conditions (1) through (3) described above” (Aratani 2009).

Unaccompanied homeless youth are subset of the homeless youth population. This group is defined as “people who are not homeless as a part of a family with children, and who are not accompanied by their parent or guardian during their episode of homelessness” (Henry, Watt et al. 2016). They can be categorized into subgroups: 1) runaway youth who left home for more

than one night without parental or guardian permission, 2) throwaway youth who left home because of parental neglect or abandonment and 3) independent youth who leave home due to irreconcilable familial conflict and do not maintain any contact with families (Aratani 2009). According to a study by the US Department of Justice, approximately 1.6 million youth between ages 12-24 experience homelessness (Hammer, Finkelhor et al. 2002).

### **Nutrition Related Challenges among Homeless Individuals**

Homelessness individuals face several health challenges, many of which are related to nutritional outcomes. One such challenge has to their ability to access healthy food. Homeless individuals face food insecurity, a condition which affects about 12.7% of American households. Food insecurity, is defined as the household-level economic and social condition of limited or uncertain access to adequate food (Coleman-Jensen, Gregory et al. 2014). Per the definition above, food insecure individuals usually face challenges of food access and resort to various coping strategies to combat hunger. Coping strategies used by homeless individuals include utilizing soup kitchens, eating at homeless shelters, dumpster diving, making food stretch to last the month, and many others (Richards and Smith 2006). By utilizing these coping strategies homeless individuals are exposing themselves to additional issues such as food safety which also has a negative consequence on health.

The US government and various nonprofit organizations, however, offer many programs to assist in alleviating the burden of food insecurity. Some of the government funded programs available for food insecure (including homeless) populations in the United States if eligible programs include the Supplemental Nutrition Assistance Program (SNAPs), formally known as Food Stamps, and the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). Additionally, nonprofit organizations provide assistance in the form of foods provided at

shelters, food banks, and soup kitchens. While these services and programs assist in food acquisition for food insecure population, some studies suggest a reduced quality in the food provided (Lyles 2013). For populations already vulnerable, such as food insecure homeless individuals, this increases their risk for obesity, and chronic diseases related to malnutrition. The subset of homeless youth is typically under studied, and face many of the same challenges as adults in similar situations. Within the homeless youth population, the prevalence of overweight and obesity, substance abuse, and various forms of mental health issues are alarming (Tarasuk, Dachner et al. 2005, Smith and Richards 2008, Merscham, Van Leeuwen et al. 2009). One study estimates that within a period of 30 days, one third of a 165,000 population of homeless youth who were surveyed went hungry, or experienced a period of food insecurity (Whitbeck, Chen et al. 2006).

### **Resources for Homeless Youth**

Homeless individuals utilize a variety of resources in order to meet basic needs for shelter and food. Some of these resources include soup kitchens, homeless shelters, runaway shelters, food banks, and many others. As previously mentioned, there are also government programs in place to help alleviate some the housing and food acquisition burdens homeless individuals face. However, most of these resources are targeted at homeless adult populations. Those built specifically for the homeless youth population are few in numbers compared to those that are available for other populations that experience homelessness (Slesnick, Dashora et al. 2009). Homeless youth are less likely to utilize adult homeless resources adults because of fear of being preyed upon by older homeless adults (Ensign and Gittelsohn 1998).

Runaway shelters and youth drop-in centers are two resources that specifically cater to the needs of homeless youth. Runaway shelters offer emergency services for the youth and

services, or treatment, provided at these establishments tend to focus on reuniting the youth with his, or her, family. Drop-in centers on the other hand tend to be unstructured, provide immediate services such as food, clothing, showers, laundry and bus passes, and the main goal is to reintegrate youth into the mainstream by offering a variety of intensive services to the youth (Slesnick, Dashora et al. 2009).

### **Diet Quality**

Diet quality considers the food an individual consumes and the effects it may have in terms of health outcomes (Wirt and Collins 2009). There are many tools available to measure diet quality, one of which being the Healthy Eating Index (HEI). HEI is a multivariable tool that measures diet quality by comparing the diet of an individual to the dietary guidelines provided by the U.S Department of Agriculture (USDA) and the U.S Department of Health and Human Services (HHS). The HEI is a useful and validated tool with various possible applications (Guenther, Kirkpatrick et al. 2014). Many studies have demonstrated the relationship between low HEI scores and high risk of chronic diseases such as diabetes, cardiovascular disease, hypertension, cancer, and more (Chiuve, Fung et al. 2012, Guenther, Kirkpatrick et al. 2014).

There is a lack of research considering the diet quality within the homeless youth population. However, there is some previous research looking at the overall intake of homeless youth. One study found that youth had calorie rich diets, that were nutrient poor (Smith and Richards 2008). This study focused on individual nutrients and total calories instead of the overall diet quality and how it compares to current dietary recommendations.

### **Nutrition Knowledge**

Though not conclusive, studies show that an individual's knowledge of health-related topics, such as nutrition, can be a major determinant of health behaviors and health status

(Domnich, Panatto et al. 2015). Identifying gaps in nutrition knowledge can therefore offer a suggestion of where, when, how, and to whom nutrition education should be focused. Nutrition knowledge can be divided into two different components, declarative knowledge and procedural knowledge. Declarative knowledge is simply knowledge about facts, such as the amount of calories in a certain food product. Procedural knowledge is about the way in which actions are performed, and is therefore more reflective of behavior (Dickson-Spillmann and Siegrist 2011)

Previous studies have demonstrated that the nutrition knowledge of the general public is relatively high (Dickson-Spillmann and Siegrist 2011, Worsley, Wang et al. 2014), and there are multiple factors that influence nutrition-related behavior aside from nutrition knowledge (Fisher, Erasmus et al. 2016). There are, however, disparities among various demographic groups as well as common nutrition-related misconceptions. For example, men and low socio-economic-status groups are more likely to have inadequate nutrition knowledge compared to women and high socio-economic-status groups (Dickson-Spillmann, Siegrist et al. 2011, Dickson-Spillmann and Siegrist 2011, Worsley, Wang et al. 2014). Education has also been positively associated with greater nutrition knowledge. As nutrition knowledge is constantly changing it is no surprise that there is confusion and common misconceptions held by the general population. One study reported participants having difficulty interpreting the term ‘balanced diet’, confusion about appropriate amounts of fruits, vegetables, and specific types of fats (Dickson-Spillmann and Siegrist 2011).

Homeless youth are a very vulnerable and marginalized population with limited formal education. As such, this population is more likely to have limited nutritional knowledge. Currently, there is no known study that has described nutritional knowledge levels among this

population. Filling this research gap is important not only to determine if nutrition education is needed within the population but also to determine the areas such education needs to focus on.

### **Summary**

Homeless youth are individuals likely to experience food insecurity and there are few resources available for this specific population. Food insecurity may lead to the utilization of unsafe coping mechanisms and therefore compromise the youth's health, including, but not limited to, nutritional health. Of those few resources available for this population, drop-in centers offer a place for the youth to rest, eat, do laundry and bathe. However, there is little to no literature about the quality and variety of food available at drop-in centers that cater to the homeless youth population. The extent to which these types of resources contribute to the food environment of the youth and affect their diet quality must be explored. In addition, while nutrition knowledge of the general population is relatively high, certain marginalized populations, especially those with poor nutritional outcomes, such as individuals with low socio-economic status and lower education, are at a higher risk of having inadequate nutrition knowledge. There is a lack of research assessing their nutrition knowledge which may expose gap in knowledge that could be addressed by nutrition education. Overall, this study will address the question of whether or not resources, such as drop-in centers, are providing nutritionally adequate food to homeless youth, and if the youth have any misconceptions caused by gaps in nutrition knowledge that prevent them choosing healthy options.



## CHAPTER 3: MATERIALS AND METHODS

### Study Design, Sample and Setting

This observational study was conducted at the Star House, the only drop-in center for homeless youth in Central Ohio. The Star House is a drop-in center, located in Columbus, Ohio, that caters to transitional youth between the ages of 14-24 who are experiencing homelessness. This establishment offers a safe environment for youth to connect with the community as well as gain access to a variety of services that address basic needs so youth can eat, do their laundry, rest, bathe, and receive clothing. Star House also provides other services such as healthcare, substance abuse counseling, job-seeking skills, education support, and housing assistance. Through the engagement of staff, volunteers, and other partners, youth begin to establish trusting relationships that is key to the ultimate goal of reintegration of the youth. This facility, in cooperation with The Ohio State University, operates on a yearly budget that allows them to provide the services to the youth in the area. In 2014 alone, Star House served 724 youth, who visited the facility more than 17,00 times (House).

For this study, homeless youth were defined according to the McKinney-Vento Act (Act 2002): “those who lack a fixed, regular, and adequate nighttime residence”. To be eligible for the study, each youth must:

1. Have met criteria for homelessness, according to the definition by McKinney-Vento Act
2. Been between the ages of 18 to 24 years
3. Understood a consent form, read aloud by the investigator, and have given verbal consent.

Youth who were interested in this project were informed of study procedures and those who met the eligibility criteria were included in the study after consenting. Each participant was informed that participation was voluntary and they could choose to withdraw from the study at any time (even after providing consent) without penalty. Upon admission into the study, participants were assigned a unique study identification number which was used on all questionnaire and records. Any forms containing personal identifying information were also kept under lock and key in the PI's office, separate from study questionnaires and assessment forms. This is to maintain anonymity and participant confidentiality. Strategies were also put in place to maintain security of records and participant confidentiality. Paper records will be kept in a locked cabinet in the research office of the PI located at the Ohio State University (OSU). Computers used in data collection were password protected. Access to research data was limited to authorized research personnel; information was available on a need-to-know basis.

The study was conducted between August 2016 and February 2017. Participants who met eligibility criteria and consented to participation were asked to complete the study surveys which included a sociodemographic questionnaire, a nutrition knowledge questionnaire and a food frequency questionnaire. All the questionnaires were interviewer-administered except the food frequency questionnaire. The length of time it took to complete the ranged anywhere from 30-90 minutes and incentive was given to all participants who successfully completed study requirements in the form of a \$10 Wendy's restaurant gift card.

### **Assessment Measures**

#### *Sociodemographic and Homeless Experience Information*

To determine the demographic and economic characteristics of youth who utilize the drop-in center, a sociodemographic questionnaire was used to collect information about participant's

age, gender, ethnicity, current employment and income, highest level of education, homelessness experience, as well as drug and alcohol use. In addition, the survey was also used to collect data about the frequency with which participant visited the drop-in center, as well as the frequency with which they consumed meals while there.

### *Nutrition Knowledge*

The consumer nutrition knowledge scale (CoNKS), was used in assessing nutrition knowledge. CoNKS is a 20-item validated consumer oriented nutrition knowledge questionnaire with true/false response options. This survey was chosen for use with the homeless youth population because it “encompasses both declarative and procedural nutrition knowledge”. Questions from many other nutrition knowledge instruments focus only on declarative and factual knowledge which uses scientific language. This type of questionnaire may not be appropriate for a population such as homeless youth who have limited education backgrounds. On the contrary, the CoNKS questionnaire utilizes terms that consumers are familiar with, such as “calories”, “vitamins”, “minerals” etc. The CoNKS has a Cronbach’s alpha of 0.73 (Dickson-Spillmann, Siegrist et al. 2011).

### *Dietary Intake*

Dietary intake of study participants was obtained using the Block Food Frequency Questionnaire for Adults (FFQ). The Block questionnaire is a validated questionnaire that assesses the usual intake of food and nutrients based on approximately 127 food items. Food items were chosen based on national dietary surveys, such as the National Health and Nutrition Examination Survey (NHANES). Frequency of consumption of the FFQ ranged from ‘Never’, or ‘Once a Month’, to ‘Everyday’. In addition to frequency, the portion size of each food and beverage item was inquired about by means of a paper comparison. It is a self-administered tool,

however, assistance was provided in completing the questionnaire if needed. The dietary data was used to generate the healthy eating index score which is a measure of diet quality (Block, Hartman et al. 1986).

### *Home Food Inventory*

The Home Food Inventory (HFI) developed by Fulkerson et al., was used to assess the variety of the foods available at the drop-in center. The HFI is a validated tool that can be applied to community-based behavioral nutrition and obesity prevention research. It covers thirteen major categories and two categories assessing ready access to food in the refrigerator and in the kitchen. The 13 major categories were total dairy products, total vegetables (including potatoes), total fruits, and total meats and other nondairy products, added fats, frozen desserts, prepared desserts, savory snacks, microwavable/quick-cook foods, bread, dry breakfast cereal, candy, and beverages. Some categories were further subcategorized to include regular vs. reduced fat and sugar options, as well as into whole vs. processed options. Items were listed in a checklist format and the response options were yes/no (1/0). The number of items in each category ranges from 5-26, with higher scores indicating greater availability (Fulkerson, et al. 2008). Kappa statistics for all the food and ready access categories ranged from 0.61-0.83, while sensitivity and specificity ranged from 0.61-0.89 and 0.86-0.95 respectively. In addition to assessing the food inventory, the HFI survey was also able to ascertain an obesogenic food availability score. This summative score was calculated to determine the availability of obesogenic foods. This calculation took into account all the regular fat/sugar versions of the foods assessed by the HFI. This included regular fat version of cheese, milk, yogurt, other dairy, frozen desserts, prepared desserts, savory snacks, added fats; regular sugar free beverages; processed meats; high-fat quick, microwavable foods; candy and access to unhealthy foods in the

kitchen or refrigerator. Possible obesogenic food availability score ranged from 0 to 71, with a higher score indicating an increased availability of obesogenic foods. The food inventory of the Star House was assessed once a month, for a total of six food inventories for each month that participants were recruited. Food inventory assessments were conducted at varying times of the month (i.e. beginning, middle, or late) to account for inter/intra-monthly variability. Each food inventory assessment was completed by the same investigator. The researcher looked for all the foods listed on the HFI in all areas of the drop-in center where food is stored. These included refrigerators, kitchen counter, pantry, freezer, kitchen cupboards, and warehouse-style storage (Fulkerson, Nelson et al. 2008).

### **Statistical Analysis**

All data collected in this exploratory study was managed and analyzed using SPSS Software version 21. Descriptive statistics was used to describe the food inventory of the drop-in center, the characteristics of youth homeless youth who utilize the center as well as their nutrition knowledge levels. Analysis of variance (ANOVA) was used to explore the associations of frequency of visit of youth to the drop-in center and their frequency of food consumption at the drop-in center with diet quality as measured by the food frequency questionnaire.

## CHAPTER 4: RESULTS

### **Sociodemographic and Homeless Characteristics**

One hundred and six homeless youth were approached for participation in this study. Of those 95 were eligible to participate and completed the sociodemographic and nutrition knowledge surveys. However, only 93 youth completed all the study surveys, including the food frequency questionnaire. The two participants that did not complete the FFQ began the questionnaire but had to leave for personal reasons before they could finish enough of the FFQ to be analyzed. Their data is therefore not included in the diet quality analysis.

Table 1 describes the sociodemographic characteristics of the youth. Of the 95 youth who completed the sociodemographic and nutrition knowledge surveys, 57 (60%) were male and 38 (40%) were female. The average age was 21.19 (1.76) years old, with about 61% being between ages 21-24. A majority (57%) of the youth identified as African American while 26% identified as Caucasians. About 73% of participants reported having had at least a high school degree or less. Unemployment was very common among youth with over 63% reporting not having a job. While the average age of the participants was 21.18 (1.76) years old, the mean age at which the youth first became homeless was 17.98 (3.31) years old. On average the youth have currently been without a shelter for 325.17 (510.30) days; while the average longest period of homelessness experienced by the youth was 422.99 (529.46) days. Participants reported staying in a variety of places, (shown in the table (Table 2), but the largest portion of participants (26.27%) reported staying somewhere outside.

Table 1. Sociodemographic Characteristics of youth utilizing the drop-in center (N=95)

<b>Characteristic</b>	<b>n (%)</b>
<b>Gender</b>	
Male	57 (60)
Female	38 (40)
<b>Age</b>	
18-20	37 (38.9)
21-24	58 (61.1)
<b>Education</b>	
< High School	27 (28.4)
High School/GED	42 (44.2)
≤ College	25 (26.3)
<b>Race</b>	
African-American/Black	54 (56.8)
Caucasian/White	25 (26.3)
Other	16 (16.8)
<b>Employment</b>	
Employed full time	20 (21.1)
Employed part time	13 (13.7)
Unemployed	60 (63.2)
Student	2 (2.1)

Table 2. Locations where Homeless Youth Spend their Nights.

<b>Location</b>	<b>Number of Participants (%)</b>
Star House	12 (12.6)
Mission or shelter	21 (22.1)
With a friend	20 (21.1)
With a family member	4 (4.2)
Somewhere outside (in a tent etc.)	26 (27.4)
Somewhere else inside (but station etc.)	3 (3.2)
Abandon building	1 (1.1)
Other	8 (8.4)

Information on a variety of substances was collected, however the most commonly used substances among this cohort of homeless youth includes tobacco, marijuana, and alcohol. Over half (55.8%) of the youth interviewed reported using tobacco in the form of cigarettes more than

once a day. A smaller portion (24.2%) reported using marijuana one or more times a day, although around a third of the youth (34.7%) reported infrequent use ranging from 3-4 times a week to once in the last 30 days. While the majority (53.7%) of participants reported never consuming alcohol, this category showed a greater variety in frequency (Table 3). Finally, only three participants reported using cocaine in the last 30 days, and only one participant reported using crack cocaine in the past 30 days. There was not other report of any use of substances within this population.

*Table 3. Frequency of Homeless Youth Substance Use*

	<b>Tobacco</b>	<b>Marijuana</b>	<b>Alcohol</b>
<b>Frequency of Use</b>	n (%)		
More than once a day	53 (55.8)	18 (18.9)	1 (1.1)
Daily	5 (5.3)	5 (5.3)	3 (3.2)
3-4 time a week	6 (6.3)	10 (10.5)	10 (10.5)
Once a week	4 (4.2)	13 (13.7)	10 (10.5)
Once in the last 30 days	4 (4.2)	10 (10.5)	20 (21.1)
Never	23 (24.2)	39 (41.1)	51 (53.7)

Participants were also asked about how frequently they come to the drop-in center; about 50% reported daily visits while 40% reported coming one or more times per week, and the remaining 10% reported rarely visiting the drop-in center. With regards to food consumption at the drop-in center, 66.3% participants reported eating at Star House one to two times a visit. Only eight participants (8.4%) reported never eating food at the drop-in center, and the remaining participants (24, 25.3%) ate three or more meals at the facility.



## Diet Quality

Diet quality was measured using a Healthy Eating Index (HEI-2010) score obtained from a food frequency questionnaire. The average HEI score of the participants was 54.92 (10.80) out of a possible 100. Scores for the various HEI components are reported in Table 4.

*Table 4. Homeless Youth HEI-2010 Scores (Diet Quality Assessment)*

HEI- 2010 Dietary Component	Maximum Score	Mean (SD)
Total vegetables	5	2.29 (1.25)
Greens and beans	5	1.97 (1.70)
Total fruit	5	2.99 (1.60)
Whole fruit	5	2.97 (1.71)
Whole grain	10	2.69 (2.09)
Dairy	10	5.89 (2.24)
Total protein foods	5	4.26 (1.10)
Seafood & plant proteins	5	3.12 (1.60)
Fatty acids	10	4.38 (2.33)
Sodium	10	5.30 (3.09)
Refined grains	10	10 (0.0)
Empty calories	20	9.08 (5.14)
<b>Total HEI Score</b>	<b>100</b>	<b>54.92 (10.80)</b>

In addition to the HEI, the study also determined the average intake of foods from the major food groups, as well as added sugars and solid fat. The results are reported in table 5. In general, the youth consumed more than the recommended servings for fruit, grains, protein, dairy, oils, solid fats, and added sugar. Fruit intake were mostly from fruit juices while refined grains constituted about 85% of the total grain intake. The average added sugar intake, was 49.14 (45.12) teaspoons, which is roughly equivalent to one cup. Youth consumed on average, 93.6 grams of solid fat. An analysis to determine the association of frequency of visiting the drop-in center, and the frequency of eating at the drop-in center with dietary intake and diet quality

showed no significant findings. For example, youth who came to and ate daily at the drop-in center did not eat more fruits and vegetables than the youth who rarely visited the facility.

*Table 5. Dietary Intake: Food Groups Intake*

<b>Food Category, unit: Description</b>	<b>Recommended Servings/day</b>	<b>Mean (SD)</b>
Total fruit, cup equivalents (cup eq.): total intact fruits (whole or cut) and fruit juices	2 cups	2.62 (3.07)
Total vegetables, cup equivalents (cup eq.): total dark green, red and orange, starchy, and other vegetables; excludes legumes	2.5- 3 cups	2.38 (2.54)
Total grain, ounce-equivalents (oz. eq): total whole and refined grains (includes whole and refined grain, including grains and flours, in baked goods)	6-8 ounces	12.82 (11.77)
Whole grain, oz eq; grains defined as whole grains and contain the entire grain kernel- the bran, germ, and endosperm	3-4 ounces (at least)	1.90 (2.46)
Refined grains, ounces (oz. eq.): refined grains that do not contain all the components of the entire grain kernel	Remaining grain amount	10.92 (10.05)
Total protein foods, ounce-equivalents: total meat, poultry, organ meat, cured meat, seafood, eggs, soy, and nuts and seeds; excludes legumes	5.5-6.5 ounces	11.95 (12.67)
Total dairy, cup equivalents (cup eq.): Total milk, yogurt, cheese, and whey	3 cups	3.45 (2.95)
Oils, grams: Fats naturally present in nuts, seeds, and seafood; un-hydrogenated vegetable oils, except palm oil, palm kernel oil, and coconut oils; fat present in avocado and olives above the allowable amount; 50% of fat present in stick and tub margarine.	6-7 teaspoons (equivalent to 30-35 grams)	44.13 (39.72)
Solid fats, grams: Fats naturally present in meat, poultry, eggs, and dairy (lard, tallow, and butter), hydrogenated or partially hydrogenated oils; shortening, palm, palm kernel and coconut oils; fats naturally present in coconut meat and cocoa butter	Limit	93.60 (84.19)
Added sugars, teaspoon equivalents (tsp. eq.):Foods defined as added sugars	6-9 teaspoons	49.14 (45.12)

### **Nutrition Knowledge**

The CoNKS was out of a total possible 20 and consisted of all true or false responses. Of the 95 participants that completed this survey the average was 11.41(2.94), with a range of 1-17

correct answers. The correct answer for each question as well as the number, and percentage, of participants that answered correctly are reported in Table 6. Of the 20 total questions, five of them were correctly answered by participants of less than 50% of the time. One question in particular resulted in only 14.7% of participants answering correctly. This questions reads as “A healthy meal should consist of half meat, a quarter vegetables, and a quarter of side dishes’, and the correct answer is false.

*Table 6. Participant response to knowledge questionnaire items.*

<b>Questions</b>	<b>Correct Answer</b>	<b>Correct responses n (%)</b>
Beans contain only few useful nutrients, therefore their health benefit is not great.	False	77 (81.1)
If you have eaten high-fat foods, you can reverse the effects by eating apples.	False	52 (54.7)
If cream is whipped it contains less calories than in its liquid form.	False	60 (63.2)
A healthy meal should consist of half meat, a quarter vegetables and a quarter side dishes.	False	14 (14.7)
Fat contains fewer calories than the same amount of fiber.	False	71 (74.7)
A salad dressing made with mayonnaise is as healthy as the same dressing made with mustard.	False	79 (83.2)
Fat is always bad for your health; you should therefore avoid it as much as possible.	False	52 (54.7)
Pasta with tomato sauce is healthier than pasta with mushroom and cream sauce.	True	52 (54.7)
A balanced diet implies eating all foods in the same amounts.	False	55 (57.9)
The health benefit of fruit and vegetables lies alone in the supply of vitamins and minerals.	False	25 (26.3)
Bacon contains more calories than ham.	True	50 (52.6)
Oily fish (salmon, mackerel) contain healthier fats than red meat.	True	74 (77.9)
To eat healthily, you should eat less fat. Whether you also eat more fruit and vegetables does not matter.	False	51 (53.7)
A scoop of chocolate ice cream is just as healthy as a scoop of lemon sorbet.	False	82 (86.3)
The same amount of beef steak and chicken breast contains equally many calories.	False	61 (64.2)
The same amount of sugar and fat contains equally many calories.	False	60 (63.2)
A sandwich with mozzarella contains as many calories as the same sandwich with Swiss cheese.	False	53 (55.8)

For a healthy nutrition, dairy products should be consumed in the same amounts as fruit and vegetables.	False	46 (48.4)
Skimmed milk contains fewer minerals than full-fat milk.	False	36 (37.9)
Brown sugar is much healthier than white sugar.	False	34 (35.8)

## Food Inventory

Table 7 describes the variety and quality of foods assessed based on the 13 categories from each food inventory assessment. Appendix 1 provides further details of the inventory, including major and subgroup categories assessed. The average availability of dairy was 25.4% of the total possible score. The average availability of vegetables (w/ potatoes) was 60.83% of the total possible score. The average availability of vegetables (w/o potatoes) was 59.65% of the total possible score. The average availability of fruit was 41.67% of the total possible score. Finally, the average availability of meat and other non-dairy protein (w/potatoes) was 56.25% of the total possible score. The average obesogenic food availability score of the six visits was found to be 31.33. Table 8 describes the categories used to calculate this number and their scores.

Table 7. Food Inventory Major Categories

<b>HFI Major Food Categories</b>	<b>Total Score Possible</b>	<b>Visit 1</b>	<b>Visit 2</b>	<b>Visit 3</b>	<b>Visit 4</b>	<b>Visit 5</b>	<b>Visit 6</b>	<b>Mean (SD)</b>
Dairy	21	3	5	7	5	7	6	5.5 (1.52)
Vegetables (w/potatoes)	20	14	13	11	13	7	15	12.17 (2.86)
Fruits	26	13	10	10	14	8	10	10.83 (2.23)
Meats & nondairy protein	16	8	10	5	9	9	13	9.00 (2.61)
Added Fat	13	5	6	6	6	6	6	5.83 (2.45)
Frozen Desserts	7	0	1	2	1	0	1	0.83 (0.75)
Prepared Desserts	8	0	3	3	4	4	2	2.67 (1.51)
Savory snacks	18	9	8	7	6	6	8	7.33 (1.21)
Microwavable/quick-cook foods	8	3	4	4	3	2	1	2.83 (1.17)
Breads	6	5	5	3	4	2	6	4.16 (1.47)
Dry breakfast cereals	3	2	3	3	2	2	3	2.50 (0.55)
Candy	5	0	0	1	2	3	2	1.33 (1.21)
Beverages	9	3	5	3	5	4	4	4.00 (0.89)

Table 8. *Obesogenic Food Availability Score*

HFI Food Category	Possible Total	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Regular fat cheese	5	0	1	1	2	2	2
Regular fat milk	1	0	0	0	0	0	0
Regular fat yogurt	1	1	1	1	0	1	0
Regular other dairy	2	1	1	1	1	2	1
Regular frozen dessert	3	0	1	1	1	0	1
Regular prepared dessert	6	0	3	3	4	4	2
Regular savory snacks	10	7	6	5	5	5	6
Regular added fats	8	4	6	5	5	4	5
Regular-sugar beverages	6	2	3	3	3	3	3
Processed meat	4	0	3	0	1	2	3
High-fat quick, microwavable foods	8	3	4	4	3	2	1
Candy	6	0	0	1	2	3	2
Access to unhealthy foods in refrigerator	6	2	3	3	1	3	4
Access to unhealthy foods in kitchen	5	3	2	4	4	3	3
<b>Obesogenic Food Availability score</b>	<b>71</b>	<b>23</b>	<b>34</b>	<b>32</b>	<b>32</b>	<b>34</b>	<b>33</b>

## Chapter 5: DISCUSSION & CONCLUSION

The goal of this study was to describe the variety and quality of foods available to homeless youth at drop-in center. To the best of our knowledge, this is the first such study to describe foods available to homeless youth in these access centers. Our findings show a high availability of vegetables, meat and other non-dairy protein foods, in addition to a limited availability of foods that are typically high in calories, fat, and sugar that contribute to obesity. This is in contrast to previous studies that report the provision of less quality foods to homeless individuals through shelter feeding facilities (Johnson and McCool 2003, Davis, Holleman et al. 2008). While many shelters typically depend on donated foods and hence have no control over the quality of foods available, the drop-in center which was the focus of this study purchased some of the foods provided to the homeless youth from a local food bank, and has limited dependence on donated food. The ability of a drop-in center to purchase and provide healthful foods to homeless youth, however, depends on their level of funding.

The availability of healthier food options did not translate to an increase consumption of healthful foods by youth who utilize the drop-in center. The lack of association of the frequency of visits, and the frequency of eating at the facility, with dietary intake and dietary quality. This is evidence that the youth are not consuming the healthful foods provided by the drop-in center. However, the findings from the HEI scores suggests that the youth are following a dietary pattern that is somewhat adherent to the dietary guidelines for Americans. The average HEI score for Americans ages 19-30 years is 51 which suggests that with an HEI score of 54, these homeless youth are following healthier dietary patterns than average Americans within similar age group.

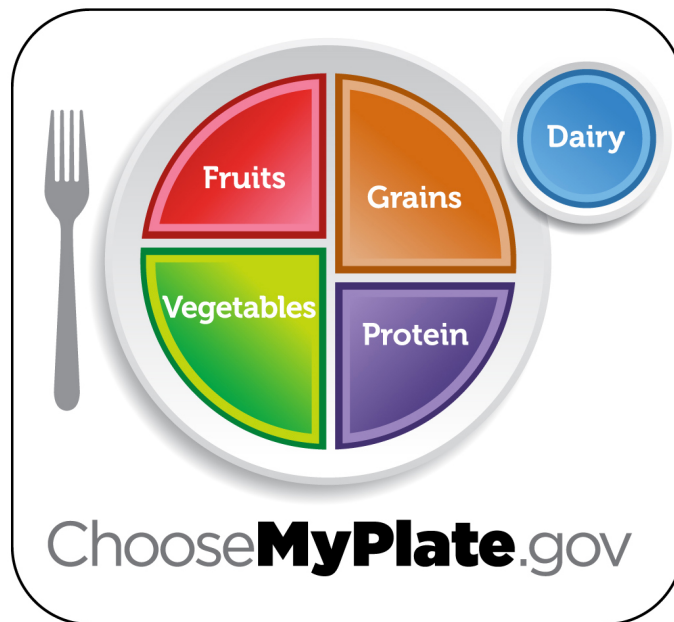
A closer examination of dietary intake however shows that are consuming less healthful foods. For example, on average the youth consumed 2.62 cups of total fruit which is slightly higher than the recommended 2 cups for their age group, however, about 50% (1.3 cups) was consumed in the form of fruit juices, which are typically high in sugar. Youth on average consumed 50% more sugar than recommended. In addition, a substantial amount of their vegetables were from starches, while only 15% of the total grain daily consumption were from whole grains. The current dietary recommendation for fat intake is to consume 30-35% of daily calories from 'healthy' fat sources, and less than 10% of that should be from saturated fat (Committee 2015). Typically, this translates to about 6-7 teaspoons, or 30-35 grams, of fats from oil sources which contain more unsaturated fatty acids. The study participants consumed on average 44 grams of oils and 94 grams of solid fats (from saturated sources). High amounts of saturated fats consumed can contribute to various negative health outcomes, such as cardiovascular disease for some individuals (Chiu, Williams et al. 2017).

In terms of the nutrition knowledge, the youth had an average score that was just slightly below the average consumer of 13. (Dickson-Spillmann, Siegrist et al. 2011). However, the questions that the youth frequently missed may indicate a gap in nutrition knowledge. Examples, the most missed questions were "A healthy meal should consist of half meat, a quarter vegetables and a quarter side dishes.", and "For a healthy nutrition, dairy products should be consumed in the same amounts as fruit and vegetables". Both of these questions suggest a gap in nutrition knowledge that has to do with the appropriate portion sizes of foods consumed. Portion sizes in the United States have continued to increase in recent years (Nestle 2003), and could therefore cause the general population to perceive the larger portion sizes as 'normal'. An important tool that could be used to educate youth about portion sizes is MyPlate. MyPlate is a consumer



friendly tool created by the USDA to reflect what a healthy plate should look like, and is illustrated in Figure 1 (Committee 2015). This tool allows users to see how much of each food groups be on each plate at meals times.

*Figure 1. MyPlate*



Other question that exposed gaps in youth’s nutritional knowledge include “The health benefit of fruit and vegetables lies alone in the supply of vitamins and minerals”; “Skimmed milk contains fewer minerals than full-fat milk”, and “Brown sugar is much healthier than white sugar”. The inability of majority of the youth to answer these questions correctly, indicate the lack knowledge about the nutritional content of food. Education about what makes up the food consumed, and what is needed by the human body may address this nutrition knowledge gap.

This study has several limitations that needs to be highlighted. First, usual dietary intake and diet quality data were assessed using a food frequency questionnaire (FFQ) that relies very heavily of long term memory. Additionally, the FFQ is long with repetitive list of foods which

may tire study participants or make them bored. Among a difficult to reach population such as homeless youth, this could have a negative impact on data on dietary data collected.

Another limitation lies within the HFI tool used to assess the food inventory. This specific tool did not measure the quantity of food, but rather the presence or absence of the food in the facility. In addition, the list of food items was not comprehensive, meaning it does not include all food items and could have potentially missed less common food products.

In spite of these limitations, however, this study shows that drop-in centers can provide healthful foods to homeless youth and can be avenues where they obtain nutritious foods. While youth frequently utilize these facilities, however, they may not be consuming the foods available to them. Youth had diet quality that was comparable to national average whether they frequently ate at the drop-in center or not. These findings suggest other food resources that need to be determined with future research. The study also shows that homeless youth have a gap in nutrition knowledge that pertains to their understanding of portion sizes and nutritional content of food. Nutrition education may be of benefit to this population and may also improve their dietary intake and patterns.

## REFERENCES

- Act, H. A. (2002). "McKinney-Vento homeless assistance act." Retrieved May 11: 2008.
- Antoniades, M. and V. Tarasuk (1998). "A survey of food problems experienced by Toronto street youth." Canadian Journal of Public Health **89**(6): 371.
- Aratani, Y. (2009). "Homeless children and youth: Causes and consequences." National Center for Children in Poverty. Retrieved April **19**: 2010.
- Block, G., et al. (1986). "A data-based approach to diet questionnaire design and testing." American journal of epidemiology **124**(3): 453-469.
- Campbell, K. J., et al. (2007). "Associations between the home food environment and obesity-promoting eating behaviors in adolescence." Obesity **15**(3): 719-730.
- Chiu, S., et al. (2017). "Effects of a very high saturated fat diet on LDL particles in adults with atherogenic dyslipidemia: A randomized controlled trial." PloS one **12**(2): e0170664.
- Chiuve, S. E., et al. (2012). "Alternative dietary indices both strongly predict risk of chronic disease." The Journal of nutrition: jn. 111.157222.
- Coleman-Jensen, A., et al. (2014). "Household food security in the United States in 2013."
- Committee, D. G. A. (2015). Dietary Guidelines for Americans 2015-2020, Government Printing Office.
- Dachner, N. and V. Tarasuk (2002). "Homeless "squeegee kids": Food insecurity and daily survival." Social science & medicine **54**(7): 1039-1049.
- Davis, L. R., et al. (2008). "Dietary intake of homeless women residing at a transitional living center." Journal of Health Care for the Poor and Underserved **19**(3): 952-962.
- Dickson-Spillmann, M., et al. (2011). "Development and validation of a short, consumer-oriented nutrition knowledge questionnaire." Appetite **56**(3): 617-620.
- Dickson-Spillmann, M. and M. Siegrist (2011). "Consumers' knowledge of healthy diets and its correlation with dietary behaviour." Journal of Human Nutrition and Dietetics **24**(1): 54-60.
- Domnich, A., et al. (2015). "Uncontrolled web-based administration of surveys on factual health-related knowledge: a randomized study of untimed versus timed quizzing." Journal of medical Internet research **17**(4): e94.
- Ensign, J. and J. Gittelsohn (1998). "Health and access to care: Perspectives of homeless youth in Baltimore City, USA." Social science & medicine **47**(12): 2087-2099.

- Fisher, H., et al. (2016). "Young adults' consideration of their food choices a propos consequences for their future health." International Journal of Consumer Studies **40**(4): 475-483.
- Fulkerson, J. A., et al. (2008). "The validation of a home food inventory." International Journal of Behavioral Nutrition and Physical Activity **5**(1): 55.
- Guenther, P. M., et al. (2014). "The Healthy Eating Index-2010 is a valid and reliable measure of diet quality according to the 2010 Dietary Guidelines for Americans." The Journal of nutrition: jn. 113.183079.
- Hammer, H., et al. (2002). "Runaway/throwaway children: National estimates and characteristics."
- Henry, M., et al. (2016). "The 2016 annual homeless assessment report (AHAR) to congress. Part 1: Point-in-time estimates of homelessness."
- Homeless, N. C. f. t. (2009). "How Many People Experience Homelessness?"
- House, S. "Home." from <https://starhouse.ehe.osu.edu/about-us/>.
- Johnson, L. J. and A. C. McCool (2003). "Dietary intake and nutritional status of older adult homeless women: a pilot study." Journal of Nutrition for the Elderly **23**(1): 1-21.
- Kuhn, R. and D. P. Culhane (1998). "Applying cluster analysis to test a typology of homelessness by pattern of shelter utilization: Results from the analysis of administrative data." American journal of community psychology **26**(2): 207-232.
- Li, A., et al. (2009). "Food intake patterns of homeless youth in Toronto." Canadian Journal of Public Health/Revue Canadienne de Sante'e Publique: 36-40.
- Lyles, C. R. (2013). "Nutritional assessment of free meal programs in San Francisco." Preventing chronic disease **10**.
- Merscham, C., et al. (2009). "Mental health and substance abuse indicators among homeless youth in Denver, Colorado." Child Welfare **88**(2): 93.
- Nestle, M. (2003). "Increasing portion sizes in American diets: more calories, more obesity." Journal of the Academy of Nutrition and Dietetics **103**(1): 39.
- Richards, R. and C. Smith (2006). "The impact of homeless shelters on food access and choice among homeless families in Minnesota." Journal of nutrition education and behavior **38**(2): 96-105.
- Slesnick, N., et al. (2009). "A review of services and interventions for runaway and homeless youth: Moving forward." Children and Youth Services Review **31**(7): 732-742.

Slesnick, N., et al. (2008). "How to open and sustain a drop-in center for homeless youth." Children and Youth Services Review **30**(7): 727-734.

Smith, C. and R. Richards (2008). "Dietary intake, overweight status, and perceptions of food insecurity among homeless Minnesotan youth." American Journal of Human Biology **20**(5): 550-563.

Tarasuk, V., et al. (2005). "Homeless youth in Toronto are nutritionally vulnerable." The Journal of nutrition **135**(8): 1926-1933.

Tarasuk, V. and J. M. Eakin (2005). "Food assistance through "surplus" food: Insights from an ethnographic study of food bank work." Agriculture and Human Values **22**(2): 177-186.

Tse, C. and V. Tarasuk (2008). "Nutritional assessment of charitable meal programmes serving homeless people in Toronto." Public health nutrition **11**(12): 1296-1305.

Whitbeck, L. B., et al. (2006). "Food insecurity among homeless and runaway adolescents." Public health nutrition **9**(01): 47-52.

Wirt, A. and C. E. Collins (2009). "Diet quality—what is it and does it matter?" Public health nutrition **12**(12): 2473-2492.

Worsley, A., et al. (2014). "Different patterns of Australian adults' knowledge of foods and nutrients related to metabolic disease risk." Journal of nutritional science **3**: e14.

**APPENDIX 1.**

Detailed Food Inventory

<b>Food Category</b>	<b>Total Possible</b>	<b>Visit 1</b>	<b>Visit 2</b>	<b>Visit 3</b>	<b>Visit 4</b>	<b>Visit 5</b>	<b>Visit 6</b>	<b>Average</b>	<b>Standard Deviation</b>
<b>Dairy</b>									
<i>Cheese</i>									
Regular Fat	5	0	1	3	2	2	2	1.67	1.03
Reduced Fat	6	0	0	0	0	1	1	0.33	0.52
<i>Milk/ other dairy beverages</i>									
Regular Fat	1	0	0	0	0	0	0	0.00	0.00
Reduced Fat	5	1	1	1	1	1	1	1.00	0.00
<i>Yogurt</i>									
Regular Fat	1	1	1	1	0	1	0	0.67	0.52
Reduced Fat	1	0	1	1	0	0	1	0.50	0.55
<i>Other Dairy</i>									
Regular Fat	2	1	1	1	1	2	1	1.17	0.41
Reduced Fat	1	0	0	0	1	0	0	0.17	0.41
<b>All vegetables, including potatoes</b>	20	14	13	11	13	7	15	12.17	2.86
<i>All vegetables, no potatoes</i>	19	13	13	10	12	6	14	11.33	2.94
<b>Fruits</b>	26	13	10	10	14	8	10	10.83	2.23
<b>Meats &amp; other nondairy proteins</b>									
Processed meat	4	0	3	0	1	2	3	1.50	1.38
All other protein	11	8	7	5	8	7	10	7.50	1.64
<b>Added Fat</b>									
Regular Fat	8	4	6	5	5	4	5	4.83	0.75
Reduced Fat	5	1	0	1	1	2	1	1.00	0.63
<b>Frozen Desserts</b>									
Regular Fat	3	0	1	1	1	0	1	0.67	0.52
Reduced Fat	4	0	0	1	0	0	0	0.17	0.41
<b>Prepared Desserts</b>									
Regular Fat	6	0	3	3	4	4	2	2.67	1.51
Reduced Fat	2	0	0	0	0	0	0	0.00	0.00
<b>Savory Snacks</b>									
Regular Fat	10	7	6	5	5	5	6	5.67	0.82

Reduced Fat	8	2	2	2	1	1	2	1.67	0.52
<b>Microwavable/ quick-cook foods</b>	8	3	4	4	3	2	1	2.83	1.17
<b>Bread</b>									
Wheat	5	2	2	2	1	2	0	1.50	0.84
White	7	4	3	3	2	2	2	2.67	0.82
<b>Dry breakfast cereal</b>									
Whole grain	1	1	1	1	1	1	0	0.83	0.41
High sugar	1	1	0	1	1	0	1	0.67	0.52
Low sugar	1	1	1	1	1	1	1	1.00	0.00
<b>Candy</b>	5	0	0	1	2	3	2	1.33	1.21
<b>Beverages</b>									
Regular sugar	6	2	3	3	3	3	3	2.83	0.41
Low sugar	3	1	2	0	2	1	1	1.17	0.75
<b>Kitchen Accessibility</b>									
Access to healthy foods	6	3	2	1	2	2	2	2.00	0.63
Access to unhealthy foods	6	3	2	4	4	3	4	3.33	0.82
<b>Refrigerator Accessibility</b>									
Access to healthy foods	9	1	4	3	3	3	5	3.17	1.33
Access to unhealthy foods	6	2	3	3	1	3	3	2.50	0.84

## APPENDIX 2.

### Participation Questionnaire

Date:

SID:

Age

- 18
- 19
- 20
- 21
- 22
- 23
- 24
- Not eligible due to age

Do you have a permanent residence?

- Yes
- No

How many days have you currently been without shelter?

- Number of days \_\_\_\_\_
- Not eligible

Where are you currently spending your nights?

- Location \_\_\_\_\_
- Not eligible

PID #:

Gender

- Male
- Female
- Trans-gender
- Refuse to answer

Education

- No high school
- Some high school
- GED
- HS degree
- Some college
- Associates Degree (14 yrs)
- Bachelor's Degree (16 yrs)
- 17+ years
- Other \_\_\_\_\_



Racial group

- Asian American
- Black or African American
- Native Hawaiian and other Pacific Islander
- Hispanic or Latino
- American Indian and Alaska Native
- White
- Other \_\_\_\_\_

Are you of Hispanic/Latin/Spanish origin?

- Yes
- No

Do you use/How often?

	1+ times a day	Daily	3-4x/week	Once/week	Once last 30 days	Never
Cigarettes/ Tobacco	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marijuana/ cannabis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cocaine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crack	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Heroin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Combination (Speed-ball)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Methadone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amphetamine/ Ecstasy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Route of administration

	Smoke	Eat/ drink/ chew	Nasal	Inject	Skin-pop	N/A
Cigarettes/ Tobacco	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marijuana/ cannabis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cocaine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crack	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Heroin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Combination (Speed-ball)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Methadone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amphetamine/ Ecstasy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your current employment status?

- Employed full time
- Employed part time
- Unemployed looking for work
- Unemployed not looking for work
- Retired
- Student
- Disabled

What is your annual income?

- Less than \$10,000
- \$10,000 - \$19,999
- \$20,000 - \$29,999
- Greater than \$30,000
- I do not know

What was your income for last month?

How old were you the first time you became homeless?

What is the longest number of days have you been homeless? (days)

Where are you currently spending your nights?

- Star House
- Mission or shelter
- With a friend
- With a family member
- Somewhere outside
- Somewhere else inside (bus station etc.)
- Abandon building
- Other \_\_\_\_\_

How many days have you currently been without shelter? (days)

How frequently do you come to Star House?

- Daily
- 4-6 times a week
- 2-3 times a week
- Once a week
- Never

How frequently do you eat at Star House?

- Daily
- 4-6 times a week
- 2-3 times a week
- Once a week
- Never

How many meals a day do you eat at Star House?

- Once a day
- 2 times per day
- 3 times per day
- More than 3 times a day
- Never

Beans contain only a few useful nutrients; therefore, their health benefit is not great.

- True
- False

If you have eaten high-fat foods, you can reverse the effects by eating apples.

- True
- False

If cream is whipped it contains less calories than in its liquid form.

- True
- False

A healthy meal should consist of half meat, a quarter vegetables and a quarter side dishes.

- True
- False

Fat contains fewer calories than the same amount of fiber.

- True
- False

A salad dressing made with mayonnaise is as healthy as the same dressing made with mustard.

- True
- False

Fat is always bad for your health; you should therefore avoid it as much as possible.

- True
- False

Pasta with tomato sauce is healthier than pasta with mushroom and cream sauce.

- True
- False

A balanced diet implies eating all foods in the same amounts.

- True
- False

The health benefit of fruit and vegetables lies alone in the supply of vitamins and minerals.

- True
- False

Bacon contains more calories than ham.

- True
- False

Oily fish (salmon, mackerel) contain healthier fats than red meat.

- True
- False

To eat healthily, you should eat less fat. Whether you also eat more fruit and vegetables does not matter.

- True
- False

A scoop of chocolate ice cream is just as healthy as a scoop of lemon sorbet.

- True
- False

The same amount of beef steak and chicken breast contains equally many calories.

- True
- False

The same amount of sugar and fat contains equally many calories.

- True
- False

A sandwich with mozzarella contains as many calories as the same sandwich with Swiss cheese.

- True
- False

For a healthy nutrition, dairy products should be consumed in the same amounts as fruit and vegetables.

- True
- False

Skimmed milk contains fewer minerals than full-fat milk.

- True
- False

Brown sugar is much healthier than white sugar.

- True
- False

### APPENDIX 3.

#### Home Food Inventory

ID: \_\_\_\_\_

#### Home Food Inventory

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Look in areas in your home where your household stores food, including the refrigerator, freezer, pantries, cupboards, and other storage areas (list follows in that order). Please check “yes” or “no” to each of the food product/item/category below. Check “yes” to a food product/item/category if it is present anywhere in your home (opened or unopened) as you are completing this form. Check “no” to a food product/item/category if it is not present anywhere in your home as you are completing this form.

Lower fat products will be labeled as “reduced-fat,” “low-fat,” “light,” “nonfat,” or “skim” on product and can be interchangeable.

##### 1. Cheese

Yes No

- |                          |                          |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | a. Shredded or block regular cheese (example: American, cheddar)       |
| <input type="checkbox"/> | <input type="checkbox"/> | b. Sliced regular cheese (example: American, cheddar)                  |
| <input type="checkbox"/> | <input type="checkbox"/> | c. Shredded or block of reduced-fat cheese (example: low fat cheddar)  |
| <input type="checkbox"/> | <input type="checkbox"/> | d. Sliced reduced-fat cheese (example: low fat cheddar, low fat swiss) |
| <input type="checkbox"/> | <input type="checkbox"/> | e. String cheese   |
| <input type="checkbox"/> | <input type="checkbox"/> | f. Mozzarella cheese   |
| <input type="checkbox"/> | <input type="checkbox"/> | g. Regular ricotta or cottage cheese (minimum of 4% fat)               |
| <input type="checkbox"/> | <input type="checkbox"/> | h. Reduced -fat ricotta or cottage cheese (2% or low fat on label)     |
| <input type="checkbox"/> | <input type="checkbox"/> | i. Regular cream cheese  |
| <input type="checkbox"/> | <input type="checkbox"/> | j. Reduced-fat cream cheese or neufchatel                              |
| <input type="checkbox"/> | <input type="checkbox"/> | k. Cheez Whiz, Velveeta, canned cheese or other similar cheese         |

**Go to next page.**

**2. Milk/Dairy (see the “other beverage” section for non-dairy beverages)**

- | Yes                        | No                         |   |
|----------------------------|----------------------------|---|
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | a. Skim milk  |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | b. 1% or 2% low fat milk  |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | c. Whole milk   |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | d. Half and half, whipping cream or heavy cream                 |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | e. Sour cream or sour cream/cheese dips                         |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | f. Reduced-fat sour cream or low fat sour cream/cheese dips     |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | g. Chocolate or flavored milk                                   |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | h. Reduced-fat yogurt (with or without fruit)                   |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | i. Regular yogurt (made from whole milk, with or without fruit) |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | j. Reduced-fat yogurt drinks                                    |

**3. Butter, Margarine and Oils**

- | Yes                        | No                         |  |
|----------------------------|----------------------------|--|
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | a. Regular butter                                |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | b. Light butter                                  |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | c. Regular margarine or butter substitute        |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | d. Light margarine or butter substitute          |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | e. Olive oil                                     |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | f. Vegetable oil (example: canola oil, corn oil) |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | g. Seed oil (example: sunflower oil, sesame oil) |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | h. Lard or shortening                            |

**4. Salad Dressing**

- | Yes                        | No                         |   |
|----------------------------|----------------------------|---|
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | a. Regular dressing (e.g., blue cheese dressing, Caesar, ranch)           |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | b. Light/reduced fat dressing (example: light blue cheese, light Italian) |

**5. Condiments**

- | Yes                        | No                         |  |
|----------------------------|----------------------------|--|
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | a. Regular mayonnaise                    |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | b. Light/reduced fat mayonnaise          |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | c. Miracle Whip or other sandwich spread |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | d. Mustard or ketchup                    |

**6. How many other types of condiments (e.g., BBQ sauce, horseradish sauce, tartar sauce, steak sauce) do you estimate you have in your home? (mark only one response)**

- 0 None
- 1 1-5
- 2 6-10
- 3 More than 10

Fulkerson JA, Nelson MC, Lytle LA, Moe S, Heitzler C, Pasch KE. The validation of a home food inventory. International Journal of Behavioral Nutrition and Physical Activity, 2008, 5;55.

**Note, please mark whether each vegetable present is fresh, canned or frozen (mark all that apply). For example, if you have both fresh and canned asparagus in your home, you would check “yes” to asparagus and check in both the fresh and canned columns.**

**7. Vegetables**

<b>Yes</b>	<b>No</b>		<u>Fresh</u>	<u>Can/Jar</u>	<u>Frozen</u>
		<b>(mark all that apply)</b>			
<input type="checkbox"/>	<input type="checkbox"/>	a. Asparagus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	b. Beets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	c. Bell peppers (e.g. green, red)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	d. Broccoli	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	e. Cabbage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	f. Cauliflower	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	g. Carrots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	h. Celery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	i. Corn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	j. Cucumbers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	k. Green beans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	l. Lettuce (example: romaine, endive)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	m. Mushrooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	n. Peas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	o. Potatoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	p. Spinach/other greens (collard)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	q. Squash (example: butternut, zucchini)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	r. Sweet Potatoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	s. Tomatoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	t. Mixed vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Go to next page.**



**Note, please check whether each fruit present is fresh, canned, frozen, or dried (mark all that apply).** For example, if you have both fresh and frozen blueberries in your home, you would check “yes” to blueberries and check in both the fresh and frozen columns.

**8. Fruit**

		<u>Fresh</u>	<u>Can/Jar</u>	<u>Frozen</u>	<u>Dried</u>	
<b>Yes</b>	<b>No</b>	<b>(mark all that apply)</b>				
1 <input type="checkbox"/>	0 <input type="checkbox"/>	a. Apples	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	b. Apple sauce	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	c. Apricots	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	d. Avocado	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	e. Bananas	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	f. Blueberries	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	g. Cranberries	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	h. Dates	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	i. Grapes (red or green)	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	j. Grapefruit	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	k. Kiwi	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	l. Lemons or limes	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	m. Mango	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	n. Melons (example: watermelon)	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	o. Mixed fruit/fruit cocktail	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	p. Nectarines	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	q. Oranges	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	r. Pears	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	s. Peaches	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	t. Pineapple	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	u. Plums	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	v. Prunes	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	w. Raisins	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	x. Raspberries	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	y. Strawberries	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>
1 <input type="checkbox"/>	0 <input type="checkbox"/>	z. Tangerines/clementines	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>

**Go to next page.**

**9. Deli, Luncheon, Sandwich Meat and Sausage**

- | Yes                      | No                       |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | a. Sliced turkey or chicken deli meat  |
| <input type="checkbox"/> | <input type="checkbox"/> | b. Sliced ham, roast beef              |
| <input type="checkbox"/> | <input type="checkbox"/> | c. Bologna                             |
| <input type="checkbox"/> | <input type="checkbox"/> | d. Salami, summer sausage, pepperoni   |
| <input type="checkbox"/> | <input type="checkbox"/> | e. Bacon, breakfast sausage            |
| <input type="checkbox"/> | <input type="checkbox"/> | f. Hot dogs, bratwurst, polish sausage |

**10. Meats and Other Protein (Fresh, frozen, canned or jar)**

- | Yes                      | No                       |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | a. Chicken/turkey (example: burgers, breasts, whole)              |
| <input type="checkbox"/> | <input type="checkbox"/> | b. Beef, pork, lamb (example: burgers, steaks, roasts, chops)     |
| <input type="checkbox"/> | <input type="checkbox"/> | c. Tofu, seitan, tempe, textured vegetable protein (TVP)          |
| <input type="checkbox"/> | <input type="checkbox"/> | d. Veggie burgers   |
| <input type="checkbox"/> | <input type="checkbox"/> | e. Fish (e.g., canned, packet, fresh or frozen tuna, salmon, cod) |
| <input type="checkbox"/> | <input type="checkbox"/> | f. Shellfish (example: shrimp, scallops, crab)                    |
| <input type="checkbox"/> | <input type="checkbox"/> | g. Lentils  |
| <input type="checkbox"/> | <input type="checkbox"/> | h. Beans (example: black beans, pinto beans, kidney beans)        |
| <input type="checkbox"/> | <input type="checkbox"/> | i. Peanut butter or other nut butter                              |
| <input type="checkbox"/> | <input type="checkbox"/> | j. Eggs   |

**11. Frozen Desserts (Ice cream/yogurt type only)**

- | Yes                      | No                       |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | a. Regular ice cream (any flavor)                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | b. Reduced-fat ice cream (any flavor)                               |
| <input type="checkbox"/> | <input type="checkbox"/> | c. Frozen yogurt (any flavor)                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | d. Frozen treats made with ice cream or pudding                     |
| <input type="checkbox"/> | <input type="checkbox"/> | e. Frozen treats made with ice milk, frozen yogurt, sherbet, sorbet |
| <input type="checkbox"/> | <input type="checkbox"/> | f. Frozen fruit <u>juice</u> bars                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | g. Frozen soy or rice desserts                                      |

**12. Microwavable or Quick-Cook Frozen Foods**

- | Yes                      | No                       |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | a. Pizza (any variety)                      |
| <input type="checkbox"/> | <input type="checkbox"/> | b. Hot Pockets (any flavor)                 |
| <input type="checkbox"/> | <input type="checkbox"/> | c. Pizza rolls or bagel snacks (any flavor) |
| <input type="checkbox"/> | <input type="checkbox"/> | d. Burritos or other Mexican snacks         |
| <input type="checkbox"/> | <input type="checkbox"/> | e. Chicken nuggets                          |
| <input type="checkbox"/> | <input type="checkbox"/> | f. French fries or tater tots               |
| <input type="checkbox"/> | <input type="checkbox"/> | g. Egg rolls                                |
| <input type="checkbox"/> | <input type="checkbox"/> | i. Ramen noodles                            |

Fulkerson JA, Nelson MC, Lytle LA, Moe S, Heitzler C, Pasch KE. The validation of a home food inventory. International Journal of Behavioral Nutrition and Physical Activity, 2008, 5;55.

**Note, please check whether each bread present is fresh or frozen (mark all that apply).** For example, if you have both fresh and frozen whole wheat rolls in your home, you would check “yes” to whole wheat bread or rolls and check in both the fresh and frozen columns.

**13. Bread**

Yes	No		Fresh (Mark all that apply)	Frozen
<input type="checkbox"/>	<input type="checkbox"/>	a. <u>Wheat</u> bread or rolls	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	b. White bread/rolls (example: baguette)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	c. English muffins (wheat)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	d. English muffins (white)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	e. Bagels (wheat)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	f. Bagels (white, any flavor)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	g. Tortillas (wheat, sprout)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	h. Tortillas (flour, any flavors)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	i. Tortillas (corn)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	j. Pita bread (wheat, sprout)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	k. Pita bread (white, any flavor)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	l. Croissants	<input type="checkbox"/>	<input type="checkbox"/>

**Note, please check whether each prepared dessert type present is homemade or store-bought (mark all that apply).** For example, if you have both homemade and store-bought chocolate chip cookies in your home, you would check “yes” to regular cookies and check in both the store-bought and homemade columns.

**14. Prepared Desserts (do not count boxed mixes that are not prepared)**

Yes	No		Storebought (Mark all that apply)	Homemade
<input type="checkbox"/>	<input type="checkbox"/>	a. Regular cookies (any flavor/variety)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	b. Reduced-fat cookies (any flavor/variety)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	c. Regular cake/cupcakes (any flavor)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	d. Reduced-fat cake/cupcakes (any flavor)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	e. Regular muffins (any flavor/variety)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	f. Brownies/bars (any variety)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	g. Other snack cakes (any variety)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	h. Pastry, sweet rolls, donuts	<input type="checkbox"/>	<input type="checkbox"/>

**Go to next page.**

**15. Chips, Crackers and Other Snack Foods**

- | <b>Yes</b>               | <b>No</b>                |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | a. Whole grain snack crackers (labeled “whole grain” or “whole wheat”, example: Triscuit) |
| <input type="checkbox"/> | <input type="checkbox"/> | b. Regular snack crackers (example: Saltines, Wheat Thins)                                |
| <input type="checkbox"/> | <input type="checkbox"/> | c. Reduced-fat snack crackers (example: Reduced fat Wheat Thins)                          |
| <input type="checkbox"/> | <input type="checkbox"/> | d. Regular potato chips   |
| <input type="checkbox"/> | <input type="checkbox"/> | e. Reduced-fat potato chips (example: Baked Lays)   |
| <input type="checkbox"/> | <input type="checkbox"/> | f. Corn chips (example: Fritos)   |
| <input type="checkbox"/> | <input type="checkbox"/> | g. Tortilla chips   |
| <input type="checkbox"/> | <input type="checkbox"/> | h. Reduced-fat tortilla chips (example: baked tortilla chips)                             |
| <input type="checkbox"/> | <input type="checkbox"/> | i. Cheese curls or puffs  |
| <input type="checkbox"/> | <input type="checkbox"/> | j. Reduced-fat cheese curls or puffs (example: baked Cheetos)                             |
| <input type="checkbox"/> | <input type="checkbox"/> | k. Regular bagel chips  |
| <input type="checkbox"/> | <input type="checkbox"/> | l. Reduced-fat bagel chips  |
| <input type="checkbox"/> | <input type="checkbox"/> | m. Graham crackers  |
| <input type="checkbox"/> | <input type="checkbox"/> | n. Pretzels, any shape  |
| <input type="checkbox"/> | <input type="checkbox"/> | o. Popcorn (microwave bags or bags of prepared popcorn)                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | p. Peanuts, cashews or other nuts   |
| <input type="checkbox"/> | <input type="checkbox"/> | q. Regular granola bars, sports bars  |
| <input type="checkbox"/> | <input type="checkbox"/> | r. Reduced-fat granola bars, sports bars  |

**16. Are any of the chips, crackers or other snacks checked above in prepackaged snack size or single size portions (do not count granola, sports bars, meal supplement bars)?**

- Yes  
 No

**Dry Breakfast Cereal**

**17. How many ready-to-eat cereals do you have that are labeled “whole grain”, “whole wheat” or have at least 3 grams of fiber per serving? (Check one response)**

- None  
 One  
 Two or three  
 Four or more

**18. How many ready-to-eat cereals indicate on the nutrition label that they have less than 6 grams of sugar per serving? (Check one response)**

- None  
 One  
 Two or three  
 Four or more

Fulkerson JA, Nelson MC, Lytle LA, Moe S, Heitzler C, Pasch KE. The validation of a home food inventory. International Journal of Behavioral Nutrition and Physical Activity, 2008, 5;55.

**19. How many ready-to-eat cereals indicate on the nutrition label that they have 6 or more grams of sugar per serving? (Check one response)**

- 0  None
- 1  One
- 2  Two or three
- 3  Four or more

**20. Beverages (do not include alcoholic beverages)**

- | <b>Yes</b>                 | <b>No</b>                  |   |
|----------------------------|----------------------------|---|
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | a. Regular soda pop (any variety, flavor)                       |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | b. Diet soda pop (any variety, flavor)                          |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | c. Prepared iced teas or lemonade (e.g., Snapple)               |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | d. Prepared light iced teas or lemonade (example: diet Snapple) |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | e. Sports drinks (example: Gatorade)                            |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | f. 100% fruit juice (labeled as 100% juice)                     |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | g. Fruit drinks (example: <100% juice, Capri Sun)               |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | h. Bottled water (unsweetened, any variety, flavor)             |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | i. Soy milk, rice milk (any variety, flavor)                    |

**21. Candy**

- | <b>Yes</b>                 | <b>No</b>                  |   |
|----------------------------|----------------------------|---|
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | a. Chocolate candy (any variety, except chocolate exclusively for baking) |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | b. Hard candy   |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | c. Gummi's  |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | d. Fruit rollups, fruit snacks or other fruit based candy                 |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | e. Chewy candy (example: Skittles, caramel)                               |

**22. Now please look around your kitchen (countertop, top of refrigerator, table) and indicate which of the following items are visible and readily accessible.**

- | <b>Yes</b>                 | <b>No</b>                  |   |
|----------------------------|----------------------------|---|
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | a. Fresh fruit  |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | b. Canned or dried fruit                                |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | c. Fresh vegetables                                     |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | d. Regular snack crackers, pretzels, chips, popcorn     |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | e. Reduced-fat snack crackers, pretzels, chips, popcorn |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | f. Dry cereal   |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | g. Bread or rolls                                       |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | h. Regular soda pop                                     |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | i. Diet soda pop  |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | j. Candy  |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | k. Regular cookies, cake, cupcakes, muffins             |
| 1 <input type="checkbox"/> | 0 <input type="checkbox"/> | l. Reduced-fat cookies, cake, cupcakes, muffins         |

Fulkerson JA, Nelson MC, Lytle LA, Moe S, Heitzler C, Pasch KE. The validation of a home food inventory. International Journal of Behavioral Nutrition and Physical Activity, 2008, 5;55.

**23. Now please open your refrigerator. Which of the following items can you see without moving items around?**

<b>Yes</b>	<b>No</b>	
<input type="checkbox"/>	<input type="checkbox"/>	a. Skim milk (any flavor)
<input type="checkbox"/>	<input type="checkbox"/>	b. 1% or 2% low fat milk (any flavor)
<input type="checkbox"/>	<input type="checkbox"/>	c. Whole milk (any flavor)
<input type="checkbox"/>	<input type="checkbox"/>	d. 100 % fruit juice (any flavor)
<input type="checkbox"/>	<input type="checkbox"/>	e. Fruit drinks/sports drinks (not 100% juice)
<input type="checkbox"/>	<input type="checkbox"/>	f. Regular soda pop
<input type="checkbox"/>	<input type="checkbox"/>	g. Diet soda pop
<input type="checkbox"/>	<input type="checkbox"/>	h. Bottled/contained water
<input type="checkbox"/>	<input type="checkbox"/>	i. Regular cheese (example: American, cheddar, Swiss, parmesan)
<input type="checkbox"/>	<input type="checkbox"/>	j. Reduced-fat cheese (example: low fat cheddar, low fat Swiss)
<input type="checkbox"/>	<input type="checkbox"/>	k. Reduced-fat yogurt (with or without fruit)
<input type="checkbox"/>	<input type="checkbox"/>	l. Regular yogurt (made from whole milk, with or without fruit)
<input type="checkbox"/>	<input type="checkbox"/>	m. Reduced-fat yogurt drinks
<input type="checkbox"/>	<input type="checkbox"/>	n. Fresh ready-to-eat vegetables
<input type="checkbox"/>	<input type="checkbox"/>	o. Fresh ready-to-eat fruit