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A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Policies and Practices in Select Elementary and Middle Schools on the Navajo Reservation

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A SOCIO-ECOLOGICAL ANALYSIS OF CHILDHOOD OBESITY AND SCHOOL NUTRITION POLICIES AND PRACTICES IN SELECT ELEMENTARY AND MIDDLE SCHOOLS ON THE NAVAJO RESERVATION

by

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DISSERTATION

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Dedication

To my beautiful family….*shi alchini'* Rachelle, Tristen, Harding, grandson Dylan, my husband Terry…we made it. We took this on as a family six years ago, not knowing what to expect. To my children, you each have a unique path in life you are striving for, it is my hope, dream, and prayer that you now know it can and will be done. I dedicate this work to each of you. Thank you all for your unconditional love, support, encouragement, and most of all your patience. Terry, thank you for believing in me, for cheering me on in times of doubt, and all the spiritual support you provided.

To my family…mom, dad, brothers and sisters, nieces and nephews, thank you all for your love, support and understanding of my absence on many occasions as well. My late *nali* Emma who was a great inspiration in taking on this endeavor in showing me the meaning of strength and perseverance.

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Abstract

Navajo and other American Indian children are most affected by overweight and obesity in comparison to their US counterparts, and schools have become a focal setting for prevention interventions. The study applied an ecological and a cultural framework to analyze the various factors that influence the food choices available to students and the impact of these choices on childhood obesity. The overall purpose of this descriptive study was to examine and describe how schools that participate in the National School Lunch Program (NSLP) are contributing to the diets of Navajo students since the passage of the *Healthy Hunger Free Kids Act of 2010*. National data have shown that schools have not always supported a healthy food environment, and with no current data about the food environment of schools serving Navajo students, this study was designed to collect data from multiple sources that included survey questions with quantitative and qualitative questions, conversations with participants, and observations.

As a baseline study, the results of this study addressed a number of areas. Overall, school lunches were meeting the nutrition standards by providing healthy food options, while a few schools also offered unhealthy foods through *a la carte* food options. Participants offered mixed views about students' nutrition behaviors. One on hand, students were making healthy food choices, but there were also concerns about food waste of nourishing foods. Further, students' access to unhealthy foods often displaced healthful food choices. From a policy and policy implementation perspective, there are areas where schools are doing well, and other areas that still need additional work. Schools have an opportunity to incorporate strategies to enhance their food environment, including finding ways to further strengthen and integrate Navajo culture teachings and practices that will ultimately create a school environment that reflects the teachings of *Hozho',* as well as restoring *Hozho'* in health and wellness within Navajo children.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Chapter 1

Introduction

In our traditional Dine' (Navajo) teachings, we are taught to awaken before the first light at dawn, go outside, face east and with white corn meal offer a traditional prayer to the Holy Deities. The purpose of this seemingly simple cultural practice is to instill perseverance, resilience, and positivity, to greet each new day with hope and optimism. This sacred view and philosophy of life by the Navajo people permeates all aspects of one's daily living. These practices and teachings are instilled in the early years of Navajo children by parents, grandparents, and kinship relatives. The academic community has likewise documented extensively this traditional Navajo array of customary cultural practices (Farella, 1984). The terms Dine' and Navajo are used interchangeably throughout this dissertation to refer to the Navajo people.

Daily practices of these traditional activities assured the attainment of daily goals through prayer offered to the Holy People (Benally, 1987; Farella, 1984; Kahn-John, 2010). Elders were emphatic that traditional Navajo teachings be followed, recognizing that these were foundational teachings for living a balanced and healthy life. A life according to the Navajo Philosophy of Learning was a life in accordance with *Hozho*'-beauty, harmony, optimal health and wellness (Austin, 2009; Begay, 2007; Benally, 1987; Kahn-John, 2010). The traditional lifestyle of Navajos that promulgated a life of *Hozho'* has nearly faded with the negative influences of *naayee'*, another critical Navajo concept that metaphorically describes anything that alters a normal and healthy way of life (Austin, 2009). From a contemporary Navajo perspective, some people might broadly view the health of Navajo and other American Indian (AI) youth as having been

affected and disrupted by *naayee'*, the realities and complexities of modern living, that have made it a constant struggle to attain and maintain *Hozho'*(Austin, 2009). A troubling example of this disruption is an alarming increase in childhood obesity.

Overweight and obesity prevalence in Navajo and other American Indian (AI) children is a major health concern, where obesity rates have exceeded that of all U.S. children from the same age groups (Eisenmann et al., 2000; Ogden, Carroll, Kit & Flegal, 2014; Moore, 2010; Styne, 2010; Story et al., 2003). Obesity is commonly attributed to lifestyle behaviors, but what is often not fully understood is that obesity stems from a multitude and complex interplay of determinants of health (Huang, Drewnowski, Kumanyika & Glass, 2009).

Schools are designated as a prime setting for addressing childhood obesity through policies, since children spend considerable time there. Policies that affect the school food environment not only provide structure, but are also a way to yield a broader impact on promoting healthier nutrition for students (Frieden, Dietz & Collins, 2010; Katz, O'Connell, Njike, Yeh & Nawaz, 2008). Evidence has shown the school food environment has and continues to influence unhealthy eating behaviors with easy access to sugary, high fat foods and beverages, and few regular offerings of healthier food items such as whole grains, fresh fruits and vegetables (Fox & Condon, 2012; Institute of Medicine [IOM], 2005, 2012; Story, Kaphingst & French, 2006; Story, Nanney & Schwartz, 2009; Turner & Chaloupka, 2012). The *Healthy Hunger Free Kids Act of 2010* has since mandated improvements for the school food environment by updating nutrition standards for school meals and established standards for foods and beverages

sold outside the school meal program (Healthy Hunger Free Kids Act, 2010; US Department of Agriculture [USDA], 2013).

Notably, since the passage of *Healthy Hunger Free Kids Act of 2010,* no research has been published to date that comprehensively examines the school food environment of schools in American Indian (AI) and Navajo reservation communities. In addition, there is an even greater paucity in the literature that examines whether and how schools are integrating AI cultural knowledge and practices into the school nutrition environment.

While the ultimate goal is to restore *Hozho*' in Navajo children and to create a school environment that models and promotes *Hozho',* this cannot be done without understanding the characteristics of the school food environment in schools serving Navajo students. Hence, the purpose of this descriptive study was to examine characteristics related to nutrition policies and practices in elementary and middle schools on the Navajo reservation. Secondly, this study described barriers and facilitators encountered in the implementation of these policies. Thirdly, it examined whether and how schools have integrated or could integrate Navajo traditional concepts and values into any school health policies and practices. As a Navajo researcher and citizen, I recognize the significance and role of public policy in shaping and supporting a healthy school nutrition environment for Navajo children, and of greater curiosity, I wonder whether reverting back to ancient ways and wisdom might be the best way to offer permanent solutions to addressing the nutritional concerns that impact Navajo children. To open this exploration and analysis, it is necessary to get a picture of what is currently happening in schools serving Navajo students.

The research questions that guided this research study were:

1) What are the current nutrition policies and practices in place for elementary and middle schools on the Navajo reservation?
2) What are barriers and facilitators that schools experience in the implementation of the latest school health policies and standards including USDA nutrition standards?
3) How are schools integrating and/or promoting Navajo cultural beliefs and practices in school health policies and programs?

Background of the Problem

The health of American Indian children has changed considerably over the last four decades. Prior to the 1970s, overweight, obesity, and even diabetes were unknown or unheard of problems. In fact, the major health issues for Navajo children were problems with being underweight and malnutrition (Eisenmann et al., 2000). Today, the unyielding prevalence and persistence of obesity presents a major health concern for Navajo children that threatens the longevity and quality of life for future generations to come. According to the most current national obesity prevalence data, one in three U.S. children 2-19 years old is overweight, and about 17% of these children are obese (Ogden et al., 2014). Recent data on the prevalence of overweight and obesity in AI children is lacking in the literature, including recent prevalence data on Navajo children. Despite these gaps, earlier studies have all consistently reported overweight and obesity as greater problems in AI children than in their general U.S. counterparts (Anderson & Whitaker, 2009; Caballero et al., 2003; Freedman, Serdula, Percy, Ballew & White, 1997; Jackson, 1993; Zephier, Himes, Story & Ahou, 2006). A special report issued by Olshansky et al. (2005) warned that continuing obesity rates in children could have worse health outcomes

than ever before by reducing life expectancy by two to five years, especially as children are becoming obese at a younger age. It is a serious problem that has challenged practitioners, researchers and even the Navajo people and communities in finding long-term and effective solutions for the prevention of childhood obesity.

The Navajo Nation is one of the largest American Indian tribes in the U.S. with a population count of 332,129 in the 2010 Census. Furthermore, the highest age population living on the Navajo Nation is in the 10-19-year-old age category, followed by the 0-9-year-olds. Combined, they account for nearly 40% of the total Navajo population (Navajo Division of Health & Navajo Epidemiology Center, 2013).

Schools on the Navajo reservation are tasked with providing healthy nutrition to children. In many cases school meals may be their only source of food by providing two meals a day. The majority (if not all) of the schools on the Navajo reservation participate in the federal nutrition USDA school meal programs - National School Lunch Program (NSLP) and School Breakfast Program (SBP). Participating schools are required to adhere to a set of nutrition requirements in order to receive federal reimbursement (IOM, 2007).

Another potential source of foods and beverages are edible items sold and available outside of the school meal program (IOM, 2007). Known as competitive foods, their actual extent is unknown. Until recently, competitive foods in schools were unregulated by the federal government. The USDA administers the school meal programs at the federal level, while state departments of education administer the NSLP and SNP at the state level. At the local/district level, participating schools and school

districts are required to designate a school food authority to operate the program at the local/district level (IOM, 2007).

In 2010, Congress passed the *Healthy, Hunger Free Kids Act of 2010*, which mandated comprehensive changes for the school food environment; requiring the USDA to align nutrition standards with the most recent 2010 Dietary Guidelines for Americans. These current guidelines took effect at the beginning of the 2012-2013 school year (USDA, 2013). The fact is that students spend a considerable amount of their time each day of the week at school and consume a large portion of their daily caloric intake at schools (IOM, 2005; Story, Kaphingst & French, 2006). Thus, it is important to understand how schools are structured to promote or deter healthful eating.

Theoretical Framework

The theoretical framework chosen for this study was the socio-ecological model, also known as the social-ecological model (SEM). The SEM will be used to examine the influences on Navajo students' dietary intake and obesity, with a focus on the school environment. Schools are an important source for promoting healthy nutrition and healthy weights (IOM, 2005, 2012; Story et al., 2006, 2009;) in a setting that is recognized as a highly complex food environment because of the different food and beverage sources that exist within schools.

Major tenets of the SEM postulate that the health and health behaviors of individuals are connected to the environment, where health cannot be explained without understanding the environment within which individuals exist. If effective change in health is sought, consideration of the individual's context is imperative (Davison & Birch, 2001; McElroy, Bibeau, Steckler & Glanz, 1988; Richard, Gauvin & Raine, 2011).

In essence, the socio-ecological perspective considers a more comprehensive view of the influences on what children eat at school and their overall health status. These influences are depicted as concentric, inter-related spheres or ecologic layers with the smallest or central sphere representing the individual or student level, moving outward to encompass a larger, more complex array of influences and factors within and outside the schools.

Townsend and Foster (2011) developed and applied an SEM to promote healthy eating in schools by investigating the influences on dietary choices kids make at school. Their model includes six layers of influence: *student demographic*, *student intrapersonal*, *student interpersonal*, *school organization*, *school community* and *macro-level organization*. Their model served as the basis for this study with some modifications. For this study, the model contains five ecological layers- *student intrapersonal*, *interpersonal*, *school organization*, *community*, and *macro-level (public policy)* (Townsend & Foster, 2011). Descriptions follow below for each layer or level of influence:

Student (Intrapersonal). At the first level of influence, students are positioned in the innermost sphere, encircled by the multiple levels of influence in a school environment setting (Townsend & Foster, 2011). At this level, students in a school setting often have little or no control over the types of foods and beverages made available to them in the school environment through the school meal program and foods and beverages available outside the school meal program.

Interpersonal. The second level of influence immediately surrounds the student and often includes peers, family members and teachers in a school setting (Suarez-Balcazar et al., 2007; Townsend & Foster, 2011). An important attribute of this level of

influence is the role of social relationships as a type of influence on behaviors (McLeroy et al., 1988). In a school environment setting, peer influences can have a crucial bearing on the choices of the types of foods and beverages consumed. This includes the norms set by the social environment, such as foods that are considered acceptable or not acceptable to eat among students. Teachers and other school personnel can also be an important source of influence through health education and role modeling.

School organization. The third level of influence is the school system, which has both an indirect and direct role in affecting access to healthy foods; both foods made available through the school meal programs and foods available outside the school meal program (Suarez-Balcazar et al., 2007). Moreover, vital to this ecological layer is understanding the schools' role in the implementation of nutrition policy such as the USDA School Breakfast Program and National School Lunch Program. This level of influence will be a major focal area for this study with one of the key research questions relevant to this level of influence- exploring how schools are integrating or could integrate indigenous cultural health promoting influences.

Community. The fourth influential level consists of factors outside the school system. McLeroy and colleagues (1988) define community as having three distinct meanings with the first making reference to groups to which individuals belong. Secondly, community is viewed as the relationships among organizations or groups within a political or geographic area. Lastly, community is described in geographic and political terms. A potential key influence for this level is the task of community organizations or groups, such as school boards. School boards could also be instrumental in establishing health promoting policies for schools.

Macro-level (public policy). The outermost circle comprises of the agencies and institutions that have the responsibility for developing and implementing regulatory policies (Townsend & Foster, 2011). This level represents the higher level of influence through policy on the lower levels of the SEM. For example, the newest requirements set forth by the *Healthy Hunger Free Kids Act of 2010* is a federal policy that influences the type of foods and beverages served on the lower ecologic level of schools. The social ecological model will be applied to this study in the context of a school environment setting. Applying the SEM to the school environment setting will help to understand the multiple levels of influence over the food and nutrition environment.

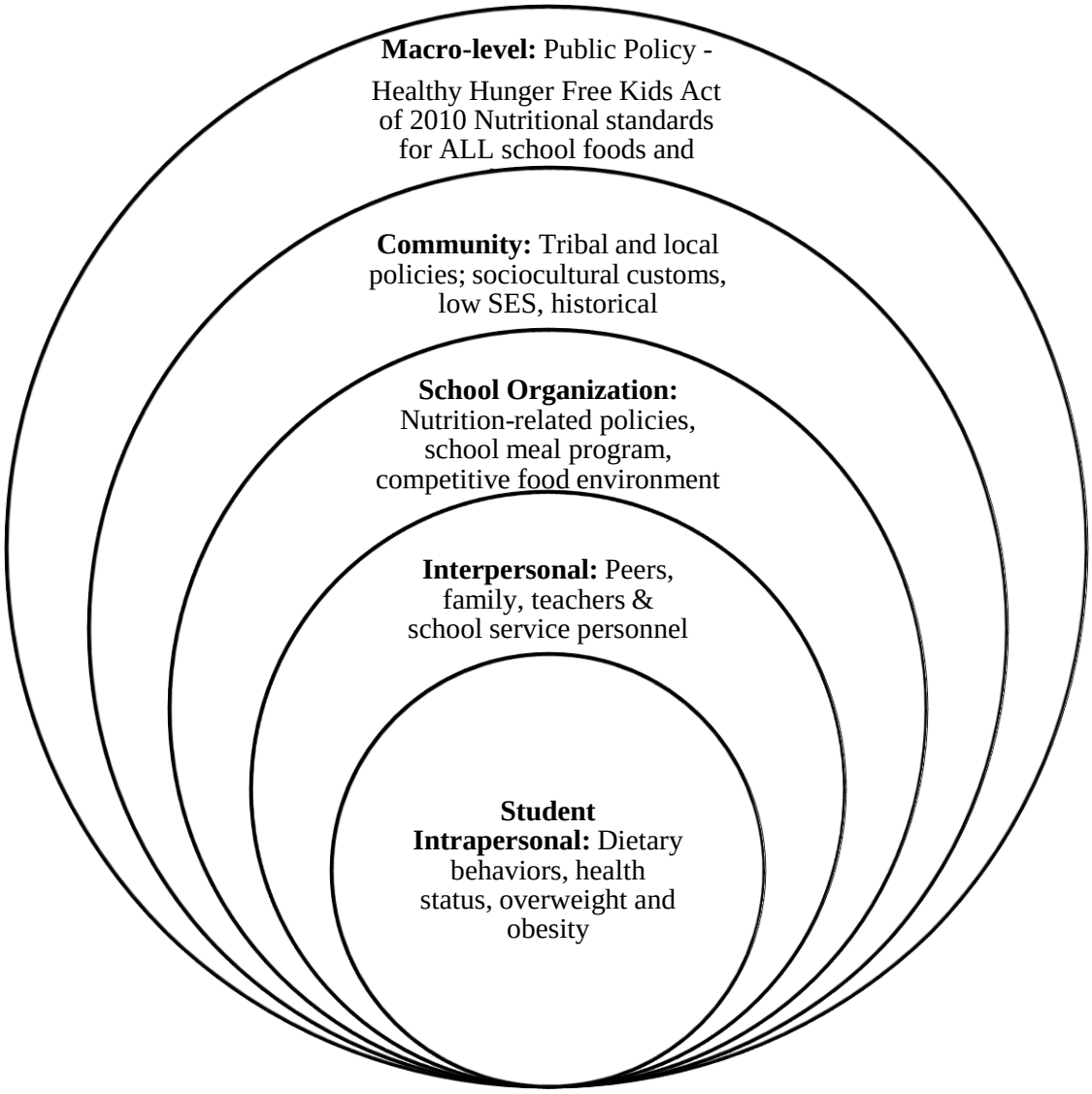


Figure 1. Adapted version of SEM model (Townsend & Foster, 2011)

Limitations

The proposed study was conducted on the Navajo reservation with a convenience sample of elementary and middle schools that participate in the NSLP. The rural geographic location and isolation of schools in remote communities limited the number of schools that participated in the study, which precluded generalizability of study results. For these same reasons, the schools that were recruited were not limited to certain types of school systems, such as public and grant contract schools. Schools were similar based

on their participation in the NSLP, location, resources, and demographics. Considering the lack of current research on school food environment policies and practices in schools serving the Navajo Nation since the nutrition mandates of the *Healthy Hunger Free Kids Act of 2010*, a small sample size was appropriate as a means to collect detailed baseline data. Furthermore, having a smaller sample size allowed for a multifaceted approach to data collection that included surveys with open-ended, qualitative questions and observations.

Significance of Study

This study is significant given the persistent health threat of obesity affecting Navajo children. If not prevented or reduced, obese children face a greater risk for the development of diabetes mellitus, asthma, heart disease and hypertension- these are health conditions that can ultimately shorten the lifespan for future Navajo generations (Franks et al., 2010; Styne, 2010). Alarmingly, there have been no prevention strategies found to date that have favorably impacted obesity rates among American Indian children (Styne, 2010). This calls for continuing research efforts in hopes of finding a lasting solution and generating critical evidence that will protect the health of American Indian children. Throughout the literature, researchers call for broad, sustainable, population-based efforts to prevent obesity (Chriqui, 2013).

While schools are considered a primary setting for population-based obesity prevention efforts, schools have not always supported a healthy food environment for students (CDC, 2012; USDA, 2012). Policies and their implementation, therefore, have an important role in shaping a healthful school environment. The U.S. Department of Agriculture established federal nutrition policy standards for school meal programs with

the latest updates that took effect during school year 2012-2013 (Healthy Hunger Kids Free Act, 2010). Periodic assessments of school nutrition programs and practices are conducted among nationally representative samples of schools and school districts, and it is unknown whether or which tribal schools have participated (CDC, 2012; USDA, 2012).

This points to major gaps in the literature. While there are nationally representative data available, there are no tribal-specific data pertaining to schools' nutrition environments and practices. For schools serving Navajo students, this is key information needed to not only identify strengths, but also to begin to identify areas within schools that can be enhanced to improve access to healthier food options. In addition, since the release of the USDA's recent nutrition standards, a need exists to understand the extent of policy implementation and identify factors that have affected the implementation process. Documentation of these barriers and facilitators will create opportunities for schools to promote a healthful eating environment for students.

Finally, another significant deficiency this study will address is assessing how schools have added and are incorporating indigenous cultural knowledge and practices as part of their school food programs and practices. Schools have a unique opportunity to develop a culturally based framework to guide their school health programs and practices. In the case of schools on the Navajo reservation, a first step would be to assess whether and how schools have integrated Navajo cultural practices in the school health environment.

Summary

This study sought to fill evidential gaps by researching the school food environment, including the nutrition policies and practices of public schools on the Navajo reservation. With these study findings, schools will be better prepared to improve, enhance and implement strategies that promote healthy eating, and in the long run prevent and reduce obesity among Navajo children. Further, by recognizing the impact policies can have on the health of school-age children, schools can find ways to strengthen the implementation and impact of policies in a school environment. This study contributes a current assessment since the implementation of the latest nutrition guidelines under the *Healthy Hunger Free Kids Act of 2010*.

For Navajo and other tribal nations faced with an obesity epidemic affecting their youth, schools can offer a way to restore *Hozho'* in Navajo students. Evidence supports that the school food environment influences not only what and how much children eat at school, but also that what they are eating is linked to rising rates of obesity. This highlights the importance of creating a school food environment that offers and models healthy nutrition, an essential element needed for *Hozho'*.

Chapter 2

Review of the Literature

Childhood obesity is widely recognized as a complex problem with no single cause or solution (IOM, 2005, 2012). It is a problem that affects more American Indian children than all U.S. children (Styne, 2010). As kids spend a good amount of time at school on an almost daily basis, schools are positioned as a major focal setting for obesity prevention (IOM, 2005, IOM, 2012). Evidence has shown the school environment contains a web of influences that impact nutrition-related behaviors in children (Hirschman & Chriqui, 2012; IOM, 2005, 2007, 2012 Story et al., 2009). Within the school food environment, the main sources of food come from school meals and competitive foods, and have become an important avenue for policy influence (IOM, 2012). Policies play a key role in promoting a school food environment where students adopt and maintain healthy eating behaviors and help in the fight against overweight and obesity (Jaime & Lock, 2009). Since the passage of the *Healthy Hunger Free Kids Act of 2010,* it is not known how schools and school districts in Navajo and other American Indian schools have implemented the nutrition mandates into practice.

My review and examination of the literature was done through the lens of a socio-ecological perspective, addressing each level of the SEM. Applying a socio-ecological model is significant because it considers the broader aspects of environmental, social, cultural and individual factors that influence health and dietary behaviors versus a focus solely on individual risk factors and behaviors (McLeroy et al., 1988). Given the paucity of research of school nutrition and policy studies involving Navajo and other American Indian schools, all relevant literature on the school food environment including studies of

schools' policies and practices were reviewed. Also, the few studies on obesity prevention in American Indian schools were examined.

This chapter is delineated into sections. The first section, which is augmented by information in Table 1, reviews the definition of terms relevant to the study. In the sections that follow, the socio-ecological model and the Navajo concept of Hozho' are discussed, with the socio-ecological model elements (i.e., intrapersonal, interpersonal, school level, community level, public policy level) analyzed in detail.

Table 1**.** *Definition of Key Terms*

Term	*Definition*
Energy balance	Calories consumed versus calories expended (IOM, 2007).
Public policy/policies	Laws, regulations, formal and informal rules and understandings that are adopted on a collective basis to guide individual and collective behavior (Schmid, Pratt & Howe, 1995).
Organizational policies	Policies within specific organizations such as schools and corporations that prescribe appropriate behavior of the organization (Schmid et al., 1995).
Body Mass Index (BMI)	BMI is calculated as weight in kilograms divided by the square of height in meters. It is a tool used to screen for obesity-related health issues. Since the development of children and adolescents varies, the use of BMI requires age and gender considerations (CDC, 2015a).
Overweight and obesity	Using age and gender specific

	parameters for children and adolescents, overweight is defined as a BMI at the 85th percentile to 95th percentile, whereas obesity is defined as a BMI at or greater than the 95th percentile (CDC, 2015; Daniels et al., 2005).
Competitive foods	Food and beverages other than meals reimbursed under programs authorized by the Richard B. Russell National School Lunch Act and the Child Nutrition Act of 1966 for sale to students on the school campus during the school day (IOM, 2007).

Theoretical Frameworks

The socio-ecological model (SEM) has been a widely used framework and a commonly used framework for population health and health promotion efforts, since the model centers on the relations between people and their surroundings in explaining health behaviors and ultimately health outcomes (McLeroy et al., 1988; Sallis, et al., 2006; Richard et al., 2011; Stokols, Allen & Bellingham, 1996). Ecological models theorize that behaviors are influenced by a wide range of physical, social, cultural, and environmental variables, rather than simply influenced by individual factors alone (IOM, 2005, 2012).

In recent years, even federal government entities such as the CDC and IOM have begun to use the SEM as a framework for facilitating a better understanding of health problems and for developing prevention strategies. For example, the CDC's Injury Prevention and Control program uses the SEM as a prevention framework to enhance

understanding of the multiple determinants that influence violence and to develop and guide prevention strategies that target these determinants (CDC, 2015c).

The concept of ecology has its origins in the biological sciences, which involves the study of the relationships between organisms and their environment. Over time, this concept expanded to fields that studied humans, as researchers began to recognize the influence of the environment on people's behavior (McElroy et al., 1988' Stokols, 1996). Kurt Lewin is credited with one of the earlier developments of social ecological theory; his work theorized the role and interactions of environmental influences on behavior. Further contributions were made by Urie Bronfenbrenner who conceptualized an ecological model that proposed levels of environmental influences on behavior, categorized as systems of influence- microsystem, mesosystem, exosystem, and macrosystem (McLeroy et al., 1988; Tricket & Beehler, 2013).

Uses of the socio-ecological model in the context of obesity are evident in the literature. Some of the evidence uses the model to extensively explain and understand the problem and determinants of obesity (Egger & Swinburn, 1997; Huang et al., 2009; Ohri-Vachaspati et al., 2014). Additionally, several sources provide an explanation for obesity recognizing the contribution of historical and sociocultural factors that are unique to minority ethnic populations including indigenous populations (Cassel, 2010; Williams, Kabukuru, Mayo & Griffin, 2011; Willows, Hanley & Delormier, 2012). In one source, the authors contend that the high prevalence of obesity in Aboriginal children in Canada exists not only because of their individual diet and physical activity behaviors alone, but also because obesity exists within a context of a history of colonization and inequities in social determinants of health such as income, education, substandard housing, and

geographic isolation (Willows et al., 2012). Importantly, these sources call attention to and validate not only the causes of obesity, but can also explain why disparities in health are most prevalent and persistent in American Indian nations.

Another area where the literature highlights the use of socio-ecological models is on the topic of health promotion, including the promotion of healthy eating in schools (Robinson, 2008; Suarez-Balcazar et al., 2007). One study critically examined factors that influenced children's eating patterns from an ecological systems approach, focusing on elements that influenced the school lunch program and food vending machines in schools, and how system changes were made. Barriers to the changes were also identified (Suarez-Balcazar et al., 2007). In another study, Townsend and Foster (2011) developed and applied a socio-ecological model for the promotion of healthy eating in students. This was done by examining the association of each level of the SEM on students' dietary choices. Key premises embedded in their model are: a) behavior affects and is affected by multiple influencing levels;and b) individual behavior shapes and is shaped by the environment. The SEM levels of influence that were developed by Townsend and Foster (2011) include components of the following: *student demographic, student intrapersonal*, *student interpersonal*, *school organization*, *school community*, and *macro-level organization*. Their SEM levels were most applicable to the current study.

For this study, a modified version of Townsend and Foster's (2011) socio-ecological model was used to *categorize* and *describe* the multiple influences on students' nutritional intake in a school setting. Revisions that were made include combining the two student levels (demographic and intrapersonal) into one level, and broadening the school community level to include tribal, community and local influences.

Finally, the macro-level organization was relabeled as public policy. Adapted SEM levels of influences with explanations of each layer appear in Table 2 below.

Table 2. *A Socio-Ecological Model for Examining Nutritional Behavior and Influences*

Levels of Influence	*Description*
Student Intrapersonal	Demographic and individual characteristics that reside within a person and can influence nutritional behavior
Student Interpersonal	An individual's relationship and social environment
School Organization	Policies, informal structures, and rules that may constrain or promote health
Community	Role of tribal, local and community influences on schools
Public Policy	Policies and legislation at a local or national level that regulate or support healthy eating in schools

Adapted by author from: Townsend & Foster (2011).

Navajo concept of *Hozho'*. In the Navajo belief system, there is a concept known as *Hozho'*, a state of being or wellness, beauty and harmony for which Navajo people strive. It is also a concept that prescribes principles of conduct, of how to act and relate with one another as people, family and community. On a grander scale, it is about how to relate to and exist with and within the broader environment and universe (Austin, 2009; Benally, 1987). In the Navajo worldview, 'everything' exists in a relational manner, and for *Hozho'* to exist requires a positive and harmonious relationship among all creation and 'beings' (Austin, 2009; Benally, 1987). Perhaps the simplest way to put this is that one has to obey and respect the path of *Hozho'* in order to be of *Hozho'*.

Austin (2009) explains *Hozho'* as a concept that permeates through all aspects of life--everything from the traditional way of existence to the contemporary, domestic walks of life for the Navajo. It is a concept for which it is difficult to find an accurate

English description, yet *Hozho'* has been generally translated as harmony, balance, beauty, goodness, and all other positive characteristics and forces (Austin, 2009; Witherspoon, 1975). Despite the many translations of *Hozho'*, Austin (2009) explains that the concept of *Hozho'* can be regarded as the "foundational backbone" in Navajo culture, similar to a 'main stalk' that binds many branches/stalks together. From the nursing literature, Kahn-John (2010) carefully delineates and clarifies the meaning of the concept of *Hozho'* in a concept analysis paper. She refers to *Hozho'* as a state of being and a continual process for which Navajo people. Through the concept analysis, six attributes of *Hozho'* are defined and these include: *positive thinking* and intention; *spirituality* entwined with everyday ways of life with prayer, recognition, and respect for all surroundings; establishing and maintaining a *relationship* with self, family, community, nature and the environment; *reciprocity* as it relates to a mutual give and take or exchange with self, family, and nature; *respect* for values, beliefs and teachings; and lastly *discipline* by which *Hozho'* is implemented (Kahn-John, 2010).

In essence, these attributes represent a Navajo's way of existence, living a life of *Hozho'* and in accordance with *Hozho'*. Kahn-John's (2010) work has relevance and significant implications for the health of Navajo children. She advocates for a platform based upon knowing and integrating indigenous ways and practices as way to restore health or *Hozho'*. At a time when health disparities are rampant in many tribal nations, resorting back to fundamental traditional teachings and values might provide answers that have been lacking, along with purposeful living.

Teachings and practices of *Hozho'* are widely unknown to many Navajo youth. By not knowing what it means to understand, respect and live in accordance with *Hozho'*,

there can be serious consequences such health problems that are plainly visible today in Navajo youth (Kahn-John, 2010). Reconnecting youth with the knowledge and practices of their elders and ancestors is fundamental to restoring *Hozho'*. Concurrently, to be in *Hozho'* also means to be one with and within one's environment. In the framework of this study, students are embedded in a complex school environment among different contextual elements that influence nutritional behaviors, creating a crucial link that can contribute to or prevent obesity. Using an ecological approach was important to gain a better understanding of the influences that shape obesogenic behaviors such as dietary patterns in schools. With a more in-depth understanding of the factors and processes relative to the school food environment, schools can begin to offer strategies to curtail these adverse behaviors in Navajo youth by creating an environment that is based on *Hozho'* and ultimately reestablish *Hozho'* in Navajo youth (Kahn-John, 2010).

Intrapersonal (student) Level of Influences

The innermost circle of a social ecological model represents the individual or student level. Students are nested in a school environment with multiple influences that exist within and outside the school structure (Townsend and Foster, 2011). This level represents characteristics that operate within individual students and these may include genetic factors, ethnic identity, culturally determined knowledge, attitude, beliefs, current health status, and their demographic profile (IOM, 2005; Robinson, 2008; Townsend & Foster, 2011). Some of these topic areas are addressed in this section:

Height and weight trends in Navajo youth. Overall the available evidence, particularly recent and comprehensive evidence on overweight and obesity rates in American Indian youth as well as Navajo youth, is relatively limited. There are a few

earlier studies that documented heights and weights in Navajos as far back as the 1950's. It is apparent that overweight and obesity issues did not surface among the Navajo people until the last several decades of the 20th century when concerns for the health and nutritional status of Navajo children shifted from nutritional deficiencies and underweight to the present-day health threats from overweight and obesity (Broussard et al., 1995; Eisenmann et al., 2000; Story, Strauss, Zephier & Broussard, 1998). A study by Adams et al. (1956) discovered through a landmark 1955 survey that only less than 5% of men and 15% of Navajo women between the ages of 15 and 45 years were obese. Van Duzen, Carter, Secondi and Federspiel (1969) surveyed Navajo Head Start children between 1967 and 1968; yielding similar results with 35% of the children with weights below the 25th percentile and 65% of heights below the 25th percentile (Van Duzen, Carter, Secondi & Federspiel, 1969). In a separate study conducted in Lower Greasewood, Arizona, Reisinger, Rogers, and Johnson (1972) found that 73% to 83% of children were below the 50th percentile for height and weight (Reisinger, Rogers & Johnson, 1972).

Later research shows dramatically different results of upward trends in overweight and obesity findings. From a survey of heights and weights taken of 1969 Navajo schoolchildren, Sugarman, White and Gilbert (1990) found that twice as many Navajo children, ages 5-17 years, exceeded the 95th percentile of weight for age in comparison to the reference population. From this same study, the researchers also confirmed Navajo children had become increasingly obese based on comparisons of height and weight data collected in 1955. Mean heights increased 6.1% among boys and 4.4% among girls, whereas mean weights increased 28.8% and 18.7% respectively in boys and girls across all age groups (Sugarman et al., 1990). Another study conducted

from 1988 to 1993 of Navajo and Pueblo 5th graders revealed 40% of Pueblo students were overweight (BMI > 85th percentile) compared to 29% of Navajo students (Davis, Gomez, Lambert & Skipper, 1993). The Navajo Health and Nutrition Survey (1991-92), the first comprehensive assessment of obesity prevalence of the Navajo people, also confirmed excessive weight across all age groups. Among adolescents (12-19 years), 35-40% were overweight with BMIs recorded at the 85th percentile or greater (Freedman et al., 1997). Eisenmann and colleagues (2000) surveyed heights and weights in a sample of younger Navajo children (6-12 years), concluding similar results with 41% of children with BMIs at the 85th percentile and greater than the reference population. It should be noted that the definitions for high-BMI-for-age have changed over time. Prior to the 2000s', the term 'at risk for overweight' was used to define BMI values between 85th and 95th percentile, while 'overweight' was defined as a BMI at or above the 95th percentile for age. This has since been changed where 'obesity' replaced the term 'overweight' for BMI values at or above the 95th, and 'overweight' substituted the term 'at risk for overweight' (Ogden & Flegal, 2010). When making comparison, it is important to know the BMI definitions used in a given report.

In addition to these Navajo specific studies, there are also several large-scale studies on obesity prevalence that are noteworthy to mention, as Navajo children were included in the research population. A 1990 study is one of the first large scale studies to describe height and weight status of AI children living on or near the reservations nationwide. The study measured over 9,400 children (ages 5-18) and found that almost 40% of children living on or near AI reservations were overweight in comparison to national reference data of 28.6% (Jackson, 1993). Another large study is the Pathways

study that took place in seven AI communities including the Navajo Nation (1996-2000). Overall, 48.9% of children were overweight and an additional 28.6% were obese. By gender, 21% of girls and 19.6% of boys were overweight while 30.5% of girls and 26.8% of boys were obese. These rates were higher than the national averages (Caballero et al., 2003). Finally, in a more recent national study of low-income preschool age children, CDC's Pediatric Nutrition Surveillance System (PedNSS) reported American Indian children, ages 2-4 years, had the highest obesity prevalence of any racial or ethnic group; 21.1% compared to 14.4% of all U.S. children in 2010 (CDC, 2010). While higher obesity rates in American Indian communities are well documented, it is also well known that other populations at risk for obesity are often people from a lower socioeconomic status, who have lower educational attainment, and who live in rural communities (IOM, 2012). Alarmingly, these contexts are all determinants that describe American Indians.

Consequences of obesity. With high obesity prevalence, there is a greater risk for a wide range of adverse health outcomes including a decrease in life expectancy (Franks et al., 2010; Styne, 2010). In 2005, a panel of experts issued a special report warning that the "steady rise in life expectancy observed in the modern era may soon come to an end and the youth of today may, on average, live less healthy and possibly even shorter lives than their parents" (Olshanky et al., 2005, p. 1143). This is further supported by a study that found obese AI children have a two-fold increase for premature death (Franks et al., 2010).

Childhood obesity is also associated with a higher risk for development of type 2 diabetes mellitus, heart disease, hypertension, high cholesterol, and sleep apnea (CDC, 2011; Daniels, 2009; Styne, 2010). In addition, obese children are likely to experience

social and psychological problems such as self-esteem issues and depression (Daniels, et al., 2005; Harriger & Thompson, 2012). From a long-term perspective, the effects of obesity are daunting with the likelihood of obesity continuing into adulthood (CDC, 2011; Daniels, et al., 2005). From an economic standpoint, the direct costs of obesity are substantial at $14.1 billion with most of these costs absorbed by Medicare and Medicaid (IOM, 2012). Finkelstein, Graham and Malhotra (2014) verified that the lifetime medical expenditures for an obese child relative to those for a child who maintains a lifetime normal weight range to be between $16,310 and $19,350. Multiplying the estimated lifetime obesity costs of $19,000 and the number of obese 10-year olds equates to a total direct lifetime obesity cost of approximately $14 billion.

The immediate organic cause of obesity is the result of a biological imbalance between energy intake and energy expenditure. Energy is measured in calories, and with excess intake of high caloric, energy dense foods relative to decrease energy expenditure, extra calories are stored as fat (Thompson, 2015; Wyatt, Winters & Dubbert, 2006). Considerable work has been done that negates the view of obesity being the product of individual attributes and behaviors; more accurately, obesity is a multifaceted problem where biological imbalances are embedded within complex socioenvironmental influences (Huang et al., 2009; IOM, 2012; Styne, 2010). Consequently, in recent years, obesity prevention efforts have shifted their attention from individual-level interventions to broad intervention strategies in hopes for a wider societal impact (Egger & Swinburn, 1997; IOM, 2005, 2012).

Navajo youth today. Ethnic and cultural identities are important characteristics that most Navajo youth lack today. The lifeways of Navajo children are much different

from those who witnessed and experienced the sacred historic teachings of Navajo ancestors. Many children are not taught what it means to understand, respect, and live in accordance with *Hozho'* (Kahn-John, 2010). A Navajo educator, Dr. Harold Begay, rightly explains this as a "massive seismic cultural shift" evidenced by the fading of traditional ceremonies, prayers, songs, and parents and grandparents who no longer acknowledge and engage in the sharing of cultural teachings (Begay, 2007). In addition, Navajo youth do not practice the healthy lifestyle behaviors of *Hozho'* such as healthy eating and physical activity. Kids consume larger portion sizes of unhealthy foods including those from popular fast food restaurants, drink more sweetened beverages, spend more time watching television, and frequently play video and computer games that have become a typical lifestyle for Navajo/American Indian youth (Moore, 2010; Styne, 2010).

The lack of access to these fundamental Navajo cultural teachings and practices has already posed serious concerns for the health and wellbeing of Navajo youth. From the perspective of Navajo culture or traditionalists, this shift in health status in Navajo children can also be explained by the ancient teachings of *naayee'*, the deleterious forces that have disrupted *Hozho'* (health, wellness and wellbeing). Restoration of *Hozho'* is direly needed and this can be done by the eliminating of *naayee'* (Austin, 2009). From a Navajo cultural perspective, one asks, "How are schools promoting *Hozho'*?" It is necessary to answer and understand this question in order to take steps to restore *Hozho'* in health for Navajo children. To begin to find answers, it is important to understand the current school nutrition environment, an important link to understanding dietary intake and childhood obesity.

Interpersonal Level of Influences

According to Townsend and Foster's (2011) description of the interpersonal level, this level of influence relates to an individual's relationships and the social environment that affect behavior by providing norms, social support, and behavior modeling. McLeroy and others (1988) explain that interpersonal sources of influence may include family members, friends, neighbors, and co-workers and are important sources of influence on the health of individuals. In a school setting, the interactions students (individuals) have with peers, teachers and staff are significant influences that can encourage, support and maintain positive or negative nutrition-related behaviors. Some studies have investigated the influences of role modeling by peers, teachers, parents, and even the impact of verbal encouragement by food service staff on students' eating behaviors (IOM, 2012; Hartline-Grafton, Rose, Johnson, Rice & Weber, 2009; Moore, Murphy, Tapper and Moore, 2010; Suarez-Balcazar et al., 2007). This study did not address this aspect of influence, but acknowledges the interpersonal level in the broader, complex scope of obesogenic influences in a school environment.

School Organization Level of Influences

The school organization level of the socio-ecological model represents the third SEM layer of influence, encircling the student and interpersonal levels of influence (Townsend & Foster, 2011). The characteristics embedded in this level are policies, informal structures and rules within schools that promote or hinder health and health behaviors (Townsend & Foster, 2011). This includes policies and programs that affect school food services and programs, and physical environment and structure (IOM, 2012).

The school environment is a key location for health promotion strategies such as supporting healthy eating as a way to reduce and prevent obesity in youth (IOM, 2012; Story et al., 2009). With recent reports indicating that the diets of most U.S. children do not meet the *Dietary Guidelines for Americans* compounds the concerns for children's long-term health. Some of these findings demonstrated that kids are eating excess amounts of foods high in sugar, fat, sodium; and that 60% of children 18 years and younger did not meet the recommended levels for fruit intake and 93% did not meet vegetable recommendations (Krebs-Smith, Guenther, Subar, Kirkpatrick & Dodd, 2010).

Research shows that kids spend more time in school than in any environment besides home. Thus, they consume a significant portion of their daily food intake at school, perhaps up to 50% of their total daily calories (Briefel, Wilson & Gleason, 2009; IOM, 2012; Story et al., 2006, 2009). Schools in American Indian communities provide a main source of nutrition by offering breakfast and lunch meals, and in many cases because of high poverty rates, these meals represent 50% or more of their daily food intake (Story et al., 2003).

Schools are a crucial environment for promoting health among children. In a school environment, the main influences on food and beverage intake among students come from (a) USDA federal school meal programs (e.g., National School Lunch and School Breakfast Programs); (b) competitive foods sold outside of the school meal programs; and (c) food and beverage items brought in from home by parents, teachers, and staff (IOM, 2005, 2012; Story et al., 2009). Each of these sources are regulated and monitored to some extent by federal, state and local governance (IOM, 2007). Documented concerns and progress with each of these food and beverage sources and

how they have impacted and continue to influence the diets of youth and overall health and wellbeing of youth were examined in the study.

Schools participating in the federal NSLP and SBP are required to meet nutritional guidelines set forth by the USDA. Eligibility for school meals is based on the child's family income. Families whose incomes fall below 185% of the poverty level are eligible to receive meals for free or at a reduced price. Children whose family incomes are greater than 185% of poverty level pay full price for meals (IOM, 2007, 2010; USDA, 2013). Participating schools receive cash subsidies for each meal served, and schools with a higher percentage of free and reduced-price lunch participants receive higher reimbursement rates (IOM, 2007; USDA, 2013). Since 1995, school meals have been required to meet the *Dietary Guidelines for* Americans which require no more than 30% of calories from fat and less than 10% from saturated fat (Story et al., 2009; Story et al., 2006). At the local level, designated school food authorities implement these recommendations by deciding on what foods to serve and how to prepare them.

In addition to federal school meal programs, the widespread availability of competitive foods and beverages in schools is well documented. Foods and beverages that are served, given or sold in competition with foods available through the NSLP and the SBP are referred to as 'competitive foods' (Story et al., 2009). Competitive foods are often sold through vending machines, a la carte, at school fundraisers, school stores, snack bars, and can even be provided in classrooms by teachers (Briefel et al., 2009). Studies have shown that with the availability of competitive food items, students are choosing to eat the less healthful foods and beverages available to them (Fox, Gordon, Nogales & Wilson, 2009; Larson & Story, 2010).

School systems/districts on the Navajo Nation and all other AI reservations are eligible to participate in the federal school meal program and to receive cash reimbursement as long as they follow national nutritional guidelines (Department of Dine' Education, 2015). Within the Navajo Nation, there are six types of educational school systems: Arizona Public Schools, Arizona Charter Schools, New Mexico Public Schools, Utah Public Schools, Bureau of Indian Education (BIE) Schools, and Grant Schools. A majority of students on the Navajo reservation attend a public school, followed by BIE schools and Grant schools (Department of Dine' Education, 2015).

School food environment policies and practices. At the national level, various federal and non-profit organizations have conducted periodic evaluations of school food environments to assess the effectiveness of policies and parameters related to healthful eating, physical activity, and other obesity-related risk factors. Since the 1990's, these periodic national assessments of the school nutrition environment have been conducted by the CDC, USDA, and Bridging the Research program (Turner & Chaloupka, 2012; CDC, 2015; USDA, 2013). These evaluation studies have had a vital role in assessing and monitoring the quality of U.S. school meals, foods and beverages that are available outside the school meal programs, and information about the broader policy and school food environment (CDC, 2015b; Johner, 2009; Story, 2009; Turner & Chaloupka, 2012; USDA, 2013). With this information, it can be known if and how schools are meeting required nutrition standards for school meals, the availability of competitive foods and beverages available to students outside the school meal program, and other policy and environmental influences on the diets of children. A better understanding of the type of foods and beverages kids are consuming at school through the choices they make around

the school meal and competitive food options available to them may lead to policy improvements and ultimately to the promotion of a healthier school food environment (Johner, 2009; Story, 2009).

Competitive foods and beverages. The availability of competitive foods is a major concern because these are high calorie, low-nutrient-dense foods that tend to be favored by kids over nutrient-dense, healthier foods; as such they are major risk factors for overweight and obesity (Fox et al., 2009; IOM, 2007). Another significant concern with competitive foods, unlike foods served through the NSLP and SBP, is that they were not regulated by any federal guidelines until the recent passage of the Healthy Hunger Free Kids Act of 2010. Some research studies have reported that when unhealthy competitive foods are not available at school, students have healthier diets, and even consume reduced calories by 22 calories and 28 calories per school day among middle and high school students, respectively (Briefel et al., 2009b; Larson & Story, 2010; Terry-McElrath et al., 2009). At the same time, research has also shown that when more healthful foods are available, students are more likely to eat these healthier foods (Larson & Story, 2010).

National data on competitive foods studies are reported by a number of sources. One source is USDA's School Nutrition Dietary Assessment (SNDA) whose original role was to assess and monitor the foods and nutrient content offered through the National School Lunch and School Breakfast Programs (Gordon, Crepinsek, Briefel, Clark & Fox, 2009b; Story, 2009; USDA, 2012), but this expanded in 2005 with the third SNDA study (Briefel et al., 2009b; Fox et al., 2009; Gordon et al., 2009b). The third SNDA collected a more comprehensive snapshot of the school food environment (Gordon et al., 2009b;

Story, 2009; USDA, 2012) including information on school food policies and procedures, competitive foods, nutrition education, whether students could leave campus during lunch, and students' food and nutrient intakes.

The SNDA III study was designed as a cross sectional study that consisted of a complex multistage sampling approach with data collected from school food directors, school food service managers, principals, students and parents. Since the study was intended to be representative of all public schools that participate in the NSLP, schools with a higher student enrollment were assigned a higher level of probability for selection in the study (Gordon et al., 2009b). While the authors reported adjustments through reweighing were done to account for unequal probabilities of sample selection at each stage of sampling, this demonstrates schools on American Indian reservations were most likely not selected due to these schools having a significantly lower student enrollment. As a three-stage sample design, the first stage sampled food service managers, then schools served by these food service managers, and lastly children and parents were sampled. Multiple methods of data collection were used including an initial telephone survey with food service directors concerning food service policies and procedures. At the school level, in-person or telephone interviews were conducted with school food service managers and principals to collect data on schools' food service operations and policies. Additionally, checklists were used to collect school-level data on competitive foods and venues. Lastly, student and parent interviews were conducted to obtain dietary recall data and other related school meal information (Gordon et al., 2009a).

SNDA-III study results found competitive foods were generally available to all students with one or more sources of competitive foods available in 73% of elementary

schools, 97% of middle schools, and 100% in high schools. Nearly two-thirds of elementary schools had a la carte food options available at lunch, whereas about 90% of middle schools and high schools sold a la carte food items at lunch. The study also found 17% of elementary schools, 82% of middle schools and 97% of high schools had vending machines available to students. (Fox et al., 2009b). Across all school levels, 40% of students consumed one or more types of competitive food with the most common type being dessert or snack items such as cookies and candy; of which kids consumed more than 175 calories on average (Fox et al., 2009b). In a most interesting finding, the most commonly reported competitive food source in elementary schools came from school activities such as fundraisers, classroom parties, and treats from teachers (Fox et al., 2009b).

In a cross-sectional study, Caparosa and colleagues (2013) developed a unique observational study that captured other aspects of the school food environment such as classrooms and playgrounds in a single low-income public school district with elementary and middle schools, but no high schools. This study was unique in that researchers were not allowed to directly observe in the classrooms, and instead observed and catalogued trash in garbage cans found throughout the school campus at the end of the school day. Their study found there were significantly more foods and beverages classified as 'unhealthy' (e.g., high sugary snacks and beverages, followed by chips, crackers and Cheetos) on campus than 'healthy' foods.

There was some improvement reported by the fourth SNDA, conducted during the school year 2009-2010. A few highlights include that while the availability of vending machines was more widespread in middle and high schools, there were fewer vending

machines in elementary schools (USDA, 2012). In addition, SNDA-IV found 82% of elementary schools, 95% and 90% of middle schools and high schools respectively had a la carte items available at lunch. For breakfast, these percentages were much smaller (USDA, 2012).

Similar findings were reported by Center for Disease Control and Prevention's (CDC, 2015b) School Health Policies and Practices Studies (SHPPS), with the 2014 SHPPS study showing some improvements between 2000 and 2014 studies (CDC, 2015b). SHPPS is one of the largest and most comprehensive assessments of school health programs and policies and is conducted every 6 years at the state, district, school and classroom levels among a nationally representative sample of public and private elementary, middle and high schools (CDC, 2015b). SHPPS assesses school-based components related to health education, physical education and physical activity, nutrition services, health services, mental health and social services, healthy and safe school environment, faculty and staff health promotion, and family and community involvement (CDC, 2015b; Kahn, Brener & Wechsler, 2007). Schools ineligible to participate in SPHSS studies are schools run by the Department of Defense, Bureau of Indian Education, and schools with fewer than 30 students (CDC, 2015b).

Some highlights from the 2006 SHPPS found 33% of elementary schools, 71% of middle schools and 89% of high schools had a vending machine, school store, canteen or snack bar where students could purchase food or beverages. Among these schools, in 12% of all elementary schools, in 25% of all middle schools, and in 48% of all high schools, students were allowed to purchase foods high in fat, sodium, or added sugars from a vending machine, school store or snack bar during lunch periods (O'Toole,

Anderson, Miller & Guthrie, 2007). Despite many improvements identified by the SHPPS 2014, there are still some areas of concern. For example, SHPPS found that only 26% of schools do not offer soda pop or fruit drinks that are 100% juice, sports drinks or sugar sweetened beverages as a la carte items, and do not sell soda, fruit drinks, or sports drinks in vending machines or school stores. Further, students can purchase these unhealthy drinks in 47.8% of elementary schools, and in 73.3% and 95.1% respectively for middle and high schools. In addition, even though there were improvements detected in students purchasing fewer foods and drinks high in fat, sodium and sugar from vending machines and school stores, in only 6% of schools, students could purchase fresh fruits and vegetables. With regard to classroom parties and fundraising events, few schools had policies requiring that fruits and vegetables be offered, and nearly half of schools provided foods, snacks and beverages high in fat and sugar (CDC, 2015b).

Since 2006-2007, Bridging the Gap (BTG) researchers have also implemented annual surveys of the school food environment. Funded by Robert Wood Johnson Foundation, Bridging the Gap studies the impact of policies, programs, and other factors that contribute to obesity, physical activity and dietary behaviors by conducting annual surveys of obesity-related topics in schools. These include school meals, competitive foods and beverages, physical education, and other physical activity opportunities (Turner, Chaloupka & Sandoval, 2012). BTG study results parallel other findings, showing the availability of competitive foods has remained steady except for a notable increase in availability for beverages from 2006 to 2012 (Turner et al., 2012). Junk foods remained widely available with students being offered high fat, salty and sweet food items. On a positive note, schools offering healthy beverages such as water, 100% fruit

juice, and nonfat/1% milk increased from 10% to 19%. In a different study, Turner and Chaloupka (2012) examined the availability of competitive foods in public and private elementary schools over a four-year span from 2006-2007 to 2009-2010. Overall, the study revealed access to most competitive foods remained constant over time. Of particular significance are some of the findings by regional differences. For example, smaller schools were less likely to have low fat snacks and sugar free products than larger schools; and 55% of students in rural schools had access to one or more competitive venues in comparison to 44% of urban schools, 41% of townships, and 53% of suburban schools. Finally, the ethnic/racial composition of schools was not significantly associated with outcomes. However, one key finding is that healthier items were less available in low-income schools (Turner & Chaloupka, 2012).

There are limited research data involving the school food environment in smaller, rural, geographically remote schools and an even greater dearth of research on schools serving American Indian including Navajo students. One study of rural schools is a cross-sectional observational study by Nollen et al. (2009) that compared the availability and purchasing of competitive foods in small versus large high schools in Kansas. Some of the noteworthy results are that all schools offered a limited a la carte lunch menu and that there were fewer vending machines and vending products available to students in small schools than large schools. Healthier items such as water, fruit/vegetables and milk were less available, while other unhealthful foods and beverages items such as high sugar and salty foods and beverages were more widely available (Nollen et al., 2009).

School meal programs. In the earlier years of the USDA school meal programs, national evaluation studies documented major concerns with the meals served to children.

In 1991-1992, the first USDA School Nutrition Dietary Assessment (SNDA-I) found school meals exceeded recommended daily allowances for total fat (no more than 30%) and saturated fat (less than 10%) with the average percentage of school meals containing 38% of energy from total fat and 15% of energy from saturated fat (Burghardt, Devaney & Gordon, 1995). These findings raised concerns and prompted new federal nutrition policies. A second School Nutrition Dietary Assessment (SNDA II) was conducted in the school year 1998-1999 to determine the progress schools made in meeting the 1995 Dietary Guidelines for Americans (DGA). Overall, there were some improvements, but generally speaking, school meals were still not meeting the DGA recommendations for fat and saturated fat content (Fox, Crepinsek, Connor & Battaglia, 2001). On average, school meals contained 33% of calories from fat and 12% from saturated fat in comparison to the recommended levels of no more than 30% and 10% respectively (Fox et al., 2001). Data from the third School Nutrition Dietary Assessment (SNDA-III) in 2005 revealed little improvement of school meals since SNDA-II. The findings showed that schools still exceeded the recommended standards for energy from total fat and saturated fat. No schools met the recommended sodium and fiber levels. In addition, while more schools offered flavored skim milk, one third of school menus continued to offer whole milk. The availability of fresh fruits was fairly limited with only half of school menus providing fresh fruit (Gordon et al., 2009b). The most current SNDA is the fourth School Nutrition Dietary Assessment (SNDA-IV) with data collection that occurred during school year 2009-2010 (Fox & Condon, 2012). Study results continue to show relative improvements in school meals offered to students. Key findings include: very few schools met the sodium requirements; less than half of elementary school

lunches met the SMI (School Meals Initiative) standard for calories; more than one-third of school meals served met the standard for total fat and 50% of all schools met the standard for saturated fat. Furthermore, school lunches were well below the recommended daily amount for whole grains (Fox & Condon, 2012).

In addition to the SNDA studies, Bridging the Gap found similar trends as the SNDA studies. For example, between school year 2006-2007 and 2009-2010, there was no change or a decrease in the availability of higher fat foods such as pizza and fries. Nearly all students were offered pizza on some, most or every day, while almost 75% of students were offered fries or other deep-fried products on some, most or every day at school. Further, there were small increases in the availability of healthy foods such as whole grain products and low-fat milk with fewer than 1 in 4 schools regularly offering whole grains at lunch and only one-third of schools offered low-fat milk. The availability of salads/salad bars remained constant at 40%. In sum, these findings showed elementary school lunches exceeded recommendations for calories from fats and added sugars, and did not meet the recommended daily allowances for vegetables and whole grains (Turner & Chaloupka, 2012b; Turner et al., 2012).

Since the passage of the Healthy Hunger-Free Kids Act of 2010 and implementation of new lunch guidelines that began in the 2012-2013 school year, there are few national assessments of the school nutrition environments available. Bridging the Gap research released a research brief reporting there is continuing improvement in school lunches with schools offering healthier lunch items, while also decreasing the availability of unhealthier lunch items (Turner & Chaloupka, 2015). The latest SHPPS 2014 also revealed an increase in the percentage of schools offering two or more different

types of non-fried vegetables and two or more different fruits or 100% fruit juice for lunch between 2000 and 2014. Also, most schools are offering whole grains on a daily basis for breakfast and lunch and more than half of schools are preparing meals with lower sodium (CDC, 2015b).

School food environment and weight outcomes. There is ample evidence documenting how all foods and beverages offered and sold within the school food environment have influenced students' dietary behavior and weight outcomes. A major concern is that the evidence highlights an association between school food environments and higher body mass index and obesity prevalence (Fox et al., 2009b). For example, some earlier studies found students who participated in the National School Lunch Programs were positively associated with weight gain (Hernandez, Francis & Doyle, 2011; IOM, 2005; Miller, 2011; Millimet, Tchneris & Husain, 2010), whereas Gleason and Dodd (2009) found no association between school lunch participation and body mass index using cross-sectional data. In separate studies involving low-income students, Vericker (2014) and Hernandez and colleagues (2011) found higher BMI scores in girls who participated in school breakfast and/or school lunch meal programs. Similar findings have been raised with competitive foods and higher BMI and weight outcomes (Briefel et al., 2009b; Taber, Chriqui, Perna, Powell & Chaloupka, 2012).

There is also emerging evidence depicting a relationship between strong nutrition/food policies and weight status. This evidence includes studies that have also reported associations between local and state-level nutrition policies and weight outcomes (Chriqui, Pickel & Story, 2014; Taber et al., 2012, 2013). Hennessy et al. (2014) found that children living in states with weak competitive food laws had over a

20% higher chance of being overweight or obese than children living states with either no or strong school competitive food laws. Further, in a 2013-2014 cross-sectional study, Sanchez-Vaughn, Sanchez, Crawford and Egerter (2015) examined the association between competitive foods and beverages in elementary schools and overweight/obesity trends by neighborhood socioeconomic resources and found differences in obesity prevalence by school neighborhood socioeconomic levels. As would be expected due to fewer resources, students in the lowest income neighborhoods experienced no change in the odds of becoming overweight/obese over time, whereas the highest income neighborhoods experienced a decline in obesity prevalence. Lastly, Taber and colleagues (2012) found that students in California, a state that regulates the nutrient content of competitive foods, reported students consuming less fat, sugar and total calories than states with no standards for competitive foods.

With regard to states with more stringent nutrition standards for meal programs, Taber, Chriqui, Powell and Chaloupka (2013) compared student weight status between school lunch participants and nonparticipants in states with stronger school nutrition standards and states with minimum nutrition requirements. Findings indicated that in states that did not exceed USDA standards, students who obtained NSLP lunches were almost twice as likely to be obese than students who did not obtain NSLP lunches. In states with more stringent nutrition standards, the differences in mean body mass index between NSLP participants and nonparticipants was noticeably reduced. This study is important because it shows that having more stringent nutrition standards for school meal programs can have promising outcomes on weight status.

School food environment and American Indian schools. Research of the school food environment of AI reservation schools including a nutritional profile of school meals is not only limited, but is also outdated. There are ample national data for the school food environment of U.S. elementary, middle and high schools available through the SHPPS, SNDA and Bridging the Gap studies, but detailed descriptive and current data that provide a comprehensive picture of the school food environment of tribal nation schools is lacking in the literature. A limited number of older studies that examined *aspects* of the food environment in schools on American Indian reservations including the prominent Pathways study were found, including a large scale multicomponent school-based randomized controlled study aimed to reduce percent body fat by addressing behavioral and environmental factors related to students' dietary and physical activity behaviors (Lytle et al., 2002; Story et al., 2002).

As part of the feasibility phase (1994-1996) of Pathways study, Lytle and colleagues (2002) published one of the first studies that assessed the dietary intakes of 3rd graders from Apache, Lakota, Navajo, and Tohono O'odham reservation communities. Overall, findings showed students' intakes of vitamins and minerals exceeded the Recommended Dietary Allowance. There was no evidence of overconsumption of total energy or of deficient intakes of vitamins or minerals. Interestingly, traditional foods such as fry bread and tripe stew were not important sources of energy or fat mentioned by children. Out of school food sources provided significantly greater amounts of energy compared to in-school food sources. Snyder et al. (1999) also described the development and implementation of the school food service intervention during the feasibility phase of Pathways. The purpose of the intervention was to lower the amount of fat in school

meals to 30% of energy. The intervention components included providing nutrient guidelines for school meals, skill-building behavioral guidelines on food preparation for food service personnel, and onsite school kitchen visits by Pathways staff. Results of the process evaluation showed lunch menus from three control schools that did not receive the behavioral guidelines averaged 34-40% of energy from total fat, in comparison to schools that did receive the behavioral training; their lunch menus averaged 31% of energy from total fat (Synder et al., 1999).

The full-scale Pathways study took place from 1996 to 2000, involving a cohort of 1704 children in 41 schools from 7 American Indian communities. It entailed four main components: classroom curriculum, physical activity, a family intervention, and a food service intervention aimed to lower the fat content in school meals (Stone et al., 2003). As part of the dietary intervention, the goal of Pathways was to reduce fat content of school meals (lunch and breakfast) to 30% or fewer calories from fat. Study findings revealed successes in lowering the fat content in school lunches from a baseline of 33.1% of energy from fat to 28.3% in the intervention schools compared to 33.2% at baseline and 32.2% at conclusion of study in control schools (Story et al., 2003). In addition, the impact of the Pathways food service intervention on breakfast foods was also a success. Average total fat decreased in intervention schools from 16 grams at baseline to 13.6 grams of fat at the end of the study compared to 16.6 grams and 16.7 respectively for control schools. The percentage of calories from fat was also reduced from baseline to final measurement in intervention schools compared to that in control schools (Cunningham-Sabo et al., 2003).

Pathways marked the first large-scale school-based obesity prevention study in American Indian communities. It must be noted that Pathways was an intervention study. It focused explicitly on improving school meal programs and examining the nutrient content of school meals before and after dietary intervention. It did not examine or address the broader food environment, such as other food and policy environmental factors.

Since the Pathways study, the only other school-based obesity prevention study found in American Indian schools is Bright Start, a group randomized trial involving cohorts of kindergarten students attending schools on the Pine Ridge reservation in South Dakota that were followed through the end of first-grade (Story et al., 2012). As an intervention study, the aim was to reduce excess weight by increasing physical activity, improving school meals and snacks, and expanding family involvement. While findings did show a change in mean levels of percentage body fat, there was net decrease of 10% in obesity prevalence. Further, for the intervention group, there was a significant decrease in the mean total fat calories and saturated fat calories in school breakfast, lunch and snacks (Story et al., 2012). Importantly, these studies not only highlight the paucity of school-based obesity prevention research in American Indian schools, but also that above all, the few published studies have primarily focused on the impact of school-based environmental interventions on main outcomes of weight status, diet and physical activity behaviors, and on secondary outcomes such as nutrient content and quality of school meals. These school-based intervention studies differ from assessment studies that describe the characteristics, nutrition policies and practices of the school food environment of tribal nation schools, which is a major gap in the literature.

Community Level of Influence

The second outermost ecological layer is the 'community'. In Townsend and Foster's (2011) socio-ecological model, the description of community refers to the relationships between schools and other organizations, and informal networks within the school itself. For this study, community incorporated a broader definition, similar to the Institute of Medicine's (IOM) report where community is defined as a group of people sharing a common goal, interest, or identity based on sociocultural, political, health, economic interests or a geographic location (2012, p. 23). This definition also acknowledges that communities have their own history, social norms, traditions, and knowledge. In examining and addressing the health of Navajo children, 'community' is an important ecological layer to consider as it contains the broader influences of historical, cultural, social and economic factors that have shaped the health of Navajo children. In many aspects, the community layer is a complex web of layers in of itself.

Navajo culture. Among the Navajo or Dine' (earth surface people), there are stories about the origins of the Navajo that have been passed down for countless generations. It is told that the Navajo journeyed through different worlds before emerging into the present world known as the fourth world or glittering world, an emergence that occurred in an area known today as *Dinetah* or Navajoland. It is believed the Holy People established the boundaries of *Dinetah*, boundaries that include the four sacred mountains- Mount Blanca in the east, Mount Taylor in the south, San Francisco Peaks in the west and Mount Hesperas in the north (Austin, 2009; Begay & Maryboy, 1998). As earth surface people, Navajos were also prescribed a certain order, certain ways of managing one's body, and skills of life by which to abide. They were taught

how to live in harmony with Mother Earth, Father Sky, plants, animals, insects, and man (Lewis, n.d.). "When everything is in its proper place and functioning in harmony, there is *Hozho'* (Austin, 2009, pg. 43).

The Long Walk. One cannot talk about the Navajo people without reference to a significant part of Navajo history. As a people, the Navajo share the same tragic history as other indigenous and American Indian nations have experienced: a history of colonization that uprooted the way of living and existence, leaving a people today who have lost their lands, language, culture and identity (Adelson, 2005; Austin, 2009; Kahn-John, 2010; Mitchell, 2012). In 1864, over 10,000 Navajos and Apaches were forcefully removed from their lands and herded to Fort Sumner, a reservation in eastern New Mexico also known as Bosque Redondo. It was a period of brutal confinement that lead to thousands of Navajos dying from exposure, hunger, and illness. The U.S. government's policy to 'civilize' the Navajo people by removing them from their ancient lands came to a halt under the negotiations of the Navajo Treaty of 1868, a treaty that not only returned the Navajo people to their sacred homelands, but also marked the creation of a sovereign Navajo Nation. Upon trekking over 300 miles to return to their homelands, the Navajo people found it a struggle to make a living and survive, but somehow retained a commitment to rebuild their way of life through what was left of their Navajo traditional ways (Austin, 2009; Kluckhohn & Leighton, 1974). From a health perspective, a history of colonization underlies many of the devastating health outcomes such as obesity and diabetes among the Navajo people today.

Navajo traditional lifestyle. For a person familiar with Navajo communities, it is evident today that the traditional lifestyle that once sustained a people has dwindled

significantly. In historic times, American Indians including the Navajo people lived a life where survival depended on high levels of physical work and labor on subsistence activities such as planting and cultivating of healthy 'traditional' crops like corn, squash and beans; gathering of wild plant foods (i.e., spinach, cactus fruit, wild onion and rhubarb), and hunting of small game (Kluckhohn & Leighton, 1974; Styne, 2010). Additionally, sheepherding became a primary mode of living in the late 16th century after the introduction of sheep by the Spaniards. This work required daily laborious effort that started in the early morning with tasks like herding, lambing, and shearing of sheep (Witherspoon, 1975). Children had a major role in the herding of sheep, a chore often done by walking (Kluckhohn & Leighton, 1974). These were everyday traditional lifestyle activities that centered on *Hozho',* and it is through these challenging subsistence efforts that the people daily maintained positive health and consumption of food sources low in fat and calories, an equation crucial to the promotion of health (Compher, 2006). By the 1930s, a federal program that imposed a livestock reduction plan drastically changed this important form of subsistence that eliminated a major source of income with no regard for the strong cultural ties the Navajo people had to their livestock (Henderson, 1989).

The Navajo today. The Navajo or Dine' today occupy the largest American Indian (AI) reservation in the United States, covering 27,425 square miles known as Dine' Bikeyah or Navajoland, extending into the three states of Arizona, New Mexico and Utah (Navajo Nation Government, 2011). The Navajo is the second largest American Indian tribe following Cherokee Nation (Navajo Nation Government, 2011). As of 2010, U.S. census data documented that the Navajo Nation consisted of 332,129

enrolled tribal members, an increase of 11.3% from the 2000 U.S. census (U.S. Census Bureau, 2013). Nearly half (47%) of the Navajo population live on the Navajo tribal lands, 26% reside in metropolitan areas, and 10% in border-town communities (Navajo Nation Government, 2011).

Of people living on the Navajo tribal lands, the largest age population is the 10-19-year-old age category, with over half of the population (51%) represented in the 0-29 age group (Navajo Division of Health & Navajo Epidemiology Center, 2013). This clearly shows a relatively young Navajo population. The unemployment rate is alarmingly high on the Navajo Nation, reported at 50.52% by the Navajo Division of Economic Development (2009-2010). Poverty rates for Navajo people in comparison to adults in the United States overall are equally disturbing. According to the 2013 American Community Survey, the median annual household income on the Navajo Nation was significantly lower than the United States overall, $26,447 compared to $53,046, respectively (U.S. Census Bureau, 2013). Moreover, 2013 data showed that 41.3% of members of the Navajo Nation as compared to 15.4% of American adults overall had an income that placed them below the poverty rate (U.S. Census Bureau, 2013). Furthermore, educational attainment is lower on the Navajo Nation when compared to the educational attainment among U.S. adults: approximately 70% of Navajo population over the age of 25 having a high school degree or higher in comparison to 86% in the United States.(U.S. Census Bureau, 2013). Only 7.7% of Navajos have a bachelor's degree or higher, whereas the percentage of U.S. adults with a bachelor's degree or higher is over 4 times higher, 28.8% (U.S. Census Bureau, 2013). .

The Navajo Nation is one of many American Indian communities throughout the United States experiencing disparities in health that can be attributed to underlying inequities associated with historical, social, economic, cultural and political conditions (Adelson, 2005; Mitchell, 2012). They are a people who have survived and been affected by a tragic history, while continuing to live through harsh and complex social and economic conditions (Adelson, 2005; Mitchell, 2012).

Public Policy Level of Influence

The outermost layer of influence of the socio-ecological model is public policy (Townsend & Foster, 2011). This level represents more distal and indirect influences (Story, Kaphingst, Robinson-O'Brien & Glanz, 2008) such as policies, law and regulations that govern school meal programs. School nutrition programs administered by the U.S. Department of Agriculture (USDA, 2008) is one major example of a dominant influence on what kids eat at school, and while these are programs that have not evolved without challenges, they continue to undergo revisions and updates through legislation passed by Congress with the most recent law being the *Healthy Hunger Free Kids Act of 2010* (Healthy Hunger Free Kids Act, 2013).

Federal nutrition policy development. The origins of federal nutrition policies began out of concerns for school children living in poverty and hunger. Charitable organizations, wealthy societies and private associations contributed to school food service programs. One of the earliest forms of federal aid for school lunch programs came with the Reconstruction Finance Corporation in 1932 providing loans to a small number of schools to help cover some of the labor costs associated with school lunch programs (Gunderson, 1971; Levine, 2008). In 1935, governmental support substantially

expanded with the establishment of the Works Project Administration (WPA), a work-relief program that offered a wide range of employment opportunities as clerks, bakers and even cooks to work in school cafeterias (Gunderson, 1971; Levine, 2008). During the same year, Congress enacted Section 32 of Public Law (P.L.) 74-320, the Agricultural Adjustment Act, which gave the USDA the authority to purchase surplus farm commodity supplies and donate them to low-income families and school lunch programs (Becker, 2008; Levine, 2008).

The NSLP is one of the largest child nutrition programs administered by the U.S. Department of Agriculture (USDA Economic Research Service, 2008). In 1946, Congress passed P.L. 79-396, the *National School Lunch Act* as a measure of national security "to safeguard the health and well-being of the nation's children and to encourage the domestic consumption of nutrition agricultural commodities and other foods" (USDA Economic Research Service, 2008, para.1). Levine (2008) and others (Story et al., 2009) described how the NSLP was permanently authorized when concerns arose around the numbers of young men who did not qualify for the World War II draft due to nutritional deficiencies. While the establishment of the NSLP was to help to fight hunger and promote healthier nutrition, it has also served as a major platform for advocating for policies that promote healthy diets (Gordon et al., 2009b; Story, 2009).

In 1980, the U.S. Departments of Agriculture (USDA) and Health and Human Services (DHHS) established the first edition of the Dietary Guidelines for Americans, a national benchmark for nutrition intended for Americans ages two years and older (USDA, 2010). Every five years, the Dietary Guidelines Advisory Committee is tasked with updating the federal guidelines as needed. The guidelines advise Americans on

approaches for healthy eating and physical activity, which include making informed choices on foods to eat more or less of and maintaining physical activity (USDA, 2010; Slavin, 2012).

In 1994, Congress passed the *Healthy Meals for Healthy Americans Act*, which for the first time mandated the U.S. Department of Agriculture to align their nutrition standards with those of the Dietary Guidelines for Americans (Story et al., 2009). The USDA implemented this federal regulation as part of the 'School Meals Initiative for Healthy Children' (SMI) in 1995 (IOM, 2005; O'Toole et al., 2007; National School Lunch Program and School Breakfast Program, 1995). The SMI not only updated nutrition standards for reimbursable meals, but also mandated states to provide schools with extensive training and technical resources for meal planning and preparation (Hirschman & Chriqui, 2012; IOM 2005). It is also important to note here, during these years, nutritional standards created for school meals were not applicable to competitive foods.

In response to growing obesity concerns, the *Child Nutrition and WIC Reauthorization Act of 2004* (P.L. 108-265) was the first federal policy passed by Congress to address the school food environment and physical activity by mandating that schools and school districts participate in the NSLP to create local wellness policies at the start of the 2006-2007 school year (S. 2507, 2004; Story et al., 2009). As required by the law, wellness policies required schools to address nutrition education, physical education, other school-based activities, and nutrition guidelines for all foods available within schools, including developing nutrition guidelines for competitive foods and beverages sold on campus (IOM, 2007, S 2507, 2004). This gave schools a major responsibility to

develop their own policies on appropriately promoting a healthier food environment for students. Given that there were no detailed guidelines or criteria specified for nutritional standards, the omission provoked the release of the 2007 IOM report, *Nutrition Standards for Foods in Schools.* The report provided explicit recommendations for all foods and beverages and mandated that unhealthy competitive foods be replaced with healthier foods such as fruits, vegetables, whole grains and nonfat milk (IOM, 2007).

The most current federal nutrition legislation, *Healthy Hunger Free Kids Act of 2010 (HHKFA)*, P.L. 111-296 was signed into law in December 2010. It authorized comprehensive changes for school meal programs, National School Lunch Program and School Breakfast Program, and for the first time the law required all foods sold outside of school meal programs, also known as 'competitive foods', to adhere to federal nutrition standards (Healthy Hunger Free Kids Act, 2010).

National School Lunch Program (NSLP). The NSLP is a child nutrition program funded by the U.S. Department of Agriculture's Food and Nutrition Service (FNS) and is administered through state agencies and local school food authorities (Hirschman & Chriqui, 2012; USDA, 2015). Child nutrition programs are reauthorized by Congress every five years for continuous improvement of these programs. Although Child Nutrition Reauthorization did not occur in 2016, all programs continue to operate under appropriations laws that continue funding. Reauthorization of these child nutrition programs await action by the 115th Congress (Food Research & Action Center, n.d.).

While meals can be purchased by any student, the NSLP lunches play a critical role in providing free or reduced cost meals for low-income students (Peterson, 2014). The NSLP operates in most U.S. public and private schools. School lunches must meet

meal patterns and nutrition standards that are consistent with the latest 2010 Dietary Guidelines. They mandate that school meal programs must offer more fruits and vegetables, whole grains, fat free milk; reduce sodium content, saturated fat and calories, and eliminate trans-fat (Healthy Hunger Free Kids Act, 2010; IOM, 2010; USDA, 2012). Implementation of most nutrition standards began at the start of the 2012-2013 school year. Offering 100% of whole grain rich products was phased in during the school year 2013-2014 with schools given an option to request an exemption to remain at 50% of offering whole grains through 2015-2016 (Turner & Chaloupka, 2015). On June 28, 2013, the USDA issued an interim final rule for standards for competitive foods to take effect at the start of school year 2014-2015 (Chriqui, 2013; USDA, 2013). The USDA guidelines for nutrition standards are shown in Table 3 below:

Table 3. *2010 Nutrition Standards for School Lunch & Breakfast Programs*

Type of Food	*Requirement*
Fruits	Offer daily at breakfast and lunch
Vegetables	Offer daily at lunch (include dark green, orange, legumes); require selection of fruit or vegetable at lunch
Whole grains	Increase whole grains
Milk flavored);	Offer milk that is fat-free (unflavored and Low-fat (unflavored only)
Meat/Meat Alternate	Offer daily at breakfast
Sodium content	Reduce sodium
Trans fat Meals	Zero grams per serving Calories specific for each age/grade group

Note. Adapted from Department of Agriculture, Food and Nutrition Service, 7 CFR Parts 210 and 220, Nutrition Standards in the NSLP and SBP.

The *Healthy Hunger Free Kids Act of 2010* represents the highest layer of influence and authority for school nutrition across the nation. Through the establishment of nutritional policies and standards, the 'lower levels' of the SEM are required to adhere and implement these standards. Even school meal programs serving American Indian students are guided by this level of influence.

Summary

Schools are considered an ideal setting for supporting a range of healthful nutrition behaviors among children based on the significant amount of time children spend at school. Within the school nutrition environment, a variety of circumstances and complexities exist within and outside the school food environment that influence what kids are eating in school. This is a key factor in the prevention of overweight and obesity among AI children. Most of the research involving obesity prevention in schools on American Indian reservations is outdated and/or limited, with studies typically involving multiple tribal nations, rarely focused exclusively on specific tribes such as the Navajo Nation.

While national school nutrition studies have been conducted since the 1990s to assess policies and parameters related to healthful eating, physical activity, and other obesity-related risk factors, the same cannot be said of schools on American Indian reservations. Without periodic monitoring and surveillance of the school food environment and practices in tribal nation schools, how would tribes and local schools know what steps to take to ensure their schools are enhancing the diets of children and

reducing/preventing childhood obesity? With the newest 2010 USDA nutrition regulations for school meal programs in progress, there are major gaps evident in what is not known regarding the characteristics of school nutrition-related policies and practices, and how schools in Navajo and other AI reservation communities are performing with the implementation of these latest nutrition standards.

With the integration of the all-encompassing frameworks of the Navajo concept of *Hozho'* and the socio-ecological model, these frameworks have taken into account the relationship among people, their environment, and health. In the Navajo context, the purpose of this study was to describe and understand how to restore harmony, balance, wellness in health, or *Hozho'* in children and the school environment.

Chapter 3

Methods

The purpose of this descriptive study was to analyze characteristics related to nutrition policies and practices in elementary public schools on the Navajo reservation; describe barriers and facilitators encountered in the implementation of these policies; and examine whether and how schools have integrated or could integrate Navajo traditional concepts and values into any school health policies and practices. It involved the current school food environment in participating NSLP elementary and middle schools located on the Navajo reservation since the implementation of the *Healthy Hunger Free Kids Act of 2010*. The *specific aims* of the study were to: (a) assess school-level policies and practices that relate to school meal programs, competitive foods and overall school environment; (b) describe barriers and facilitators encountered in the implementation of school nutrition policies and practices mandated by *Healthy Hunger Free Kids Act of 2010*; and (c) assess whether and how schools have integrated or could integrate traditional Navajo practices in any part of the school food environment.

In this chapter, the research methodology and procedures for the study are explained, including a description of the research design, setting, subjects, recruitment, data collection, instrumentation, protection of human subject, and data analysis.

Research Design

The study used a *descriptive research design* that employed both quantitative and qualitative methodologies to capture greater depth and detail about the existing school food environment of select schools on the Navajo reservation. The most common types of descriptive research are case study, observational, and survey methods (Given, 2007).

For this descriptive study, a combination of survey, open-ended questions and observational methods were used. Surveys were completed first, then the open-ended questions, followed by observations. Given the scarcity of literature on this topic area, a descriptive design was appropriate for a study that sought to understand and gather a baseline description of what type of food environment students encountered on a daily basis.

Research literature explains that descriptive studies address the 'what is' concerning a phenomenon or behavior without influencing it or changing the environment that surrounds it in any way (Given, 2007; Langford & Young, 2013; Shuttleworth, 2007; Shuttleworth, 2008; University of Southern California, 2016). Other descriptive research design features are that they do not make predictions or determine cause and effect, so unlike experimental research, there is no manipulation of variables, there are no hypotheses, and no testing of an intervention (Langford & Young, 2013). Lastly, they are relatively low cost and provide easily accessible information (Shuttleworth, 2008). The operational components used for this descriptive study are visualized in Figure 2.

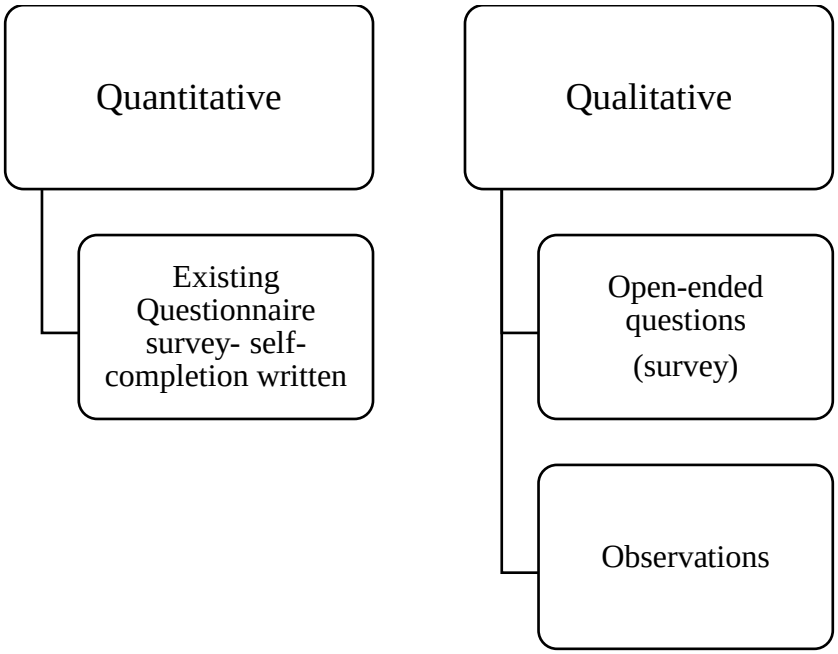


Figure 2. Components of descriptive study

Population, Sampling, and Setting

The target population for this study were Arizona schools within the Navajo Nation that participate in the federal reimbursable National School Lunch Program. Using a non-probability sampling method, a convenience sample of six schools located within the Fort Defiance Agency (similar to counties) of the Navajo Nation in Arizona was selected. Of the six schools, the units of analyses were school principals (n=6), food service managers (n=5), food service staff (n=8) and one district food service manager that totaled a sample size of N = 20 participants.

As for any study, the method of sampling depends on the study type, and on whether the study results are to be generalized to the population, or simply compiled to offer insight and understanding about something (Langford & Young, 2013). For this descriptive study, acquiring a better understanding of the food options in various venues within schools was a major goal, not making generalizations. Additionally, with the

study's location on the Navajo Nation covering a vast region of over 27,000 square miles, convenience sampling allowed for selection of participating schools within a confined geographic area on the Navajo Nation, an area denoted as the Fort Defiance Agency (please see Appendix A for details). This was necessary to stay within the researcher's capacity in terms of time and resources, especially with the distances that were frequently traveled to and from the three communities, averaging anywhere from 150 to 380 miles per round trip. The three communities chosen were an average of 70-90 miles apart. Langford and Young (2013) explained that in convenience sampling, participants may be selected because of their accessibility and close proximity to the researcher.

The study had specific inclusion/eligibility criteria for study enrollment and participation. The geographical location of the study was within the boundaries of Fort Defiance Agency. The study participant must have been affiliated with an Arizona elementary or middle school located on the Navajo reservation that had the federal NSLP meal program. The participants had to be a food service manager, food service staff, or the principal/administrator of the school. Participants must have had the ability to speak and read English.

Recruitment

Prior to the study, identifying schools on the Navajo Nation that participated in the NSLP was an important preliminary step. A directory of NSLP schools was obtained from the Arizona Department of Education's Health and Nutrition Services program (Arizona Department of Education, 2016). Using this directory, an initial recruitment email was sent to 18 school principals and/or superintendents about the dissertation project. Please see Appendix B for that recruitment letter. A follow-up email was sent

about a week and half later when the researcher finally received 1-2 email responses from principals who expressed interest. For the remaining schools who did not respond to the emails, the researcher made phone calls to principals, which proved to be more successful than emails. Thereafter, face-to-face meetings were arranged with each respondent where further details were provided about the study, and any remaining questions or concerns were clarified. These in-person meetings facilitated gaining the support and commitment from school administrators, and many who kindly expressed their gratitude for researcher's efforts in pursuing higher education. Letters of support indicating a commitment to participate in study were acquired from two principals and one district superintendent, and were vital documents needed for the Navajo Nation research approval process. Please see Appendix C for the Letters of Support. It is important to note that recruitment of schools essentially took place as researcher completed the steps for approval by the Navajo Nation Human Research Review Board (NNHRRB), as this approval required the support/approval from school boards and local communities. A more complete explanation of this process appears under the Human Subjects Protection section below.

Data Collection

After research approval was obtained from the NNHRRB and the University of New Mexico Health Sciences Center's Human Research Protection Office (HRPO), the researcher worked with school principals to schedule a meeting with eligible participants including principals themselves, food service managers and food service workers that met the inclusion criteria. At each meeting, proper cultural etiquette for introductions was always important to establish first, followed by an explanation in lay terms participants

understood about the overall purpose of the dissertation research project, the benefits and risks of the study, the voluntary nature of participation in the study, and the fact that identifiable information would not be collected. The researcher also offered reassurance that all their local school boards, community, and Navajo Nation approved the study.

For participants who agreed to take part in the study, they were provided a survey packet that contained an Informed Consent Letter for Anonymous Surveys and a survey coded with an anonymous identification number. Please see Appendix D for the Informed Consent. Part 1 surveys were coded with the letter "A", followed by a random number selected from an online randomizer software package. Part 2 surveys were distinctly coded with the letter "B", followed by a random number as described above. With the study approved as holding *exempt status*, written consent was not obtained. To ensure that participants understood the informed consent letter, a verbal explanation of the content was provided, emphasizing that by their returning the survey in the envelope provided, participants were agreeing to participate in the research study. Further, for participants who were not fully comfortable with a self-completion survey instrument for reasons such as literacy capacities or simply unfamiliar with completing survey, participants were also offered the option for surveys be read to them and responses recorded for them.

With the many visits and distant travels to each of the schools and communities, the researcher remained on-site to retrieve surveys and to be available to participants if any questions arose. Typically, survey questionnaires are completed by participants themselves, but in particular cases the surveys can be completed in-person (Brophy,

Snooks & Griffiths, 2008). Each participant was given a $25 Walmart gift card for taking part in the study.

Survey instrument. For the survey segment of the study, an existing two-part quantitative survey instrument was adapted for this particular study by supplementing with a set of open-ended qualitative questions. Permission was obtained to use and modify this survey from Dr. Lindsey Turner, principal investigator with the Bridging the Gap Robert Wood Johnson Foundation funded research program, through email correspondence (Turner et al., 2014). Principals completed Part 1 of *School Food and Policy Questionnaire Navajo Nation*, which contained three sections. Section A asked questions about general school characteristics such as school enrollment and class schedules. Section B asked questions about specific school food practices related to breakfast and lunch policies and practices outside the school meal program, while Section C contained nine questions about schools' wellness policies, a provision that was passed in 2004 by the US Congress. Food service personnel completed Part 2 of the *School Food and Policy Questionnaire Navajo Nation* that contained 28- questions about the types of foods and beverages available to students, such as vending machines, school stores, snack bars, *a lá carte*, and the school lunch program.

As for the open-ended qualitative questions added to both survey versions, they explored the participants' experiences and viewpoints regarding school food topic areas. Responses from open-ended questions represent the simplest form of qualitative data that renders depth, detail, and understanding about categories under investigation (Patton, 2015). The specific open-ended questions included the following: (a) For schools that participate in the National School Lunch Program, schools are required to adhere to

certain nutrition requirements set forth by the Arizona Department of Education and the USDA (US Department of Agriculture). What has been your school's experience in carrying out these nutrition requirements? (b) What factors have facilitated and/or impeded implementation of these nutrition requirements? (c) What are ways your school has incorporated Navajo cultural teachings and practices for the promotion of health? and (d) What role, if any, do you think schools should play in student nutrition? Copies of both surveys with open-ended questions are included in Appendix E.

Observations. Observation is recognized as a type of qualitative data gathering method and consists of detailed rich descriptions of a setting, people's interactions and behaviors, and activities that take place in a setting. Through observations, one is able to acquire a more holistic understanding about the context of the study setting (Patton, 2015). Collection of observational data supplemented and illuminated a different kind of data that were compared with data already collected from surveys. Observations involved no interviews and were conducted as unobtrusively as possible before and during lunch periods in two schools (4-6 school and K-8 school) on separate days. An observational checklist was developed and modified from USDA's School Nutrition Dietary Assessment study (Gordon, Crepinsek, Nogales & Condon, 2007). Specific areas observed were the availability of vending machines, location of these vending machines, types of beverages or snacks sold, times during the day students accessed machines, and other alternative food and beverage sources (Gordon et al., 2007). In addition, the researcher recorded field notes and rich descriptions of the school food environment, including the school meals that were served. Finally, key phrases or major points from conversations with school employees about the school food environment were also

documented. Remaining open and flexible during observations was important (Patton, 2015). See Appendix F.

Reliability and Validity

Reliability and validity are important principles in all forms of measurement. Reliability of an instrument has to do with its dependability, where the same study results are generated each time under the same conditions (Neuman, 2003; Shuttleworth, 2008). There are three major types of reliability that are often reported in research studies. These are internal consistency, stability and equivalence with each reported as a correlation statistic (Langford & Young, 2013). Validity of an instrument is the extent to which an instrument measures what it is intended to measure. An instrument can be reported as having face validity, content validity, criterion validity or construct validity (Langford & Young, 2013; Newman, 2003). In terms of the survey instrument used, reliability and validity were reported in a technical report (Turner, Sandoval & Chaloupka, 2015). The survey development began in 2006 with a review of existing instruments such as the School Health Policies and Programs Study (SHPPS), School Nutrition and Dietary Assessment study, and a survey developed by National Center for Education Statistics. Many of the survey items that were used had already been pre-tested and/or adopted from existing surveys. In addition, the instrument was reviewed by a team of content experts in the areas of nutrition, health policy, health economics, and health behavior along with the project director (a doctorally-educated psychometrician specializing in school health research). This was followed by an external review by four national experts on child nutrition and physical activity, including two individuals who had been investigators for the USDA. Lastly, the survey was tested with three target

respondents who were not part of the study sample, and the survey was revised accordingly (Turner et al., 2015). However, the addition of the four open-ended questions at the end of the survey may impacts the reliability and validity of the instrument.

Ensuring study rigor

Establishing rigor in qualitative research is an important consideration for ensuring the worth and integrity of a study. Trustworthiness is a term that denotes rigor and consists of evaluation criteria based on credibility, transferability, dependability, and confirmability (Langford & Young, 2013; Lincoln & Guba, 1985). *Credibility* refers to confidence in the truthfulness and accuracy of the study findings. For this study, the strategy to ensure study credibility was through triangulation by using more than one type of data collection method, including surveys and observations. Further, debriefing with research peers also enhanced credibility of this study's results. *Transferability* has to do with the ability to transfer or apply the study findings to other situations. Efforts that enhanced transferability included consistently maintaining a rich account and description of context, a technique consistent with knowledge generated by naturalistic generalization (Patton, 2015). *Dependability* means being able to demonstrate that the study findings are consistent, transparent and can be repeated. A technique for meeting the dependability criteria was met by regular consultation with the dissertation chair and members of dissertation committee throughout the research process. This was an example of an external audit where committee members specifically examined the design, data collection, analysis and results of the study, and provided feedback and suggestions. Lastly, *confirmability* refers to maintaining objectivity, where study

findings are shaped by participants and not the researcher (Langford & Young, 2013; Lincoln & Guba, 1985). Confirmability was preserved through reflective journaling and maintaining an audit trail from the start of the study to the conclusion (Creswell, 2015).

Data Analysis

For this descriptive study, a distinct combination of analytic techniques was used to analyze quantitative and qualitative data. Analysis of survey results preceded observational data since surveys were administered first, when participants agreed to take part in the study. As previously described, the surveys not only included fixed-scale quantitative questions, but also were supplemented with qualitative open-ended questions. The SPSS statistical software version 24 (2016) was used for analysis of quantitative data. In terms of qualitative analysis, several approaches including matrix analysis, detailed descriptions and descriptive statistics were employed for responses to open-ended questions, follow-up conversations with participants, and on-site school observations.

Quantitative analysis. Both surveys (parts 1 and 2) consisted mainly of nominal and ordinal level of measurement questions with a few interval level measurement questions. Frequencies and percentages were used to examine nominal and ordinal level data, and statistical measures such as mean (average) and median were used for interval data (Brophy, Snooks & Griffiths, 2008). Principal survey data and food service worker data were analyzed separately, then compared.

Qualitative analysis. Qualitative analysis transforms data into findings, and there is no specific pathway or recipe in how this is done. Much of the qualitative analysis depends on the judgment and creativity of the researcher (Patton, 2015). An

important distinction with qualitative inquiry is that analysis is not linear. There can be overlap with data collection and analysis, meaning any analytical insights and ideas that emerge while in the field collecting data should not be ignored (Patton, 2015). The core of qualitative analysis involves discovering patterns, themes, and categories from data obtained. The specific analytic strategy used for the research findings included both a matrix and thematic analysis. Analysis of textual information gathered from open-ended questions and discourses of communication with participants was completed using a matrix analysis approach. This analytic strategy was chosen for its use in organizing and displaying large amounts of information in a systematic, concise and visual manner, making it more practical to compare and contrast data (Averill, 2002; Fetterman, 2010). Analysis began with the construction of an initial *process* matrix, a matrix displaying synthesized key points for each question from each participant (principals and food service workers). This step was similar to coding by identifying data that tended to cluster together, reducing the large quantity of text into concise categories (Creswell, 2013). Within this matrix, responses to the open-ended questions were displayed along the vertical axes (columns), and the individual participants were specified along the horizontal axes (rows). A subsequent *outcome* matrix was then created from the initial *process* matrix. The outcome matrix is a more condensed matrix that was generated from a cross-referencing exercise in synthesis, and progression that involved a deeper level of inquiry, reflection, grouping and reorganizing of data in the search for essential/key ideas and concepts. Key grouped data by the two distinct groups of participants are displayed in Chapter 4. Additional columns were added for the researcher's perceptions, since the researcher is the interpretive instrument in qualitative analysis (Patton, 2015).

Observational analysis. Analysis of observation data involved calculating frequencies and percentages to describe the type, number, location, times of day vending machines are in operation, and other food/beverage sources available to students. Other relevant field notes captured during observations were rich descriptions of the school, analyzed by pattern, theme and content analysis, similar to steps taken with the transcript data (Patton, 2015).

Human Subjects Protection

Ethical considerations must be considered for any type of research study to protect study participants from potential harm (Langford & Young, 2013). For this study, the researcher designed this study with minimal to no risks to study participants, as the study focused on gathering data about the school food environment, not about individuals.

Since this study was conducted in schools on Navajo tribal lands, this study was subject to separate reviews and approvals by the University of New Mexico Health Sciences Center Human Research Protection Office (HRPO) and the Navajo Nation Human Research and Review Board (NNHRRB). The Navajo Nation research review process consisted of a 12-phase review and approval process that was preceded by submission of a letter of intent to conduct research on the Navajo Nation along with a two-page abstract of the proposed study. Phases I through IV were required steps completed before implementation of the study. Phase I was a time intensive process of over a four-month period to obtain the commitment and support from the community including principals and school boards to participate in the study. The first phase essentially meant eligible schools had to be recruited while proceeding through the steps

to acquire NNHRRB approval. Principals were the first point of contact, where letters of support were obtained from each principal. Thereafter, the researcher worked with each principal or superintendent to be placed on the school board agenda with the goal of acquiring board approval. A brief presentation of the research project was provided to each school board, followed by addressing any questions or concerns that were posed. In the end, all school boards were in full support of the research and provided her with a supporting resolution. Please see Appendix G for school board approvals. With these letters of support and school board resolutions, the last step of phase one concluded with the researcher going before community members and their elected officials through a forum known as a 'chapter meeting'. Once again, a formal presentation about the research project was provided to the community followed by a Q & A session. Similar to the school board approval process, supporting chapter resolutions were obtained from three different communities. Please see Appendix H for supporting resolutions from communities (chapters).

Phase II of the NNHRRB process is known as the Tribal Program Partnership phase and required the researcher to engage program administrators and the Division Director, along with obtaining a letter of support from administrators. The step mainly involved contacting a relatively new program within the Navajo Nation Department of Health known as the Healthy Hunger Free Kids Act program. According to the NNHRRB protocol, phase III required the researcher's application and study contents to be reviewed by the Navajo Department of Health before proceeding to phase IV, seeking approval from the full body of the NNHRRB. On October 18, 2016, research was

approved by the NNHRRB after a formal presentation to the board. Please see Appendix I for Navajo Nation research approval.

While the researcher proceeded through the steps in acquiring NNHRRB approval, the researcher also pursued approval by the university, especially since the Navajo Nation required university approval first. The researcher met all training requirements imposed by UNM's Human Research Review Committee (HRRC), including the online Collaborative Institutional Training Initiative (CITI). The proposed study was approved as *exempt category* since identifiable information such as names of schools or individuals was not going to be collected. Please see Appendix J for proof of HRPO approval.

Informed consent. Informed consent is a statement that informs participants as to the purpose of the study, what participants will do in the study, the length of time required, and any potential risk exposure (Langford & Young, 2013). Before the start of data collection, eligible participants were provided written informed consent along with a simple verbal explanation of the purpose of the study. Since this study was approved as *exempt* category, written consent was not obtained. Participants agreed to participate in the research study by their completion of the surveys.

Participants were also informed their participation was voluntary and could withdraw from the study at any time with no question or penalty. Due to the nature and scope of this study to describe and increase understanding about the current school food environment and participants' disclosure about the nature of policies and practices of the school nutrition environment, the likelihood of harm was considered minimal. Participants were given a small token of appreciation in the form of a $25 Wal-Mart gift

card for their participation. For the observational component part of the study, two schools participated in the study.

Confidentiality. In any type of research, confidentiality of information is always a significant concern. A strategy employed to protect the confidentiality of study participants was that they were given a survey packet coded with an anonymous identification number. Furthermore, identifiable information such as name of school and participant names were not collected.

Data management. Data management included proper storage of all information and data. The surveys collected from each school were stored in a locked office file cabinet accessible only by researcher. Observational data including memos and field notes were stored in the same manner.

Summary

This chapter described the research methodologies used to implement this descriptive research design. As a descriptive research study, the study aimed to describe the current school food environment among a select number of elementary schools that participate in the NSLP on the Navajo reservation. Quantitative and qualitative procedures were used to obtain a more comprehensive picture of the school food environment. The specific methods of data collection were described, including a quantitative survey, qualitative interviews, and researcher's observations/notes. In addition, the various techniques of data analysis were explained along with the specific measures to ensure credibility and study rigor.

Chapter 4

Results

This chapter presents the results of the data analysis, including description of key quantitative and qualitative findings relevant to the *specific aims* of this descriptive study. The specific aims were to (a) assess school-level policies and practices that relate to school meal programs, competitive foods and overall school environment; (b) describe barriers and facilitators encountered in the implementation of school nutrition policies and practices mandated by *Healthy Hunger Free Kids Act of 2010*; and (c) assess whether and how schools have integrated or could integrate traditional Navajo practices in any part of the school food environment. Organization of this chapter is presented as follows: description of sample characteristics, presentation of survey results including responses to open-ended by school principals and food service workers, observational findings, and an overall comparison and synthesis of all findings.

Schools on the Navajo reservation that participated in this descriptive study were selected based on their responses to an invitational letter sent by e-mail to principals and agreed to a follow-up face-to-face meeting. Data essential to describing and characterizing the school food environment and practices were collected from several sources. Principals and food service workers completed two separate sections of a school food and policy survey instrument, and observations of the school food environment were conducted by the researcher with two schools. These data collection activities occurred over a two-month period from November 2016 to December 2016.

Descriptive statistics (i.e., frequencies and percentages) were used to present the results of the quantitative portion of the survey and food environment observation

findings; matrix analysis was used to present the results of the open-ended qualitative questions. Principal survey data and food service worker data were analyzed separately then compared. Missing data were noted on some items and may have occurred as a result of not understanding what was being asked, respondents skipping questions if their response did not apply, or other reasons that were not apparent to the investigator. For questions with missing data, the percentages were calculated out of non-missing data.

School and Participant Demographics

A total of six elementary and middle schools participated in the study. The schools selected were participants in the National School Lunch Program (NSLP) and were located in several different remote communities on the Navajo reservation in Arizona. Five of the schools were part of the Arizona public school system and one school was a community grant school. All schools were low-income with 100% of children on free and reduced priced meals. In addition, all schools offered breakfast to students through the USDA reimbursable school breakfast program. With these schools located in remote regions of the Navajo reservation, all schools had fewer than 500 students each. Half of the schools had between 350 to 472 students with the remaining three schools with less than 160 students (Table 4).

From each of these schools, the main study participants were principals and food service workers--six principals and 14 food service personnel. The overall response rate for completion of surveys was 100% with all principals and food service workers from each school returning surveys. Of the six principals, four were males and two were females, and by race/ethnicity, three were White, one African American, and two Navajo participants. For the food service workers, all participants were Navajo, and that

included nine females and five males with ages that ranged from the 30's to the 60's (Table 5).

Table 4. *Demographics of Select Elementary and Middle Schools that Participate in NSLP*

School workers Type	*Enrollment n*	*Free and reduced lunch % enrollment*	*% SBP[a] participation*	*Food service n*
K-3	472	100	100	4
K-6	132	100	100	2
4-6	419	100	100	4[b]
K-8	158	100	100	2
K-8	123	100	100	2
7-8	351	100	100	4[b]

[a]School Breakfast Program [b]These two schools were combined in one school with grades 7-8 on upper level and grades 4-6 on lower level, with the same food service workers.

Table 5. *Characteristics of Study Participants*

Participant n	*Male*	*Female*	*Ethnicity White*	*African American*	*AI (Navajo)*
Principal n=6	4	2	3	1	2
Food Service Workers n=14	6	8			14

The next section presents the *quantitative* (fixed, scaled) results relevant to addressing one of the research aims: 1) assess school-level policies and practices that relate to school meal programs, competitive foods and overall school environment. Principals' results are presented first, followed by food service workers.

Principals and School Health-Related Policies and Practices

All six principals completed the survey with a series of questions related to nutrition, school policies and practices that promote health. Information in Table 6 shows the principals' responses related to school food policies and practices. Most principals (4 out of 6) indicated they were familiar with their school's Wellness policy, while two (33%) principals were not familiar with their Wellness policy. Half (3) of the schools indicated they had one or more designated persons for ensuring the Wellness policy is implemented. Further, two of the schools (33%) indicated they had an ongoing health advisory council, wellness council, or an advisory group, while the remaining four (67%) schools did not have an ongoing health advisory council or principals did not know. With regard to the extent principals were familiar with the most current USDA nutrition standards, 50% (3 out of 6) of the principals were 'a little' familiar with these standards, two respondents (33% of the principals) were 'somewhat' familiar with the latest USDA nutrition, and one principal was 'not at all' familiar with standards. Among these schools, only two (33%) of the principals reported their schools have made changes to ensure school practices align with standards. On the topic of fundraising activities, only 2 out of 5 principals (40%) reported that they have policies in place regarding the nutritional quality for fundraising activities, while another two principals indicated they do not have policies, and one principal answered that their school did no fundraising activities.

Results for food-related practices identified by principals revealed important findings. In terms of schools having a garden, half of the principals (3 out of 6) indicated their schools do have a garden for which students participate in the care and maintenance.

As for participation in the USDA Fresh Fruit and Vegetable Program (FFVP), only 2 out of 5 (40%) principals reported their schools take part in this USDA reimbursable program, whereas 3 out of 5 principals did not know if their school participated in the USDA FFVP program or not. Interestingly, of these five schools, only one school participates both in the USDA FFVP and has a school garden.

Foods that children received as rewards from teachers in the classroom comprised another practice reported by principals. Three out of four (75%) principals reported that teachers were allowed to use candy or other unhealthy food items for good academic performance and good behavior, including the use of candy as part of classroom lessons. An example shared was using M & M candies in teaching math.

Aside from food-related practices, a significant finding reported by principals was related to health screening practices of children, where the majority (67%) of principals indicated BMI (body mass index) screening has 'never' been done, while only 33% (2 out of 6) principals indicated that these health screenings are done annually. The researcher was not told who conducts these health screenings. With regard to nutrition education in the classroom, for the five principals who responded, the results diverged, with 40% (2 out of 5) of principals disclosing their schools provided nutrition education, 40% did not provide education, and one principal did not know whether nutrition education was provided in the classroom (Table 6).

Table 6. *Principals' Description of School Food Environment Policies and Practices among Select Elementary and Middle Schools that Participate in the NSLP[a] During the 2016-2017 School Year*

Characteristic	*n (%)*

Wellness policy and other nutrition-related policy	
Familiarity with Wellness policy	4 (67%)
School/school district has one or more designated persons for ensuring the Wellness policy is implemented[b]	3 (100%)
School/school district has health advisory council	2 (33%)
Extent of familiarity with USDA nutrition standards	
Not at all	1 (16%)
A little	3 (50%)
Somewhat	2 (33%)
Extent school practices align with nutrition standards	
Have already made changes	2 (33%)
Don't know	3 (50%)
Not applicable	1 (16%)
Has policies regarding nutritional quality for fundraising[c]	2 (40%)
Classroom practices	
Teachers allowed to use candy as a reward for good academic performance[d]	3 (75%)
Teachers allowed to use candy as a reward for good behavior[d]	3 (75%)
Classroom lessons involve candy (math using M & M candies)[d]	3 (75%)
Nutrition education provided in classroom[c]	2 (40%)
Other health-related practices	
School has a garden that students participate in	3 (50%)
Participates in USDA Fruit and Vegetable Program[c]	2 (40%)
Body mass index (BMI) screening of students	
Never	4 (67%)
Annually	2 (33%)

[a]National School Lunch Program [b]Missing data from 3 principals [c]Missing data from 1 principal [d]Missing data from 2 principals

Food Service Participants and Food Environments and Practices

The results of this analysis focused on school food environments, school food practices and school lunch characteristics, based on the perceptions of food service workers (FSW) or staff. Information on the school food environment and characteristics of lunches offered to students as reported by staff are seen in Table 7. As described in the previous section, there were 14 food service workers including six food service managers that completed the survey. With regard to the training and credentials of food service managers, none of the food service managers was a registered dietitian. All (100%) of the managers received some form of food safety and/or nutrition training certification including School Nutrition Association certification. In terms of the operations of school food services programs, all the schools used an outside vendor or food service management company to implement their food services program.

Participation in farm-to-school programs was not a common practice, with only 29% of food service workers indicating their schools participate in this USDA program--this represented food service workers from only 1 out of 6 schools. On the contrary, there was greater participation in the USDA-sponsored Team Nutrition program by schools that was reported by 67% of food service workers, which represented food service workers from four of the schools. As for the school environment, access to vending machines was not a source for foods or beverages for students at all schools according to food service workers. Other sources of foods and beverages such as *a la carte*, school stores or snack bars were also not as common. Across all schools, 64% of food service workers indicated their schools did not serve alternative food options such as through *a la carte* foods. With regard to school stores or snack bars, the majority of food

service workers (86%) indicated their schools did not have school stores or snack bars (Table 7). In spite of these findings, it is interesting to note that food service workers from 2 out of the 6 schools reported that they have both school stores/snack bars and *a la carte* food options available.

Availability of specific foods and beverages as part of the NSLP lunches is also described in Table 7. The current guidelines for milk call for fat-free (flavored or unflavored) or 1% low-fat unflavored only as part of the reimbursable meals. Across all schools, the unhealthier milk versions--whole or 2% milk and low-fat flavored milks were available in 4 out 6 schools as reported by 64% of food service workers. As for schools offering the healthier versions of milks (fat-free flavored and unflavored), only 43% and 36% of food service workers said they offered fat-free flavored and unflavored milks respectively. This represented 3 out of 6 schools. Other common beverages available to students were 100% fruit or vegetable juice and low-fat unflavored milk, reported by over half of food service workers (>57%).

A majority of food service workers (85-100%) indicated more *healthy* foods were offered through the school lunch program including healthier pizza (whole grain crust, low-fat cheese, fresh vegetables), fresh fruit, salad bar, vegetables, whole grain breads including bread sticks and bagels, and whole grain crackers. Along with guidelines-friendly foods, half or more of the food service workers from 4 out of 6 schools also reported their schools offered *unhealthy* foods or foods not consistent with nutrition guidelines, such as French fries/tater tots and regular pizza. Although not as common, other *unhealthy* foods/snacks such as cookies, cakes, pastries not low in fat, salty snacks,

crackers not whole grain, and regular ice cream were reported by fewer food service workers (<30%) from 2 out of 6 schools. These numeric data appear below in Table 7.

Table 7. *Description of School Practices and Characteristics of School Meals (N=14)*

Demographics of food service workers	**n (%)**
Total food service staff	8 (57%)
Total food service managers	6 (43%)
No Registered Dietitian credentials	6 (100%)
Has School Nutrition Association certification	6 (100%)
Has food safety or nutrition training certification	6 (100%)
School food and other health-related practices	
Supplier of school meals	
Food service management	6 (43%)
School system food service	8 (57%)
Participates in farm to school programs	4 (29%)
Participates in USDA sponsored Team Nutrition program[c]	8 (67%)
No vending machines	14 (100%)
No a la carte beverages or food	9 (64%)
No school store or snack bars	12 (86%)
In comparison to last year, do school lunches offer the following:	
Amount of fruit and vegetables offered[b]	
Same	9 (69%)
More	4 (31%)
Variety of fruits and vegetable offered[c]	
Same	9 (69%)
More	4 (31%)
Whole grain food options[c]	
Same	9 (75%)
More	3 (25%)

Low-fat dairy products[c]	
Same	11 (85%)
More	2 (15%)
Characteristics of NSLP lunches offered	
100% fruit or vegetable juice	8 (57%)
Sugar-sweetened beverages	1 (7%)
Sport drinks	2 (14%)
Non-fat skim white milk	6 (43%)
Non-fat skim flavored milk	5 (36%)
Low-fat 1% white milk	11(79%)
Low-fat 1% flavored milk	9 (64%)
Whole or 2% milk[d]	7 (64%)
Low-fat baked goods	5 (36%)
Cookies, cakes, pastries not low in fat	3 (21%)
Candy	0
Regular salty snacks	3 (21%)
Low-fat salty snacks	4 (29%)
Regular ice cream or frozen yogurt	3 (21%)
Low-fat ice cream or frozen yogurt	7 (50%)
Whole grain crackers	12 (86%)
Crackers not whole grain	4 (29%)
Bread sticks, bagels or other breads (whole grain)	14 (100%)
Bread sticks, bagel, or other breads (not whole grain)	6 (43%)
Whole grain breads	14 (100%)

French fries or tater tots offered	9 (64%)
Cheese sticks (not low in fat)	5 (36%)
Vegetables[b]	13 (100%)
Fresh fruit	13 (93%)
Salad bar	12 (86%)
Healthier pizza (whole wheat crust, low fat cheese, toppings)	14 (100%)
Regular pizza	7 (50%)

[a]Missing 6 responses [b]Missing 1 response [c]Missing 2 responses [d]Missing 3 responses

Thematic Findings

This section presents the findings from the *qualitative* follow-up questions (open-ended) that were included at the end of the quantitative (fixed, scaled) survey questions. Results to these open-ended questions were designed to specifically address two of the study aims: 1) describe barriers and facilitators encountered in the implementation of school nutrition policies and practices mandated by *Healthy Hunger Free Kids Act of 2010,* and 2) assess whether and how schools have integrated or could integrate traditional Navajo practices in any part of the school food environment.

Gathering of these qualitative responses further explained the primary quantitative survey results by yielding more in-depth information about the perceptions and experiences (Patton, 2015) among food service workers and principals regarding the current food environment including how schools are incorporating Navajo cultural practices as a way to promote health. As a researcher, capturing a glimpse of the participants' distinct experiences 'in their own terms' or points of view about what is happening in their schools in their roles as a principal and a food service worker was

crucial. Principals and food service workers responded to the same open-ended questions.

Although the primary mode of data collection was by self-completion of surveys, a valuable array of information was also gathered through informal discourse with participants when surveys were collected. Following proper Navajo etiquette and following *ke'* (relationship) norms, the researcher shook hands with participants, expressing gratitude for their appreciation. Likewise, for participants, they were appreciative of the researcher's efforts and concerns for the health and wellbeing of Navajo children. It is in this context, participants further elaborated on immediate survey questions, offering their individual thoughts and collective group insights in their own words.

The following four open-ended questions analyzed were: 1) What has it been like for your school to take part in the NSLP requirements? 2) What things have helped or hindered the use of these requirements? 3) What are ways your school has incorporated Navajo cultural teachings and practices for the promotion of health? 4) What role if any do you think school should play in nutrition/health? *It is important to note that some of these open-ended questions were designed to similarly reflect and inform the research questions used for this study.*

Analysis of textual information gathered from open-ended questions and discourses of communication with participants was completed using a matrix analysis approach. This analytic strategy was chosen for its use in organizing and displaying large amounts of information in a systematic and visual manner, making it more practical to compare and contrast data (Averill, 2002; Fetterman, 2010). Analysis began with the

construction of an initial *process* matrix, a matrix displaying synthesized key points for each question from each participant (principals and food service workers). Within this matrix, the set of open-ended questions were displayed along the vertical axes (columns) and the individual participants were specified along the horizontal axes (rows). The summary of major findings for each participant (representing individual data points or response sets) for each question appear in Appendix K.

A subsequent *outcome* matrix was then created from the initial *process* matrix. The outcome matrix is a more condensed matrix that was generated from a cross-referencing exercise, and progression that involved a deeper level of inquiry, reflection, grouping and reorganizing of data in search for key ideas and concepts. These key grouped data by the two distinct groups of participants are displayed in Table 8. Additional columns were added for the researcher's perceptions from field notes, contexts and follow-up communication with participants. A final analytic step, displayed in Table 8, was then used to develop *themes* (larger units of meaning) which are presented by each open-ended question.

Table 8. *Outcome Matrix: Major Findings from Survey Questions*

Type of respondent	*Q1: Key Findings*	*Q2: Key Findings*	*Q3: Key Findings*	*Q4: Key Findings*	*Follow-up conversations*	*Researcher's Analysis & Reflections*
Food Service Workers	Benefits: changes have been positive; kids eating healthier; eating foods otherwise would not get at home	With a food service management co has helped to meet requirements	Incorporation of Navajo cultural practice varies among schools, offered as a class or school hosts a cultural night	Recommendations: educate and teach about healthy lifestyle	Food waste a major concern especially with lower sodium requirements	All schools work under a food service company; pros and cons
	Concerns: Kitchen staff hear complaints from kids about food tasting different	Staff are trained on USDA standards	Traditional foods are served in some schools; some schools are restricted by their food service management company	Staff recognize schools have an important role in health promotion	One supervisor states the key is to be creative in making healthy foods that are tasteful	Unclear as to why kids are wasting healthy foods
	One food service manager mentioned the new HHFKA nutrition standards has	Finding ways to prepare healthful meals that kids will eat has been a challenge			Many kids are coming to school hungry so extra foods/snacks are prepared	Food service workers recognize the new requirements

made it difficult to prepare foods kids will eat; reports of food waste			improved food options
	District personnel have concerns about the foods that are being served	Kids don’t eat salad and vegetables	Some food service workers not aware of integration of Navajo cultural practices
	Use of posters in the cafeteria has helped kids to understand healthy nutrition		Operational issues not identified

Table 8. *Outcome Matrix: Major findings from Survey Questions*

Type of respondent	*Q1: Key Findings*	*Q2: Key Findings*	*Q3: Key Findings*	*Q4: Key Findings*	*Follow-up conversations*	*Researcher's Analysis & Reflections*
Principals	Recognizes more fresh fruits and vegetables and whole grains are offered to students	Difficult to change eating habits because students have already established their eating habits	Schools vary in cultural practices. Some are in the classroom, others set aside a day or a week to recognize	Schools should offer more fresh nutritious meals instead of heat up foods	See above	Nutritional quality has improved in some aspect but schools offer lower quality foods that are appealing to children
	Despite healthier foods offers, many kids are still choosing heat up foods; food waste of healthier foods a concern	Time constraints	One school incorporates the Navajo teachings in their curriculum	Schools have an important role in providing nutrition education to students, families and communities		Unclear as to why kids are wasting healthy foods
	Food service department is responsible for monitoring and ensuring standards are met	No problems or concerns identified by several principals				Some principals unaware of factors and processes involved in food services experience with the implementation

	of USDA requirements
Concerns about food waster of healthier snacks	Incorporation of Navajo cultural practices vary among schools

Open-ended questions #1 and #2. Grouped thematic findings to questions 1 and 2 were combined as participants answered both questions very similarly. These findings specifically addressed the study aim related to the experiences with implementation: 1) Describe barriers and facilitators encountered in the implementation of school nutrition policies and practices mandated by *Healthy Hunger Free Kids Act of 2010.* The emergent themes associated with the implementation under the categories of barriers and facilitators are discussed.

Barriers to implementation. Food service participants and principals offered different perspectives and opinions about their experiences with and perspectives on the latest nutrition mandates under the *Healthy Hunger Free Kids Act of 2010*. While a few barriers to implementation were mentioned, many of the participants also disclosed their concerns about the HHFKA.

District support. Although not expressed broadly by food service participants, a food service worker made a comment concerning the lack of district support and understanding about the nutrition requirements. This participant noted the district personnel have concerns about the foods we serve, particularly foods with lower sodium, saying, "They don't understand the requirements we have to meet." As for principals, there was no mention of any information related to support or lack of support at the district level. By not having, district-level support not only poses a concern, but it also raises a key question: How then are district level personnel informed of nutrition and other health-related guidelines?

Lack of familiarity with nutrition standards. Interestingly, several food service participants acknowledged they were not familiar at all with the NSLP nutrition

requirements. Whether these were new employees on the job or had not received NSLP training was not known.

Stringent nutrition standards. Regarding the nutrition requirements, some of the food service workers were frustrated with the nutrition standards, mainly because they thought the more stringent standards changed the way kids were eating. With the newer healthier standards, participants expressed that children were eating less/fewer of the foods they were served, mainly the more healthful items, because these were foods were not of their preference. One participant stated, "Students had mixed reactions to the newer healthier standards at first, but it has improved somewhat depending on what is served." Another participant added, "It's been a big adjustment for the students" and "Students and even parents have complained." Some of the specific complaints by students were in reference to the different taste in foods and smaller portion sizes. "These kids complained that the food has no taste. And they don't like the whole grains because it has no flavor and it's too dry." This was further illustrated with an example that when kids are served hamburgers or hot dogs with whole grain bread, they do not eat the bread, only the meat.

Also, under the new lunch requirements, school meal programs are required to offer a serving of fruit and a serving of vegetable daily including a specific vegetable subgroup weekly (dark green, orange, legumes), and students are required to select a fruit or vegetable as part of the reimbursable meal. Many of the food service workers indicated they see a lot of food waste, including fruits and vegetables. One respondent added, "When we are cleaning up after lunch, we find whole apples not eaten in the trash cans." One food service manager was visibly discontent with the overall HHFKA

nutrition requirements, stating HHFKA has made it difficult to work together on these issues. This manager specifically cited the new sodium requirements as another reason why children are wasting food. "A favorite meal the kids used to enjoy was chicken noodle soup and with the new requirements, there is little sodium in the soup, and the kids notice the change." Out of concern for more and more kids wasting food, the food service manager stated that he searched and found a new food vendor for their school, which has been a change in the positive direction for the kids and the overall school lunch program. A supervisor stated, "We still see some food waste. The key is to be creative in making meals that are tasteful for children to eat." These findings suggest that schools are meeting the updated nutrition guidelines, but it has come with a price by affecting how children eat their meals.

Portion sizes of meals especially with breakfast meals was another category of concern. Students and even some parents have complained about smaller portion sizes, especially with breakfast meals. A food service manager explained that under the new requirements, "Protein is no longer served with breakfast, so all kids are getting is toast with butter, fruit and milk and parents tell us we are starving the kids."

With regard to principals, they held both similar and distinct views from food service workers. A chief concern from two principals was regarding the nutritional quality of foods available to children. It was their view that the school lunches offered too many unhealthy breaded items, and as a result, these favored foods were chosen over healthy foods. One of these principals stated, "You still see a lot of heat-up foods served. It would be good to see more fresh foods made for these kids." Another distinct point of

view by a different principal was the belief that it was difficult to change the eating habits of children, because they have already developed their eating habits and preferences.

Similar to previous concerns brought forward about food waste, one principal was not only bothered by the amount of food waste seen with healthy foods, but was specifically concerned with the school's practice in not allowing children to take uneaten healthy foods with them outside the cafeteria. This principal further suggested a change in practice. "Children who don't finish their lunches and still have fruit left from their lunches should be allowed to take with them and eat later in the day as a snack." This would minimize food waste and boost good nutrition.

Reliance on food service department. Across all schools, nearly all principals relied heavily on their food service department and/or manager for ensuring that their school meal programs aligned with the USDA nutrition standards. One principal stated, "The food service department ensures we meet the nutrition requirements." Five out of six principals indicated there have been no issues in meeting the new requirements. Another principal commented, "The food service department operates very smooth and the food service manager ensures standards are followed." These findings demonstrate that the food service programs more or less operate independently with little to no involvement by principals or administrators.

Facilitators to implementation. As with barriers, there were not many specific facilitators to implementation identified by participants. However, there were many more statements regarding the benefits and positives observed and experienced with the nutrition mandates.

Staff training. An important factor in the implementation of nutrition standards is the training of food service personnel on the USDA meal requirements. One food service participant stated, "By understanding the requirements, we know which meals are reimbursable." A manager also added the staff, on occasion, attend training offered by the Arizona Department of Education." Additional trainings are held on the reservation, which makes accessibility more convenient.

Availability of healthy foods. Many of the food service workers felt their school lunch programs offered more healthy foods after implementation of the new NSLP nutrition requirements. The HHFKA called for updates to school nutrition standards including more fruits, vegetables and whole grains, and many of the respondents thought their school meal programs aligned with the required nutrition standards. As one participant reported, "Our kids are eating more whole grains and fruit." Another respondent stated, "Salad bars has given students the option eat more vegetables." Others stated, "It's been great seeing the children get the right foods." Another benefit that was mentioned by several food service workers was the display of more posters related to healthy nutrition and physical activity throughout the school including the cafeteria. One respondent stated, "It's been good. There are more posters on the wall where the students and staff see everyday"

From the principals' perspective, there were not as many comments or opinions about the availability of healthy foods compared to food service participants. In fact, only one principal took notice of healthier food options available to students under the new nutrition requirements, stating that some of the meal choices available to students included more fresh fruits, salads and whole grains. This same principal also indicated

there were restrictions in place that did not allow students to bring in homemade goods for class parties, only prepackaged items.

Open-ended question #3. As previously described, themes were developed from key findings presented in Table 5. The themes that emerged from question #3 were informative to one of the research aims: To assess whether and how schools have integrated or could integrate traditional Navajo practices in any part of the school food environment.

Traditional foods and lifestyle practices. Across the food service participants, there were mixed responses about whether traditional foods were served to students or not, and a few who had no knowledge of this possibility. On one end of the spectrum, the majority of the participants reported they did not serve or offer traditional foods. With food service programs managed by a separate food management company/vendor, participants explained they are restricted from serving foods outside of the menu requirements. According to one participant, "Before going with a food service management system, we used to be able to make some traditional foods for students. We can't do this anymore." Opposite of the majority stance, a smaller number of participants indicated there were occasions when traditional foods were served as part of designated school cultural days. One participant provided an example, saying "The school has grandparents that come to the classroom to teach about Navajo cultural ways including Navajo food." Another participant shared that there is one school that fully incorporates Navajo teaching where staff do their best to speak Navajo to kids throughout the day. Other cultural practices occurring in the schools involve school gardens. Although not widely mentioned by food service staff, one participant recognized the importance of

having a school garden and its role in teaching children about planting and growing fresh vegetables.

Comparatively, principals echoed similar statements regarding inclusion of various types of Navajo cultural activities, including traditional food demonstrations. One principal communicated the extent to which one school engages students in traditional food demonstrations, which includes sheep butchering, planting corn and squash, harvesting and even making 'steam corn' (cooked in the ground). Other principals thought the schools could offer more cultural foods.

Classroom instruction. Contrary to traditional food practices, Navajo culture teaching in the classroom setting was a commonly reported practice in most schools. Principals stated that they have classes dedicated to teaching Dine' language and culture. One principal indicated their Dine' Language teacher addresses health practices that Navajo people once lived by. This same principal also stated, "We have a committee that hosts a cultural night for the community where a presenter provides more in-depth culture information to families." Consistent with principal statements, one food service participant also mentioned that elders or grandparents from the community were coming into the classrooms for sharing of traditional knowledge. Many other food service workers were not aware or knowledgeable of cultural immersion activities in their schools. Integration of fundamental Navajo cultural concepts including traditional foods could potentially have significant bearing on promoting health and wellbeing in Navajo children.

It was also interesting how some schools served traditional foods while others have not done so because of food service management restrictions, and with all schools managed by a food service company, how is it some schools are able to do this and others are not?

Open-ended question #4. The findings from this question were not directly related to any one of the study aims, but instead were intended to get an overall sense of how schools saw their role in the health of their students. A major theme that emerged was an opportunity for strengthening health promotion strategies.

Opportunities for strengthening health promotion strategies. Most food service workers understood the crucial role schools have in the promotion of health in students, with one participant who rightly pointed out that since children are in school most of the day, schools are certainly suitable for this initiative. Another participant acknowledged the obesity problem on the reservation and suggested that school personnel have a responsibility to implement wellness policies. Many other participants shared similar perspectives and added that schools could offer more opportunities for health promotion, such as more physical activity opportunities, a wider selection of healthful foods, and more health education in the classroom.

In general, principals believed their schools have an important role in the promotion of health through education, as well as by offering a variety of fresh, nutritious meals. One principal raised a key point that education on healthy lifestyle needed to involve the parents, as well as the children.

Observational Findings

This section presents the results from on-site observations that were conducted in two schools, one K-8 school and one 4-6 school on two separate days. Observational

findings from firsthand experience in the school environment specifically addressed two of the study aims- assess school-level nutrition policies and practices. Observational findings were used to further validate or enhance findings obtained from previous sources described--survey results including responses to open-ended questions. On-site observations were mainly conducted in the cafeteria during the lunch period to record all foods and beverages offered by food services, as well as food and beverage sources outside the cafeteria.

Table 9 *School Observation Findings*

School Type	*School enrollment #*	*# of vending*	*Type of vending: Machine Food Beverage*	*A la carte*	*School stores*	*Other sources*
K-8	158	0	N/A	No	No	Fundraising
4-6	419	1	Beverage[1]	Yes	No	N/A

[1]Water and juice vending machine

Observation at the K-8 school began about 30 minutes before the first lunch period. All foods and beverages were noted/recorded by the researcher. Lunch preparation was underway with the menu consisting of spaghetti with meat sauce (whole grain), whole-grain bread sticks, canned peaches, steamed zucchini, and variety of milk (non-fat chocolate milk and non-fat white milk). There were no vending machines, school stores or snack bars noted, and no *a lá carte* foods offered. Aside from these cafeteria findings, in talking with a school employee, the researcher was shown their school and community calendar on display on the bulletin board at the main entrance. Listed on the school calendar were an array of after school activities including sport

activities and club fundraisers. The researcher learned that these events are sources where foods such as soda pop, chips, candy, pickles, etc. were sold.

The second school (4-6 grades) was a much larger school with over 400 students. A beverage vending machine containing water and juice was located at the main entrance. As for the foods offered, there were many more food items offered to students, including *a la carte* food items. Choices available to students were turkey and cheese subs, pepperoni and jalapeno pizza cheeseburger, orange chicken w/ rice beef and bean burritos, and French fries. There were no school stores or other sources noted, although the researcher was told that the school used to have a school store, but it was removed because students were taking these snacks into the classroom.

Comparison and Synthesis of *All* Quantitative and Qualitative Findings

The section directly compares and synthesizes the three sets of findings about the school food environment: categorical data from surveys, survey responses to open-ended questions and observational data (Creswell & Plano Clark, 2011). This integration and synthesis helps clarify overall patterns in the research completed.

With regard to health-related policies, there were differences in principals' knowledge and familiarity with their school's Wellness policy and the current USDA nutrition mandates. This is interesting since these are policies are closely linked through their participation in the NSLP. Further, even though most principals were familiar with their school's Wellness policy, most of these schools did not have an active advisory or wellness council. At the same time, most of these schools also did not make changes either to ensure their school practices aligned with standards, which was not surprising considering fewer principals were familiar with the requirements. Finally, fewer schools

also did not have policies in place for foods and beverages sold on campus including foods/snacks made available to students in the classroom (i.e., parties and given as incentives/rewards). These findings were somewhat consistent with responses from the open-ended questions. Responses indicated principals fully relied on their food service department for ensuring adherence to nutrition requirements. It was also interesting for principals to note there were no issues in meeting nutrition requirements and everything with the food service department ran smoothly when most had indicated they were not familiar with standards. Also, based on observational data, it was apparent in one of the schools, fundraising is an important school function that is occurring during and after school hours where foods/snacks that do not meet the nutrition standards are available to buy on this school campus. Overall, these findings show there is much room for strengthening policies and taking action on these policies by schools.

With regard to school meal practices, there were consistencies among data obtained from all sources. Survey categorical data revealed *healthier* foods (i.e., healthier pizza, fresh fruit, salad bar and whole grains) were available in all schools, while most schools (4 out of 6 schools) also offered unhealthier foods such as French fries/tater tots and regular pizza. Also, fewer schools (2 out of 6 schools) offered *unhealthier* snack items such as cookies, cakes, salty snacks and regular ice cream. As for beverages, fewer schools offered the *healthier* non-fat flavored and unflavored milks, while more schools offered the *unhealthier* milk (whole or 2% milk). Data from open-ended questions were consistent with most of these findings. The majority of food service workers validated their lunches offer more healthy foods such as whole grains, fruits and vegetables. At the same time, many participants reported problems with

wasting of healthy foods. Other consistencies and convergences were reports from principals about the lower quality lunches, specifically heat up foods. Lastly, observational data further validated the presence of healthy and unhealthy foods available in schools.

Other potential school-related practices such as schools having a school garden varied. A favorable example was provided by a food service participant, who explained that students at a particular school were involved in the planting and harvesting of traditional foods corn and squash.

Conclusion

This chapter presented results from multiple data sources that primarily examined school food policies and practices in six schools located on one of the largest American Indian reservations. Other areas studied were barriers and facilitators encountered with implementation of NSLP, as well as the extent of integration of Navajo cultural practices. Importantly, this descriptive study presented results that no study has yet investigated, specifically examining how schools located within the Navajo reservation communities have responded to the requirements set forth by the *Healthy Hunger Free Kids Act of 2010.* The study sample included principals and food service personnel of elementary and middle schools. Across the data sets, there were findings that converged and supported one another, while other findings differed across participants.

Some of the most relevant findings pertaining to schools' policies were findings associated with knowledge of health-related policy and implementation of policy. Overall, findings suggested that schools could have a stronger role in policy familiarity

than is currently obvious, including a role in shaping policy development and implementation of policies that support and promote a healthful school environment.

With regard to school food practices, findings from this study resemble other national school food environment results compared to most schools that offer school meals consistent with the updated nutrition standards. At the same time, some schools also offer *a lá carte* foods that are of lower quality and do not meet the nutrition guidelines. These findings raise concerns about how students have responded to these changes. On one hand, children have opted not to eat some of the healthy foods they are served. On the other hand, if lower quality foods are available, children have often chosen these preferred foods over different-tasting healthy foods. One of the food service managers made a crucial point stating, "The key is to be creative in making meals that are tasteful for children to eat." This statement is a key element that schools must consider as they continue to enhance and improve the school food environment.

In light of these findings, it was encouraging that with many of these schools, they were already incorporating aspects of traditional Navajo teachings and practices into the school environment. The rich and fundamental teachings of the Navajo Philosophy of Life provide a cultural blueprint to attaining and maintain health and wellness. Schools are in an ideal position to find ways to further strengthen and integrate Navajo culture teachings and practices as part of efforts to promote a healthy school environment for Navajo children. Chapter 5 provides further discussion of these results including conclusions, implications for schools, communities, Navajo tribe, and recommendations for future research.

Chapter 5

Summary, Conclusions and Recommendations

Chapter five consists of a brief study overview, a summary of findings framed by the SEM model, study limitations, suggestions for future research and policy implications, summary/conclusions, and recommendations. Reflections on the complex interface between the research and *Hozho'* are also addressed.

Overview of study

There are vast issues and adversities common to many American Indian (AI) communities, including Navajo communities. The concerns with childhood overweight and obesity comprise a leading example. With high obesity rates in AI children that continue to challenge AI communities, and with no effective and sustainable solutions readily apparent, the search for answers and resolutions is much more alarming. Furthermore, while a number of prevention and treatment interventions have been proposed and implemented, favorable effects and outcomes remain elusive.

From the perspective of traditional Navajo elders, the solution is simple. One of the elders poignantly stated, "Our children and grandchildren must return home." This statement was about re-establishing their cultural identity and roots. In today's modern technological society, there is a growing worry that youths may not be culturally connected to family, communities, and ultimately traditional teachings. The majority of youth today do not speak or understand their Dine' language, are unable to communicate with their grandparents, are uncertain of the clan identities of their mother, father, maternal and paternal grandparents, and even do not practice the sacred offering of white corn meal to the Holy People at early dawn. These are the basic teachings embedded in

the Navajo concept of *Hozho*', a lifeway that teaches healthy living and promotes health and wellness.

How can *Hozho'* be restored? One potential solution could be within schools, especially since schools have been deemed an ideal environment for childhood obesity prevention efforts because of their important role in providing nutrition (Welker, Lott & Story, 2016). Further, studies have shown that the school food environment influences what and how much children would eat, as well as their weight and BMI outcomes (Briefel et al., 2009b). In addition, concerns have been raised about children accessing unhealthful foods at schools, prompting an interest to learn more about the schools that serve Navajo children. How are schools contributing to the diets of Navajo children?

To no surprise, there is no *current* information in the literature about how schools are contributing to the diets and weight outcomes of Navajo children. In 2010, the *Healthy Hunger Free Kids Act* mandated comprehensive changes for all schools participating in the National School Lunch Program (NSLP). These changes were intended to not only improve the nutritional quality of school meals *offered*, but also to influence foods and beverages *sold* outside the school meal program, often referred to as 'competitive foods'. This fact underlies the main purpose of the descriptive study, to describe and understand *all* the food and beverage sources offered and available, including the nutrition policies in place since these changes have been implemented. The research questions that guided this study were:

1) What are the current nutrition policies and practices in place for elementary and middle schools on the Navajo reservation?

2) What are barriers and facilitators that schools experience in the implementation of the latest school health policies and standards including USDA nutrition standards?
3) How are schools integrating and/or promoting Navajo cultural beliefs and practices in school health policies and programs?

To answer the above research questions, a descriptive study design that used both quantitative and qualitative methodologies was employed—specifically, a survey with the addition of open-ended questions, along with on-site observations of the school food environment. Principals contributed information pertaining to school-wide health and nutrition practices and policies, and food service personnel provided data about foods and beverages *offered* at lunch. *All* participants were then asked open-ended questions that were directly relevant to the research questions about the incorporation of Navajo cultural practices and schools' experiences with implementation of the current nutrition standards. For analytic methods, descriptive statistics were generated for the types of foods and beverages offered, and a two-step matrix analysis approach was generated for responses to open-ended questions. For observational analysis, frequency counts of food and beverage sources (i.e., vending machines, school stores/snack bar, *a la carte*), and detailed descriptions of lunch meals were completed.

Summary of Findings

The findings reported from this study have not been documented in previous studies. Therefore, this is one of the first to report baseline findings about school food and policy environment after implementation of revised USDA nutrition requirements in rural schools on the Navajo reservation. As noted earlier, the socio-ecological model

(SEM) provided a guiding framework to analyze and understand the various factors that influenced students' food choices in a school setting and ultimately health outcomes such as overweight and obesity. A summary of these findings is presented and organized by the SEM's layers of influence: *Macro-level*, *community*, *school organization*, *interpersonal*, and *student intrapersonal*. This is followed by an analysis of relevance, limitations and strengths of the research findings at each SEM level, with researcher insights and ideas for enhancement at each level. Also, as appropriate, each ecological level included researcher's reflections of the relevance and applicability of the Navajo concept of *Hozho'*.

Macro-level of influence. Although this study did not yield specific macro level findings, the macro level is essential for describing the contextual background of current and historical (macro) level policies and their influences on the health and wellbeing of the Navajo (Dine') people. A distinguishing characteristic of the socio-ecological model (SEM), particularly at the macro level, is that it clearly defines this level as corresponding to a broader level *policy.* In most cases these are overarching federal policies, rules, and regulations that funnel down to 'lower' ecological levels in a top-down approach. In a top-down approach, authoritative decisions are centrally located by actors who seek to produce desired outcomes (Matland, 1995, pp. 146). One important downfall with this approach is that often there is no consideration for the local actors or the local contexts of people who may be influenced by such policies. In reference to this study, the federal authority and regulations set forth by the *Healthy Hunger Free Kids Act of 2010* (HHFKA) represents the current macro level policy intended to improve student nutrition. The goals of the HHFKA can be appreciated, but it became clear in the study

that issues arose in response to the new *Healthy Hunger Free Kids Act of 2010* (HHFKA) nutrition requirements. These issues are discussed in the upcoming 'lower ecological' sections. To some extent, it can be argued that the macro level nutrition policy did not work to the full extent intended for many school districts across the U.S., including schools serving Navajo children, which calls for action by the lower ecological levels in response.

An equally if not a more important contextual background factor is the role and influence of tribal level policy, which brings attention to a limitation of the SEM, for it does not clearly define an obvious place for dual policies. For the purpose and context of this study, it would be essential to include the Navajo Nation governance structure and policies at the macro level policy because of its inherent role and responsibility to advocate politically for its citizens (Navajo Nation Council, 2005). Integral to the Navajo context is the historical significance of an 1863 federal policy that launched a military campaign against the Navajo people that uprooted and stripped them of their way of being. They would never be the same after this brutal round up and forced removal of over 7,000 Navajos to Fort Sumner, located on the Bosque Redondo reservation (Austin, 2009). For the benefit and preservation of future generations, efforts to rebuild and restore required the people to completely transform a way of life our ancestors would have never envisioned by way of a Westernized governmental system (Lee, 2008).

Adding to the Navajo Nation contextual background are key policies that moved tribal nations, including the Navajo Nation, in the direction toward self-determination. As a federal policy, the Indian Self-Determination and Educational Assistance Act of 1975 marked the emergence of tribal nations to take control of their education and health

care systems (Thierry, Brenneman, Rhoades & Chilton, 2009). Then as recently as 2005, representing a macro level policy at the Navajo Nation government level, the *Navajo Sovereignty in Education Act of 2005* (NSEA) was enacted. Its main purpose was to exercise the Navajo Nation's right as a sovereign entity to assume full control of all schools by granting this authority to a newly established Navajo Nation Board of Education that would be responsible for overseeing the operations of all schools serving the Navajo Nation, including updating of education standards and teaching of Navajo language and culture in schools (Navajo Nation Council, 2005). Clearly, this Navajo Nation policy greatly impacts the educational systems, including Navajo language and culture. *What is not clear is the direction and guidance for child health, specifically the role of school health programs in education systems.* Considering the alarming child health trends in AI communities, could child health provisions be further strengthened, delineating the specific program(s) that would have the responsibility for oversight and monitoring of schools? Remarkably, as a sovereign nation, the Navajo Nation has declared a position of self-determination, assuming the responsibility, authority and accountability for all educational systems' policies and practices, and it seems essential these same provisions be applied to school health policies and practices.

A final contextual segment to add relates to the 'top-down' administering of the federal nutrition policy, with a process that involves interactions between states and schools, and excludes the tribal nation government. In the state of Arizona, the NSLP is administered by the Arizona Department of Education (ADE), where schools serving the Navajo Nation apply to the state for reimbursement of federal subsidies. In some respect, this potentially presents concerns for a tribal entity who may not be aware of the

processes or the outcomes of school meal program reviews by the ADE for compliance. As a Navajo Nation, it would be invaluable to create and maintain a repository of how school meal programs throughout the Navajo Nation are performing and complying with federal nutrition standards. As cited in Lee (2008) authored by Carol Perry and Patricia Anne Davis is a description of what Dine' sovereignty is and should be about:

> The tribal governance standards of the past are not obsolete. They were focused on maintaining the health and wellness of every member of the community. Safety, health, wellness and protection were facilitated, not by dominance, confrontation, conflict and coercion, but by the ethics, communication, cooperation and reverence for the creator and the laws of nature. To continue to preserve our cultural strengths in self-governance, we must renew our cultural teaching and restructure our tribal government according to the spiritual values of the Holy People and our ancestors because our children deserve balanced living, harmony in communication, peace in family, beauty in environment and joy with our hearts, homes, and communities (Lee, 2008, p. 1).

Community level. The community level of the SEM addresses relationships among organizations, institutions and informal networks within defined boundaries (McLeroy et al., 1988). Townsend and Foster's (2011) definition considers the relationships between schools and other organizations and institutions. For purposes of this study, community refers to the relationship between schools and school boards as the governing entity, and the broader geographic community within which schools are nested. In this aspect, the community level influences are particularly salient because they correspond to the local school leadership and policymaking entity within the

communities. Similar to macro level, specific data corresponding to community level were not collected. However, given the role of school boards and their link in the education governance structure, there are implications for certain findings collected from study participants that are discussed here. First, it is important to note the context regarding school boards, as outlined in the *Navajo Sovereignty Education Act of 2005:* local school boards are granted the authority to develop and implement local education policies, standards and priorities (Navajo Nation Council, 2005). In addition to local school boards, a governing board entity that is representative of *all* school boards on Navajo Nation known as the Dine' Bi Olta School Board Association was established and charged with having the responsibility for establishing policy and overseeing the operations of local schools. Local control of schools at the community level is supported and encouraged by the Navajo Nation.

Regarding this study, school food practices of interest were the schools' low participation rate in USDA programs such as Farm-to-School (FTS) and Fresh Fruit and Vegetable Program programs, and the finding that only half the schools (3 out of 6) have a school garden. Each of these is an additional opportunity for schools to enhance their food environments by increasing access to fresh produce, fruits and vegetables. Why more schools are not participating in farm-to-school (FTS) programs is essential to explore and understand, especially at a time there is a movement and calling for a return to Dine' heritage, culture and customs as a way to rid our society of the health and social issues that plague our people and communities. The traditional lifestyle of farming and harvesting was once a way of life that kept Navajo people healthy and strong through cultivating of sacred traditional foods. These were practices that centered on *Hozho'*.

Farm-to-School (FTS) programs represent a relatively new concept that mirrors these aspects of Dine' lifeways by which that our ancestors once lived. In the present day FTS can be a strategy by which students are reintroduced to cultural values and teachings about traditional foods and the laborious work involved in farming and harvesting, while promoting health and nutrition, and supporting local economic development (Joshi, Azuma & Feenstra, 2008; National Farm to School Network, 2016). A few FTS programs currently exist in Native communities. In 2013-2015, there were a total of 14 participating schools in Native communities with two schools on the Navajo reservation, one in Arizona and one in New Mexico (National Farm to School Network, 2016). Lessons can be learned from the few schools on Navajo that have participated in FTS program and can also serve as future landmark examples for schools that are interested. One example is STAR school's *Navajo and Hopi Farm-to-School Project* funded by First Nations Development Institute in 2012 (Newell, 2013).

Strategies that build community capacity, collaboration and leadership among various community level stakeholders, including local school boards, tribal government and other community resources for supporting local agriculture, ultimately increase participation in FTS programs on Navajo and are essential. Encouraging and supporting more schools to incorporate traditional Navajo foods (corn, squash, and beans), and to provide education on Navajo culture, language and history including teaching students about Dine' food traditions will give rise to more healthy school food environments.

School organization level. The school organizational level of the SEM, as described by Townsend and Foster (2011), includes policies, informal structures and rules that may constrain or promote health. Since children spend at least 6-8 hours a day

at school, where schools have the established infrastructure for education, schools are not only a convenient setting, but also a setting with policies and structures that can have a substantial influence on nutrition behaviors and health outcomes. Unlike the other SEM levels, this level corresponds to current data on school food policies and practices, implementation experiences with nutrition requirements, and descriptions of Navajo cultural practices that were collected from school principals and food service staff. In a major way, this level is key to addressing all of this study's research questions.

School food policies and practices. Analysis of school food policies and practices was the primary focus area for this study. While this study determined that most school lunch programs were serving healthful foods in accordance to the latest NSLP requirements, there were also some discoveries that were less encouraging and even worrisome. For instance, foods of low nutritional quality (i.e., regular pizza, French fries/tater tots, cookies, salty snacks) were offered in some cafeterias through *a la carte* food lines. Respondents expressed concerns with how these unhealthful foods were selected by students over healthy foods when available. Although this finding represents only a small sample of schools on the Navajo reservation, it is significant considering the role of specific dietary factors known to contribute to weight-related issues such as obesity. However, it is also important to note that not all schools offered *a la carte* food options; one of the observed schools, a K-8 school, served only the reimbursable school meal to all students including older students (6-8th), eliminating other food options. In contrast to this school, the second observed school did offer an array of *a la carte* food options that were available to all students in grades 4th-8th grades. This demonstrates two different food environments, one that offers fewer unhealthful choices and the other more

unhealthful choices. As both types of food environments bear significantly on student nutrition, deeper understanding of these contexts is critical, with special attention to how school meal programs are deciding what food options they make available to students.

Consistent with literature, another area of concern highlighted by the current data were reports of students' waste of food (Niaki, Moore, Chen & Cullen, 2017; Smith & Cunningham-Sabo, 2013). A pair of respondents commented on how disturbing it was to see fresh fruits and vegetables disposed of and discarded. Compounding this issue with food waste were student complaints about foods tasting different. A food service manager attributed this change in food palatability to the new lower sodium NSLP requirement. As this same manager keenly pointed out, the key is to be creative in making healthy foods that are tasteful for children to eat, but this may even become a greater challenge with two more phases of sodium reductions slated for school year (SY) 2017-2018, and the final target timeline at the start of SY 2022-2023 (Nutrition Standards in National School Lunch Program, 2012). Although these concerns about plate waste are mainly subjective, they provide some insight about an area where there are no recorded data on diet intake in Navajo students. At the same time, it suggests an area where more research is needed, using more objective measurements to examine plate waste.

Convincing young children to eat more nutritious foods like apples, carrots or whole grain breads is not an easy task, especially when competing foods such as pizza and French fries are available choices. One major consideration is for school food programs to engage students in taste testing of foods and elicit their input and ideas about what foods they liked the best. Among the samples schools surveyed, only one school

described involving students in taste tests and cooking demonstrations. Across the nation, more and more school food service programs are conducting taste test demonstrations with students as a strategy to introduce new and different healthy foods before they are offered on the school menu. Along with taste testing, students are learning about where the food comes from and how it is grown (Action for Healthy Kids, n.d.; Vermont Farm to School, 2010). Getting more school food service programs on the Navajo reservation to incorporate taste testing food strategies with students could be a vital link, especially when new healthy foods are being introduced. Many students may find tasting of foods fascinating, and the fact they are taking part in deciding food choices in the cafeteria might be an incentive for them to be more open to trying and accepting healthier foods.

It is noteworthy that advocates are questioning the need for school lunch programs to implement further sodium reduction targets, citing evidence that supporting further sodium reduction is inconclusive. Additionally, some evidence suggests that reducing sodium intake mainly targets issues with blood pressure issues in children rather than with weight issues (American Academy of Pediatrics, 2015; School Nutrition Association, 2015). As long as the targeted sodium requirements remain, school lunch programs may face greater opposition by students, perhaps impacting future participation in school lunch programs, as foods may become even less palatable to students.

Aside from the lunchroom environment practices, this study highlighted insights on schools' adherence to certain federal wellness policy requirements and its influence on other aspects of the school environment that promote or inhibit healthy eating. On a positive note, only one of schools had a beverage vending machine with water and juice

available to students. This finding is consistent with Nanney, Davis and Kubik (2013), who found that schools with the highest percentages of minority and low-income students were more likely to not have vending machines than schools with low-medium minority enrollment and low-medium income students. Conversely, most schools did not have an active wellness council; few schools had policies in place for fundraising, offered nutrition education in the classroom, and allowed classroom practices where teachers rewarded good behavior with food and snacks such as candy or used candy in teaching a math assignment. Further, respondents shared that students commonly brought in outside foods such as hot Cheetos, and at one school, an active student council sold unhealthy foods/snacks during school hours for fundraising. These findings are consistent with Caparosa et al. (2013) where a major source of unhealthy foods and beverages are those brought from home by teachers, staff, parents and students. Interestingly, these same authors note that research on the relationship between snacks and weight outcomes is inconclusive and is an area needing more study. Regardless, these findings represent a source of unhealthy foods in a school environment that requires attention, and at a time when literature consistently shows that obesity rates in American Indian children soar beyond any other groups in the US. This finding should be reason enough to employ every measure possible to eliminate or reduce obesogenic risk factors including the offering of poor food options in schools.

Significantly, a report of nationwide evaluation of school districts' wellness policies in comparison to this study's findings reveals some consistencies. The most recent data reported that for school year 2013-2014, 95% of school districts adopted a wellness policy. However, the inclusion of the required policy components varied with

the domains of nutrition education and physical activity. Focus on school meals was more common, whereas competitive food guidelines remained the least incorporated component. Also, the report concluded wellness policies varied in addressing a number of components (comprehensiveness), but could easily be strengthened (Piekarz et al., 2016). Furthermore, wellness policies by school district size, region, and racial/ethnic composition of the schools varied with policies in majority Hispanic districts that were significantly more comprehensive and stronger than majority White districts. Policies in small school districts were significantly less comprehensive and weaker than large school districts (Piekarz et al., 2016). This national report underscores gaps in data and implementation that need attention. For instance, periodic monitoring and reporting of data that are exclusive to tribal nations is vital for many reasons. For one, by having benchmark data, tribes would be able to better monitor their progress and determine the extent their schools are meeting school health-related standards, also perhaps in comparison to national data.

Implementation experiences. A remaining area to address focuses on the schools' experiences with the implementation of nutrition requirements. When asked about what things helped or hindered in using the nutrition requirements, a respondent conveyed the lack of district level support as a barrier. Consistent with this finding, Tabak and Moreland-Russell (2015) found that one of the barriers food service directors encountered was the lack of understanding about the new NSLP guidelines among parents, teachers and district personnel, making the implementation process challenging. Adding to the concerns about district level support, another potential barrier relates to the role of principals and their familiarity with policies. Notably, most principals were

familiar with their school's wellness policies, but were not familiar with the latest nutrition standards. Although understanding the reasons for the differences in knowledge between wellness policies and nutrition standards is beyond the scope of this descriptive study, it is disconcerting because this could very well be an important influential factor in whether and how health related policies are implemented.

Accordingly, it is important to emphasize how crucial effective leadership at the school level could be in the context of this study. In the realm of educational research, the Wallace Foundation (2013) asserts that the job of the principal is to "create the conditions under which that can occur" (p. 4). In essence, action in schools begins with the principals taking the lead in what needs to be done and how it needs to be done. Langille and Rogers (2010) also suggest that essential to the success of policy implementation at an organizational/ school level is the influence of a champion, who can be a principal or others and can stimulate a culture that prioritizes health. For schools serving the Navajo Nation, principals are not only vital for setting a climate for academic success, but also for promoting a culture that prioritizes health, creates and enforces policy for health promotion, and models healthy behaviors for all constituents-- students, faculty, staff and parents. Champions are needed at all levels, including the higher levels of influence such as the district administration, school board, and even the broader community. All are needed for their interaction, support and direction of health promotion initiatives. Tabak and Moreland-Russell (2015) found that school districts where leadership displayed a commitment and passion to child nutrition and health were highly successful with implementation of health and nutrition-related policy.

The Navajo concept of *Hozho*' is significant and has pertinence in the implementation process described above. A determinant or component of *Hozho'* is the connection or relationship established between individuals. Dine' culture teaches and holds in high regard the value of positive relationships, an attribute known as *k'e* (Kahn-John, 2010). Austin's (2009) exquisite account of *k'e* can be appreciated, stressing the importance of respect, compassion and cooperation, and informing individuals of their duties and obligations to their community, all so that people live in *Hozho'*. Collectively as individuals and groups, when planning and taking action, and carrying out duties and responsibilities for the benefit of child health, no matter the setting or context, the customs of *k'e* are the foundation for establishing and maintaining a school environment based on *Hozho'*.

Navajo culture practices. A final and important area to highlight within the school organization level is how schools are integrating aspects of Navajo culture and practices. Despite the variations in cultural activities from school to school and the uncertainty about the structure or frequency of these activities, it is encouraging that schools are making this effort to reestablish youth with their cultural ways and practices. Another interesting finding directly relevant to student nutrition was this: when asked if their schools served traditional foods, the majority of respondents indicated their school lunch program is managed by an external food service company that does not allow preparing and serving of traditional foods. However, a few respondents reported that they have served blue corn mush, a traditional favorite.

From traditional Navajo thinking, the principles of *Hozho*' provide a means for living a healthy lifestyle and environment. Kahn-John (2010) emphasized that

establishing and maintaining a harmonious 'relationship' between people and their environment is the most significant attribute of *Hozho'*. In essence, a school environment that negates healthy behaviors signifies discord between individuals and their environment, and subsequently can lead to problems. From a nutrition and health promotion standpoint, more strategies that align with the teachings of *Hozho'* are needed in schools. For example, policies that encourage and shape a healthy food environment including the integration of traditional foods are essential. Respondents in this study said that their schools contract with a food service management company to manage their school food operations. For schools or school districts looking to introduce or expand traditional foods as part of the reimbursable school lunch program, an effort is needed to effectively negotiate and incorporate this cultural piece. In July 2015, the US Department of Agriculture (USDA, 2015a) released a memorandum regarding child nutrition programs and traditional foods, clarifying that traditional foods in Native communities are encouraged and that certain foods may count towards a reimbursable meal. A few examples of reimbursable traditional foods include blue corn mush, native whole blue corn kernels, native white corn and mutton. For traditional foods that are not reimbursable, foods must still be accounted for when assessing for compliance in meeting dietary specifications (2015a). Given these allowances of certain traditional foods for reimbursement by USDA, an opportunity exists for food service management companies to explore the serving of traditional foods as part of their meal offerings.

Traditional Dine' teachings emphasize a spiritual connection with foods. Corn, beans, and squash are sacred foods created from Mother Earth and the environment and are essential for maintaining health (Benally, 1994). Not all Navajo youth today have the

understanding and respect for the role traditional foods have on their health, including all other foods for that matter. The simple act of offering a prayer before partaking of a meal or the motioning of 'blessing oneself' with the food while thinking and uttering this phrase 'with this food I will be stronger, be kind to me so that I have good health' is a teaching not known or practiced among many youth today. Milburn (2004) acknowledged that indigenous nutrition can be the solution to modern health problems and by returning to traditional food ways that kept our ancestors healthy, can also restore health in today's indigenous youth. The challenge is for schools to offer a more culturally-integrated approach to nutrition, one that respects and promotes traditional food practices, while also introducing contemporary healthy foods that students would accept and enjoy.

Interpersonal level. The interpersonal level pertains to an individual's relationships with peers, teachers, staff and family, and the broader social environment, which can then influence health behaviors (Townsend & Foster, 2011). The mediators of social support, social norms, and role modeling of behaviors are particularly important because schools are an established context in which learning occurs. As with other SEM levels, this study did not produce data corresponding to interpersonal level. However, the findings that could be considered relevant to interpersonal level were statements collected from several food service staff members about their encounters and experiences in dealing with students' negative and positive reactions to the new foods that were introduced, which persists among students. This illustrates a key interaction for food service personnel working on the front lines of preparing and serving meals to influence student food choices. Given this integral role for food service personnel, it seems crucial

to provide the support and training on how food services staff respond, inform, and encourage students to make better food choices. In their study examining food service workers' experiences in implementing the NSLP, Tabak and Moreland-Russell (2015) called attention to food service staff who had the responsibility of menu planning and meal preparation, but who were also tasked with removing or reformulating food menu options that are acceptable to students. Results from this study suggest that food service staff can also role model healthy nutrition behavior and provide positive reinforcement through their daily interactions and contact with students.

An important contextual factor that plays a key if unspoken role in students' food choices are their home-life experiences. Many, if not all, students in this study were from lower income households and likely depended on the school meals as a vital source of food/nutrition. Given this background, food service workers may be more positively received, looked to as role models, and even through the cultural teaching of *k'e'*, they may be viewed as grandparents or parent figures, clan relative figures. Embracing this role, food service workers can be a powerful influence on students' food choices. The role of the food service worker takes on a more powerful meaning when considered with a food service worker's statement about one school's effort to promote and teach Dine' language by conversing with students only in Dine' language while serving meals and engaging grandparents in the classroom setting. These examples illustrate the various and distinct interactions among students and food service staff, teachers, and elders/ grandparents. As previously discussed, the teachings of Navajo kinship have relevance in the school environment. Through the teachings of *k'e'*, students are connected to family, clan relatives, and people in general (Austin, 2009).

Although the extent of elder involvement in schools is unknown, it is an area that deserves a great deal of attention because of the important role elders play in teaching traditional knowledge, as they are the 'teachers' in the homes and family settings. In the Navajo culture, sharing of traditional knowledge and teachings through storytelling or in oral form is a customary practice (Benally, 1994), and elders can teach the ways and values for proper learning and living. A need exists to help young Navajo students learn about, understand and appreciate/respect their elders, listening to what they have to say, and by all means knowing the proper etiquette for addressing others and speaking to others (Austin, 2009; Benally, 1994).

Intrapersonal (student) level. From a socio-ecological perspective, the intrapersonal level represents the complex interplay of intrinsic attributes that reside within an individual (student) including the personal dimensions of biomedical, attitudinal, and behavioral factors that influence health and health-related behaviors (Townsend & Foster, 2011; Willows et al., 2012). These personal characteristics offer a valid explanation from a Westernized perspective, but from a Navajo cultural perspective, they do not tell the whole story because the true nature of these personal dimensions is rooted in Navajo identity. The teachings of Navajo identity emphasize who we are, why we exist, and what our ultimate goal in life is (Benally, 1987).

There was a time when the majority of Navajo youth knew their cultural identity, were able to speak their language, identify their clan heritage, and properly greet their family members, clan relatives, nature and the environment. They even knew the importance of their individual duties and responsibilities and their contribution to the family unit, relatives and Navajo society. As young as they were, children also

understood and practiced the value of discipline. Benally (1987) stressed that the most valuable lesson a child is taught is discipline of the mind, body and spirit. According to Navajo teachings, everything begins with a thought and intention (Kahn-John, 2010). The ancient teachings to rise early, overcome laziness, run at early dawn were practices that required discipline and strength. It was understood that a person would be rewarded with many benefits, including physical strength and endurance, mental, emotional and spiritual benefits for following this path (Benally, 1994).

As explained in previous sections, the concern surrounding this study is that many Navajo youth lacked cultural knowledge, and without this knowledge, they are not equipped and prepared to follow and live a clear understanding of their path in life, surrendering themselves to physical, intellectual, emotional and spiritual strife (Kahn-John, 2010). Revitalizing these traditions is direly needed. In today's society, this is difficult for youth to understand, let alone practice. But the researcher contends that it can be done. Youth are very capable of practicing the ways for proper living, having the confidence to move about and being physically active, and making good food choices, which are all standards of living that support the teachings of *Hozho*'. Promoting Navajo identity is the key to health and wellness in Navajo children, and they represent the future of the Navajo people (Kahn-John, 2010).

Limitations of the Study

For a descriptive study that employed a survey, open-ended questions and observational methodologies, there are important limitations to acknowledge that potentially impact the results of the study. One major limitation was a small sample size of N=6 schools, including the units of analysis, the principals (n=6) and food service

workers (*n*=14) who took part in the study. A second limitation concerned the study's geographic location in rural, remote areas on the Navajo Nation, and participating schools were located in communities that were an average of 70-90 miles apart. Due to the geographic distance between communities, the sample of schools selected were schools confined to a particular region on the Navajo Nation that was accessible to the researcher. Attempts to increase sample size would have required more resources and time than was feasible for a dissertation. These limitations clearly restrict generalizing results to other populations. However, this study was not intended to make generalizations or look for any specific relationships between variables. The sole purpose of this study was to explore, learn and describe what is happening in the schools since the *Healthy Hunger Free Kids Act of 2010*, describe how schools contributing to the diets of Navajo students, what policies are in place that support or deter healthy eating behaviors, and to accurately articulate the findings. With no baseline or previous research to follow except for national studies, a small sample size was appropriate (Creswell & Plano Clark, 2011). Furthermore, having a small sample size allowed for a more in-depth analysis of the school food environment, especially with the open-ended questions that brought conversations between the participants and the investigator (Creswell & Plano-Clark, 2011). Not only were surveys administered, but on-site observations were conducted, contributing visual evidence to the overall study.

Another important limitation to acknowledge was the use of a self-report survey that potentially could have been influenced by several sources (Creswell & Plano Clark, 2011). First, social desirability bias is an important factor to consider in how participants might have answered the questions. Participants may have responded to survey questions

in a manner they knew would be viewed favorably by others. Therefore, they may either not have wanted to reveal what they considered as 'bad' or 'negative' food practices, or they could have exaggerated favorable responses (University of Southern California, 2017). Secondly, the extent of participants' familiarity or lack of same with the content area could have been an added factor in how they responded to survey questions. For example, there may have been participants who were fairly new to the school system that participated in study, as this study did not include the length of employment as part of its eligibility criteria to participate.

Lastly, the survey method used to collect the open-ended questions responses may have impacted study results. Although quality responses to the open-ended questions were collected, many of the participants contributed additional information *after* surveys were collected. It became clear that many of the participants were more comfortable expressing themselves orally rather than in written form. Further, it is also important to acknowledge that most if not all of the participants likely have never been surveyed before and/or never been asked to contribute their opinions, ideas or suggestions. Thus, asking participants to fill out a survey for a research study was a task completely foreign to them. From a Western science research paradigm, how best does one prepare or take into account these nuances that are embedded in cultural and historical contexts? Researcher reflections on this dilemma supported the use of open-ended interviews in future work.

Clearly, this study could have been strengthened by incorporating full interviews to elicit participants' responses to the open-ended qualitative questions. Despite this limitation, rich and detailed data were still gathered from many of the participants who

were comfortable enough to approach the researcher. From a Navajo cultural explanation, it is important to note that the researcher established relationship through Navajo clanship with participants beforehand, which is a factor that enriched the informal discourse that occurred after surveys were collected.

Recommendations for Future Research

The findings from this descriptive study provide a number of research implications, marking the beginning in what may become a continuous and established research project that addresses nutrition in the school environment. First, integral to any future studies, it would be important to begin with a community-based participatory research (CBPR) approach, a strategy that actively engages the community, eliciting their perspectives and involving them in the decision-making process through all phases of the research process, including the intervention and evaluation (Wallerstein & Duran, 2006). With looming childhood obesity concerns affecting Navajo children and no effective solutions in sight, a collaborative approach is essential for further development of an in-depth understanding of the ecological contexts, processes, and influences within the multiple ecological levels. Broadly speaking, further understanding in a partnership approach with the Navajo community would be a primary step that would help identify needed multilevel solutions, especially if the research team included Dine' people (Trickett & Beehler, 2013).

One important initiative needed is the expansion of the Navajo cultural concept of *Hozho'*, a concept which has only been explored superficially in this study as it relates to the promotion of health and well-being in a school environment (Benally 1994). An important point to emphasize is that as a Navajo nurse researcher, I recognize my own

limitations and acknowledge I am by no means a cultural expert. It is for this reason that seeking the expertise of those who possess this knowledge is culturally appropriate and even more so respectful of cultural teachings that recognize the role of elders as knowledge keepers. In light of the findings elicited from surveys, discourse with participants and observations within the various ecological levels, engaging Navajo elders, cultural experts, and traditional healers and having them share what they see as priority health concerns affecting youth is needed, along with how to address the major issues. In addition, in the context of this study, it is imperative to elicit their perspectives about the concerns with obesity challenges affecting youth. To what extent are they aware of this being a health problem? What is their explanation from a Navajo perspective? How do they think it should be addressed?

In all, a major consideration in moving forward is establishing a sustainable partnership with the community to develop a 'model' school that comprehensively promotes and teaches healthy behaviors. An overarching question that would be vital to pose is this: *'From policy to practice, what would a model school look like that incorporates the principles and practices of Hozho'?* Using this model schools could lay the foundation and means for future work and development, expansion to other schools, and for future policy development that is congruent with their cultures.

Policy Implications

Policies that improve nutrition and limit access to unhealthy foods on school campuses are needed. The Navajo Nation can declare a position on improving nutrition in schools through a policy statement. Based on findings from this study, the statement can address three main venue areas where foods and beverages are available to students:

a) School meal programs (SBP and NSLP), b) competitive foods sold outside of the USDA meals, and c) other sources such as classrooms, fundraising efforts, and sporting events. Furthermore, this declaration can include a statement that supports a traditional foods program in schools.

Given the documented highest obesity prevalence in AI nations, the study calls for an assessment of separate monitoring and surveillance of school nutrition-related policies and practices of AI schools as a whole, and potentially even data that are tribal specific. Monitoring and surveillance of the school food environment and practices are essential steps to enhance the diets of children, reduce/prevent childhood obesity, and improve the quality and length of their lives (Briefel et al., 2009b).

Summary

Navajo youth along with other AI youth are experiencing sub-optimal health and health outcomes, manifested by having one of the highest obesity rates in the nation in comparison to their general US counterparts. In the search for solutions, how one understands the origins of obesity is important. From a cultural account, health imbalances can be attributed to the contemporary lifeway of youth, a path in which they have disregarded the historic Dine' way of life, the rich teachings and ways of *Hozho*'. Distinct from a cultural explanation or a Western ecological perspective, obesity exists for reasons beyond a biological explanation that can be attributed to more complex influences between individuals and their environments.

The vital role nutrition plays in the development or prevention of obesity is well documented. Therefore, a major focus of this study specifically analyzed nutrition in a school environment context through ecological and cultural lenses. It became clearer

how these two perspectives were more similar and congruent than they were different, mainly for their recognition of a more comprehensive view of health involving the interconnections between individuals and their environments.

Overall, the findings captured in this study were important in covering a number of areas as the concerned healthy eating and obesity. However, the results were mixed in terms of their capacity to positively influence student dietary intake. On one hand, in some schools, students' access to unhealthy foods displaced healthful food choices. At the same time, participants also indicated that students are making healthy food selections, yet they found evidence of food waste. From a policy and policy implementation stance, the findings were perhaps more disconcerting than encouraging. Policies that promote a healthy food environment including wellness policies were somewhat limited. Factors that positively and negatively influenced the implementation of the new USDA requirements were identified. As a baseline descriptive study, this study uncovered domains where schools are doing well, areas that need improvement, and still other content areas that need further investigation. In general, schools have an opportunity to do more to provide a consistently healthy, culturally congruent food environment for students.

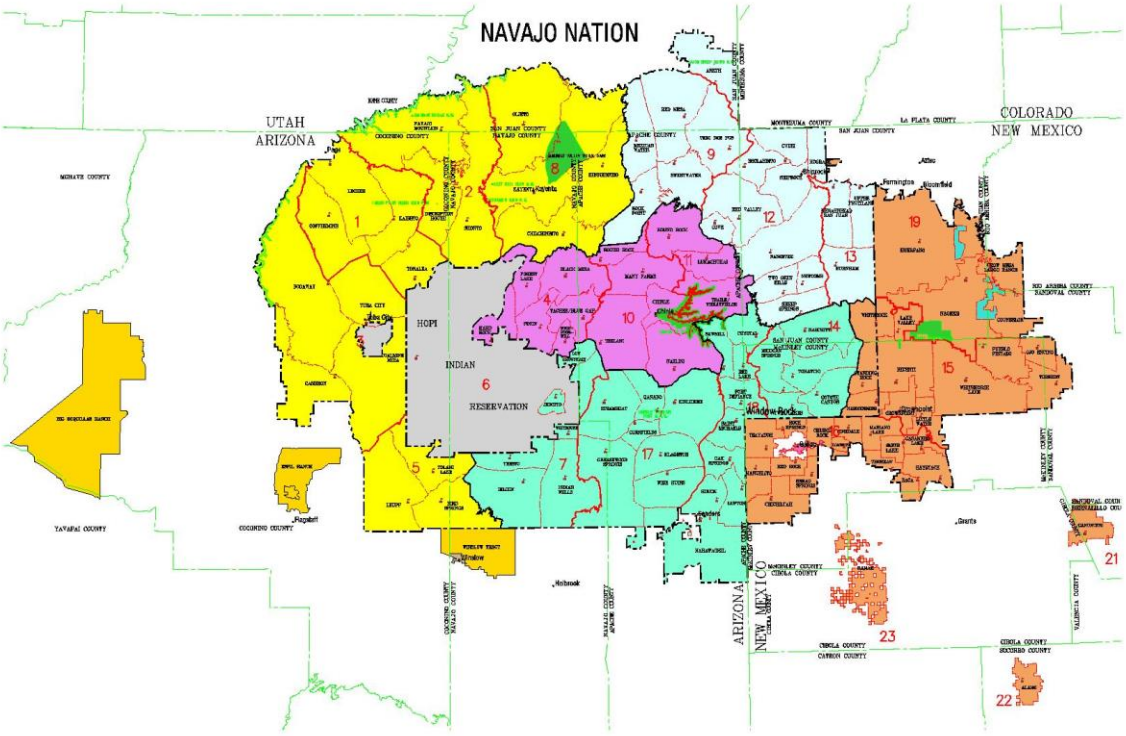
In order to improve the future health of Navajo children, a focus on restoring and maintaining a school environment that embraces, teaches and characterizes *Hozho'* is fundamentally needed for improving the health and wellbeing of Navajo youth. Students attend school on a daily basis, where they have no say or control over their environment. They enter the school systems from all walks of life and experiences, and many of them arise every day of the week, and they look forward to spending a good portion of each

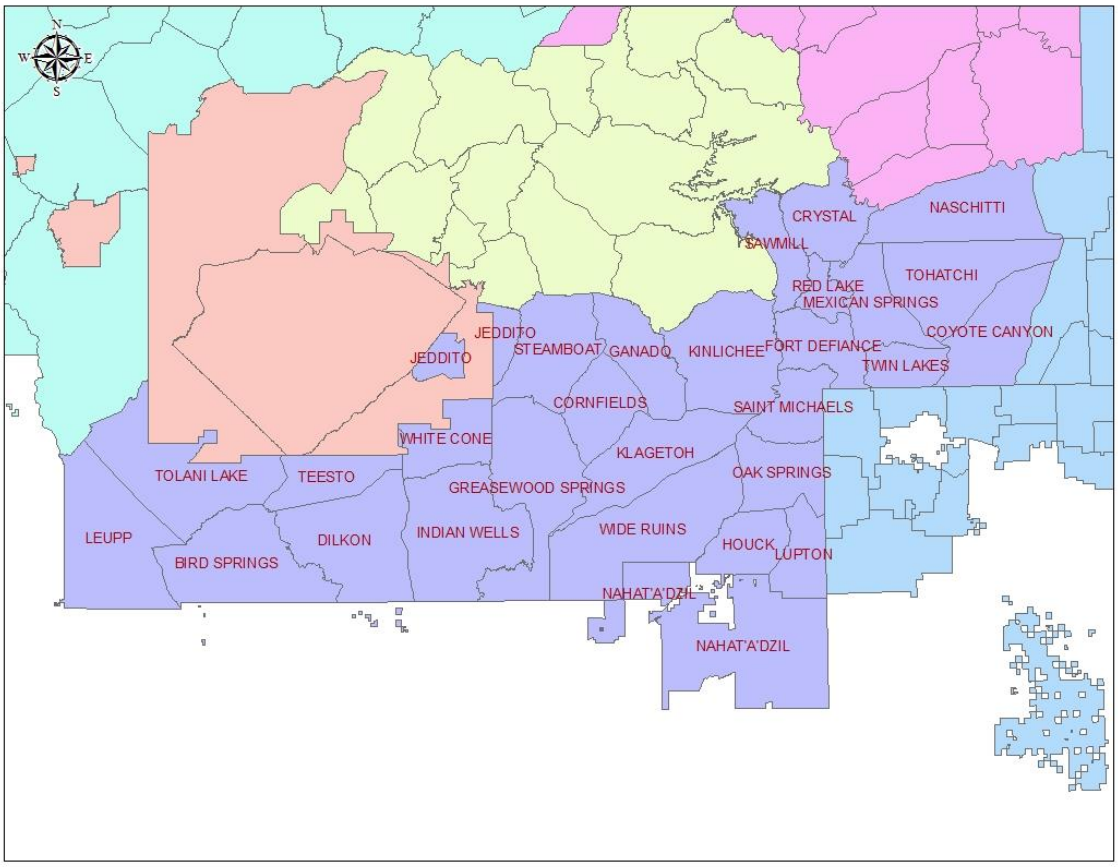
day in school. It is important that they begin to learn, value and appreciate the lifeways of their ancestors that once existed, a lifeway that protected them from the health threats seen today.

Collectively and individually, all sectors within the Navajo community must become involved, as each has an important and distinct role in this crucial effort. The community includes students, parents, elders, teachers, school administrators, school board members, and tribal leaders. 'Champions' must emerge from the community, from the homes, schools and the broader community. In stepping forward, the community can take part and lead this grand initiative to define their own policies and strategies to restore and ensure schools provide an all-encompassing environment that reflects *Hozho*' and cultural essentials for protecting the health, safety and wellbeing of Navajo students.

Appendix A

Maps





Fort Defiance Agency of the Navajo Nation (Blue)

Appendix B

Recruitment Letter

September 13, 2016

Name
Superintendent
Name of School

Dear (name):

My name is Regina Eddie, I am Navajo, a nurse educator in AZ and a nurse enrolled in a PhD program at the University of New Mexico. My work focuses on making positive changes to the health and eating habits of Navajo children.

My reason for emailing you is that I hope to earn the support and participation of your school in my dissertation research study. The topic and heart of my study relate to the school nutrition environment, more specifically to assess the policies and available nutritional options for students. At a time when overweight and obesity present a major health concern for Navajo children, schools have become an ideal location for obesity prevention efforts, such as providing an environment that supports healthy eating behaviors among youth.

Participants I hope to find for the study are school principals, food services directors and food services staff (not the children). Participants will be asked to complete a two-part survey. School principals (or a designee) will complete sections of the survey about general school characteristics and other nutrition policy related questions. The food service director and food service staff at each school will complete a section of the survey that asks about the foods and beverages available to students. While this is my own study, I work under the guidance of my research advisers at UNM. The chair of that group (Dr. Jennifer Averill) is also willing to respond to any questions you may have. Your participation and support could be most helpful and would be greatly appreciated. If you have potential interest in taking part, and you have some further questions or concerns, I am more than happy to schedule an appointment to meet in-person with you. Also, you are welcome to call me with any questions, at (928) 606-2670. Please let me know of your earliest convenient time to meet, and thank you for considering this opportunity.

Sincerely,

Jennifer B. Averill, PhD, RN (Principal Investigator)
College of Nursing
(505) 272-0859
javerill@salud.unm.edu

Regina Eddie, MS, RN
UNM PhD student
12880 Three Man Trail, Flagstaff, AZ 86004
(928)606-2670
reddie@salud.unm.edu

Appendix C

Letters of support from principals

Window Rock Unified School District No. 8
Superintendent of Schools

P.O. Box 559
Navajo route 12
Fort Defiance, Arizona 86504

Office: 928.729.6706
Fax: 928.729.6841
www.wrschool.net

August 1, 2016

Dear Ms. Eddie,

As the superintendent of Window Rock Unified School District, I support your proposed dissertation project with the University of New Mexico that concerns the health and nutritional services available to children during the school day. I am aware of the importance of promoting healthy nutrition for healthier kids especially in the prevention of overweight and obesity in children. We are a school district that participates in the National School Lunch Program (NSLP), and with the federal mandates required by *Healthy Hunger Free Kids Act of 2010*, your project will help us to understand how our schools are meeting the nutritional requirements as well as the nutritional needs of our students.

I understand that the participants you will need for your project will be the principals of our elementary and middle schools as well as the district food service director and food service staff at each of these schools. School principals (or a designee) will be asked to complete a survey about general school characteristics and other nutrition policy related questions, while the food service director and food service staff at each school will complete a separate survey that asks about the foods and beverages available to students. I am aware you will need to meet with employees for project explanation and I will assist by not only providing the times and area for employees to meet with you, but for employees to complete the surveys.

I look forward to working with you on this project. If you need further assistance please contact me or my staff.

Sincerely,

Lynnette Michalski
Superintendent
Window Rock Unified School District

July 21, 2016

Regina Eddie, MS, RN, PhD student
University of New Mexico
12880 Three Man Trail
Flagstaff, AZ 86004

Dear Ms. Eddie,

I am writing this letter in support of your proposed dissertation research project titled *A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Policies and Practices in Select Elementary and Middle Schools on the Navajo Reservation"*. I support the idea of a project that concerns the health and nutritional habits of children. As the superintendent and principal of the Cedar Unified School District #25, I am aware of the importance of promoting healthy nutrition for kids who attend school on a daily basis as a measure in the prevention of overweight and obesity.

The purpose of your dissertation project is to examine the school-level policies and practices that influence what children are eating at the elementary and middle schools. For schools participating in the National School Lunch Program, the *Healthy Hunger Free Kids Act of 2010* released comprehensive mandates for the school nutrition environment, including the school meal programs, and all other foods and beverages outside the school meal program, and through your project, it will help us to understand how our schools are meeting the nutritional needs of our students.

I understand that participants you will need for your project will be the principals of our elementary and middle schools as well as the district food service director and food service staff at each of these schools. School principals (or a designee) will be asked to complete a survey about general school characteristics and other nutrition policy related questions, while the food service director and food service staff at each school will complete a separate survey that asks about the foods and beverages available to students. I am aware you will need to meet with employees for project explanation and I will assist by not only providing the times and area for employees to meet with you, but for employees to complete the surveys.

I look forward to working with you on this project. If you need further assistance please contact me or my staff.

Sincerely,

Duane Noggle
Superintendent/Principal
Cedar Unified School District #25

Dilcon Community School, Inc.

HC 63, Box G, Winslow, Arizona 86047 - Phone: (928) 657-3211 - Fax: (928) 657-3213

William M. Wachunas, *Principal*

George Joe, *Governing Board President*
Rose VanCruz, *Vice-President*
Marjorie Clark, *Secretary*
Steven J. Begay, *Member*
Lorraine Jackson, *Member*

15 July 2016

To: Whom It May Concern

As the principal of Dilcon Community School, I would like to express my support of your proposed dissertation research project titled "A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Policies and Practices in Select Elementary and Middle Schools on the Navajo Reservation". I support the idea of a dissertation project that concerns the health and nutritional habits of Navajo children. Through your project, it will help us to understand how our schools are meeting the nutritional needs of our students.

Further, we, Dilcon Community School, will assist with this project by providing times and area for Ms. Eddie to meet with our employees from food services, and other personnel as needed to support this research project.

Sincerely,

William Wachunas

Principal/CEO

Appendix D

Consent Letter

The University of New Mexico Health Sciences Center
Consent to Participate in Research
A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Policies and Practices in Select Elementary and Middle Schools on the Navajo Reservation

08/19/2016

Introduction

You are being asked to participate in a research study that is being done by Dr. Jennifer Averill, who is Research Advisor, and Ms. Regina Eddie, who is the Co-Investigator. Ms. Regina Eddie is an enrolled member of the Navajo Nation and PhD student working under Dr. Averill's supervision, from the UNM College of Nursing.
This study of the school nutrition environment focuses on *describing* the current school meal program and other foods and beverages outside the school meal program that are available to kids. It is important to understand what kids are eating at school and the policies that influence what kids are eating so that schools can be encouraged to provide a healthier, more nutritious environment.

You are being invited to participate in this study because you are an employee of the school district and have an important role in serving the nutrition needs of students. Overweight and obesity are major health problems in Navajo and other American Indian children. Your participation can help us learn more about *what* the nutrition environment looks like while kids are at school on a daily basis. Identifying this baseline is critical if we want to promote healthy changes.

This consent form explains what the study involves. This consent form also explains the possible risks and benefits to you for taking part. If you have any questions, please ask one of the study investigators. Both of them are ready to respond to your questions. We also encourage you to talk with your family, friends and co-workers before you decide to join in this research study.

What will happen if I decide to participate?

If you agree to participate, the following things will happen: you will be given a written survey that will take about 30 minutes to complete.

The *portion* of the survey you will complete will depend on your role. There is a section that asks questions about general school information and policies that a principal or

administrator will complete. For food service personnel, there is a separate section to complete that asks specific questions about the school meal program.

Your responses to the survey will not be shared with anyone at any school. Only the Research Advisor and Co-Investigator will have access to your survey responses.

Your responses to the survey will not affect your job in any way. Your decision to participate or not participate, and your responses to the survey, will not affect your job in any way, including evaluations, raises or promotions.

How long will I be in this study?

Participation in this study will be a one-time activity involving completion of a survey that will take approximately 30 minutes.

What are the risks or side effects of being in this study?

This is not a medical study. This is not a study of medical treatments that could cause side effects.

There are no major risks associated with this study, but there is the possible risk that someone could find out that you were a participant in this study or someone could find out which survey answers were yours. However, the risk of this happening is very small since there will be several steps taken to protect your identity and confidentiality throughout the study.

If you have any questions or concerns about risks of participating, please ask the investigators.

What are the benefits to being in this study?

There are no direct benefits to you, but your participation in the study may benefit the kids by helping us understand and improve the quality of nutrition available in schools serving Navajo and other American Indian students.

What other choices do I have if I do not want to be in this study?

You do not have to participate, and if you decide at any time during the study that you do not want to continue, you may withdraw without any questions or explanation. You will still receive a $25 gift card for your time.

How will my information be kept confidential?

You will be given a survey to complete and you will not be putting your name or anything that could identify you on the survey. The survey will have a number that has been given to you as a code. The code key, which lists names of participants and the number code assigned to them will be kept separate and secure from the surveys. All sources of data, including investigator field notes, memos and surveys, will be safely secured by the researcher using approved electronic security measures. Upon completion of the study, all forms of data collected, and the list of participant number codes and names, will be permanently destroyed.

Following policies of the University of New Mexico's Internal Review Board (IRB, described in the next paragraph), we will take measures to protect the security of all study responses (data) collected from you, but we cannot guarantee confidentiality of all study data.

Also, as part of the research process, data collected from you could be shared with the University of New Mexico and the Navajo Nation Human Research Review Boards. There may be times when we are required by law to share your information. However, your name will not be used in any published reports about this study. A copy of this consent form will be stored and kept confidential with other research records.

What are the costs of taking part in this study?

There are no monetary costs associated with participating in the study.

What will happen if I am injured or become sick because I took part in this study?

There is minimal risk that you would become injured or become sick from participation in this survey research.

Will I be paid for taking part in this study?

You will be given a $25 Walmart gift card for your participation in the study.

Can I stop being in the study once I begin?

Your participation in this study is completely voluntary. You have the right to choose not to participate or to withdraw your participation at any point in this study without question or penalties.

Whom can I call with questions or complaints about this study?

If you have any questions, concerns or complaints at any time about the research study, Co-Investigator Regina Eddie or her dissertation chair Jennifer Averill will be glad to

respond. You may contact Regina Eddie at (928) 606-2670 or reddie@salud.unm.edu. You may contact Dr. Averill at javerill@salud.unm.edu.

If you would like to speak with someone other than the research team, you may call the UNMHSC HRRC at (505) 272-1129 or send mail to 1 University of New Mexico, Albuquerque, NM 87131-0001 USA.

You may also contact Beverly Becenti-Pigman, Board Chair, Navajo IRB Office, Navajo Department of Health, P.O. Box 1390, Window Rock, AZ 86515. Telephone number is (928)871-6929, Fax number (928) 871-6255.

Whom can I call with questions about my rights as a research participant?

If you have questions regarding your rights as a research participant, you may call the UNMHSC HRRC at (505) 272-1129. The HRRC is a group of people from UNM and the community who provide independent oversight of safety and ethical issues related to research involving human participants. For more information, you may also access the HRRC website at http://hsc.unm.edu/som/research/hrrc/.

CONSENT

You are making a decision whether to participate in this study. Your signature below indicates that you read the information provided (or the information was read to you). By signing this consent form, you are not waiving any of your legal rights as a research participant. A copy of this consent form will be provided to you.

I have had an opportunity to ask questions and all questions have been answered to my satisfaction. By signing this consent form, I agree to participate in this study.

_____ _____ _____

Date

Name of Adult Subject (print) Signature of Adult Subject

INVESTIGATOR SIGNATURE

I have explained the research to the participant and answered all of his/her questions. I believe that he/she understands the information described in this consent form and freely consents to participate.

Regina Eddie
Name of Investigator (type or print)

_____ _____

(Signature of Investigator) Date

Appendix E

Survey instruments

School Food & Policy Questionnaire

Navajo Nation Schools

Part 1

2016

Modified from Bridging Gap RWJF Program

Instructions

Thank you for participating in this important study of school policies and practices on the Navajo Nation. If your school includes grades higher than 6th grade, please answer the questions with regard to elementary school grades (K-6th) at your school. It may be helpful to consult with teachers or other staff at your school to assist you in answering some of the questions.

Your answers are confidential. We will never release your name or your school's name to the public.

Part 1

- Asks about characteristics of your school, including school practices and policies relevant to student health.
- Part 1 is best suited to be answered by a school administrator

Part 2

- Asks about foods and beverages available at school
- Part 2 is best suited to be answered by the Food Service Manager and food service staff

Section A: General Characteristics

1. About how many students are enrolled in your school for the 2016-2017 school year?

   _____total # of enrolled students

2. What is the percentage of students enrolled in free and reduced lunch at your school?

   _____% of students

3. At what time do classes begin and end for your students?

   Start time ____ : ____ AM End time ____ : ____

4. What grades are offered at your school?

   _____ (Ex. K – 6th)

Section B: School Food Practices

1. The USDA's Fresh Fruit and Vegetable Program (FFVP) provides reimbursement to selected elementary schools for providing fresh fruits and vegetables to students during the school day separately from the lunch or breakfast meal. Does your school participate in the FFVP?

   ☐ Yes ☐ No ☐ Don't know

This section is about USDA's reimbursable breakfast at your school

2. Does your school participate in the USDA reimbursable School **Breakfast** Program

   ☐ Yes ☐ No → **Please go to #5 on the right side of this page**

   3. On a typical day, about how many students at your school eat the USDA reimbursable School **Breakfast** offered by your school…

      … at **full price** _____# students Don't know
      … at **reduced price** _____# students Don't know
      … for **free** _____# students Don't know

      4. For USDA **Breakfast**, what is the…

      … full price charged for breakfast? $_____
      (write 0 if breakfast is free)

      … reduced price charged for breakfast? $_____
      (write 0 if breakfast is free for reduced-price eligible students)

      Please go to #6 on the right side of this page

5. If your school does not participate in the USDA reimbursable School **Breakfast** Program, please indicate why not.

   PLEASE CHECK ALL THAT APPLY

   ☐ Too few eligible students
   ☐ Lack of interest among students/families
   ☐ Program too costly
   ☐ School starts too late to serve breakfast
   ☐ School lacks facilities to serve breakfast
   ☐ School lacks staff to serve breakfast
   ☐ Students don't like the food
   ☐ Other – please explain _____
   ☐ None of the above

This section is about USDA's reimbursable lunch at your school

6. Does your school participate in the USDA reimbursable National **Lunch** Program?

   ☐ Yes ☐ No

   7. On a typical day, about how many students at your school eat the USDA's reimbursable lunch at your school…

      …at **full price** _____# students Don't know
      …at **reduced price** _____# students Don't know
      …for **free** _____# students Don't know

   8. For USDA lunch, what is the…

   … full price charged for lunch? $_____
   (write 0 if lunch is free for all students)

   … reduced price charged for lunch?
   (write 0 if lunch is free for reduced-price eligible students)

   Please go to #10 on the next page

9. If your school does not participate in the USDA reimbursable National School **Lunch** Program, please indicate why not.

PLEASE CHECK ALL THAT APPLY

- ☐ Too few eligible
- ☐ Lack of interest among students/families
- ☐ Program too costly
- ☐ School lacks facilities to serve lunch
- ☐ School lacks staff to serve lunch
- ☐ Students don't like the food
- ☐ Other – please explain _____
- ☐ None of the above

This section is about lunch-related practices at your school

10. Please estimate how many minutes are generally set aside for lunch for students:

_____ minutes

11. Please indicate the timing of lunch in relation to mid-day recess, for Students:

PLEASE CHECK ALL THAT APPLY

- ☐ Students have lunch and then go directly out for recess
- ☐ Students have recess and then come in for lunch
- ☐ Students do not have recess directly prior to or after lunch
- ☐ Varies by class

In 2013 the USDA announced pending standards for foods and beverages sold to students through vending machines, school stores/ snack bars and a la carte at lunch (but not items gold in the USDA meals programs). These standards went into effect in the 2014-15 school year. This section asks about those "Smart Snacks in Schools" standards.

12. To what extent are you familiar with the USDA's updated standards?

PLEASE SELECT ONE ANSWER

Not at all	A little	Somewhat	A lot
☐	☐	☐	☐

13. To what extent have you started to align your school practices with the standards?

PLEASE SELECT ONE ANSWER

- ☐ **Have already made changes**
- ☐ **Planning changes for next year**
- ☐ **Have started to discuss**
- ☐ **Don't know**
- ☐ **Not applicable, don't sell snack foods or beverages**

This section is about other food related practices at your school

14. Please indicate whether any posters or other advertisements for the following products are currently posted in the cafeteria or in other locations at your school:

PLEASE CHECK ALL THAT APPLY	In the cafeteria (or where students eat)	Anywhere else
Milk	☐	☐
Fruit and/ or vegetables	☐	☐

15. Is there any advertising for food products/brands (e.g., candy, drinks, restaurants) on the exterior or interior of school busses that transport students to and from school?

PLEASE CHECK ALL THAT APPLY

☐ Yes, exterior ☐ Yes, interior ☐ Both exterior and interior ☐ None

16. Does your school have any school-wide polices regarding the nutritional quality of items of items sold for PTA fundraisers or other school fundraisers?

☐ Yes ☐ No → Please go to #18 ☐ N/A, no fundraising → Please go to #18

17. If yes, which types of restrictions do you have?

PLEASE CHECK ALL THAT APPLY

☐ No Foods or Minimal Nutritional Value (soda, hard candy, gum) allowed for fundraisers
☐ No soda/soft drinks allowed for fundraisers
☐ No food products allowed for fundraisers
☐ Only healthy foods allowed
Other_____

18. Does your school ever participate in (or conduct) the following types of physical activity-based fundraising events?

PLEASE CHECK ALL THAT APPLY

☐ Walk-a-thon
☐ Jump Rope for Heart
☐ Other (please describe): _____

19. Please indicate how frequently your school participates in the following types of fundraising activities at which students are able to consume foods and beverages:

	# of times per school year
Bake sale where students/parents can purchase items	_____
Ice cream social/dinner/pizza night at school	_____
Sponsored fundraiser at local restaurant (e.g., pizza night)	_____

20. Does your school participate in the Box Tops for Education program?

☐ Yes ☐ No → Please go to the next page

21. If yes, approximately how much money did your school earn from the program last year (during the 2015-16 school year)?

_____$

22. Please indicate whether any of the following practices at your school.

	No	Yes, it is up to this teacher	Yes, but it is discouraged
Food (e.g., candy) is used as a reward for good academic performance	☐	☐	☐
Food (e.g., candy) is used as a reward for good behavior	☐	☐	☐
Food coupons are used as an incentive for students (e.g., "Book-it" pizza party for reading)	☐	☐	☐
Classroom lessons involve candy (i.e., mathematics using M&M candies)	☐	☐	☐

23. Are there any policies limiting sugar-sweetened items (e.g., candy, cupcakes, cookies) from being served or brought in either at *snack time* or for *parties* during the school day? If no snack time or parties, please check N/A.

PLEASE CHECK ONE BOX ON EACH ROW

	No Policy	Decision is up to each teacher	Sweetened Items *discouraged* school-wide	Sweetened items *discouraged* school-wide	N/A, no parties or snacktime
Snack time	☐	☐	☐	☐	☐
Birthday parties	☐	☐	☐	☐	☐
Holiday parties	☐	☐	☐	☐	☐

24. Does your school currently have a garden (fruit and/ or vegetable) that students participate in?

☐ Yes ☐ No

25. During the school day, do students have access to working drinking fountains in any of the following locations?

PLEASE CHECK ALL THAT APPLY

☐ In cafeteria
☐ Near cafeteria
☐ Other locations at school
☐ In hallways near classroom
☐ Gymnasium/locker rooms
☐ None available

Section C: Wellness Policies

This Section asks about the Wellness Policy provision of the National School Lunch Act that was passed in 2004.

1. Are you familiar with the wellness policy developed by your school district?

☐ Yes ☐ No → **Please go to #4 on the right side on the page**

2. Has your school district or school designated one or more persons to have operational responsibility for ensuring that the wellness policy is implemented?

PLEASE CHEACK ALL THAT APPLY

☐ Yes, the **school district** has a designated a person
☐ Yes, the **school** has designated a person
☐ No
☐ Don't know

3. Is your school required to report to your district regarding implementation of any of the following components as part of your local wellness policy? Please note that although these may be required to be reported for other mechanisms/purposes, we are specially interested in whether you are also required to report on these items for district wellness policy reporting purposes.

PLEASE CHECK ONE BOX ON EACH ROW	Yes	No	Don't Know
# of minutes of physical education required per grade level	☐	☐	☐
# of minutes of nutrition education required per grade level	☐	☐	☐
Student participation in school meal programs	☐	☐	☐
Revenue from sale of food or beverages in school-sponsored fundraisers or other school-sponsored venues outside of school meal programs (e.g., vending, school store, a la carte)	☐	☐	☐
Opportunities for increased physical activity during the school day, outside of physical education and recess (e.g., classroom physical activity breaks, free time physical activity)	☐	☐	☐
CDC's School Health Index	☐	☐	☐
FitnessGram or other physical fitness assessment results	☐	☐	☐
Body Mas Index (BMI) of students	☐	☐	☐

24. Does your school currently have a garden (fruit and/ or vegetable) that students participate in?

☐ Yes ☐ No

25. During the school day, do students have access to working drinking fountains in any of the following locations?

PLEASE CHECK ALL THAT APPLY

☐ In cafeteria
☐ Near cafeteria
☐ Other locations at school
☐ In hallways near classroom
☐ Gymnasium/locker rooms
☐ None available

Section C: Wellness Policies

This Section asks about the Wellness Policy provision of the National School Lunch Act that was passed in 2004.

1. Are you familiar with the wellness policy developed by your school district?

☐ Yes ☐ No → **Please go to #4 on the right side on the page**

2. Has your school district or school designated one or more persons to have operational responsibility for ensuring that the wellness policy is implemented?

PLEASE CHEACK ALL THAT APPLY

☐ Yes, the **school district** has a designated a person
☐ Yes, the **school** has designated a person
☐ No
☐ Don't know

3. Is your school required to report to your district regarding implementation of any of the following components as part of your local wellness policy? Please note that although these may be required to be reported for other mechanisms/purposes, we are specially interested in whether you are also required to report on these items for district wellness policy reporting purposes.

PLEASE CHECK ONE BOX ON EACH ROW	Yes	No	Don't Know
# of minutes of physical education required per grade level	☐	☐	☐
# of minutes of nutrition education required per grade level	☐	☐	☐
Student participation in school meal programs	☐	☐	☐
Revenue from sale of food or beverages in school-sponsored fundraisers or other school-sponsored venues outside of school meal programs (e.g., vending, school store, a la carte)	☐	☐	☐
Opportunities for increased physical activity during the school day, outside of physical education and recess (e.g., classroom physical activity breaks, free time physical activity)	☐	☐	☐
CDC's School Health Index	☐	☐	☐
FitnessGram or other physical fitness assessment results	☐	☐	☐
Body Mas Index (BMI) of students	☐	☐	☐

PLEASE USE SPACE PROVIDED TO ANSWER EACH QUESTION

1) For schools that participate in the National School Lunch Program, schools are required to adhere to certain nutrition requirements set forth by the Arizona Department of Education and the USDA (US Department of Agriculture). What has been your school's experience been in carrying out these nutrition requirements?

2) What factors have facilitated and/or impeded implementation of these nutrition requirements?

3) What are ways your school has incorporated Navajo cultural teachings and practices for the promotion of health?

4) What role, if any, do you think schools should play in student nutrition?

☐ Other – please describe: _____
☐ Free, potable drinking water is not available

13. Compared to this time last year (fall 2015), how many students at your school typically purchase (whether they eat it or not) the **school lunch** offered through the USDA-reimbursable National School Lunch Program (whether it is purchased at full/reduced-price or free)?

PLEASE CHECK ONE BOX ONLY

☐ A lot more students
☐ Slightly more students
☐ About the same
☐ Slightly fewer students
☐ A lot fewer students
☐ Don't know

14. Has the percentage of food in **lunches** that students typically consume each day changed since this time last year?

PLEASE CHECK ONE BOX ONLY

☐ Students are eating a lot more of the food
☐ Students are eating slightly more of the food
☐ About the same
☐ Students are eating slightly less of the food
☐ Students are eating a lot less of the food
☐ Don't know

15. Compared to this time last year do your school lunches offer less, the same, or more of the following items?

	Less	Same	More
Amount of fruits and vegetables	☐	☐	☐
Variety of fruits and vegetables	☐	☐	☐
Whole grain options	☐	☐	☐
Low-fat dairy products	☐	☐	☐
Variety of entrée options	☐	☐	☐

16. Has your school used any of the following strategies to promote healthier lunches during the past year?

	Never	Once or twice	Often
Student taste tests	☐	☐	☐
Student advisory groups	☐	☐	☐
Cooking club/demonstrations/classes	☐	☐	☐
Promotional signage or events in cafeteria	☐	☐	☐
Social media (Facebook, Twitter, etc.)	☐	☐	☐
Engagement with PTA or parent groups	☐	☐	☐
Newsletters	☐	☐	☐

School Food & Policy Questionnaire

Navajo Nation Schools

Part 2

2016

Modified from Bridging Gap RWJF Program

Food and Beverage Polices and Practices

- We encourage your Food Service Manager or cafeteria to complete this section if possible.
- All the information that you provide will be kept completely confidential, with no disclosure of your name or your school's name.
- This section asks about food and beverages available to **students** in your school during the 2016-2017 school year'

Thank you for your help!

Part 2: Food and Beverage Policies and Practices, 2016-2017

1. Please indicate your role at this school:

PLEASE SELECT ONE ANSWER

- ☐ Cafeteria or food service manage
- ☐ Food service staff
- ☐ Principal/assistant principal/administrator
- ☐ Other (please specify):_____

2. Does the food service manager at this school have any of the following credentials?

PLEASE CHECK ALL THAT APPLY

- ☐ Registered Dietitian (RD)
- ☐ Dietetic Technician, Registered (DTR) credential
- ☐ Certified Dietary Manager (CDM) credential
- ☐ School Nutrition Association credential or certification
- ☐ Food safety or nutrition training by a credentialing agency or state
- ☐ Other credentials (please specify):_____
- ☐ Not applicable, no food service professionals employed at this school

3. Which of the following kitchen facilities are available at your school?

PLEASE SELECT ONE ANSWER

- ☐ School system food service
- ☐ Food service management company(e.g., Sodexho, Preferred Meals)
- ☐ Other (please specify):_____

4. Who provides the food service at this school?

PLEASE CHECK ALL THAT APPLY

- ☐ School system food service
- ☐ Food service management company (e.g., Sodexho, Preferred meals)
- ☐ Other (please specify):_____

5. On a typical day, about what percent of elementary students (grades K-5)

	% students
...eat lunch offered by your school	_____
...bring their own lunch	_____
...other (please explain)_____	_____
(please make sure answers sum to 100%) →	100%

6. During a typical week, on how many days (if any) are students at your school offered food from each of the following sources? Enter "0" if none.

	# of days per week
Pizza places	_____
Sandwich or sub shops	_____
Fast food chains	_____
Other food establishment	3 _____

7. Does your school currently incorporate any locally – produced food (e.g., fruits, vegetables, meat, dairy) into the meals offered at school (through, for example, a "farm-to-cafeteria," "farm-to-school," or other program)?

☐ Yes ☐ No

8. Does your school participate in the USDA-sponsored Team Nutrition program?

☐ Yes ☐ No ☐ Don't know

If yes, which Team Nutrition resources are used?

PLEASE CHECK ALL THAT APPLY

☐ Nutrition education materials (posters, activities, games)
☐ Lesson plans
☐ Food buying guide and menu planning assistance
☐ Training grants to support staff training/ continuing education
☐ Other Team Nutrition mini-grants
☐ Other (please specify):_____

9. Does your school use any other resources for improving the food environment (meals, competitive foods and/or beverages) and/or nutrition education programs in your school?

☐ Yes ☐ No ☐ Don't know

If yes, from whom are the resources obtained?

PLEASE CHECK ALL THAT APPLY

☐ School district
☐ State (e.g., state Superintendent or Department of Education)
☐ Alliance for a Healthier Generation
☐ United States Department of Agriculture (USDA)
☐ Other (please specify):_____

10. To what extent has your school or school district set *food or beverage prices* (in vending machines, stores, a la carte) with the intent of encouraging students to eat healthier foods (e.g., fruits, vegetables, low-fat foods) and/or beverages (e.g., bottled water, low-fat milk) instead of less-healthy foods and beverages?

PLEASE CHECK ONE BOX ONLY

☐ Students are eating a lot more of the food
☐ Students are eating slightly more of the food
☐ About the same
☐ Students are eating slightly less of the food
☐ Students are heating a lot less of the food
☐ Don't know
☐ N/A- school or district don't set the prices

11. Which (if any) of the following criteria impacts your choice of snack foods and beverages sold in vending machines, stores/snacks or a la carte?

PLEASE CHECK ALL THAT APPLY

☐ Total fat ☐ Saturated fats ☐ Trans fat
☐ Sodium ☐ Sugar

12. The Healthy, Hunger-Free Kids Act of 2010 required schools to provide free, potable drinking water for students during lunchtime, starting in the 2011-12 school year. Please indicate which (if any) of the following strategies your school has used to meet this requirement.

PLEASE CHECK ALL THAT APPLY

☐ Existing drinking fountains in cafeteria
☐ Installed new drinking fountains in cafeteria
☐ Water dispenser/pitcher and cups (in the food line)
☐ Water dispenser /pitcher and cups (elsewhere in the cafeteria)
☐ Water dispenser/pitcher but no cups (students bring water bottle)

☐ Other – please describe: _____
☐ Free, potable drinking water is not available

13. Compared to this time last year (fall 2015), how many students at your school typically purchase (whether they eat it or not) the **school lunch** offered through the USDA-reimbursable National School Lunch Program (whether it is purchased at full/reduced-price or free)?

PLEASE CHECK ONE BOX ONLY

☐ A lot more students
☐ Slightly more students
☐ About the same
☐ Slightly fewer students
☐ A lot fewer students
☐ Don't know

14. Has the percentage of food in **lunches** that students typically consume each day changed since this time last year?

PLEASE CHECK ONE BOX ONLY

☐ Students are eating a lot more of the food
☐ Students are eating slightly more of the food
☐ About the same
☐ Students are eating slightly less of the food
☐ Students are eating a lot less of the food
☐ Don't know

15. Compared to this time last year do your school lunches offer less, the same, or more of the following items?

	Less	Same	More
Amount of fruits and vegetables	☐	☐	☐
Variety of fruits and vegetables	☐	☐	☐
Whole grain options	☐	☐	☐
Low-fat dairy products	☐	☐	☐
Variety of entrée options	☐	☐	☐

16. Has your school used any of the following strategies to promote healthier lunches during the past year?

	Never	Once or twice	Often
Student taste tests	☐	☐	☐
Student advisory groups	☐	☐	☐
Cooking club/demonstrations/classes	☐	☐	☐
Promotional signage or events in cafeteria	☐	☐	☐
Social media (Facebook, Twitter, etc.)	☐	☐	☐
Engagement with PTA or parent groups	☐	☐	☐
Newsletters	☐	☐	☐

The next questions ask about the availability of various foods and beverages in specific venues. If your school does not have that venue, you will skip to the next one. Please be careful to answer about the venue that is the focus of each quest

VENDING MACHINES - BEVERAGES

17. Does your school have ***beverage vending machines*** available to *elementary* students?

☐ Yes ☐ No → **Please go to Question #18**

Please indicate whether the following beverages are available to elementary students from vending machines in your school.

PLEASE CHECK ONE BOX ON EACH ROW	**No**	**Yes**
Bottled Water	☐	☐
Regular soft drinks (e.g., Coke, Pepsi, Dr. Pepper, Sprite)	☐	☐
Diet soft drinks (e.g., Diet Coke, Diet Pepsi, Diet Dr. Pepper, Diet Sprite)	☐	☐
Other no-calorie or very low-calorie beverages (e.g., Crystal Light Lemonade, Propel Fitness Water, Fruit2O)	☐	☐
100% fruit or vegetable juice with no added sweeteners	☐	☐
Sports drinks (e.g., Gatorade, Powerade)	☐	☐
"Light" juices (e.g., Minute Maid Light Orange Juice)	☐	☐
Fruit drinks that are not 100% fruit juice and that are high in calories (e.g., Hawaiin Punch, Sunny Delight, Hi-C)	☐	☐
Sweetened iced tea or coffee (e.g., Snapple or Lipton Tea, Starbucks Frappuccino)	☐	☐
Energy drinks (e.g., Monster, Rockstar)	☐	☐

PLEASE CHECK ONE BOX ON EACH ROW	No	Yes
Milks	☐	☐
Non-fat (skim) unflavored (white) milk	☐	☐
Non-fat (skim) flavored milk	☐	☐
Low-fat (1%) unflavored (white) milk	☐	☐
Low-fat (1%) flavored milk	☐	☐
Whole or 2% milk, including flavored or unflavored milk	☐	☐

18. At what times are *vending machines* available for elementary students to purchase beverages?

PLEASE CHECK ALL THAT APPLY

☐ Before classes begin in the morning
☐ During school hours (but not when meals are being served)
☐ During school lunch periods
☐ After school

NEXT PAGE FOR QUESTION 19- VENDING MACHINES- FOOD

19. Does your school have ***food vending machines*** available to *elementary* students?

☐ Yes ☐ No → **Please go to Question #20**

Please indicate whether the following foods are available to elementary students from vending machines in your school.

PLEASE CHECK ONE BOX ON EACH ROW

	NO	YES
Candy	☐	☐
Cookies, cakes, pastries, or other sweetened baked goods that are not *low in fat*	☐	☐
Low-fat cookies, cakes, pastries, or other low-fat sweetened baked goods	☐	☐
Salty snacks that are **not** *low in fat*, such as regular potato chips	☐	☐
Low-fat salty snacks, such as pretzels, baked chips, or other *low-fat* chips	☐	☐
Ice cream or frozen yogurt that is **not** *low in fat*	☐	☐
Low-fat or *fat-free* ice cream, frozen yogurt, sherbet	☐	☐
Crackers that are made from *whole grains*	☐	☐
Crackers that are **not** *whole grain*	☐	☐
Granola bars that are made from *whole grains* (e.g., Nutri-Grain)	☐	☐
Energy bars (e.g., PowerBar)	☐	☐
Bread sticks, rolls, bagels, pita bread, or other bread products that made from *whole grains*	☐	☐
Bread sticks, rolls, bagels, pita bread, or other bread products that are **not** *whole grain*	☐	☐
Low-fat or *non-fat* yogurt	☐	☐
Fresh fruit	☐	☐
Other fruit (e.g., dried or canned fruit)	☐	☐
Vegetables (e.g., carrot sticks or celery sticks)	☐	☐
Pre-made main course salads (e.g., chef's salad)	☐	☐

20. At what times are *vending machines* available for students to purchase food?

PLEASE CHECK ALL THAT APPLY

- ☐ Before classes begin in the morning
- ☐ During school hours (but not when meals are being served)
- ☐ During school lunch periods
- ☐ After school

SCHOOL/STUDENT STORE and/or SNACK BARS/CARTS/BEVERAGES

21. Does your school have ***school stores or snack bars*** available to students?

☐ Yes ☐ No ⟶ **please go to next page (Question #22)**

Please indicate whether the following beverages are available to students from stores/snack bars machines in your school.

PLEASE CHECK ONE BOX ON EACH ROW	No	Yes
Bottled water		
Regular soft drinks (e.g., Coke, Pepsi, Dr. Pepper, Sprite)	☐	☐
Diet soft drinks (e.g., Diet Coke, Diet Pepsi, Diet Dr. Pepper, Diet Sprite)	☐	☐
Other no-calorie or very low-calorie beverages (e.g., Crystal Light Lemonade, Propel Fitness Water, Fruit 2 O)	☐	☐
100% fruit or vegetable juice with no added sweetners	☐	☐
Sport drinks	☐	☐
"Light" juices (e.g., Minute Maid Light Orange Juice)	☐	☐
Fruit drinks that are not 100% fruit juice and that are high in calories (e.g., Hawaiian Punch, Sunny Delight, Hi-C)	☐	☐
Sweetened ice tea or coffee (Snapple or Lipton teas, Starbucks Frappucino)	☐	☐
Energy drinks (e.g., Monster, Rockstar)	☐	☐

SCHOOL/STUDENT STORE and/or SNACK BARS/CARTS/BEVERAGES

21. *PLEASE CHECK ONE BOX ON EACH ROW*

Milks	No	Yes
Non-fat (skim) unflavored (white) milk	☐	☐
Non-fat (skim) flavored milk	☐	☐
Low-fat (1%) unflavored (white) milk	☐	☐
Low-fat (1%) flavored milk	☐	☐
Whole or 2% milk, including flavored or unflavored milk	☐	☐

22. At what times are stores/snack bars available for students to purchase beverages?

PLEASE CHECK ALL THAT APPLY

☐ Before classes begin in the morning
☐ During school hours (but not when meals are being served)
☐ During school lunch periods
☐ After school

SCHOOL/STUDENT STORE and/or SNACK BARS/CARTS/BEVERAGES

23. Does your school have ***school stores or snack bars*** that are available to elementary students?

☐ Yes ☐ No → **please go to next page (Question #25)**

Please indicate whether the following foods are available to elementary students from stores/snack bars in your school.

PLEASE CHECK ONE BOX ON EACH ROW	**No**	**Yes**
Candy	☐	☐
Cookies, cakes, pastries, or other sweetened basked goods that are **not** *low in fat*	☐	☐
Low-fat cookies, cakes, pastries, or other low-fat sweetened baked goods	☐	☐
Salty snacks that **not** *low in fat*, such as regular potato chips	☐	☐
Low-fat salty snacks, such as pretzels, baked chips, or other *low-fat* chips	☐	☐
Ice cream or frozen yogurt that is **not** *low in fat*	☐	☐
Low-fat or *fat-free* ice cream, frozen yogurt, sherbet	☐	☐
Crackers that are made from *whole grains*	☐	☐
Crackers that **not** *whole grain*	☐	☐
Granola bars that are made from whole grains (e.g., Nutri-Grain)	☐	☐
Energy bars (e.g., PowerBar)	☐	☐
Bread sticks, rolls, bagels, pita bread, or other bread products that are made from *whole grains*	☐	☐
Bread sticks, rolls, bagels, pita bread, or other bread products that are **not** *whole grain*	☐	☐
Low-fat or *non-fat* yogurt	☐	☐

SCHOOL/STUDENT STORE and/or SNACK BARS/CARTS/BEVERAGES

Please indicate whether the following foods are available to elementary students from stores/snack bars in your school.

PLEASE CHECK ONE BOX ON EACH ROW	No	Yes
Cheese sticks that are **not** *low in fat*	☐	☐
Low-fat or *not-fat* cheese sticks	☐	☐
Fresh fruit	☐	☐
Other fruit (e.g., dried or canned fruit)	☐	☐
Vegetables (e.g., carrot sticks or celery sticks)	☐	☐
Pre-made, main course salads (e.g., chef's salad)	☐	☐

24. At what times are school stores or snack bars available for students to purchase foods?

PLEASE CHECK ALL THAT APPLY

- ☐ Before classes begin in the morning
- ☐ During school hours (but not when meals are being served)
- ☐ During school lunch periods
- ☐ After school

SCHOOL LUNCH MEAL – BEVERAGES

25. Does your school offer a school lunch meal to *elementary* and/or *middle school* students?

Yes ↓ No ⟶ **Please go to next page (Question #26)**

Please indicate how often the following beverages are available to elementary students with the lunch meal (not a la carte) in your school.

PLEASE CHECK ONE BOX ON EACH ROW	**Never**	**Some days**	**Most or every day**
Bottled water	☐	☐	☐
Regular soft drinks (e.g., Coke, Pepsi, Dr. Pepper, Sprite)	☐	☐	☐
Diet soft drinks (e.g., Diet Coke, Diet Pepsi, Diet Dr. Pepper, Diet Sprite)	☐	☐	☐
Other no-calorie or very low-calorie beverages (e.g., Propel Fitness Water)	☐	☐	☐
100% fruit or vegetable juice with no added sweetners	☐	☐	☐
Sports drinks (e.g., Gatorade or Powerade)	☐	☐	☐
"Light" juices (e.g., Minute Maid Light Orange Juice)	☐	☐	☐
Fruit drinks that not 100% fruit juice and that high in calories (e.g., Hawaiian Punch, Sunny Delight, Hi-C)	☐	☐	☐
Sweetened iced tea or coffee (e.g., Snapple or Lipton teas, Starbucks Frappuccino)	☐	☐	☐
Energy drinks (e.g., Monster, Rockstar)	☐	☐	☐
Milks	**Never**	**Some days**	**Most or every day**
Non-fat (skim) unflavored (white) milk	☐	☐	☐
Non-fat (skim) flavored milk	☐	☐	☐
Low-fat (1%) unflavored (white) milk	☐	☐	☐
Low-fat (1%) flavored milk	☐	☐	☐
Whole or 2% milk, including flavored or unflavored milk	☐	☐	☐

SCHOOL LUNCH MEAL- FOOD

26. Does your school offer a school lunch meal to students?

☐ Yes ☐ No → **Please go to next page (Question #27)**

Please indicate how often the following food items are available to elementary students with the lunch meal (not a la carte) in your school.

PLEASE CHECK ONE BOX ON EACH ROW	**Never**	**Some days**	**Most or every day**
Candy	☐	☐	☐
Cookies, cakes, pastries, or other sweetened basked goods that are **not** *low in fat*	☐	☐	☐
Low-fat cookies, cakes, pastries, or other low-fat sweetened baked goods	☐	☐	☐
Salty snacks that **not** *low in fat*, such as regular potato chips	☐	☐	☐
Low-fat salty snacks, such as pretzels, baked chips, or other *low-fat* chips	☐	☐	☐
Ice cream or frozen yogurt that is **not** *low in fat*	☐	☐	☐
Low-fat or *fat-free* ice cream, frozen yogurt, sherbet	☐	☐	☐
Crackers that are made from *whole grains*	☐	☐	☐
Crackers that **not** *whole grain*	☐	☐	☐
Granola bars that are made from whole grains (e.g., Nutri-Grain)	☐	☐	☐
Energy bars (e.g., PowerBar)	☐	☐	☐
Bread sticks, rolls, bagels, pita bread, or other bread products that are made from *whole grains*	☐	☐	☐
Bread sticks, rolls, bagels, pita bread, or other bread products that are **not** *whole grain*	☐	☐	☐
Low-fat or *non-fat* yogurt	☐	☐	☐
Cheese sticks that are **not** *low in fat*	☐	☐	☐
Low-fat or *not-fat* cheese sticks	☐	☐	☐
Fried potatoes (including reheated French fries or tater tots)	☐	☐	☐

SCHOOL LUNCH MEAL- FOOD

Please indicate how often the following food items are available to elementary students with the lunch meal (not a la carte) in your school.

PLEASE CHECK ONE BOX ON EACH ROW	**Never**	**Some days**	**Most or every day**
Vegetables (excluding potatoes)	☐	☐	☐
Fresh fruit	☐	☐	☐
Other fruit (e.g., dried or canned fruit)	☐	☐	☐
Whole grains (e.g., wheat bread or brown rice)	☐	☐	☐
Two or more different entrees or main courses	☐	☐	☐
Salad bar	☐	☐	☐
Pre-made, main course salads (e.g., chef's salad)	☐	☐	☐
Regular pizza	☐	☐	☐
"Healthier" pizza (e.g., whole-wheat crust, lower-fat cheese and/or toppings)	☐	☐	☐

A LA CARTE BEVERAGES

A la carte items are any foods or beverages that are not included as part of the school lunch or breakfast meal provided for the USDA National School Lunch Program or School Breakfast Program prices. Examples are milk only, single item lunches from the lunch meal, or snack items.

27. Does your school offer **a la carte** service at lunch time to students?

☐ Yes ☐ No → **Please go to next page (Question #28)**

Please indicate how often the following food items are available to students in your school ***a la carte at lunch.***

PLEASE CHECK ONE BOX ON EACH ROW	Never	Some days	Most of every day
Bottled water	☐	☐	☐
Regular soft drinks (e.g., Coke, Pepsi, Dr. Pepper, Sprite)	☐	☐	☐
Diet soft drinks (e.g., Diet Coke, Diet Pepsi, Diet Dr. Pepper, Diet Sprite)	☐	☐	☐
Other no-calorie or very low-calorie beverages (e.g., Propel Fitness Water)	☐	☐	☐
100% fruit or vegetable juice with no added sweetners	☐	☐	☐
Sports drinks (e.g., Gatorade or Powerade)	☐	☐	☐
"Light" juices (e.g., Minute Maid Light Orange Juice)	☐	☐	☐
Fruit drinks that not 100% fruit juice and that high in calories (e.g., Hawaiian Punch, Sunny Delight, Hi-C)	☐	☐	☐
Sweetened iced tea or coffee (e.g., Snapple or Lipton teas, Starbucks Frappuccino)	☐	☐	☐
Energy drinks (e.g., Monster, Rockstar)	☐	☐	☐
Milks	**Never**	**Some days**	**Most or every day**
Non-fat (skim) unflavored (white) milk	☐	☐	☐
Non-fat (skim) flavored milk	☐	☐	☐
Low-fat (1%) unflavored (white) milk	☐	☐	☐
Low-fat (1%) flavored milk	☐	☐	☐
Whole or 2% milk, including flavored or unflavored milk	☐	☐	☐

A LA CARTE - FOOD

26. Does your school offer **a la carte** service at lunch time to students?

☐ Yes ☐ No → **Please go the next page**

Please indicate how often the following food items are available to students with the lunch meal (not a la carte) in your school.

PLEASE CHECK ONE BOX ON EACH ROW	**Never**	**Some days**	**Most or every day**
Candy	☐	☐	☐
Cookies, cakes, pastries, or other sweetened basked goods that are **not** *low in fat*	☐	☐	☐
Low-fat cookies, cakes, pastries, or other low-fat sweetened baked goods	☐	☐	☐
Salty snacks that **not** *low in fat*, such as regular potato chips	☐	☐	☐
Low-fat salty snacks, such as pretzels, baked chips, or other *low-fat* chips	☐	☐	☐
Ice cream or frozen yogurt that is **not** *low in fat*	☐	☐	☐
Low-fat or *fat-free* ice cream, frozen yogurt, sherbet	☐	☐	☐
Crackers that are made from *whole grains*	☐	☐	☐
Crackers that **not** *whole grain*	☐	☐	☐
Granola bars that are made from whole grains (e.g., Nutri-Grain)	☐	☐	☐
Energy bars (e.g., PowerBar)	☐	☐	☐
Bread sticks, rolls, bagels, pita bread, or other bread products that are made from *whole grains*	☐	☐	☐
Bread sticks, rolls, bagels, pita bread, or other bread products that are **not** *whole grain*	☐	☐	☐
Low-fat or *non-fat* yogurt	☐	☐	☐
Cheese sticks that are **not** *low in fat*	☐	☐	☐
Low-fat or *not-fat* cheese sticks	☐	☐	☐
Fried potatoes (including reheated French fries or tater tots)	☐	☐	☐

A LA CARTE - FOOD

Please indicate how often the following food items are available to elementary students with the lunch meal (not a la carte) in your school.

PLEASE CHECK ONE BOX ON EACH ROW	Never	Some days	Most or every day
Vegetables (excluding potatoes)	☐	☐	☐
Fresh fruit	☐	☐	☐
Other fruit (e.g., dried or canned fruit)	☐	☐	☐
Whole grains (e.g., wheat bread or brown rice)	☐	☐	☐
Two or more different entrees or main courses	☐	☐	☐
Salad bar	☐	☐	☐
Pre-made, main course salads (e.g., chef's salad)	☐	☐	☐
Regular pizza	☐	☐	☐
"Healthier" pizza (e.g., whole-wheat crust, lower-fat cheese and/or toppings)	☐	☐	☐

PLEASE USE SPACE PROVIDED TO ANSWER EACH QUESTION

1) For schools that participate in the National School Lunch Program, schools are required to adhere to certain nutrition requirements set forth by the Arizona Department of Education and the USDA (US Department of Agriculture). What has been your school's experience been in carrying out these nutrition requirements?

2) What factors have facilitated and/or impeded implementation of these nutrition requirements?

3) What are ways your school has incorporated Navajo cultural teachings and practices for the promotion of health?

4) What role, if any, do you think schools should play in student nutrition?

Appendix F

School Observation Form

Vending Machine

1. Type of Vending Machine: ___ Food ___ Beverage ___ Both
2. # of Vending Machine _____
3. Vending Machine Location: _____
4. Hours of Operation: ***(check ALL that apply)***
   - ___ Before school
   - ___ During lunch period
   - ___ After lunch period
   - ___ Before lunch
   - ___ After school

Other Food/Beverage Sources

5. Types of Alternative Food Sources:
   - ___ School stores
   - ___ Snack bars
   - ___ Food carts
   - ___ Other sources:_____
   - ___ No alternative food sources

6. Locations of Alternative Food Sources:
   - ___ In foodservice area
   - ___ Adjacent to foodservice area (within 20 feet)
   - ___ Elsewhere in school building or on school grounds: _____

7. Times Alternative Food Sources Were Available to Students:
   - ___ Before school
   - ___ During lunch period
   - ___ After lunch period
   - ___ Before lunch
   - ___ After school

Adapted from: USDA, Food & Nutrition Services, School Nutrition Dietary Assessment Study III (2007)

Appendix G

School board approvals

WINDOW ROCK UNIFIED SCHOOL DISTRICT NO. 8
GOVERNING BOARD

P.O. BOX 559
NAVAJO ROUTE 12
FORT DEFIANCE, ARIZONA 86504

OFFICE: 928.729.6706
FAX: 928.729.6841
WWW.WRSCHOOL.NET

RESOLUTION OF WINDOW ROCK SCHOOL DISTRICT NO #8 OF APACHE COUNTY, ARIZONA

IN SUPPORT OF DISSERTATION PROJECT TITLED: *A SOCIO-ECOLOGICAL ANALYSIS OF CHILDHOOD OBESITY AND SCHOOL NUTRITION POLICY AND PRACTICES IN SELECT PUBLIC SCHOOLS ON THE NAVAJO RESERVATION*

By Regina Eddie, PhD student, University of New Mexico

WHEREAS:

1. The Window Rock Unified School District (WRUSD) is part of the Arizona public school system that is located on the Navajo reservation and includes Tsehootsooi Dine' Bi Olta, Tsehootsooi Primary Learning Center, Tsehootsooi Intermediate Learning Center, and Tsehootsooi Middle School;
2. The WRUSD is committed to providing quality education that is founded on core principles that guide the school district in providing exemplary education and meeting tribal, state and federal standards; and core principles are exemplary curriculum & assessment; exemplary student performance; exemplary staff performance; strong parental and community relations; safe, efficient & supportive school environment, and efficient & supportive learning operations; and
3. The WRUSD has a governing body comprised of 5 board members with the responsibility for establishing policy and overseeing the operation of the local schools;
4. The WRUSD is a school district that participates in the federally funded National School Lunch Program and receives cash subsidies for each meal served. Meals served must meet federal nutrition requirements; and
5. Ms. Regina Eddie, is Navajo, a nurse in a PhD program with the University of New Mexico and is conducting a dissertation project that involves schools that participate in the National School Lunch Program;
6. The dissertation project will examine how schools are contributing to the diets of Navajo students. By understanding what kids are eating at school and the policies that influence the food options offered are important steps needed to ensure schools provide an optimal environment for healthy eating; and
7. Participants needed for the dissertation project will be the school principal and food service personnel; no students will be involved; and Ms. Eddie will also conduct observations of food environment of select schools; and
8. As part of the research approval process, Ms. Eddie will follow all the required research protocols outlined by the University of New Mexico and the Navajo Nation Human Research Review Board; and
9. The WRUSD Superintendent supports Ms. Eddie's dissertation project. See attached letter of support.

Marcus Tulley	*Carl A. Hillis*	*Marty Bowman*	*Brenda Wauneka*	*Floyd Ashley*
Board President	*Board Clerk*	*Board Member*	*Board Member*	*Board Member*

WINDOW ROCK UNIFIED SCHOOL DISTRICT NO. 8
GOVERNING BOARD

P.O. BOX 559
NAVAJO ROUTE 12
FORT DEFIANCE, ARIZONA 86504

OFFICE: 928.729.6706
FAX: 928.729.6841
WWW.WRSCHOOL.NET

NOW, THEREFORE, BE IT RESOLVED THAT:

1. The Window Rock Unified School District Governing Board declares it support and approval to conduct her dissertation project at Tsehootsooi Dine' Bi Olta, Tsehootsooi Primary Learning Center, Tsehootsooi Intermediate Learning Center, Tsehootsooi Middle School as part of her doctoral program.

CERTIFICATION

This resolution was duly considered by the Governing Board of Window Rock Unified School District No. 8 at a duly called meeting at Fort Defiance, Arizona, at which a quorum was present and passed by a vote of 5 in favor, 0 opposed, and 0 abstaining, this 5th day of October 2016.

Marcus Tulley, Governing Board President

Carl Hillis, Governing Board Clerk

Marty Bowman, Governing Board Member

Brenda Wauneka, Governing Board Member

Floyd Ashley, Governing Board Member

Marcus Tulley *Board President*
Carl A. Hillis *Board Clerk*
Marty Bowman *Board Member*
Brenda Wauneka *Board Member*
Floyd Ashley *Board Member*

Dilcon Community School, Inc.

HC 63, Box G, Winslow, Arizona 86047 - Phone: (928) 657-3211 - Fax: (928) 657-3213

William M. Wachunas, *Principal*

George Joe, *Governing Board President*
Rose VanCruz, *Vice-President*
Marjorie Clark, *Secretary*
Steven J. Begay, *Member*
Lorraine Jackson, *Member*

Dilcon Community School, Inc.
Governing Board Resolution Support

The Dilcon Community School, Inc. Governing Board approval for dissertation project titled: *A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Policy and Practices in Select Public Schools on the Navajo Reservation*
by Regina Eddie, PhD student, University of New Mexico
Resolution No:

WHEREAS:

1. The Dilcon Community School Inc. is a community controlled school, with grades K-8, located on the Navajo reservation in Dilcon, AZ; and
2. Dilcon Community School Inc. is committed to providing quality education and maximizing academic excellence while preserving Dine' cultural values; and believes all children can learn through a solid foundation of intellectual, social, emotional and physical development in a safe, healthy and structured learning environment; and
3. The Dilcon Community School Inc. has a governing body comprised of 5 board members with the responsibility for establishing policy and overseeing the operation of the local school; and is supported by the *Navajo Sovereignty in Education Act of 2005*, which prescribes local control of education shall be under the guidance and direction of the local governing board; and further
4. The *Navajo Sovereignty in Education Act of 2005* establishes the Navajo Nation has the authority and an inherent right to exercise its responsibility to the Navajo People for their education by prescribing and implementing educational laws and policies applicable to all schools serving the Navajo Nation and all educational programs receiving significant funding for the education of Navajo youth or adults. At the same time, the Navajo Nation recognizes the legitimate authority of the actual education provider, whether state, federal, community controlled, charter or private; and
5. The Dilcon Community School Inc. is a school that participates in the federally funded National School Lunch Program and receives cash subsidies for each meal served. Meals served must meet federal nutrition requirements; and
6. Ms. Regina Eddie, is Navajo, a nurse in a PhD program with the University of New Mexico and is conducting a dissertation project that involves schools that participate in the National School Lunch Program;
7. The dissertation project will examine how schools are contributing to the diets of Navajo students. By understanding what kids are eating at school and the policies that influence the food options offered are important steps needed to ensure schools provide an optimal environment for healthy eating; and
8. Participants needed for the dissertation project will be the school principal and food service personnel; no students will be involved; and Ms. Eddie will also conduct observations of the school food environment; and
9. As part of the research approval process, Ms. Eddie will follow all the required research protocols outlined by the University of New Mexico and the Navajo Nation Human Research Review Board; and
10. The Dilcon Community School Inc. Principal, Mr. William Wachunas supports Ms. Eddie's dissertation project. See attached letter of support.

NOW, THEREFORE, BE IT RESOLVED THAT:

1. The Dilcon Community School Inc. Governing Board declares it support and approval to conduct her dissertation project at Dilcon Community School as part of her doctoral program.

Adopted by the Governing Board of the Dilcon Community School Inc. on August 10, 2016, by the following vote of the Board:

President

Vice-President

Secretary

Motion by: Lorraine Jackson

Second by: Marjorie Clark

VOTE: 4 **in favor** 0 **opposed** 1 **abstained**

Cedar Unified School District # 25
Governing Board Resolution Support

The Cedar Unified School District Governing Board approval for dissertation project titled:*A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Policy and Practices in Select Public Schools on the Navajo Reservation*

by Regina Eddie, PhD student, University of New Mexico

Resolution No:

WHEREAS:

1. The Cedar Unified School District #25 is part of the Arizona public school system that is located on the Navajo reservation in Kearns Canyon, AZ; and includes Jeddito Elementary School which is a K-8 school; and
2. The Cedar Unified School District supports strong programs for special education, vocational, interscholastic, athletic programs, and much more; and believes that all students can learn when given the opportunity and encourages parent volunteers to become part of his child's education; and
3. The Cedar Unified School District #25 has a governing body comprised of 5 board members with the responsibility for establishing policy and overseeing the operation of the local school; andis supported by the *Navajo Sovereignty in Education Act of 2005*, which prescribes local control of education shall be under the guidance and direction of the local governing board; and further
4. The *Navajo Sovereignty in Education Act of 2005*establishes the Navajo Nation has the authority and an inherent right to exercise its responsibility to the Navajo People for their education by prescribing and implementing educational laws and policies applicable to all schools serving the Navajo Nation and all educational programs receiving significant funding for the education of Navajo youth or adults. At the same time, the Navajo Nation recognizes the legitimate authority of the actual education provider, whether state, federal, community controlled, charter or private; and
5. The Cedar Unified School District is a school district that participates in the federally funded National School Lunch Program and receives cash subsidies for each meal served. Meals served must meet federal nutrition requirements; and
6. Ms. Regina Eddie, is Navajo, a nurse in a PhD program with the University of New Mexico and is conducting a dissertation project that involves schools that participate in the National School Lunch Program;
7. The dissertation project will examine how schools are contributing to the diets of Navajo students. By understanding what kids are eating at school and the policies that influence the food options offered are important steps needed to ensure schools provide an optimal environment for healthy eating; and
8. Participants needed for the dissertation project will be the school principal and food service personnel; no students will be involved; and Ms. Eddie will also conduct observations of the school food environment; and
9. As part of the research approval process, Ms. Eddie will follow all the required research protocols outlined by the University of New Mexico and the Navajo Nation Human Research Review Board; and
10. The Cedar Unified School District supports Ms. Eddie's dissertation project. See attached letter of support.

NOW, THEREFORE, BE IT RESOLVED THAT:

1. The Cedar Unified School District Governing Board declares it support and approval to conduct her dissertation project at Jeddito Elementary School as part of her doctoral program.

Adopted by the Governing Board of the Cedar Unified School District #25 on August 16, 2016, by the following vote of the Board:

Board Member 8/16/16

Board Member 8/14/16

President

Vice-President

Secretary

Motion by: RAYMOND JACK

Second by: IRIS YESSLITH

Appendix H

Supporting resolutions from Chapters (communities)

THE NAVAJO NATION
FORT DEFIANCE CHAPTER

P.O. Box 366 • Ft Defiance, Arizona 86504
Phone: (928) 729-4352 • Fax (928) 729-4353
Email: *ftdefiance@navajochapters.org*

Zondra J. Bitsuie, *President*
Lorraine W. Nelson, *Vice-President*
Brenda Wauneka, *Secretary/Treasurer*
Herman Billie, *Grazing Official*
Ben Bennett, *Council Delegate*

RUSSELL BEGAYE
Navajo Nation President

JONATHAN NEZ
Navajo Nation Vice President

FDC-2016-09-18-01

Resolution of Ft. Defiance Chapter

Supporting and Recommending Ms. Regina Eddie for Approval to Conduct Dissertation Project at the Elementary and Middle Schools of Window Rock Unified School District to Complete PhD Studies at the University of New Mexico.

WHEREAS:

1. The Ft. Defiance Chapter is an LGA chapter pursuant to N.N.C. 26 established to speak and act on behalf of its constituents for the benefit of its community issues including education; and

2. The Ft. Defiance Chapter supports Window Rock Unified School District (WRUSD) as its local educational institution which includes Tsehootsooi Dine' Bi Olta, Tsehootsooi Intermediate Learning Center, Tsehootsooi Middle School, and Tsehootsooi Primary Learning Center school;

3. The WRUSD Superintendent supports Ms. Eddie to conduct her necessary dissertation project toward acquiring her doctorate degree in nursing; and

4. As part of the research approval process, Ms. Regina Eddie will follow all the required research protocols outlined by the University of New Mexico and the Navajo Nation Human Research Review Board; and

5. The dissertation project titled, *A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Policies and Practices in Select Elementary and Middle Schools on the Navajo Reservation* will help to understand how schools are contributing to the diets of students that attend the WRUSD schools. By understanding what students are eating at school and the policies that influence the food options offered are important steps needed to ensure schools provide an optimal environment for healthy eating and is **a crucial step in the prevention of overweight and obesity; and**

NOW THEREFORE BE IT RESOLVED THAT:

1. The Ft. Defiance Chapter hereby declares its support and recommendation for Ms. Regina Eddie to conduct her study and research at Tsehootsooi Dine' Bi Olta, Tsehootsooi Intermediate Learning Center, Tsehootsooi Middle School, and Tsehootsooi Primary Learning Center schools as part of her doctoral program.

3. The Ft. Defiance Chapter requests and recommends the Navajo Nation Human Research Review Board to accept and support Ms. Eddie's dissertation work to be completed at the following WRUSD schools: Tsehootsooi Dine' Bi Olta, Tsehootsooi Intermediate Learning Center, Tsehootsooi Middle School, and Tsehootsooi Primary Learning Center.

CERTIFICATION

I, hereby certify that the foregoing resolution was duly considered at duly called meeting at Ft. Defiance, Navajo Nation, Arizona at which a quorum was present and the same was passed with a vote of 32 in favor; 0 opposed and 2 abstained on this 18th Day of September, 2016.

Motion by: Dorothy A. Tully Seconded by: Daniel Yazza

Zondra Bitsuie, President

Lee Jack, Sr., Council Delegate
Lorenzo Lee, Sr., President
Daryl Joe, Vice President
Rudie T. John, Secretary Treasurer
Willie Foster Sr., Grazing Committee Officer
Margie Barton, Chapter Manager
Medina James, Account Maintenance Specialist

DILKON CHAPTER
HCR 63 BOX E • WINSLOW, AZ • 86047

THE NAVAJO NATION
Russell Begaye
PRESIDENT
Jonathan Nez
VICE PRESIDENT

Resolution of Dilkon Chapter **DIL-09-076-16**

Supporting and Recommending Ms. Regina Eddie for Approval to Conduct Dissertation Project at the Dilcon Community School to Complete PhD Studies with University of New Mexico

WHEREAS:

1. The Dilkon chapter is a LGA chapter pursuant to N.N.C. 26 established to speak and act on behalf of its constituents for the benefit of its community issues including education; and

2. The Dilkon chapter supports the Dilcon Community School as its local educational institution including collaboration and coordination on community/school related issues; and

3. The Dilcon Community School Governing Board has approved to allow Ms. Regina Eddie to conduct her dissertation project titled, *A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Polices and Practices in Select Elementary and Middle Schools on the Navajo Reservation*; a requirement toward acquiring her doctorate degree in nursing; and

4. As part of the research approval process, Ms. Regina Eddie will follow all the required research protocols outlined by the University of New Mexico and the Navajo Nation Human Research Review Board; and

NOW THEREFORE BE IT RESOLVED THAT:

1. The Dilkon chapter hereby declares its support and recommendation for Ms. Regina Eddie to conduct her study and research at Dilcon Community School as part of her doctoral program.

2. The Dilkon chapter is appreciative to Dilcon Community School to accept Ms. Eddie to perform her necessary research program at the school.

3. The Dilkon chapter requests and recommends the Navajo Nation Human Research Review Board to accept and support Ms. Eddie's dissertation work to be completed at the Dilcon Community School.

CERTIFICATION

I, hereby certify that the foregoing resolution was duly considered at duly called meeting at Dilkon, Navajo Nation, Arizona at which a quorum was present and the same was passed with a vote of **23** in favor; **00** opposed and **03** abstained on this **13th** Day **of September, 2016**.

Motion by: Anna Frazier; Seconded by: Carol Davis

PRESIDING CHAIR:

Daryl Joe, Vice President

PHONE (928) 657-8100 • FAX (928) 657-8103
Website: www.dilkon.navajochapters.org Email: dilkon@navajochapters.org

THE NAVAJO NATION

JEDDITO CHAPTER
P.O BOX 798
KEAMS CANYON, ARIZONA 86034
TEL: (928) 738-2276 Fax: (928) 738-5455

Resolution of Jeddito Chapter
JEDD-09-18-16-001

Supporting and Recommending Ms. Regina Eddie for Approval to Conduct Dissertation Project at the Jeddito Elementary School to Complete PhD Studies at the University of New Mexico

WHEREAS:

1. The Jeddito Chapter is an LGA chapter pursuant to N.N.C. 26 established to speak and act on behalf of its constituents for the benefit of its community issues including education; and

2. The Jeddito Chapter supports the Jeddito Elementary School, a K-8 school, as its local educational institution including collaboration and coordination on community/school related issues; and

3. The Cedar Unified School District #25 Governing Board has approved to allow Ms. Regina Eddie to conduct her dissertation project titled, *A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Policies and Practices in Select Elementary and Middle Schools on the Navajo Reservation*; a requirement toward acquiring her doctorate degree in nursing; and

4. As part of the research approval process, Ms. Regina Eddie will follow all the required research protocols outlined by the University of New Mexico and the Navajo Nation Human Research Review Board; and

5. The dissertation project will help to understand how schools are contributing to the diets of students that attend Jeddito Elementary School. By understanding what students are eating at school and the policies that influence the food options offered are important steps needed to ensure schools provide an optimal environment for healthy eating; and

NOW THEREFORE BE IT RESOLVED THAT:

1. The Jeddito Chapter hereby declares its support and recommendation for Ms. Regina Eddie to conduct her study and research at Jeddito Elementary School as part of her doctoral program.

2. The Jeddito Chapter is appreciative to Cedar Unified School District Governing Board to accept Ms. Eddie to perform her necessary research program at the school.

3. The Jeddito Chapter requests and recommends the Navajo Nation Human Research Review Board to accept and support Ms. Eddie's dissertation work to be completed at the Jeddito Elementary School.

CERTIFICATION

I hereby certify that the foregoing resolution was considered at a duly called regular chapter meeting at the Jeddito Chapter, Navajo Nation, Arizona at which a quorum was present and the same passed by a vote 14 in favor 0 opposed and 3 abstained this 18th day of September 2016.

Motion by: Christina Yazzie Second by: Ida Nelson

Terry J. Yazzie, President

Appendix I

Navajo Nation Human Research Review Board Approval

October 20, 2016

Regina S. Eddie, MS, RN
University of New Mexico
12880 Three Man Trail
Flagstaff, AZ 86004

Dear Ms. Eddie,

This is to advise you that the **Study #NNR-16.260T "A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Policies and Practices in Select Elementary and Middle Schools on the Navajo Reservation"** has been presented to the Navajo Nation Human Research Review Board (NNHRRB) on **October 18, 2016**, and the following action taken subject to the conditions and explanation provided below.

Reasons:	New Title
Description:	Request Review and Approval of New Study
NNHRRB Action:	**Accepted and Approved – covering October 18, 2016 – October 18, 2017**
Conditions:	With all Standard Conditions

The Navajo Nation Human Research Review Board has added a very important additional contingency regarding failure to comply with NNHRRB rules, regulations, and submittal of reports which could result in sanctions being placed against your project. This could also affect your funding source and the principal investigator. Under Part Five: Certification, please note paragraph five wherein it states: *"I agree not to proceed in the research until the problems have been resolved or the Navajo Nation Human Research Review Board has reviewed and approved the changes."* Therefore, it is very important to submit quarterly and annual reports on time and if continuation is warranted submit a letter of request sixty (60) days prior to the expiration date.

The following are requirements that apply to all research studies:

1. The Navajo Nation retains ownership of all data obtained within its territorial boundaries. The Principal Investigator shall submit to the NNHRRB a plan and timeline on how and when the data/statistics will be turned over to the Navajo Nation;
2. Only the approved informed consent document(s) will be used in the study;
3. Any proposed future changes to the protocol or the consent form(s) must again be submitted to the Board for review and approval prior to implementation of the proposed change;
4. If the results of the study will be published or used for oral presentations at professional conferences, the proposed publication, abstract and/or presentation materials must be submitted to the Navajo Research Program for Board review and prior approval;
5. Upon Board approval, three (3) copies of the final publication must be submitted to the Navajo Research Program;
6. All manuscripts must be submitted to the Navajo Research Program for Board Review and prior approval;
7. The Principal Investigator must submit a dissemination plan on how the results of the study and how these results will be reported back to the Navajo Nation;

8. The Principal Investigator must share specifically how these results will generally benefit or improve the health of the Navajo people. This can be completed by:
    a. Conducting an educational in-service for the community people and health care providers on the Navajo Nation and present the findings. Provide documentation of these in-services presented.
    b. Developing educational materials for use by the health care providers and the community people and providing the training on how to use the materials; and
    c. Presenting and sharing the results of the study at a research conference sponsored by the Navajo Nation for its health care providers and the Navajo people.
9. The Principal Investigator is expected to submit documentation on 8a, b, & c;
10. The Principal Investigator must submit quarterly and annual reports as scheduled.

Please begin using Protocol Number **NNR-16.260** on all correspondences. If you have any questions on this subject, please call the Navajo Research Program at (928) 871-6929.

Sincerely Yours,

Beverly Becenti-Pigman, Chairperson
Navajo Nation Human Research Review Board

cc: #NNR-16.260 file

Appendix J

University approvals

UNM HEALTH SCIENCES CENTER

Human Research Review Committee
Human Research Protections Office

October 6, 2016

Jennifer Averill
JAverill@salud.unm.edu

Dear Jennifer Averill:

On 10/6/2016, the HRRC reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	A Socio-Ecological Analysis of Childhood Obesity and School Nutrition Policy and Practice in Select Elementary Public Schools on the Navajo Reservation
Investigator:	Jennifer Averill
Study ID:	16-333
Submission ID:	16-333
IND, IDE, or HDE:	None
Submission Summary:	Initial Study
Documents Approved:	• Supporting resolutions chapters • -HRP583 Exempt Category 2 3.pdf • REddie-JA_UNMHSC-Consent-Survey-ResearchLetter (1).pdf • Supporting resolutions school boards • Recruitment letter.pdf • Food and Policy Questionnaire Part 2.pdf • Food and Policy Questionnaire Part 1.pdf
Review Category:	EXEMPTION: Categories (2) Tests, surveys, interviews, or observation.
Determinations/Waivers:	Provisions for Consent are adequate. HIPAA Authorization Addendum Not Applicable.
Submission Approval Date:	10/6/2016
Approval End Date:	None
Effective Date:	**10/6/2016**

The HRRC approved the study from 10/6/2016 to inclusive. If modifications were required to secure approval, the effective date will be later than the approval date. The "Effective Date" 10/6/2016 is the date the HRRC approved your modifications and, in all cases, represents the date study activities may begin.

****Additional Action: After this study is approved by the Navajo Nation IRB, please create a Modification in Click and submit a copy of the NNIRB approval letter.**

Because it has been granted exemption, this research is not subject to continuing review.

This determination applies only to the activities described in this submission and does not apply should you make any changes to these documents. If changes are being considered and there are questions about whether HRRC review is needed, please submit a study modification to the HRRC for a determination. A change in the research may disqualify this research from the current review category. You can create a modification by clicking Create Modification / CR within the study.

In conducting this study, you are required to follow the Investigator Manual dated April 1, 2015 (HRP-103), which can be found by navigating to the IRB Library.

Sincerely,

Thomas F. Byrd, MD
HRRC Chair

Appendix K

Process Matrix

Record ID	What things have helped or hindered the use of these nutrition requirements?	What things have helped or hindered the use of these nutrition requirements?	What are ways your school has incorporated Navajo cultural teachings and practices for the promotion of health?	What role, if any, do you think schools should play in student nutrition?
B1688	Been a big adjustment for the students	Whole wheat requirements- students think its too dry to eat and has not taste	Making of blue corn mush	Students need more exercise in school and students need to understand mild is good for them
B1456	'It's been good'	Having good team work	Navajo cultural foods	Yes
B1924	Eating more grain and fruit	Made the food more nutritious	No cultural foods are served with the Southwest Food Co	
B1095	Not too familiar with NSLP requirements	Informing the children of nutrition with the use of posters/signs	Has not seen incorporation of Navajo culture in the promotion of health	Making sure every student has a meal is very crucial in student health. The school should be more informative when it comes to health even by providing health fairs where students can get more information

B1712	It has come with challenges when healthier entrees were first introduced. Students complain meals don't take the same	Nutrition requirements have helped me to understand the value of nutrition, even to a point I try to buy more groceries that are healthier	Every week we have a thing call fit families sponsored by the local hospital for health education including nutrition	Schools could incorporate a class about the importance and how to practicing good health in our daily lives
B1707	It's been okay so far	Know what the kids needs on their plate to get a reimbursable meal	None that I am aware of	I don't know
B1264	I'm new here but I usually attend monthly meetings	Make sure nutritious foods is provided	Not aware of any cultural activities	Make sure they get nutritious foods
B1168	It's good, I like it and working with the kids	I just transferred here so I don't really know	No knowledge of	Encourage the kids to eat more vegetables
B1353	Very well	Healthier less obesity	Don't know- as a food service worker I am not familiar with classroom activities	Very important
B1453	With the new program, it has been a lot easier working with the kids	That kids are eating a healthier breakfast and lunch	The school has grandparents that come to the classroom to teach about Navajo cultural ways as well as having Navajo foods prepared	I think teachers should teach and encourage kids also about healthy eating in the classroom; more encouragement in the cafeteria as well

B1720	School is on a menu program with Shamrock	The requirements under the HHFKA is difficult to work with	No cultural foods are served by food services program	Our school needs to get away from the HHFKA
B1400	It has been good	It helps the children to be healthy		Schools need to help children grow and provide proper nutrition which will help them later in life
B1167	It has been great to see children get the right foods.	Salad bar has given the students the choice to pick more vegetables	There is a day set aside for staff to speak Navajo to students	The consumption of health food is vital
B1201	We have always been part of NSLP and it helps the students understand My Plate	Students are eating more fruits and vegetables	School has a garden and it teaches kids about planting and eating healthy	Obesity is high on the reservation and need all staff to implement wellness policy
B1705	It's been good. There are more posters on the walls where the students and staff see everyday	A lot more healthy students coming in everyday	Not so much under the food service management company	Need more variety in the salad bar
B1918	No problems with NSLP or USDA requirements. Staff is trained to identify a reimbursable meal. District	Staff are attending more trainings	There is one school that incorporates the Navajo teaching, K-8 school. Staff do their best to speak Navajo to kids	Teach the kids about the importance of serving healthy meals so they can understand the importance

	personnel have a lot of disagreements about what we serve especially lower sodium		while serving food	of school nutrition
A1219	Has been okay. No problems or issues.		Only in the Navajo Language Cultural class	Very little
A1908	Food service department ensures that we meet nutrition requirements		Our Dine' language and culture teacher addresses health practices. We also have a committee who hosts a cultural night where a presented provides more in-depth information to families	Schools should offer a variety of fresh nutritious meals to students. Students should be allowed to take healthy snacks to be consumed during the day, instead sees a lot of fresh fruits thrown away. This would prevent food waste.
A1568	Very smooth-food service manager monitors and ensures nutrition standards are followed	None	More traditional foods	A lot of meals are heat up foods. No longer are fresh foods prepared and served.
A1940	With new food service director, we are fully compliant with all requirements	Time constraints	We offer Dine' Language & Health	Provide support to parents regarding training healthy living by offering physical activities and

				substance abuse education
A1971	Meal choices are fruit and salad; no homemade goods for class parties; no parties before lunch; more fresh fruit and salad bar and whole grains	Students already developed eating habits; students may be willing to try different foods	Food demonstrations of cultural foods is done in classroom; also sheep butchering and making steam corn	Need more health education
A1775	Lunch program is set by SW foods. Lunches have a lot breaded items		Incorporated in Navajo class	Nutrition is provided by Health PE educator

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