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Kristin Sara Rohfleisch

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AN ASSESSMENT OF FEMALE FRESHMAN STUDENTS' NUTRITION EDUCATION NEEDS AT THE UNIVERSITY OF MONTANA

by

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Bachelor of Arts, University of Montana

Missoula, Montana 2001

Presented in partial fulfillment of the requirements for the degree of Master of Science The University of Montana

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The purpose of this study was to assess the nutritional needs of female freshman residing in residence halls at The University of Montana, and then to use themes developed from that qualitative data to create a framework for future nutrition education workshops. Four focus groups and seven key informant interviews were conducted to gather data about the target population's nutritional knowledge, skill level and capacity, and motivation to change dietary behaviors. An additional goal of this study was to identify current nutrition-related service providers on campus and then to determine the level of awareness and usage of those resources by students. All focus group and interview sessions were tape-recorded, transcribed, and analyzed using qualitative methodology.

The analysis of focus group discussions, interviews, and literature revealed several themes relating to nutrition. The top identified dietary behaviors of concern were (a) skipping breakfast, (b) not consuming enough fruits and vegetables, (c) not consuming enough protein, (d) eating an excess of high fat and 'junk foods', and (e) increased snacking. The target population identified a need for education in all of these areas, with informational and behavioral skills components. Additionally, they expressed feeling a lack of support from service providers on campus, as they had yet to receive any type of nutrition information, education, or other outreach since being at college. Because a myriad of predisposing, enabling, and reinforcing factors were found to influence the problematic dietary behaviors, a variety of strategies were developed to address those factors. Strategy recommendations were based upon behavioral theory and focused on providing information and skills training through interactive, hands-on approaches. The activities were also designed to increase a perception of support from fellow peers and service providers on campus as well.

The strategies recommended as a result of this study are intended to guide future nutrition programming at The University of Montana. The qualitative data gathered during this project supports the need for basic nutrition information and skills training for female freshman living in the dormitories.
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CHAPTER I
INTRODUCTION TO THE STUDY

Research has consistently found that college students tend to consume a diet consisting of inadequate nutrients. This behavior occurs for a multitude of reasons, resulting in a myriad of potential health problems – including increased risk for chronic disease (Centers for Disease Control and Prevention [CDC], 2006). Many of the potential health problems such as heart disease, cancer, and stroke begin to manifest during college years (Grace, 1997). Additionally, this young group of people has seen the greatest increases in overweight and obesity rates (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005; Huang et al., 2003). According to the 2003 American College Health Assessment, 30 - 35% of the college population is overweight or obese, and even a higher percentage perceive themselves to be overweight ("The American College Health Association National College Health Assessment" [ACHA-NCHA], 2005). Additionally, some experts estimate that symptoms of disordered eating may be diagnosable in up to 30% of the female college student population (Grace, 1997). For all of these reasons, programs that improve the nutritional knowledge and behaviors of college students may help to lower the risk for chronic disease and overweight and obesity as they enter middle adulthood.

First-year freshman are a unique population that is especially in need of nutrition education, as many of them may be challenged by the task of selecting and/or preparing their own meals for the first time in their lives (Cousineau, Goldstein, & Franko, 2004). This can be an overwhelming undertaking when you consider peer, family, school, community, and societal influences (see Figure 1). Many factors play a role in food
selection – financial constraints, buffet-style cafeterias, convenience and availability, social events, consumption of alcohol, and lack of nutrition knowledge or food preparation skills. Over half of all college students report eating at fast food restaurants at least three times per week on average, and less than a third consume the recommended serving of five fruits and vegetables a day (Racette et al., 2005). It’s no wonder college students have such a difficult time filtering through all the influencing factors in order to adopt and maintain healthy eating behaviors.

Figure 1. Societal Influences on Adolescents & Young Adults. From Centers for Disease Control and Prevention [CDC], National Center for Chronic Disease Prevention and Health Promotion, Division of Adolescent and School Health. Retrieved October 2005, from http://www.cdc.gov/HealthyYouth/AdolescentHealth/index.htm.

In the year 2000 more than 12 million students were enrolled in the nation’s universities, which is one in four persons aged 18-24 (Lowry et al., 2000). Thus, the college campus offers a readily accessible setting for health professionals to positively influence the health behaviors of an entire population of adolescents and young adults. Campus-based nutrition education programs can provide primary prevention to entire generations, all in one location (Grace, 1997; Huang et al., 2003). Further, it is suggested that adults who have taken a nutrition education course at the collegiate level are more likely to be knowledgeable about certain dietary behaviors. Pearman et al. (1997) found that college alumni who had taken a nutrition health course consumed fewer total
calories, fewer calories from fat, less sodium, and weighed less than alumni who did not take a nutrition health course. Therefore, it seems that the college campus is an optimal setting for health educators to positively impact dietary knowledge and behaviors of college-age students during their post-baccalaureate years.

**Purpose of the Study**

The purpose of this study was two-fold: (1) to assess the nutritional education needs of college freshman at the University of Montana through focus group discussions with the target population and interviews with health professionals; and (2) to use themes developed from that qualitative data to create strategies for future nutrition education programs for college students. Literature and behavioral theory were used to further support needs assessment data in order to best address not only knowledge but also skills and future behavior.

**Research Questions**

1. What dietary behaviors are of concern within the target population?

2. What predisposing, enabling, and reinforcing factors influence those behaviors?
   a. What knowledge, skills, and support systems are needed by the target population to change dietary behaviors?

3. What nutrition-related resources are available to students?
   a. Are referral networks among resources adequate?
   b. Are students aware of and using available resources?
   c. Where does the target population get their nutrition information?
4. What types of nutrition programming would be most beneficial to the target population?
   a. What topics or nutrition concerns should be addressed?
   b. Who would be most effective in communicating these messages to the target population?
   c. What procedural considerations should be noted? (i.e. length, location, format of class, etc.)

   **Statement of the Problem**

   A poor diet can affect college students in many ways. It can negatively influence school performance, sleep patterns, weight management, and increase risks of diet-related diseases such as heart disease, osteoporosis, diabetes, and cancer (Selkowitz-Litt, 2000). Therefore it is important to provide up-to-date, applicable and prevention-based nutrition education to young adults attending college, particularly freshman. By offering programs that provide both knowledge and skills, college students can learn strategies for improving diet that they can use throughout their lifetime. Perez-Rodrigo and Aranceta (2001) further support the need for school-based nutrition education to address not only nutrition knowledge, but also the teaching of behavioral and life skills necessary to use that information.

   **Sub-problem**

   The University of Montana offers a basic nutrition course, but like many other post-secondary institutions it is not required that all University of Montana students take the class. Therefore it was important to assess needs and develop an on-campus, yet out of the classroom, nutrition education for college students.
Delimitations

The delimitations of the study are as follows:

1. The study is delimited to female freshman students living in residence halls at the University of Montana during the 2005-2006 school year.
2. Data was collected by focus groups and interviews.
3. The study was further delimited to residents who voluntarily took part in the needs assessment processes (focus groups and interviews).

Limitations

The limitations of the study are as follows:

1. The data is limited in that the individuals from the target population who volunteered to participate in the focus groups or other assessment procedures may have had different issues and concerns relating to nutrition than those who did not participate.
2. The study is limited by the potentially socially desirable responses given by participants during focus group discussions and key informant interviews.
3. Generalization of the results is limited due to the non-randomness of the selection of participants.
Definition of Terms

American College Health Association (ACHA): Established in 1920, this association focuses on the health needs of college and university students across the United States.

Focus Group: A relatively small group of people (6-10) invited to discuss feelings, opinions, perceptions, insights, beliefs, misconceptions, attitudes, and receptivity concerning a particular idea or issue.

Key Informant: Strategically placed individuals who have knowledge and ability to report on the needs of those in the priority population.

National College Health Assessment (NCHA): A biannual survey conducted at universities across the United States to gather information about the health behaviors of college students.

Needs Assessment: The process of determining, analyzing and prioritizing the needs, and in turn identifying and implementing solution strategies to resolve high-priority Needs (McKenzie et al., 2005).

Predisposing, Enabling, & Reinforcing Factors: Professionals using the PRECEDE-PROCEED program planning model will identify theses factors during the fourth phase of the model (McKenzie et al., 2005):

- **Predisposing factors** are things such as a person's knowledge that facilitate or hinder one's motivation to change.
- **Enabling factors** are found within societal systems such as availability of resources and can be barriers or vehicles to behavior change.
- **Reinforcing factors** are the types of feedback received after behavior change that either encourage or discourage the maintenance of a behavior.

Primary Data (perceived): Data that is collected first-hand by the researcher(s) to answer unique questions related to the specific needs assessment.
**Primary Prevention:** The act of reducing the likelihood that a disease, condition, or injury will occur.

**Secondary Data (actual):** Data previously collected by somebody else and available for immediate use.

**Triangulation (of data):** When more than one method is used to collect data on a particular phenomena within a study. The idea is that researchers can be more confident with a result if different methods lead to the same result.
CHAPTER II

REVIEW OF LITERATURE

The purpose of this study was to assess the nutritional education needs of college freshman living in residence halls at The University of Montana, and then to create strategies for educational programming based upon those needs. Nutrition education needs of the target population were assessed through the primary data collection methods of focus groups with college freshman and interviews with health professionals on campus. Additional rationale for the intervention development came from literature pertaining to nutrition education and college students – the data included in this chapter analysis. The review of literature is divided into six sections:

1. Why Nutrition Education is Needed for College Students
2. Successes and Failures of Basic Nutrition Courses
3. Nutrition Interventions Outside the Classroom
4. Qualitative Research Methods in Health Promotion
5. Inclusion of Behavior Change Theory in Program Planning
Why Nutrition Education is needed for College Students

Poor Dietary Behaviors

Eating habits generally get worse as young adults make the transition into college and the effects of these poor eating habits carry into adulthood (Grace, 1997). Consistent with other research findings, Racette et al. (2005) found that college freshman are not consuming adequate nutrients based upon the USDA's Food Guide Recommendations. In this recent study over half of the students surveyed ate fried/high-fat fast foods at least three times per week, and 70% ate fewer than the recommended 5 fruits and vegetables daily. Additionally, Hertzler et al. (1992) found that almost a third of college students ate more than 35% of their energy from fat (higher than the recommended 30%), and equally as many students exceeded 5% of their energy from alcohol.

The 'freshman fifteen' is a commonly accepted occurrence among first-year students, but it has not been consistently proven across research (Selkowitz-Litt, 2000). Racette et al. (2005) found that almost three fourths of students had gained an average of nine pounds between their freshman and sophomore years. However, Graham and Jones (2002) found that although 59% of first year students living on campus gained weight, the average was only around five pounds, and that 36% of the sample (n=49; total population=175) actually lost weight in their first year at college. But whether the average weight gain is five, ten, or fifteen pounds, when considering that this group of young adults is experiencing the highest rate increases in overweight and obesity (ACHA-NCHA, 2005), it seems to be logical to suggest that nutrition education be offered to these college students – a group that makes up approximately 12 million people nation-wide. University communities provide an optimal and convenient setting to
promote and teach healthy lifestyle behaviors that can be practiced throughout college and carried into adulthood (Racette et al., 2005).

**Health and Academic Performance Problems**

Because many college students do not eat diets containing adequate nutrients, they put themselves at increased risk for developing serious health problems including heart disease, cancer, high blood pressure, and osteoporosis (Brown, Dresen, & Eggett, 2005). It appears that while the symptoms of these diet-related diseases may not be detectible until later into adulthood, they are starting to develop during late adolescence (Grace, 1997). Because the symptoms are generally not detectible until post baccalaureate years, it may be important for college health professionals to focus on a larger sense of well being and life performance, rather than focusing only on disease prevention.

Trockel et al. (2000) found that school performance can be affected by nutritional habits. In their examination of first-year college students living in dormitories, they found a strong relationship between nutritional habits and college GPA's. Eating breakfast was one of five variables positively correlated \( r = .241; p = .001 \) with higher GPA's during students' first year of college (Trockel et al., 2000). These data demonstrate the need for studies investigating the effects of nutrition education and/or behavioral interventions on college students' academic performance.

Disordered eating such as anorexia, bulimia, and binge eating is another nutrition-related health problem occurring among college students. According to Selkowitz-Litt (2000), 20-30% of college students have some type of diagnosable eating disorder, and women are especially prone. Research of college students has found that anywhere from 34 – 75 % of college students (ACHA-NCHA, 2005) reported that they
had attempted to lose weight by dieting (Mitchell, 1990). Even students who are considered to be at a healthy weight tend to perceive themselves to be overweight. These misperceptions are commonly attributed to the media and its portrayal of beauty. The inability of most young adults to healthfully attain the images they see on television and in magazines leads to disordered eating and exercise patterns (Grace, 1997). Because of the high prevalence of disordered eating among college students, it is probable that it may be identified by the target population in nutritional programming needs assessments. For this reason, health professionals should be prepared to address disordered eating during nutrition education sessions.

**Insufficient Dissemination of Nutrition Materials to Students**

Luquis et al. (2003) found that students identified dietary habits and physical activity as their #1 health concern. However, despite these concerns, students do not access and use available nutrition and exercise based campus resources that may benefit their health. According to the 2003 National College Health Survey, students list friends, parents, the Internet, and magazines as their top four sources of nutrition information – even though they ranked health center medical staff, health educators, and peer educators as being more believable sources. One possible reason that students don't access health resources on campus may be because they are not aware of them. Nationally, only 30% of students reported having received dietary information from their Universities (DeBate, Topping, & Sargent, 2001; Lowry et al., 2000; NCHA, 2005).

There seems to be a gap in communication between college health professionals and the students, which is illustrated by this lack of dissemination of nutrition-related information. DeBate, et al. (2001) suggest that a collaborative approach is the best answer
for bridging the gap between each university's health resources and its students. They recommend developing a collaborative, team-like approach between residence life, the student health center, dining services, the counseling center, and health promotion to provide a wide-ranging variety of resources to students.

**Basic Nutrition Courses: Successes and Failures**

Many studies that examine the effectiveness of nutrition courses on nutrition knowledge and related behavioral skills find confusing or conflicting results. For example, Mitchell (1990) found that following a basic nutrition course many students were still unable to correctly answer basic questions about caloric density. Yet all of these same students responded that they had learned a lot about nutrition and 45% indicated they had made changes in their dietary behavior because of the learning – where previous attempts to change their diets were because they didn't like how they looked. Additionally, the majority of participants believed that improving future health would be the greatest benefit of changing their dietary behaviors, which becomes an interesting point for nutrition educators. Can nutrition interventions with this population of young adults use future health as a motivator for behavior change?

Another interesting finding from this study was that the post-test revealed that students who completed the nutrition course were concerned about weight management, controlling their sodium intake, and reducing their fat and cholesterol; compared to students in the control group who felt their diets were okay (Mitchell, 1990). However, at the time of the pre-test the students in the nutrition class were already more likely to report that their diet needed improvement, suggesting a possible inherent difference in
nutritional knowledge or motivation between students taking the class and not taking the class.

Despite the previous findings, research in the field of nutrition education generally supports a positive relationship between nutrition knowledge and healthy eating behaviors (Wiita, Stombaugh, & Buch, 1995). This relationship becomes much more strongly supported when a third component is applied: hands-on presentations, workshops and behavioral skills training. Perez-Rodrigo and Aranceta (2001) assert that school-based nutrition education programs need to address not only nutrition knowledge, but also the teaching of behavioral and life skills necessary to use that information. Brown et al. (2000) studied the impact of using food models on improving the accuracy of college students' estimations of food portions. They found that students who were exposed to 3D food models showed significant improvement in the portion estimations compared to students seeing 2D models (pictures) and students who only received lecture.

Abood et al. (2004) also found that behavioral skills are an important component of nutrition education. In a study with female college athletes, researchers used various hands-on strategies to teach students how to improve their dietary behaviors such as calculating one's caloric needs, individualized analysis and interpretation of food intake records, reading food labels and using the Food Guide Pyramid, timing and composition of meals and snacks, and how to make healthier meal choices at restaurants. In a discussion of meaningful nutrition education methods, Abusabha et al. (1999) concluded that improved nutritional health couldn't be addressed through information alone but
rather through a complete understanding of the processes and stages people go through to make dietary choices – what motivates them.

Basic nutrition education courses provide students with the general knowledge of what healthy dietary choices are, but overall the review of literature suggests that the ability of a nutrition education course to change knowledge, motivation, and behavioral skills is mixed. Pearman et al. (1997) found that a basic nutrition education course positively impacted the health knowledge and behaviors of alumni years after they'd graduated from college. Yet in another study, students didn't retain knowledge of food labels, nutrients, energy density, and the USDA Food Guide Pyramid just one year after completing the nutrition course (Matvienko, Lewis, & Schafer, 2001). Simple factors can be to blame for these inconsistencies – such that class sizes are too large and heterogeneous, which makes it difficult for one professor to meet the needs of each individual. Additionally, basic nutrition courses are not offered and/or required at every college or university.

That's where health promotion or health education specialists come in – to assess needs and plan on-campus, yet out of the classroom, nutrition education programs that are tailored to each segment of the student population. Mitchell (1990) suggests using feedback from the basic nutrition courses to help develop these campus-based interventions to help to better tailor them to specific populations on the campus. Components such as behavioral skills and motivational strategies can be added to the interventions to formulate more effective messages and methods that address the needs of each segment of the college population, enabling them to make healthy food choices wherever they might be eating (Hertzler & Frary, 1992).
Nutrition Interventions Outside of the Classroom

Peers as Teachers

Lowry et al. (2000) believe that a college campus is a perfect setting to reach out to entire populations of young adults with health prevention programs. This education should focus not only on the individual, but also on the importance of a healthy environment supported by relations between student and student, student and faculty, and student and health professionals (Grace, 1997). Lowry et al. (2000) suggest that colleges use not only professional, but peer-led programs to provide hands-on nutrition and exercise education, outreach, and referral services.

A study done by Birnbaum et al. (2003) further supports peer leadership as a potentially valuable method of teaching nutrition education to adolescents. Researchers who designed this program called Teens Eating for Energy at Schools (TEENS) felt that although substantial support for peer leadership hasn't been well recorded, there is sufficient research to support the strong effect of normative expectations and peer influence on behavioral decisions during adolescent years (Lytle & Perry, 2001). It seems they were correct, as students in the TEENS program who were part of a peer leader group consumed a greater number of fruits and vegetables at the end of the program than at baseline, while other intervention groups and the control group did not experience any changes in fruit and vegetable consumption. The participants in the peer led group were also more likely to choose lower fat foods. These findings suggest that the use of peer leaders can positively affect dietary behaviors of adolescents, and more research in this area is needed (Birnbaum, Lytle, & Story, 2003).
Brown et al. (2005) found that college students who used campus meal plans were closer to meeting the USDA’s Food Guide Recommendations than students without meal plans. Significantly more students with the meal plan met recommendations for fruit and meat, although increased vegetable consumption was only significant for males on the meal plan. But contrary to previous studies these participants did not consume increased amounts of milk, and compared to students without meal plans actually ate fewer grains. Other studies have pointed to problems that university dining services face. Haberman et al. (1998) found that students eating at campus food services consumed the same foods on a daily basis, and Brevard & Ricketts (1995) found that students eating at campus cafeterias ate more fried and high-fat foods than students eating off-campus.

Thus it becomes apparent that although the buffet-style cafeterias on college campuses have the potential to provide nutritionally adequate diets, many students aren’t choosing to eat foods that meet basic food guide recommendations. They suggest that there is a need to provide nutrition education to these students so they have the knowledge to choose the healthiest foods possible from the huge variety offered in a typical buffet-style campus cafeteria.

The University of Montana currently employs a registered dietitian as part of the dining services staff who works with programming specifically targeted at students who dine on campus. One of her ongoing tasks is to make and update nutrition labels to accompany the food dishes at The Food Zoo. Brevard and Ricketts (1995) concluded that this type of nutrition education at the point-of-purchase [POP] might be a helpful tool for increasing healthy food choices in university dining halls. Perez-Rodrigo and
Aranceta (2001) further identify this environmental intervention as a possible addition to other school-based education programs.

Studies about POP interventions show mixed results, but in some cases it does seem to have an effect on food choices. Busher et al. (2001) studied the influence of signage at an on-campus store on the snack choices of college students. Sales of fruit and vegetable baskets, pretzels, and yogurt were tracked for the week during the POP intervention, as well as the weeks before and afterward. Yogurt and pretzel sales increased during and after the POP intervention, but fruit and vegetable baskets did not. However, sales of whole fruit and prepackaged salads increased during the intervention – both items that are less expensive than the fruit and vegetable baskets.

Computers and the Internet

A literature review by Brug, Campbell, & VanAssema (1999) concluded that computer interventions are successful for nutrition education in young adults if the programs also entail: (a) interaction and social support, (b) follow-up feedback – the more the better, (c) components tailored to each individual, and (d) use of theory. Internet-based nutrition education was not a focus during this study, but it is the hope that the results of this research may be used to expand current programs and also to develop future nutrition classes that may have an internet-based component.

A plethora of ideas for nutrition programs exist, but the one component that stands out across research is to design interventions that address the specific needs of the target population. The last sections of this literature review examine how health professionals methodically assess needs and develop programs.
Qualitative Research Methods in Health Promotion

Focus Groups

Focus groups are a commonly used method of gathering data in the field of health promotion and health education. This qualitative method is successful in this field because it "...allows participants to express freely their beliefs and ideas within the context of the group and discuss issues that may not disclose otherwise" (Luquis, Garcia & Ashford, 2003: 156).

Horacek & Betts (1998) discuss some of the factors that influence dietary intake such as convenience, residence, financial reasons, weight control habits, misperceptions, and eating out practices. Hertzler and Frary (1992) studied the effect of eating out on college student's food intake and found that students were more likely to eat high-fat meals when eating out. They choose to eat out for many reasons including to socialize with friends, get out of the house/dorm, go on a date, to celebrate a special event, it's accessible, they were hungry, they didn't know how to cook the certain food, or they didn't want to prepare/clean up. But eating fried and high-fat foods isn't limited to students who eat outside of campus cafeterias. It has also been found that students who eat at university dining services actually eat more fried foods than their counterparts who eat most of their meals off campus (Brevard & Ricketts, 1996). The identification of barriers to healthy food selection is a key step in the creation of nutritional programming, particularly considering that there is such a variety of factors that influence food choices for college students (Perez-Rodrigo & Aranceta, 2001).

Focus groups are used in qualitative research because they elicit each target population's opinions about the phenomena of interest (Morse & Field, 1995). As part of
their review of school-based nutrition education, Perez-Rodrigo and Aranceta conclude that student focus groups are an excellent strategy to get to this information. Additionally, when planning health education for a population such as college students, the use of focus groups as an assessment tool will ensure that the content developed for the nutrition program will fit the needs of those participating in it (Cousineau, et al., 2004). Focus groups also help program planners to determine facilitator methodology that will positively impact participant behavioral change (Borra & Earl, 2000).

James et al. (1997) demonstrated using focus groups as the preliminary strategy to design a nutrition education video for adolescent students. Using a developed interview guide, facilitators held several focus groups with adolescents to identify eating patterns, sources of nutrition information, barriers to healthy eating, and areas of nutrition they would like to know more about. The responses from the focus groups were combined with input from various health professionals including a dietitian and health educators. As a result, an educational video and accompanying curriculum was developed covering nutrition topics identified by the target population such as weight control, the food guide pyramid, nutrition facts and fallacies, and preparation of quick and healthy meals and snacks. Other better-known nutrition related programs that have used focus groups to refine or develop programming include the 5-A-Day-Program, the Dietary Guidelines for Americans, and the Food Guide Pyramid (James et al., 1997).

Interviews

Interviews are an advantageous method to qualitatively assess needs, as they can generate important information to use when developing educational programs (Gilmore & Campbell, 2005). Unlike gathering information through surveys or questionnaires, face-
to-face interviews provide an opportunity to obtain more complete information. Interviewers can enhance data by asking follow-up questions as needed in order to elicit more detailed information. Interviewees chosen to participate in health related needs assessments are oftentimes selected because of their knowledge of the target population – thus making the sample purposeful, not random. These participants, referred to as key informants, add insight to program planning because they have a unique and knowledgeable perspective on the needs of the particular group or target population (Gilmore & Campbell).

*Analyzing and Comparing Interview and Focus Group Data*

The analysis of focus groups and interviews as part of a needs assessment is done qualitatively. Focus group analysis is done in order to (1) identify important and reoccurring themes as identified by the participants, and (2) compare the themes across different focus group discussions (Stockdale, 2002). The study and interpretation of data from interviews is similar – looking for consistent responses identified by key informants across interviews (Gilmore & Campbell, 2005). Increasingly when assessing needs, methods such as interviewing are used in addition to other information gathering procedures. When using more than one method of data collection as part of a needs assessment, the analysis of themes takes into consideration consistency within and across both sources of information. This use of two or more methods of data collection, known as triangulation, allows researchers to study the same phenomenon from different perspectives and then collectively develop a program using reoccurring themes from all sources of data (see Figure 2) (Morse & Field, 1995).
As part of this needs assessment for nutrition education conducted at The University of Montana, data was collected through focus group discussions with the target population and interviews with key informants. Analysis of both methods, along with relevant literature from the field of health education and promotion, were tied in with behavioral theory to address dietary health behaviors of concern within the target population. The following section further describes the use of behavioral theory as an essential key to developing effective health education programming.

**Inclusion of Theory in Program Planning**

Behavior change is not an easy feat – rather it is a complicated and individually unique process that cannot be addressed by information giving alone. This is where behavior change theories come in – to help health professionals specifically tailor interventions to fit the needs of each unique population. The report published by the American College Health Association (ACHA-NCHA, 2005) begins by discussing the importance of assessing the health needs of college students prior to developing programs for them. The framework of each behavior change theory helps health professionals do just that – design interventions specifically for the target population they aim to effect. Michie and
Abraham (2004) found that interventions aimed at behavior modification could have effect size two times larger when behavior theories are used. Additionally, this methodically planned style of theory-based programming has heightened credibility over other curriculum (Sigman-Grant, 1996), as it provides an explanation of why the intervention and its various techniques were successful (Michie & Abraham, 2004).

The importance of incorporating behavior change theory is illustrated by a study done by Racette et al. (2005), in which they used the Transtheoretical Model to identify the appropriate nutrition interventions for freshman college students. In an initial needs assessment, they found that over half of the students were in the precontemplation stage for adopting healthy eating behaviors, meaning that they hadn't even considered changing their dietary habits. For this group of students, a "hands-on" type intervention showing them how to prepare healthy meals probably wouldn't be very effective. Rather, a more fitting program would consist of strategies outlined for the precontemplation stage of this model – things such as consciousness raising (providing nutrition information through brochures, marketing campaigns, etc.) or dramatic relief (making emotional appeals through guest speakers, role playing, etc).

Another example of incorporating behavioral theory into program planning is a nutrition study conducted with college female athletes. The self-efficacy construct of the Social Cognitive Theory [SCT] was used as a framework for program development, to increase the likelihood that the intervention would actually change dietary behaviors – not just increase knowledge (Abood et al., 2004). Athletes in the experimental group took part in mastery experiences during in-class activities, successfully working through dietary assignments on their own. Additionally, they observed other athletes performing
positive dietary behaviors (vicarious experience). Both mastery and vicarious experience are strategies implemented by program planners to increase self-efficacy of intervention participants. At the end of the eight-week intervention the group receiving the intervention had significantly higher scores in nutrition knowledge, self-efficacy, and overall difference in positive dietary changes.

This previous study, which employs only some of the constructs of the Social Cognitive Theory, demonstrates a commonality of program planning. Oftentimes health professionals will rely on not one theory, but rather a combination of constructs from many theories to design their programs. Considering the diverse needs within each segment of our population, it makes sense to design each health intervention according to behavioral theories that reflect their needs specifically (Achterberg & Miller, 2004). For the nutrition-related study conducted at The University of Montana two different models were employed to guide and support the various stages of the assessment process (see Figure 3).

Figure 3. The PRECEDE-PROCEED program planning model and the IMB behavior change model. A visual representation of the incorporation of the two models into the program planning process.

Problematic dietary behaviors and the PER factors that influence them were identified using the PRECEDE-PROCEED MODEL

Strategies were developed to address the PER factors using the IMB model

Strategies for future nutrition programming address PER factors, and in turn influence the problematic dietary behaviors

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The PRECEDE-PROCEED planning model helped to focus the overall design of the project – from assessing needs to data analysis and strategy development; and (2) The Information – Motivation – Behavioral Skills [IMB] behavior change model was used to further substantiate the development of strategies in particular (as discussed in Chapter 5). The following sections further describe these models that collaboratively substantiate the program planning process.

The PRECEDE-PROCEED Model

The PRECEDE-PROCEED model is referred to as a program planning model as it guides professionals through the planning, implementation, and evaluation processes. The most widely known of its kind, this comprehensive model consists of nine phases. The first four phases of the model are used to assess needs, and phases five through nine of the model cover program implementation and evaluation (see Appendix A) (McKenzie, Neiger, & Smeltzer, 2005). The main constructs from the PRECEDE-PROCEED model utilized in this study conducted at The University of Montana came from the third and fourth phases. The third phase of the model helps planners to determine what behavioral and environmental risk factors contribute to the identified health problem (poor diet in this case); and the fourth phase of the model assists in identifying the predisposing, enabling, and reinforcing factors [PER] that contribute to the behaviors.

The Information – Motivation – Behavioral Skills Model [IMB]

Behavior change models (or theories) help to increase the likelihood that the strategies developed to address the PER factors will in fact lead to a change in behavior within the target population (McKenzie, et al., 2005). The IMB Model is a behavior change model.
designed by Fisher and Fisher and includes three constructs – information (knowledge), motivation, and behavioral skills (see Appendix B) (DiClemente, Crosby, & Kegler, 2002). According to this model, behavior change will not occur unless people are well informed, motivated, and have the behavioral skills necessary to carry out the particular health-related behavior. A visual representation of this model can be seen in Figure 4.

*Figure 4. The IMB Behavior Change Model.* Adapted from DiClemente, et al., 2002.

The *informational* component addresses basic knowledge, clarification of misperceptions, and understanding of risk if the behavior is not adopted. *Motivation* is an influencing factor that determines whether a well-informed individual will adopt the preventive behavior or not. This includes attitude toward the preventive acts, perception of social support, and personal perception of susceptibility to the negative health outcomes. *Behavioral skills* are what are actually used by the already informed and motivated individual to perform the health behavior. Participant's objective ability and their self-efficacy to perform the skills are what will determine their success within this final component of the theory.
In the assessment of nutrition educational needs conducted at The University of Montana, the constructs from the IMB behavior change model were used during the strategy development phase of the needs assessment process. The data analysis (guided by the PRECEDE-PROCEED model) revealed a common theme from focus group participants and key informants that future nutrition education would need to contain interactive, informational, and social support components. The IMB behavior change model was used for strategy development because it asserts that in order for behavior change to be successful, health programming must target information, motivation, and behavioral skills – the same themes identified during the needs assessment process using the PRECEDE PROCEED planning model. Therefore, the programming strategies for this study (described in Chapter 5) were developed using the three components of the IMB model. This approach increased the likelihood that the methods created to address the identified PER factors were developed in such a way that actual dietary behavior change would occur within this target population.
CHAPTER III

METHDOLOGY

The purpose of this study was to assess the nutritional needs of college freshman living on campus at The University of Montana, and then to develop strategies for future educational classes based upon those identified needs. A triangulation of data through the following three sources provided rationale for the suggested nutrition education strategies: (1) focus group discussions with the target population, (2) interviews with health professionals on campus, and (3) review of literature from the field of nutrition education and health promotion. This chapter further describes the methods and procedures employed in this study.

Description of the Target Population

The target population for this study consists of female freshman students living on campus at The University of Montana. As of the fall 2005 there were 901 students in this population (see Appendix C).

Protection of Human Subjects

The research project in its entirety, as well as consent forms and supplemental questionnaire forms were all reviewed and approved by the University of Montana Institutional Review Board [IRB] (see Appendix D).

Procedures

Data for this needs assessment was collected through focus groups and interviews. Sampling methods, research setting, data collection techniques, and instrumentation for each of the two methods are described in the following sections.
Focus Groups

Sampling Methods and Research Setting. Focus group participants consisted of female freshman, 18 years of age or older, who resided in a dormitory on The University of Montana campus during the Spring 2006 semester. The group sessions were conducted in four separate dormitories in order to enhance the variety of opinions, perceptions, and beliefs identified at each session (Morse & Field, 1995); and also to ensure that enough participants from the target population are involved so that "...saturation of information is reached" (Sharts-Hopko, 2001). One focus group took place in Turner Hall (an all-female facility), a second group took place in Knowles Hall (co-ed), a third group took place in Aber Hall (co-ed), and the fourth group took place in Craig Hall (co-ed). All focus groups were held on-site at each respective dormitory and were conducted within a two-week period in March 2006.

Recruitment took place through collaboration with the Department of Residence Life at The University of Montana. One Resident Assistant [RA] at each of the four dormitories was selected as the on-site contact, or gatekeeper, and was assigned the duty of enrolling 5 – 10 freshmen in the study. The contact RA's had approximately one week to recruit volunteers from their dormitory. Selecting participants via a convenience sample is typical of focus group methodology as "...participants in focus groups are usually not selected through a random-sampling process" (McKenzie, Neiger, & Smeltzer, 2005: 77). The researcher met with each contact RA a couple days prior to their respective scheduled focus group date to verify the meeting location and adequate session enrollment.
Data Collection. Each of the focus groups took place in a private study room at eight o'clock in the evening and lasted approximately one hour. At the start of each session the facilitator gave an overview of the study and distributed consent forms and a supplemental questionnaire to each participant (see Appendices E and F respectively). The facilitator then conducted the focus group discussions per standard procedure for topic guide questioning. The focus group discussions were audio recorded to enable the facilitator to actively listen to the participants and stimulate discussion as needed. Participants received $5.00 and free snacks for taking part in the study. Additionally, at the conclusion of each focus group the facilitator distributed information about nutrition services available through the campus dietitian (see Appendix G) as well as a current copy of the campus nutrition newsletter – the Hungry Grizzly.

Instrumentation. The focus group interview guide was developed based upon general recommendations for focus groups (Kitzinger, 1995; Krueger, 1998; Luquis et al., 2003; Morse & Field, 1995; Sharts-Hopko, 2001), a review of literature, and the third and fourth phases of the PRECEDE-PROCEED model (McKenzie, Neiger, & Smeltzer, 2005). The guide was designed to elicit dietary behaviors as well as predisposing factors (including knowledge and perceptions of nutrition), enabling factors (availability of options, level of skill associated with health dietary habits), and reinforcing factors (social support). Following data analysis, strategies for future nutrition education classes were developed specifically to address the behaviors and factors contributing to problematic dietary habits. This tool kit for future programming was developed with additional support from the IMB Model to ensure theoretically grounded strategy development. Health promotion graduate students and health professionals reviewed the
focus group questions prior to the focus group sessions. Revisions were made as needed to clarify ambiguous, offensive, or leading questions (see Appendix H for focus group question guide).

**Interviews**

*Sampling Methods and Research Setting.* Oftentimes focus group studies are combined with other data collection techniques (Kitzinger, 1995). For this nutritional needs assessment, interviews were performed in addition to the focus group sessions. Interviews were conducted with seven professionals at The University of Montana identified as *key informants*, or "...individuals who have knowledge and ability to report on the needs of those in the priority population" (McKenzie et al., 2005: 75). The project researcher identified an initial group of five interviewees based upon their work as a health professional and/or as staff who work with the target population. Two additional interviewees were recruited through referrals by the initial contact list. The seven key informants were contacted via email by the researcher, given an overview of the study, and then invited to participate. All seven health professionals and University of Montana faculty agreed to partake in the study and appointments were scheduled with each separately (see Appendix I for list of interviewees). As recommended by Morse and Field (1995), all interviews were held at a location chosen by the interviewees.

*Data Collection.* All interview participants were emailed copies of the question guide prior the interview date. Interviewees were given a brief review of the study, as well as a consent form and supplemental questionnaire prior to the start of each interview (see Appendices J and K respectively). All seven interviews were conducted in person and were audio recorded. This enabled the interviewer to actively listen throughout each
interview, the most important skill for an interviewer (Seidman, 1998). The interviews lasted approximately half an hour and were all completed between January and March of 2006.

Instrumentation. The interview guide (see Appendix L) was designed to examine the same nutrition-related issues addressed in the focus group discussions – but through the perspective of a key informant. In addition to addressing (1) perceptions and knowledge about nutrition, (2) behavioral and environmental risk factors linked to dietary choices, (3) barriers to changing nutrition-related behaviors, and (4) skills or knowledge that would be helpful in fostering behavior change, interviewees were asked to identify nutrition-related services currently available to students, as well as to describe the referral system employed among on-campus departments.

Data Analysis

Development of Themes for Nutrition Education Programming

The project researcher transcribed the data following each focus group discussion (target population) and key informant interview (health professionals and University of Montana staff). The transcriptions were then reviewed and additional information from the researcher's notes was recorded, including observations of group dynamics. Focus groups offer a unique opportunity for researchers not only to collect primary data, but also to analyze each group's dynamic and its effect on interpersonal communication and information shared (Kitzinger, 1995).

The project researcher then examined and studied the transcriptions in a manner comparable to analysis of other qualitative data: (1) identifying patterns that emerged across interviews and focus group discussions, (2) categorizing the patterns, and then (3)
developing overall themes (Luquis et al., 2003; Sharts-Hopko, 2001). These key themes were then combined with program planning and behavioral theories to methodically develop a framework for future nutrition classes that would be specifically tailored to the target population. Quotes from the focus group discussions and interviews were used to validate these themes. Minority opinions that fell outside of overall discussion patterns were examined and addressed as part of the analysis, as they are important piece of the needs assessment process (Kitzinger, 1995).
CHAPTER IV

RESULTS

The purpose of this study was to (1) assess the nutrition education needs of female freshman students living in dormitories at The University of Montana, and (2) to analyze and categorize the interview and focus group data in order to develop content and procedural framework for future nutrition education programming. It is hoped that staff from Residence Life and University Dining Services, as well as future graduate researchers in the Health and Human Performance Department will be able to use the findings from this study in the creation of future nutrition education workshops.

The four focus groups were held with voluntary participants from within the target population of female freshman living in residence halls at The University of Montana. Additionally, there were seven interviews conducted with faculty or staff who work with the target population and health professionals who have expertise in the area of nutrition. This chapter reports the results of a thorough analysis of the above described data collection methods. Key themes are identified for each portion of the assessment.

Participant Description: Focus Groups

The Resident Assistant's that were serving as the on-site contacts at each of the four dormitories were given approximately one week to recruit 5 – 10 students from their floor for the study. Thirty-two volunteers signed up for the study, with a total of 28 in attendance on each of their respective focus group dates. Six of those 28 were male students and were not involved in the focus group discussions, leaving a total of 22 participants from the target population.
General Demographics

At each group meeting the participants completed a brief supplemental questionnaire that addressed general demographic information. One hundred percent (n=22) of the focus group participants were full-time freshman female students and resided in a dormitory at The University of Montana. Forty-one percent of participants were 18 years old (n=9), 55% were 19 years old (n=12), and 4% were 20 years old (n=1).

Ninety-five percent of participants (n=21) were Caucasian and 5% (n=1) were Asian. Of the 22 participants, 41% were employed at least part-time (n=9) and 59% did not work at all (n=13). Sixty-four percent of participants had their own car (n=14) and 36% did not have their own transportation.

Previous Nutrition Coursework

Thirty-two percent (n=7) of participants had never taken any nutrition coursework, 50% (n=11) had taken high school level coursework, 14% (n=3) had taken or were currently enrolled in a college-level nutrition course at The University of Montana, and 4% (n=1) had taken HHP 236 – the general nutrition course offered at The University of Montana.

Participant Description: Key Informants

Seven professionals from The University of Montana faculty and staff were contacted and invited to participate in the study. One hundred percent (n=7) agreed to take part and interviews were scheduled and held at a location chosen by each of the key informants between January and March 2006.
General Demographics

At each interview the key informants completed a brief supplemental questionnaire that addressed general demographic information. All key informants in the study were Caucasian females (n=7), with ages ranging from 27 to 56. Five of the seven professionals studied nutrition at the collegiate level, ranging from basic nutrition to a Doctoral degree in nutrition. Occupations of interview participants were as follows:

- Registered Dietitian (RD)
- Clinical Psychologist/Adjunct Psychology Faculty
- Director of Health Enhancement (Curry Health Center)
- Clinical RD/Adjunct Health and Human Performance Faculty
- Associate Director of Residence Life
- Registered Dietitian (University Dining Services)
- Manager of Fitness Programs (Campus Rec)
- Director of Undergraduate Advising

The length of time at the current position ranged from two years to twenty years, with an average of twelve years.

Themes Identified Through Focus Group and Interview Questions

Direct quotations have been intertwined where appropriate to authenticate themes.

- [FG] = Quotations from focus group discussions with the target population
- [KI] = Quotations from interviews with key informants
Research Question #1: What types of dietary behaviors are of concern within the target population of college students?

Section 1. Inadequate Consumption of Nutrient Dense Foods

Participants of this study discussed dietary habits and the following reoccurring concerns emerged: (a) skipping meals – particularly breakfast, (b) inadequate consumption of fruits and vegetables, and (c) inadequate consumption of meat.

Theme A. Skipping Breakfast

Participants in focus group discussions expressed concern with not regularly eating breakfast, and key informants noted skipping breakfast as one of the most problematic dietary behaviors of the college students. There were perceptions within the target population of a lack of healthy breakfast options on campus, that they didn't have time to make or eat breakfast, and that the lower meal plan limited them to two meals a day – leading them to skip breakfast.

- You hear students talking a lot about how they eat, and what I noticed is a lot of people don't eat breakfast – they drink coffee or drink soda in the morning, oftentimes not eating breakfast. And people with meal plans...it'd be interesting to learn what their use of it is – because some of the plans you only get two meals a day, so those people may not get breakfast. (KI)
- I try to eat at least something...a banana or a donut or something. (FG)
- I eat breakfast...at least every other day. (FG)
- I usually don't have money on my card to get breakfast...so more lack of money for me. (FG)
- I eat it if I get going soon enough. (FG)
- I've heard some students complain about breakfast, not having some place to go...the Food Zoo not being open for breakfast. (KI)
- A lot of people don't eat breakfast. (FG)
- Yeah, they don't encourage breakfast here. (FG)
- I've cut from three meals to two because that's all the lower meal plan covers...it cuts breakfast out pretty much but I don't usually eat until like ten o'clock, so... (FG)
- They have the breakfast thing (at the Country Store), but it's only served until ten thirty...eggs and bacon and stuff...and I don't usually eat that kind of stuff for breakfast anyway. (FG)
Theme B. Inadequate Consumption of Fruits/Vegetables

In the focus group discussions, students frequently expressed concern with an inadequate consumption of fresh fruits and vegetables – due to a lack of availability at on-campus dining facilities, a poor selection, and produce that appeared to be unappetizing.

- I worry that I don't get enough fruit in my diet because I don't know; they have a lot of canned stuff at the Food Zoo, but not...a lot of fresh. (FG)
- I get smoothies for my lunch because then I know I'm getting some fruit. (FG)
- I don't get enough fruits and veggies. (FG)
- I don't get all the food groups. (FG)
- In my household we were fairly strict on having like a veggie, fruit, meat, dairy at our table, so it's been hard to find everything you like here to eat...and tastes decent and isn't greasy...there isn't much of a variety of fruits and veggies. (FG)
- They don't really have anything healthy in there...a lot of canned fruits and veggies...I'd buy more fresh stuff if they actually offered more. (FG)
- I usually eat a lot in the salad bar...the vegetables in the vegetarian line are pretty good...it's actually pretty impressive...I remember touring cafeterias at other schools and this is like, way better. (FG)
- Yeah, it's pretty good (the salad bar). There's not a very big variety of fruits, but the veggies are good...I wish every once in while they'd bring in something new...give me a little variety. (FG)

Theme C. Inadequate Consumption of Meat

Concern with lack of consumption of meat was undoubtedly one of the strongest themes emerging from the focus group discussions. Members of the target population repeatedly referred to a disgust with the appearance of meat dishes, and therefore their avoidance of it at on-campus dining facilities.

- I don't eat meat anymore because it makes me sick...I can't eat meat...I won't eat the meat there (Food Zoo). (FG)
- I worry I don't get enough meat...growing up in Montana I'm used to having good meat...and then you come here and you don't want to eat it...so when you go home you eat it like crazy...I call my mom on the way home and make sure she has meat. (FG)
- I miss eating meat...that used to be like my whole meal at home. (FG)
Section 2. Over Consumption of Unhealthy Foods

Participants discussed concern about: (a) eating bigger portions, (b) eating excessive amounts of fattening foods, and (c) increased snacking.

Theme A. Eating Bigger Portions

The main dining facility on campus – the Food Zoo, serves food to students in a buffet-style fashion. During hours of operation during lunch and dinner, there is an abundance of items that students can choose from ranging from pizza and pasta to dessert and hamburgers. Students as well as key informants consistently described this as problematic as it makes portion control difficult.

- You see students that eat in the Food Zoo...its kind of a weird concept how it's all you can eat. And you have people who are making their choices, totally making their choices about what they eat, and they have this broad selection and probably tend to eat things that they...that taste good. (KI)
- Yes, too many choices...your portions grow because you eat a little bit of everything...too much. (FG)
- Part of the option thing, you know (at the Food Zoo), is portion control. Because I remember going away to college and it was sort of a restaurant experience at every meal – and I was very ill equipped to do that. Because I was used to my mother packing a little half grapefruit and bowl of grape nuts or whatever, and now I can have scrambled eggs, hash browns, and toast every day for breakfast – neat. (KI)
- Again, just knowing how much to eat, what's a portion size, what's a serving? (KI)
- They don't always know how to eat in the dorm...there are so many choices...too many...and a lot of meat there. And I think there is, and it should be, but there is a quantity there that they can keep going to, and that may not be good. If they want more they can just keep getting more? I think you would
find that when there are a wide variety of foods available then you eat more. If they only had turkey sandwiches they probably wouldn't eat four, but if there's turkey sandwiches, and lasagna, and enchiladas, and pasta and whatever, then you eat more. (KI)

- Basic nutrition should be incorporated into anything you do, but portions are really important. There's some research from Cornell that says you can prevent freshman from gaining weight just by talking to them about portions — especially given the all-you-can eat venues...that's hard for some people to handle. (KI)

**Theme B. Frequently Eating High-Fat Junk Food**

Students and key informants both talked about an over consumption of high-fat junk food. The target population revealed a belief that junk food is more readily available, and that there is a lack of healthy options. Interviewees felt that healthier foods are available, but that students didn't put forth the effort to seek out and choose the healthier foods.

- I sit and study and study and I'm like ooooh, I have cookies, that candy I got with the rest of my meal plan money, and all the other fattening junk I bought with my extra meal plan money. (FG)
- I eat more fattening foods at school — I went home for break and seriously lost like 10 pounds. (FG)
- I want to eat less fattening foods...more veggies and stuff. (FG)
- Especially first semester, like we ordered pizza late at night — you know, like really late at night...(FG)
- Complaining more about their own behavior, not the Food Zoo...some students talk about eating desert every day...because it's there and presented to them. (KI)
- When they get here...and those first few months that experience of being away from home and being able to make whatever choices they want really changes their choices because they'll eat three desserts every day because they've never been able to do that before, you know? (KI)
- Not paying attention to portions sizes so kind of a skewed diet where fruits and veggies and plant-based foods are minimized and junk foods and snack foods are maximized so the portions are out of whack. (KI)
Theme C. Increased Snacking/Eating on the Run

Discussions revealed frequent snacking on junk food as one of the biggest concerns among the target population. Further, they describe a lack of knowledge about how to select or prepare healthy snacks from available venues on campus. Key informants also mentioned that snacking and eating meals on the run is a concern that they commonly hear from the students – not knowing how to eat healthfully when time is an issue.

- They cannot cook (in the dorms) so they probably tend to stock up on snacky things. (KI)
- Usually if I have to wait too long then I'll just grab something else...like at lunch when it's really busy...I usually sit down and eat there for dinner. (FG)
- The snacking I do (is of concern)...there aren't enough like whole grains...like crackers...so when I snack it's not very good stuff. (FG)
- That's usually the case with me too...if I do snack it's really hard to find anything healthy. (FG)
- There's not enough healthy snack choices...and breakfast...the options we do have aren't healthy ones...they need better whole grain cereals...like Kashi whole grain crunch, stuff like that... (FG)
- Especially freshman, part of the issue is...who do I eat with? They might feel uncomfortable going to the Food Zoo by themselves...and eat more on the run because they feel self-conscious. (KI)
- I hear a lot of students kind of eating on the run...eating from vending machines or maybe having money leftover on their Griz card at the end of the week and just buying junk. (KI)
- On the go, ready made or fast food type things (common eating behaviors of college students)...they don't have to spend a lot of time cooking. (KI)

Research Question #2: What predisposing, enabling, and reinforcing factors influence the dietary behaviors within the target population?

This portion of the results describes the factors that influence the dietary behaviors of the target population. Themes were identified and are listed in the following order: (1) predisposing factors, (2) enabling factors, and (3) reinforcing factors. Quotations from the target population and key informants immediately follow each set of factors.
Section 1. Predisposing Factors

Predisposing factors include knowledge, attitude, perceptions and beliefs that "...either facilitate or hinder a person's motivation to change and can be altered through direct communication" (McKenzie et al., 2005: 19). Both the focus group and interview discussions produced many predisposing factors that influence the dietary habits of the target population, but three themes in particular were identified across all groups.

**Theme A. Lack of knowledge about nutrition (i.e. food groups, portion sizes)**

**Theme B. Perception of lack of time or resources to eat healthfully**

**Theme C. Belief that healthy foods are not available on campus**

- "I don't know much about nutrition in general, so I don't know" (FG)
- "I would say students perceive they don't have enough time for good nutrition – and that's a perception, not a reality. So I'd say lack of time, perceived lack of nutritious foods...I think a lot of students think there's only junk food available." (KI)
- "I'm amazed at how little grasp they have at what they should be eating." (KI)
- "One (barrier to healthy eating) is operating under misinformation, feeling kinda overwhelmed, not knowing which food choices to make..." (KI)
- "I think people get more misinformation than good information." (KI)
- "I'd like to know how much a portion size is...does it vary with the food you're eating...I have no idea...that's what I'd like to know...still." (FG)
- "Even though I think it was helpful for people to be talking about their struggle with others (in the weight management support group), it soon became clear to me that they also needed information, that there was a subgroup in that group that really wanted information or were operating under misguided (nutrition) information." (KI)
- "The coffee shops are all open early but they don't have anything nutritious." (FG)
- "Again just misinformation...buying a rich coffee drink and not realizing those have like 500 calories." (KI)
- "Overall, just basics (topics for nutrition classes)...a lot of people don't know basics – a lot of people do, but you don't realize how many calories you're taking in a day, like actually keep track of it...and portion sizes and stuff...a lot of people don't know that. I'm pretty uninformed...I've never taken a class or anything...I know about the food pyramid from cereal boxes." (FG)
- "I think a lecturing part is important too though (to the classes), so you actually get information out of it...so maybe have charts and stuff...so it's not totally a class situation but you get information still." (FG)
- I think it's important to not only stress nutrition, like downsizing, but also on...like on both sides...like not eating too much or too little...I'm personally uninformed about both. (FG)
- It doesn't taste right (the meat)...it's so greasy. (FG)
- The thing that bothers me ...is they put half and half in the eggs...so I won't eat them. (FG)
- And how much is okay to eat...I think a lot of people have a misperception about how much is okay to eat. (FG)
- Tell about balance...so many people know so many myths about eating healthy...so if somebody could straighten those out. (FG)
- And people don't realize that, like if things are lower in fat, then they add more sugar. (FG)
- I think lack of knowledge too...or a lack of awareness of how to apply knowledge they might have...they've read all these recommendations but what does that mean in terms of behavior they don't know. (KI)

**Section 2. Enabling Factors**

Enabling factors are created by societal systems and can serve as barriers or vehicles to behavior change. These can include things such as access to facilities, efficiency of referral systems, and skill development (McKenzie et al., 2005: 19). The following enabling factors were identified as themes due to reoccurring appearance during data analysis.

**Theme A. Lack of skills to select, prepare, and cook healthy foods**

**Theme B. Availability and overabundance of foods (buffet-style service)**

**Theme C. Lack of dissemination of nutrition materials**

- I think I've eaten more junk food because it's more available at the store and stuff...and if I have extra money I buy candy or something. (FG)
- They're not getting homemade meals anymore, which most of them are probably used to getting at least once a day. So now they have to plan their own meals, go shopping – which some of them might not be used to shopping for themselves, or cooking and preparing the food. A lot of them probably don't know how to cook – how to start. So a lot of foods are probably ready-made foods...stuff they can eat on the go. (KI)
- I think sometimes with the Food Zoo there are so many choices and so many options...dessert and things and they can just pretty much eat whatever they want. (KI)
I think the easier and more inexpensive healthy, fresh foods are – that it would be there and available for them. I think the food course does have some salad bars, and so does the Food Zoo so they do have some fresh foods. (KI)

It's all right there...I'm like well I can eat pizza or pasta with heavy sauce...or hamburgers...or chicken... (FG)

Probably the proximity to a lot of types of foods like vending machines, calling up the pizza delivery people, that type of thing – a lot of group social behavior where eating is involved (effects food choices). (KI)

Up until now they've had other people that have been influencing their food choices, so it's a really new experience for students...they might walk into the Food Zoo and feel a little overwhelmed...certainly with eating disorders, it can be a trigger time for somebody who might be predisposed. (KI)

I think another big factor for college students is cost...those who don't have a lot of money, their food choices are often governed by finances...it's a whole lot cheaper to eat fast food and junk stuff than it is to eat healthier. (KI)

Time and money is a big thing...one thing that comes up frequently in groups is students saying they can't buy fruits and vegetables because they're too expensive rather than realizing you get the paper Wednesday and just shop with the ads...but students just now knowing what the steps are to take to start eating healthy. (KI)

Another thing that limits people is they don't know how to cook, how to prepare food, how to shop. (KI)

The older students, peer advisors, I hear them talking about good foods, the organic movement, buying fresh, but they live off campus. So when you're talking on campus, in dorms, these people are captive you know...at the mercy of people preparing the food for them essentially. (KI)

If more things were available it'd be easier to follow (a healthy diet). (FG)

There are a group of people who eat most of their meals in the Food Zoo because they can get the most food for their dollar value...and there's some kids who buy junk food at the country store or eat more of the fast food style, and I think that is directly correlated to disposable income. (KI)

Tuesdays and Thursdays are hard for me because I have an 8am class, so I eat something before that...but I have a little time and another class until 6pm and then I work so I really have to try to plan...but it's hard. (FG)

There are too many choices at the Food Zoo. (FG)

If I had the bigger meal plan I'd eat breakfast more often because I'd have more money to have stuff there in my room and I'd eat it then. (FG)

Section 3. Reinforcing Factors

Reinforcing factors are the rewards or feedback the target population receives after a behavior change. If positive they can encourage the continuation of the behavior change, and if negative they can discourage continued behavior change. Family, friends, peers,
and teachers can all deliver reinforcing messages (McKenzie et al., 2005: 19). These factors were discussed more subtly among the target population and key informants and emergent themes are as follows.

**Theme A.** No tangible reward (actually seems more expensive to eat healthy)

**Theme B.** No vicarious reward – don’t see peers eating healthfully

**Theme C.** Lack of support from faculty, staff, and campus resources; lack of communication between service providers and students

- Nutrition is one of those hard things – most of us know what we're supposed to eat, but we don't always do it. In the third grade the kids learn about food groups, the food pyramid. They all know the difference between candy...protein...vegetables...but look at all of us as adults; we don't all make perfect decisions. I know I should eat a carrot stick instead of a cookie, but I still eat the cookie. (KI)
- Pressure from family, friends, and parents to look a certain way definitely effects eating behavior. (KI)
- I think using some positive peer pressure (to motivate students), like saying your friends are doing it, why aren't you? (KI)
- I think students are sort of at the mercy of their surroundings, and their peers probably. (KI)

**Research Question #3: What nutrition-related resources and services are currently available to the target population at The University of Montana?**

The responses from this question will be divided into four sections: (1) a brief description of the nutrition-related resources and services available on The University of Montana campus, (2) the referral system among service providers, (3) student knowledge and use of those resources as identified by the target population, and (4) where students go to get their nutrition information.
Section 1. Resources and Services Available to the Target Population

Health Enhancement @ Curry Health Center

- This department is currently expanding their primary care services to include nutrition-related resources for students. This addition of services was based on requests from doctors and nurses at Curry Health Center who reported student interest in the area of nutrition. General nutrition handouts will soon be available for students who come to Curry Health Center with nutrition-related questions.

CAPS (Counseling and Psychological Services)

- Individual counseling to students – psychological in nature.

- Why Weight – psycho-educational group co-led with the UDS dietitian; meetings are generally information based.

- Food: Friend or Foe – process oriented group about healthy relationships with food. Participants tend to be women that are either bulimic or have a history of restricting or are compulsive eating.

- Weight Management Group – psycho-educational group taught in collaboration with the UDS dietitian & Campus Rec fitness director. Class is designed to educate participants on healthfully losing and maintaining weight. Unlike other groups, faculty members are welcome to attend in addition to the student participants.

- Guest lectures in group settings such as the dormitories or sororities (as requested).

- Saturday Seminars – taught in collaboration with the UDS dietitian and the Campus Rec fitness director. These half-day gatherings are generally offered once or twice per semester and provide participants with information on fitness, nutrition, and body image.
Registered Dietitian @ University Dining Services

- One-on-one nutrition counseling
- Special diet accommodations – students with allergies or certain health problems can work with the dietitian to ensure the campus meal plan provides them with adequate food sources.
- Outreach programs and classes – the dietitian does on-site mini consults twice a month at Campus Rec; presentations in dorms or sororities, at health fairs; and teaches a variety of classes on weight-related issues with CAPS and Campus Rec.
- Nutrition information posted on UDS website
- Nutrition information posted in all UDS locations on campus
- Hungry Grizzly Nutrition Newsletter – published monthly and distributed throughout campus. Its contents include information on a variety of health topics

Residence Life

Nutrition-related services available to RA’s and dormitory residents are provided through collaboration with the dietitian at UDS:

- Training for RA’s
- Guest talks on floors of the dormitories
- Nutrition information posted by the foods at all UDS locations

Health and Human Performance Department

Nutrition-related coursework available to students through this department are:

- Basic nutrition
- Nutrition for sport
- Chronic disease and nutrition (graduate level course)
Campus Recreation

- Bi-weekly visits from the dietitian at UDS for mini-consults (based on demand – students sign up for a fee of $5.00).

Section 2. Referral Services Among Service Providers

The key informants from this study representing Health Enhancement, Campus Recreation, University Dining Services, Health and Human Performance Department, and Residence Life all showed awareness of, and working relationships with, the other campus resources.

- The other thing we do is if somebody is being seen here at CAPS, dining services, or Campus Rec, we really try to work as a team approach, so we coordinate with each other, consult, and keep each other updated our clients. (KI)
- We brought an in-service for our staff about the different services those people (other departments on campus) offer. So what does the dietitian offer? What does Campus Rec offer? What does CAPS offer? So we did training for our staff to outline what those services are. (KI)
- I do always suggest nutrition as a course to take – I do because it's a useful science, it's applicable to your lifestyle right now. (KI)

Section 3. Target Population Awareness and Use of Resources

Of the four focus groups held with the target population (n=22), not one person reported receiving any nutrition information since they'd been at The University of Montana. Of the available nutrition-related resources and services on campus, the target population only identified two that they had actually used: (1) nutrition information on food labels at the Food Zoo, and (2) the Hungry Grizzly Newsletter. While several participants discussed their awareness and usage of the food labels at the Food Zoo, only one member of the target population (4%) was aware of the nutrition newsletter, and had mentioned it during the focus group discussion. The rest of the participants (96%) were unaware of the newsletter until given a current copy at the conclusion of each focus group.
- I always look at the Food Zoo...on the main line...that tells you which foods are a good source of things, I look at that. (FG)
- Just like at the Food Zoo they have those little tags above the food that say this is a good source of iron. (FG)
- I see a lot of information around the dining areas that show caloric amounts and that kind of stuff – and I think that's fabulous...I mean I read it all and I see kids reading labels, food labels...and there should be more awareness out there. (KI)
- I don't even look at those. (FG)
- I looked at them occasionally and think yay, fiber. (FG)
- Sometimes it doesn't even click if it doesn't look appetizing. (FG)
- They have those signs...about the food. (FG)
- They have those signs there...the red, green, yellow...but it's not very detailed, because a lot of times it could be red because it has olive oil or something in it...something that's not necessarily horrible for you, but you don't take any because it's red...it doesn't explain why it's red. (FG)
- They have those flyers...I think once a month that I pick up at the UC...at like the coffee shop...and they have some kind of food source...whole grains, facts and stuff. (FG)

Section 4. Sources of Nutrition Information used by Students

When asked where they would go for assistance if they had nutrition-related questions or concerns most students identified their friends, the Internet, or Curry Health Center; two mentioned the nutritionist; and many were not sure. During interview sessions, professionals and faculty from The University of Montana were also asked where they believed most members of the target population sought out nutrition information. The key informants' responses were comparable to not only this target population, but also to national assessment data. The findings from the 2003 National College Health Assessment Survey ranked friends, the Internet, and magazines in the top five, and health center staff and health educators at number six and seven on the list.

- Most students don't realize they can sit down with a dietitian, you know, like I said students who have used it overwhelmingly have good things to say...it's just not being aware that it's an option, especially a free option in the dorm. So getting that information out, without overwhelming the dietitian. (KI)
- I know a lot of students get their information on the Internet...we've really had to move in that direction and get things on the Website now because that seems to be the method of choice for people. It's interesting – students in the
HHP department get information through the classes, but the other students...I don't think they're getting very much of it. (KI)

- Advertisements – television, magazines, books...South Beach Diet. I think a lot is word of mouth...'my friend told me this', or 'I heard that'. (KI)
- Probably from mass media – television, Internet, magazines. I'd say primarily from friends and family, from books, and probably from a health professional pretty far down the list I'd say. (KI)
- Certainly from home...from what their mother wants them to do – if their mother sends them a multivitamin then they take a vitamin. Also a lot of information they get from their physicians...and then there's the media. Not so much the Missoulian, but more of the lay magazines, stuff on the Internet. They get some information; mostly misinformation from the Internet...rarely is it from a dietitian they've met with (that they get nutrition information). (KI)
- From the media – that's a big one...and the Internet and from other students. (KI)
- I have yet heard somebody talk about taking a health class in high school and what they learned about nutrition in health class...nobody's ever mentioned that...I think the Internet, magazine articles, things like that (is where students get nutrition information). (KI)

Research Question #4: What content and procedural components would be most appropriate and beneficial in future nutrition-based workshops for the target population?

The target population and key informants suggested a plethora of creative and insightful considerations for program planning. This crucial portion of the results will be divided into three sections and will include identified themes for (1) topics, (2) instructor preference, and (3) procedural recommendations. Following the identified themes in each section are direct quotations from the target population and key informants.

Section 1. Interactive Topics

Topic ideas offered during the focus group discussions and interview sessions were innovative and unique, yet they supported a similar theme of combining knowledge with hands-on skills training. Following are the three main themes that emerged from the array of generated ideas.
**Theme A.** Information and hands-on practice selecting healthy foods (including snacks) from available venues on campus.

- Healthy snacking might be a good thing...what you can pack that's going to help you start out the day. (KI)
- One thing that might be really good is to give some samples of what's offered and then have them actually choose what would be good choices, so it'd actually be a role modeling practice. And why those things are good for them, so helping them to make choices from what's actually on campus. And certainly always awareness about eating disorders and where to get help – particularly for the girls, that’d be very advantageous. And maybe a few tips on how to avoid the freshman twenty. (KI)
- Especially in the dorms, navigating the Food Zoo. You know, just again information about what's available, choices they can make, information about where the hidden calories might be...smoothies and coffee drinks, again educating about the freshman 15, but I really think hitting them in the first month would be good. (KI)
- Healthy snacks...and also a balance in the meals. (FG)
- What would be useful is to empower students – give them the basic pyramid and help them figure out, over the course of a week, how to meet their requirements...so they actually put a menu together from what’s available here. Have them get in groups... talking about 'if you eat a salad...that's probably 3 servings of veggies,' you know? Some kind of interactive thing like that – a useful thing – so they can come away with a little plan so they know what are the good foods and the basic building blocks they need. (KI)
- I'm just such a proponent of point of purchase stuff. So information at the point of purchase...this salad has lots of vitamin K which can help with such and such...or this has a lot of potassium, which can lower your blood pressure, not just calories and stuff, but...like 'think color – always add a color' that kind of stuff.
- How to eat healthy on a college campus...with what they know they're going to be providing (FG)
- Tips, like if you eat in the Food Zoo eat this, this, or this...like in magazines they give all kinds of options for certain diets and stuff...like snacks and they're healthy (FG)
- Yeah, like a fun way to put snacks together...different snack ideas that are easy to make...and are good for you...instead of being unhealthy. (FG)
- Tips about what you can get where. (FG)
- This probably sounds weird, but take a group down to the Food Zoo...give like a bunch of options, portion sizes...you know? Because then when you go back by yourself it'd be way easier to know what's good...what's a good amount...ways to get everything in...because I could look at something and not have any idea what's in it. (FG)
**Theme B.** Information and skill training about shopping, preparing, and cooking healthy foods (with commonly available resources).

- Something on how to cook with things you have in dorm rooms. (FG)
- I think it'd be beneficial for them to learn what to shop for, how to prepare foods, things that would be inexpensive but also quick and easy to do because they probably won't spend a lot of time on it and don't have much money. (KI)
- You could like go cook something...make it healthier or something...like 'this is how you could cook it, but this is better; ' to actually do it. (FG)

**Theme C.** Basic nutrition information including the food pyramid, portion sizes, and label reading; accompanied with or followed by hands-on practice in all three areas. Clear up misperceptions.

- Also portion sizes... I think pretty much everybody at every age in this society has concept of portion sizes that are way out of whack. (KI)
- Basic nutrition should be incorporated into anything you do, but portions are really important. There's some research from Cornell that says you can prevent freshman from gaining weight just by talking to them about portions – especially given the all-you-can eat venues...that's hard for some people to handle. (KI)
- Talk about fad diets... how unhealthy fad diets are... so many people are hooked on these fad diets... like ones that cut out veggies and fruits and stuff... that aren't good. (FG)
- I pretty consistently hear fear of freshman 15 – more information on that... that it's usually not 15 pounds. (KI)
- I think there should be more on eating disorders... fad diets... diet pills... images on TV, on body types... I think it needs to be talked about that being a certain weight is like being a certain height... you can't do it. (FG)
- Portions are something. (FG)
- How much you should eat at each meal... fat...(FG)
- I'd like to know about fast food... we all know it's bad for you, but how bad is it, you know? (FG)
- Organic vs. nonorganic... is there... I mean I know some people say they think it's crap and there's really not a difference. (FG)
- A lot of us obviously know what good nutrition is... it's been presented enough times... it's probably going over it again. (FG)
- Another thing is how to read nutrition labels on boxes and stuff... because it's all Greek to me. (FG)
- Vitamins, what vitamins are for... what their benefits are... the effect of getting too many. (FG)
- Healthy ways to manage your weight or lose weight... and examples of how to do it. (FG)
Section 2. Instructor Preference

Participants of the focus groups and interviews both discussed who they thought would be best suited to lead future nutrition interventions in the dormitories. Three main themes pertaining to instructor preference were identified, and are followed by direct quotations from the target population and the key informants.

Theme A. Peers would be effective leaders for this intervention because they can relate to the experiences of the target population, and conversely the target population can relate to them.

- I think they might pay more attention if it's a student. (FG)
- I think the RA's would like interacting with people like you – young people who look like they have an active lifestyle and are in great shape, don't you think? (KI)
- Kinda like the care rep people... it was a student so I wanted to go to that... it wasn't like 'let me explain this to you...' (FG)
- I was just talking to a student the other day about this, and she thinks that hearing the information from peers is much more powerful – even than a young adult like I consider myself to be... coming from a peer might be more powerful. Or from an expert – someone who really knows the information well who can think on their feet and can answer questions that are going to come up. (KI)
- The advantage of having a student would be that they'd know the places around campus... what we're eating. (FG)
- Someone our age... or who has lived on this campus and knows what we eat and stuff. (FG)
- Someone who goes to the Food Zoo and stuff. (FG)
- A grad student would be good (to teach the classes). (FG)
- Yeah, they have to be closer to the age... it'd feel like they would be more personable. (FG)
- I agree with her... the bigger the age difference gets... the gap, then we pay attention to them less. (FG)
- They know what's going on, but people that are younger would understand more... be more realistic. (FG)
- And it'd be more comfortable (to have someone closer in age). (FG)
- But someone with knowledge can talk all day and not understand what's at the Food Zoo if they'd never been there before. (FG).
- Maybe graduate students or something would be good... because they've been through it but not too old to understand. (FG)
- When I think of old I think of the professor that gets up and talks to you about everything and is cool and all, but not relating to our lives at all, you know?

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Some of the students want to hear from someone who is a professional, but they also like programs that are done by their peers as well. (KI)

**Theme B.** A health professional should participate as a supporting instructor, providing guidance and expertise in planning and implementation of the program. Additionally, involving a health professional will provide an opportunity for the target population to get acquainted with one of the available nutrition-related resources on campus.

- I think it'd be nice to, again, look at it as a team approach – nutrition is somebody from CAPS, Campus Rec., etc., so you're hitting all three areas of the information just in case students have questions or want to come in and talk to somebody – it's easier if you have a face or a name. (KI)
- Probably a dietitian - the only person really qualified to give that kind of information. (KI)
- Someone with knowledge about the topic. (FG)
- You could even have a graduate student present, and then have a faculty person there too, and help with questions, or the dietitian on campus. (KI)
- A nutritionist. (FG)
- Anyone who knows what they're doing. (FG)
- Somebody who knows what they're talking about. (FG)

**Theme C.** Is it imperative that the instructor(s) is enthusiastic, personable, inspiring, and charismatic – someone the target population will want to work with for one or more nutritional sessions.

- I think once you get them there... because that's the most difficult task... but once you get them there the way a person talks and acts – are they interesting? Do they talk in monotone? Do they avoid lecturing? It's really in the way the presentation comes across, and if it's interactive that makes it more fun. I don't think it has anything to do with being a student, faculty member, good-looking girl, or anything. I think it has to do with the person's ability to present. (KI)
- I don't think it matters (student versus faculty)... I think it's the presentation – as long as you take someone that's knowledgeable. I mean would take a freshman student or something, but seniors, graduate students – particularly graduate student probably, that are knowledgeable – you have to be able to answer their questions. Someone that is enthusiastic and is willing to listen and give them feedback. Don't you think? I think that's more important than straight-laced faculty that's bored and doesn't want to be there. (KI)
- And someone you can talk to if you have questions. (FG)
Section 3. Procedural Considerations

The focus group participants and interviewees gave procedural suggestions for future programming. Feedback from the target population in this area was particularly important in order to assure that enrollment for future nutrition education workshops won't be low due to procedural inadequacies. As one of the key informants said during an interview, "...getting them there (to a program)...is the hardest task." The target population and key informants gave suggestions about procedural issues such as length, location, frequency, time of day, and format, with the following themes emerging as the most important.

**Theme A.** [Time & location] The intervention should be held on site at each of the respective dormitories. Participants also suggested having the classes during the evening (seven or eight o’clock), and early in the week or possibly on a Sunday.

- Usually nighttime...daytime wouldn't work at all! (FG)
- We've tried advising in the dorms – almost everyone has tried something in the dorm. And it's difficult you know, because the dorm is their home...and when you think not having someone come door-to-door where you live, how receptive are you to listen to their shtick? (KI)
- Weekdays...well, maybe Sunday night...if you're not doing homework. (FG)
- Eight o’clock is good...people are done with sports and stuff. (FG)
- Earlier in the week...the later in the week it is, the less likely people are to go...you have stuff all week and don't want to do stuff later in the week. (FG)
- I prefer the dorms (for the classes)...then I don't have to walk across campus...if I'm settled in I don't have to go anywhere. (FG)
- I think you'd get more people if you had them in the dorms...you can just roll downstairs or whatever. (FG)
- (Classes should be offered) on site at the dorms – and in smaller groups if possible. (KI)
- Having it in the dorms is probably going to be helpful. I tried a program like this away from the dorm and I didn't get anyone to come...and of course offering free food is always a good thing. (KI)
- Like at six or something...(FG)
- Or seven... (FG)
- I like it here in the dorms. (FG)
- Here...especially when it's cold. (FG)
Theme B. [Frequency] The class should meet at least twice. The target population thought a second meeting would allow an opportunity to ask follow-up questions and track progress of knowledge and skills learned at the first meeting.

- Not a bad idea to have one session, but offer it at a couple different times because sometimes there will be something I want to go to but I'll have class or I'm going home or something. (FG)
- Maybe offer it a couple times a month, but offer it at different times each time. (FG)
- Maybe a couple times (to meet). (FG)
- There's so much information...then they can bring back questions. (FG)
- You can talk to them about personal things throughout the semester. (FG)
- You could do a couple times kind of close together, and like keep track of food or something for a day or two and it'd be kind of cool to go over that...it'd be really individualized. (FG)
- Ongoing I think...so more people can make it...if you have it on other nights and you can reinforce things...so you actually retain some of the information. (FG)
- I think like once a month would be good...like on the same day so you get a little routine going...and you can expect it...and you'd get more people when you can plan it. (FG)
- Every week would be too much. (FG)
- This is my guess, but an extended series of classes probably wouldn't work as well as one or two sessions – but then letting people know where they can get information. (KI)
- I'd probably do most once a month, maybe once a semester. (KI)
- You know, thinking of our weight management class, we meet once a week and I think that it's helpful for people because they can pick a goal and they have a week to work on it and they know they have to come back and be accountable for it...so it keeps you on track as far as making changes because it's hard to make changes and you have to do it one little bit at a time. So I think it's better if they have to come back with some frequency – report back or at least their friends. (KI)

Theme C. [Style] The nutritional sessions should be taught in an interactive, hands-on manner. Students repeatedly emphasized that they attend lecture-based classes all week long and don't care to be "lectured" about nutrition.

- The key is to make it not a lecture – they sit through classes all day long, they're not going to come and listen to a lecture about eating healthy. They want to be entertained, so if you're going to do something it has to be entertaining, fun, and interactive. (KI)
- Make it more fun. (FG)
Comfortable environment...talking and asking questions...not like let me raise my hand for ten minutes before you ask me. (FG)
Visual aids...hands on stuff. (FG)
Open discussion is always good...like a question and answer thing. (FG)
A workshop. (FG)
I like the whole forum thing – like just discussing. (FG)
It'd be better if you get to be involved instead of just listening the whole time. (FG)
Keep them small...small enough you're comfortable talking. (FG)

Additional Noteworthy Themes

Incorporating Computers

Many of the key informants mentioned the regularity with which the target population uses computers and the Internet daily to communicate and seek out information. Thus they discussed the growing need for health information to be readily accessible to students via the Internet. The University Dining Services dietitian was beginning to work on a project that would provide a database of nutrition information via the Internet that would be accessible to college students across the country. Additionally, the focus group participants reported that the Internet was one of their top sources of nutrition information.

Something that has come up to me recently is how much technology is an integral part of these kids' lives...it's a different generation then what we've seen before. So incorporating technology, and interactivity is really important to this generations expectations. Websites – they like things personalized to themselves. (KI)
I don't know what's on the dining services Website or how often students look at that, but it could be another avenue to get information to students. (KI)
Or you could have a computer available and getting on my pyramid and showing them how to use it. That'd be a fun class too...teaching them how to use mypyramid...and it's easy...and free. (KI)
Exercise

The main focus of this study was to assess the nutrition needs of the target population. However, during nutrition discussions the topic of exercise came up several times among students as well as key informants. Members of the target population expressed an interest in having an exercise component as part of the nutrition workshops.

- Even information about exercising...maybe I'm wrong, but doesn't each individual person or each body type need different...it'd be neat to know just for you...I think that'd be helpful. (FG)
- Make us aware...I was talking to a woman about how much time we spend being inactive...most of the day I'm sitting around or laying down and I don't think you realize how inactive you are... (FG)

Eating Disorders

During focus group discussions and key informant interviews, the topic of eating disorders came up several times. None of the participants discussed this topic in depth, or identified it as a key topic to be addressed, but it was repeatedly mentioned by professionals and students alike to at least provide information and referral services regarding eating disorders as part of any future nutrition education programming.

- I think one of the things that might need to be a part of what you're doing is to look at the whole thing around disordered eating...it's certainly an issue. (KI)
- I think part of a freshman's task is to learn how to develop their own healthy relationship with food...and I think some students are taken aback by that...certainly with eating disorders - it can be a trigger time for somebody who might be predisposed. (KI)
- Another thing that really affects health is that particularly how women eat is they're very conscious of weight - and a lot of them limit what they eat so they can be thin. (KI)
- Certainly always awareness about eating disorders and where to get help - particularly for the girls that'd be very advantageous. (KI)
- I'd talk about eating disorders (in the future classes)...maybe how to identify them perhaps in your friends, classmates...and where to get help. (KI)
- I think it's important to not only stress nutrition, but also on both sides...like not eating too much or too little...it seems like a touchy subject... (FG)
- I think there should be more on eating disorders...fad diets...diet pills...body types...everybody's different. (FG)
CHAPTER V
DISCUSSION OF FINDINGS

Researchers have found that eating habits generally get worse as young adults make the transition into college (Grace, 1997). The consequences of poor dietary habits include an increased risk for cancer, heart disease, and obesity – just to name a few (CDC, 2006). College and University campuses provide health educators a readily accessible setting to reach entire groups of young adults who are still shaping lifestyle habits (Huang et al., 2005). Ideally, students who obtain nutrition education and skill training in college will carry those learned dietary habits into adulthood (Silliman, Rodas-Fortier, & Neyman, 2004). Therefore, the purpose of this study was to: (1) assess the nutritional education needs of college freshman at the University of Montana through focus group discussions with the target population and interviews with health professionals; and (2) use themes developed from that qualitative data to create strategies for future nutrition education workshops for college students. Program planning and behavioral theories were used to further support needs assessment data in order to address not only knowledge but also skills and future dietary behavior.

Incorporation of Program Planning and Behavior Change Models

Conducting a thorough needs assessment prior to the implementation of a nutrition program is important to determine (1) which behaviors contribute to poor nutrition and (2) which factors most significantly influence nutritional behaviors (using the PRECEDE-PROCEED model – phases 3 & 4). As discussed in Chapter II, health education and health promotion specialists commonly rely on planning and behavior change models to guide their needs assessment methods, as well as to strengthen their
findings and strategy recommendations. For this study two models were used – the PRECEDE-PROCEED planning model and the Information – Motivation – Behavioral Skills [IMB] behavior change model.

The PRECEDE-PROCEED model for program planning guided the data gathering and data analysis portions of the study. The main constructs from the third and fourth phases of this model helped to create an outline for the interview and focus group question guide intended to elicit the following information:

- What behaviors contribute to problematic dietary choices?
- What predisposing, enabling, and reinforcing factors [PER] contribute to those dietary behaviors?

The information gathered from the target population and key informants was then analyzed qualitatively. Dietary behavioral risk factors were categorized into themes, as well as the PER factors contributing to those behaviors. The PER factors considered to be most important and most changeable then became the focal point of the next stage of the study – the strategy development.

The IMB model of behavior change was used to increase the likelihood that the strategies developed to address the PER factors will in fact lead to a change in behavior within the target population. The IMB model asserts that behavior change will only occur when participants are informed, motivated, and capable of the skills necessary to carry out the given behaviors. Therefore, the IMB model was employed during the strategy planning phase of this study to ensure that methods developed to target the PER factors would incorporate the components necessary to lead to actual dietary behavior changes for the college students. In this study, the target population and key informants both
discussed factors that led to dietary behaviors that were motivational, informational, and skill-based in nature.

**Strategy Recommendations for Future Programming**

As a result of a thorough analysis of focus group, interview, and literature data, five key dietary behaviors were identified as most problematic for the target population: (1) eating a healthy breakfast, (2) eating more fruits and vegetables, (3) consuming adequate protein, (4) eating less high-fat and 'junk foods', and (5) eating healthier snacks in between meals. Next, in accordance with the PRECEDE-PROCEED program planning model, the PER factors that influence each of those behaviors were identified. It was during this early stage of the strategy development process in which it became apparent that before nutrition workshops could address the PER factors specific to each behavior, initial workshops would need to cover several fundamental PER factors relevant to all the behaviors. For example, before programming could address the predisposing factor *belief that healthy breakfast options aren't available on campus*, which is specific to the dietary behavior of eating a healthy breakfast, prior sessions would need to address predisposing factors such as *lack of knowledge to read food labels*, or reinforcing factors such as *lack of information dissemination and perceived support from university health services* that are fundamental to all dietary behaviors. For this reason, the following strategy recommendations portion of this study will be divided into two sections.

*Section I: Strategies Addressing Fundamental PER Factors*

It is recommended that these fundamental nutrition education strategies be implemented before the topic specific nutrition education strategies. By implementing these fundamental strategies first, program participants will gain the basic knowledge and skills
necessary to understand and succeed at changing the topic specific nutritional behaviors addressed in the *Section II* workshops. The strategies and activities described in the first section will address the PER factors relevant to the behavior of overall healthy diet including (a) lack of knowledge and behavioral skills regarding nutrition (i.e. portion sizes, food groups, label reading), and (b) lack of knowledge and skills to access service providers on campus.

**Section II: Strategies Addressing Topic Specific PER Factors**

Section II contains strategies addressing PER factors specific to *one* dietary topic (one of the five key problematic dietary behaviors). For example, falling under the dietary behavior of eating a healthy breakfast is a strategy that addresses the enabling factor *'lack of time to pick up a healthy breakfast'*. Strategies pertain only to the behavior of eating a healthy breakfast. Other examples include:

- Strategies addressing the predisposing factor *'lack of knowledge about non-meat protein sources'* , specific to the dietary behavior of eating adequate protein
- Strategies addressing the predisposing factor *'belief they cannot obtain adequate servings of fruits and vegetables from on campus dining venues'* , specific to the behavior of consuming adequate fruits and vegetables.

Combined, the strategies from sections I and II are designed to serve as a program planning tool kit for those who may be planning future nutrition education workshops. Understandably, budget and time constraints likely won't allow for the use of all of the developed strategies. It is recommended that planners initially select some of the fundamental strategies from the first section in order to provide basic knowledge and skill development, and then select strategies accordingly from the second more specific
section. However, if future program planners find that the needs of their target population would be better met by skipping directly to Section II - topic specific strategies, that approach may be used as well. In such a case, it would be highly encouraged that facilitators be prepared to also include basic nutrition education components such as:

- Reading food labels
- Identifying healthy portion sizes
- Awareness of the food groups

Further, as the needs within the target population may change over time, planners may want to consider conducting focus groups with the target population to pretest session ideas before opening the workshops to all dormitory residents.

*Strategy Section Design*

Each strategy within the fundamental (Section I) and topic specific (Section II) sections will include the following components:

- A nutrition related goal
- Description of the particular PER factor and/or behavior being addressed
- Specific strategies (created in accordance with the IMB model) to be employed within each strategy that include informational, motivational, and behavioral skills components as necessary to address one or more of the PER factors that influence the problematic dietary behaviors.

Additionally, tables can be found at the end of both sections that provide a summary of each strategy, the identified PER factors, and the IMB-based methods designed to address those factors (see Figures 5 and 6, respectively).
Section I. Fundamental Strategy Recommendations

DIETARY BEHAVIOR: EATING A NUTRITIONALLY SOUND DIET

The following section of strategy recommendations were created in order to address the fundamental PER factors relevant to all five of the identified problematic dietary behaviors. In turn, these strategies will build a knowledge and skill base that the topic specific strategies in Section II can build upon.

GOAL #1: IMPROVING NUTRITION KNOWLEDGE ABOUT THE FOOD GROUPS (EDUCATIONAL STRATEGY)

- **Addressing:** Lack of knowledge (predisposing factor) about food groups in the MyPyramid scheme. Many of the focus group participants expressed a concern with an overall lack of knowledge about the food groups. Additionally, students said it would be beneficial to learn exactly how much they need from each of the groups in order to meet their daily requirements.

- **IMB-based Strategies:** Brainstorming (informational), handouts (informational), lecture/discussion (motivational), problem-solving activity (behavioral).

Workshop facilitators will start by asking the participants to name the food groups, which will be written on a whiteboard or large piece of paper. The students will then be divided into groups, with each group receiving several food items – some common and some more rare. A combination of food models and real non-perishable food items will be used for the activity. To address the predisposing factor 'lack of knowledge about food groups', the students will have a set amount of time to split their food items into each respective food group. Once time is up, each group will informally present their designated food groups. Discussion will be encouraged throughout the activity, and when all the groups have had an opportunity to share their foods, facilitators will disseminate a
handout. The handout will visually and verbally describe foods found within each of the food groups, as well as the daily recommended servings from each group. The facilitator will go through the handout with the participants and answer questions/clarify misperceptions during this process. Part of the discussion will include the idea of moderation – clarifying which foods within each food group should be eaten more frequently (i.e. lean meats), and which foods should be eaten less frequently (i.e. fatty meats). Additionally, samples of at least one of the "rare" food items used during the activity will be passed around to the students to encourage them to taste a new healthy food.

**GOAL #2: LEARNING TO CREATE INDIVIDUALIZED DIET PLANS (EDUCATIONAL STRATEGY)**

- **Addressing:** *Lack of individualized information (predisposing factor) about nutritional needs.* Many of the students expressed an interest in receiving (a) individualized information pertaining to food groups and daily recommendations, (b) receiving information via computer programs.

- **IMB-based Strategies:** *Computer-based (informational, motivational), field trip (behavioral).*

Participants will accompany the facilitators to an accessible computer lab. Facilitators will begin the activity by giving a brief, interactive orientation to the various nutrition services offered on the MyPyramid Website – a Website with the capability of assisting students in accessing *individualized dietary information (the identified enabling factor).* Each student will then be presented with a hypothetical daily food record. To provide student with hands-on practice using the program, facilitators will work through the first couple food and/or beverage items with the participants, showing them how to enter
foods, food quantities, etc., into the program. The students will then be given time to enter the remaining food items. If the participants prefer to work in pairs or groups, that will be encouraged in order to foster the perception of peer support.

Next, students will be shown how to print dietary analysis reports based on their entered data, and the facilitator will hand out reports (printed ahead of time) that show the results from the hypothetical data. The remainder of the time will be spent in casual discussion over the handouts – how to interpret them, determining whether or not they’ve reached dietary recommendations, and if not, discussing possible items from the appropriate food groups that could be added or removed. If students wish to keep a record of their food and beverage consumption for a day and enter it into the MyPyramid program, facilitators will make themselves available for a set period of time in the weeks following to interpret and discuss the results with the students as needed.

**GOAL #3: IMPROVING KNOWLEDGE ABOUT PORTIONS AND SERVING SIZES (EDUCATIONAL STRATEGY)**

- **Addressing:** *Lack of knowledge (predisposing factor) about portions and serving sizes, and lack of skills (enabling factor) to identify and select appropriate portions.*

  Students and key informants mentioned that an over consumption of junk foods and an under consumption of essential nutrients are both due to a lack of knowledge about serving sizes, as well as a lack of skills to identify and select appropriate portions.

- **IMB-based Strategies:** *Food models (informational – to address the predisposing factor 'lack of knowledge'), field trip (behavioral, motivational – to address the enabling factor 'lack of skills').*

  To start the session, the facilitators will clarify the difference between portions (the amount you choose to eat) and servings (a predetermined unit of measure describing the
recommended amount to eat from each group). Next, to enhance this learning experience aimed to increase knowledge about food portions, an assortment of food models will be handed around for the participants to look at, touch, and get familiarized with. The facilitator will then talk with students about each of the food items, giving examples of what is considered to be a serving size for each of the foods, and how many serving sizes are needed per day. In addition to food models, the facilitator will use everyday items such as playing cards or dominos to give students a visual representation of what a serving of each food item looks like. Once students have some knowledge and familiarity with what a serving of the food items looks like, the food models will be collected.

The participants and facilitators will then take a field trip to the Food Zoo, and students will be split into groups. To put their knowledge about portion sizes to the test in a real-world setting, students will be given a set amount of time to gather a plate of food that contains what they believe to be healthy portions from all of the food groups. When finished, participants will share their selections and discuss why they chose them. The facilitator will distribute a MyPyramid food group handout for students to use as a reference. As each of the groups present their meal selections, discussion will be encouraged about the food choices – including portion sizes and whether or not any alternative choices could be made to make the meal healthier (i.e. wheat bread instead of white bread). Additionally, the facilitator will ask students to discuss how many servings from each of the food groups is included in their meal, and how many more of each would be needed (in their remaining meals) in order for them to meet their daily recommendations. This will help students to grasp an overall understanding of portions – not just in one meal, but also in relation to the day’s total requirements.
GOAL #4: IMPROVING THE ABILITY TO READ AND INTERPRET FOOD LABELS (EDUCATIONAL STRATEGY)

- **Addressing:** Lack of knowledge (predisposing factor) and skills (enabling factor) to read food labels. Many students reported a concern with not knowing how to read and interpret food labels in order to guide their dietary choices.

- **IMB-based Strategies:** Lecture/discussion (informational – to address the predisposing factor 'lack of knowledge'), games (motivational, behavioral – to address the enabling factor 'lack of skills'), transparencies (informational, motivational – to address both the predisposing factor 'lack of knowledge' and the enabling factor 'lack of skills').

First, to address the predisposing factor 'lack of knowledge about food labels', the facilitator will place an example of a food label on an overhead projector and go through the main components of the label with the students, answering questions as they arise. Students will then be divided into groups and given a food label with an accompanying worksheet. To practice reading food labels, students will work together to answer questions such as: How many calories are in a serving? Does this product contain trans fats? Is this food item a good source of fiber? How much total fat is in the entire package? After all the groups have finished completing their worksheets, the facilitator will ask them each to form a straight line. When the instructor says, "Go!" the first person in the group's line will race to the board (or to a large piece of paper if board is not available) and write the answer for question #1. That person then hands off the pen and worksheet to the next group member who races to the board and writes the answer to question #2, and so on until all answers have been written on the board.
The facilitators can award prizes to the team who finishes first, and then go over each group’s food label and worksheet questions on an overhead projector. During this process, participants from the groups will be encouraged to share their answer, ask questions, or engage in discussion with one another and the facilitator. Additional prizes can be given at the discretion of the facilitator – for example if the group who finished first had any incorrect answers on their worksheet, the second place group can also win a prize if their worksheet was error free, and so on. This activity will allow students to directly apply their newly acquired knowledge about reading and interpreting food labels through a fun and interactive activity.

**GOAL #5: IMPROVING KNOWLEDGE OF NUTRITION SERVICE PROVIDERS ON CAMPUS (EDUCATIONAL STRATEGY)**

- **Addressing:** Lack of knowledge (predisposing factor) about service providers on campus, lack of information dissemination (reinforcing factor) from university health services. Focus group participants expressed a feeling that the university campus does not encourage students to eat healthfully as they hadn't received any nutrition information from the university. Additionally, students discussed a lack of awareness of the available service providers on campus.

- **IMB-based Strategies:** Handouts (informational), games (behavioral, motivational).

To address the reinforcing factor of 'lack of information dissemination from university health services', the students will be given a handout that clearly lists the nutrition-related service providers on campus including the department, names of key contacts, location, and services offered. After a discussion about the services, students will be split into groups and sent out on a 'scavenger hunt' to each of the service provider locations. If the session is held during daytime hours, the students will be asked to retrieve signatures
from specific professionals in each department (the professionals will be alerted ahead of time). If the session is conducted during evening hours facilitators will plan ahead, placing a certain number of identifiable trinkets outside each of the respective offices. Prizes can be awarded to the first group to return with the required signatures/trinkets. Additionally, this scavenger hunt will help to familiarize students with health professionals on campus, what services they offer, and where they are located.

**GOAL #6: IMPROVING SUPPORT AMONG PEERS AND COMMUNICATION BETWEEN SERVICE PROVIDERS AND STUDENTS (SOCIAL INTERACTION STRATEGY)**

- **Addressing:** Lack of support (reinforcing factor) from peers, lack of communication between service providers and students (enabling factor).

- **IMB-based Strategies:** Social Networking (motivational, informational – to address the reinforcing factor 'lack of support' and the enabling factor 'lack of communication from service providers').

Students who have completed the nutrition workshops can have the opportunity to become peer representatives in their dormitories during their second semester at school, serving as contacts for other dormitory students who did not attend the workshops. These student reps will address the reinforcing factor of 'lack of support from peers' by altering the perception that fellow students do not eat healthfully, or are not interested in nutrition. Students who have nutrition concerns or questions can contact the peer rep (via phone, in person, or over email), who will then either choose an appropriate resource to refer the student to, or give them a list of all possible resources and let them decide who to contact.

These peer reps will keep in periodic contact with the nutrition workshop facilitators, bridging the gap between college students and the health professionals on
campus. Additionally, they will provide feedback to the service providers to assist with updating program content and format in order to best meet the ever-changing nutrition needs of their fellow college students. This contact between students and campus professionals will help to address the enabling factor 'lack of communication between service providers and students'.

Figure 5. Summarized table of the Section I strategies. The information listed in the three columns includes the PER factor(s), the IMB constructs employed (I=informational M=motivational, B=behavioral Skills), and a brief description of the session activities.

<table>
<thead>
<tr>
<th>PER Factor(s)</th>
<th>IMB-based Methods</th>
<th>Session Goal &amp; Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of knowledge about food groups (predisposing), lack of knowledge about servings needed within each of the food groups (predisposing)</td>
<td>Brainstorming (I), handouts (I), lecture/discussion (M), problem-solving activity (B)</td>
<td>IMPROVING NUTRITION KNOWLEDGE ABOUT FOOD GROUPS: Participants learn about the food groups with food models and hands-on activities.</td>
</tr>
<tr>
<td>Lack of individualized information about nutritional needs (predisposing).</td>
<td>Computer-based (I, M), field-trip (B)</td>
<td>LEARNING TO CREATE INDIVIDUALIZED DIET PLANS: Participants learn how to use the MyPyramid website in order to receive a personalized dietary assessment, as well as how to interpret the dietary analysis reports.</td>
</tr>
<tr>
<td>Lack of knowledge about portions and serving sizes (predisposing), lack of skills to identify and select healthy portions (enabling)</td>
<td>Food models (I), field trip (B, M)</td>
<td>IMPROVING KNOWLEDGE ABOUT PORTIONS AND SERVING SIZES: Participants learn about portions and serving sizes using food models, and then by taking a field trip to the Food Zoo for an interactive activity.</td>
</tr>
<tr>
<td>Lack of knowledge (predisposing) and skills (enabling) to read food labels</td>
<td>Lecture/discussion (I), games (M, B), transparencies (I, M)</td>
<td>IMPROVING THE ABILITY TO READ AND INTERPRET FOOD LABELS: Participants learn about how to read and interpret food labels with a hands-on group activity and game.</td>
</tr>
<tr>
<td>Lack of information dissemination and support from university service providers (reinforcing)</td>
<td>Handouts (I), games (M, B)</td>
<td>IMPROVING KNOWLEDGE OF NUTRITION SERVICE PROVIDERS ON CAMPUS: Participants learn about the nutrition-related services on campus through a group-based scavenger hunt game.</td>
</tr>
<tr>
<td>Lack of support from peers, lack of communication between students and professionals (reinforcing)</td>
<td>Social networking (M, I)</td>
<td>INCREASING SUPPORT AMONG PEERS AND COMMUNICATION BETWEEN SERVICE PROVIDERS AND STUDENTS: Participants learn to be peer representatives – and how to serve as a liaison between fellow students and service providers.</td>
</tr>
</tbody>
</table>
Section II. Topic Specific Strategy Recommendations

After students have gained fundamental nutrition knowledge and skills during the Section I workshop sessions, they will be prepared to move onto these topic specific activities. Each goal and its accompanying strategies pertain to one of the five problematic dietary behaviors specifically (eating a healthy breakfast, eating more fruits and vegetables, consuming adequate protein, eating less high fat and 'junk foods' on campus, or eating healthier snacks).

DIETARY BEHAVIOR: EATING A HEALTHY BREAKFAST

Focus group participants expressed concerns with irregular breakfast consumption, and key informants also said that skipping breakfast seemed to be a common behavior of college students. Research in this area has found this to be a problem nationwide, with between 33% and 44% of U.S. college students reporting that they rarely or never ate breakfast (Debate et al., 2001; Silliman et al., 2004).

GOAL #1: LEARNING TO EAT A HEALTHY BREAKFAST ON CAMPUS (HEALTH ENGINEERING & EDUCATIONAL STRATEGIES)

- **Addressing:** Belief (predisposing factor) that healthy breakfast options aren't available, lack of time (enabling factor) to pick up breakfast, and lack of knowledge (predisposing factor) about what a healthy breakfast is.

- **IMB-based Strategies:** Point of Purchase [POP] labeling (informational, motivational – to address the predisposing factor 'belief that healthy options aren't available'), lecture/discussion (informational – to address the predisposing factor 'lack of knowledge about what a healthy breakfast is'), field trip (informational, behavioral – to address the enabling factor 'lack of time to pick up breakfast').
Nearly all of the focus group participants mentioned awareness and use of the food labels posted near food dishes at the Food Zoo. For this reason, workshop facilitators will collaborate with dining services to prepare and post POP signage that indicates healthy breakfast choices throughout the campus dining venues to help address the predisposing factor 'lack of knowledge about what and where a healthy breakfast is'. Student participants will be given an orientation about the layout of the POP signs – how to read and interpret them, as well as knowledge about combining different food groups in order to create a nutritiously balanced breakfast. To foster choice selection, the signs will indicate things such as: (a) which of the food groups the item contains – protein, grain, etc., (b) what a portion of the item looks like, and (c) whether the item is a healthy choice and why – contains 'good' fats, good source of fiber, etc.

After students are familiar with the signage they will travel to at least one food venue on campus with the facilitators to practice using the labels to guide their breakfast food purchases. Because students commonly expressed that the enabling factor 'lack of time' inhibits their consumption of breakfast, an on-site activity could entail asking students to gather what they believe to be a nutritious combination of breakfast foods in a short period of time – one minute for example. When time has expired, participants and facilitators can transition into a casual group discussion about what they selected and why, as well as how they can set aside an extra five minutes in the morning to get breakfast.
GOAL #2: IMPROVING THE ABILITY TO PREPARE A HEALTHY BREAKFAST IN A DORM ROOM (EDUCATIONAL STRATEGY)

- **Addressing:** Lack of skills (enabling factor) to cook healthy foods, hours of operation at the Food Zoo (reinforcing factor) – they don't serve breakfast. Students talked repeatedly about lack of campus facilities that serve breakfast, and that they oftentimes try to eat something in their dorm rooms but don't know how to cook nutritious breakfast meals.

- **IMB-based Strategies:** Cooking demonstration (informational, behavioral – to address the enabling factor 'lack of skills to cook healthy foods'), handouts (informational – to address the enabling factor 'lack of skills to cook healthy foods'), discussion (motivational – to address the reinforcing factor 'hours of operation at the Food Zoo').

The main focus of this session will be a cooking demonstration, which will be lead by the dining services dietitian. All of the students as well as the workshop facilitator will have a workstation set up so they can prepare the breakfast meal along with the dietitian. All of the foods used will be basic, inexpensive items that can be easily stored in dormitory rooms and prepared in microwaves. At the conclusion of the demonstration, samples of the food they prepared will be passed around so the students will have the opportunity to taste what they prepared. To further educate students about how to prepare healthy breakfasts in their rooms, they will be given handouts that outline healthy breakfast foods to stock up on in their rooms – particularly items they can buy with meal money at the Country Store. Additionally, they will receive several breakfast recipes from the dietitian that they can prepare in their rooms. The dietitian will stay until the conclusion of the
session, answering any questions the students may have. This strategy also helps students to feel connected to service providers on campus (a reinforcing factor identified across problematic dietary behaviors) by engaging in a cooking activity with the dietitian on campus.

**DIETARY BEHAVIOR: EATING MORE FRUITS AND VEGETABLES**

Participants from the target population repeatedly discussed concerns about an inadequate consumption of the fresh fruits and vegetables, primarily due to a lack of availability on campus. Research studies at colleges across the country have found that up to 70% of students do not consume the recommended servings of fruits and vegetables (Racette et al., 2005), and the 2006 NCHA results for The University of Montana (n=1703) revealed that only 8% of males and 7% of females reported eating the recommended 5 or more fruits and vegetables daily.

**GOAL #1: IMPROVING KNOWLEDGE ABOUT ON-CAMPUS VENUES OFFERING FRUITS AND VEGETABLES (COMMUNICATION STRATEGY)**

- **Addressing:** Belief (predisposing factor) that they cannot obtain adequate servings of fruits and vegetables from campus dining facilities.

- **IMB-based Strategies:** Posters throughout high-traffic areas of the freshman dormitories (informational and motivational based).

Posters will be placed throughout the dormitories with a large caption at the top such as:

**Feel like you’re not getting enough fresh fruits and vegetables?**

*Actually, they're right at your fingertips.*

Below the caption will be an easy-to-read, plainly stated listing of the dining venues on campus and the fresh fruits and veggies typically available at each one. Additionally, the

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background of the poster could have pictures of fruits or vegetables, with notations to indicate what a serving size looks like, as well as how many servings are needed daily.

To increase the likelihood that students will see the posters and learn of venues on campus that provide fruits and vegetables, posters should be placed throughout the hallways as well as on doors, in bathroom stalls, and in study rooms.

**GOAL #2: IMPROVING ABILITY TO SELECT AND CONSUME A NUTRITIONALLY ADEQUATE ARRAY OF FRUITS AND VEGETABLES (EDUCATIONAL STRATEGY)**

- **Addressing:** *Lack knowledge (predisposing factor) about nutrients contained in different fruits and vegetables, lack of skills to incorporate them (enabling factor) into each meal with available options.* Additionally, it was mentioned during focus group discussions and key informant interviews that this population of students commonly prefers to use the Internet to seek out health information.

- **IMB-based Strategies:** *Discussion (motivational, informational — to address the predisposing factor 'lack of knowledge about nutrients contained in fruits and vegetables'), computer-based (behavioral — to address the enabling factor 'lack of skills to incorporate them into each meal with available options').*

This session will be almost completely interactive and hands-on for the participants. The facilitator will take students to a nearby computer lab (if one is not available in the dorms), and ask students to pair up. The facilitator will then give each group a slip of paper with a question on it relating to the nutrient composition of different fruits and vegetables. To practice *using the Internet to access nutrition information* (a preferred informational source as identified by the target population), students will then log onto www.5aday.org and have a set amount of time to peruse the Website and find the answer...
to the question. When time is up, the participants and facilitator will engage in a casual small group discussion, sharing their findings and asking any questions that arise. Students will be given a handout that gives ideas of how to incorporate a variety of fruits and vegetables into their daily diet from on campus dining venues.

**Dietary Behavior: Consuming Adequate Protein**

This topic was one that was not anticipated at all, but came up repeatedly during focus group discussions. Participants from the target population felt concerned that they were missing out on key nutrients due to their low intakes of meat since being at school – primarily due to its appearance and taste. Additionally, since students mentioned the predisposing factor 'lack of knowledge about the food groups', it is likely that this problematic dietary behavior is a result of a lack of knowledge about how much protein is needed daily, as well as alternative protein sources.

**Goal #1: Improving Knowledge About Protein Recommendations and Possible Non-Meat Protein Sources (Educational Strategy)**

- **Addressing:** Belief (predisposing factor) that inadequate meat is being consumed, lack of knowledge (predisposing factor) about alternative protein sources, and lack of knowledge (predisposing factor) about recommendations and serving sizes for protein sources.

- **IMB-based Strategies:** Discussion (informational, motivational – to address predisposing factor 'lack of knowledge about alternative protein sources'), food models (behavioral – to address the predisposing factors 'belief that inadequate meat is being consumed' and 'lack of knowledge about recommendations and serving sizes for protein sources').
sizes'), computer-based (behavioral – to address predisposing factor 'lack of knowledge about alternative protein sources').

First, facilitators will give students a handout listing a variety of non-meat sources of protein, emphasizing foods that can be found at dining facilities on campus – primarily the Food Zoo where most students reported eating lunch and dinner. This strategy addresses the predisposing factor 'lack of knowledge about alternative protein sources'.

The dietitian from dining services will likely be asked to attend this session to answer specific questions from the students pertaining to protein consumption. Additionally, to address the predisposing factor 'lack of knowledge about daily protein requirements and serving sizes', food models will be used to illustrate serving sizes of protein sources, as well as how many servings are needed to meet recommendations. After receiving fundamental information about alternative sources of protein, facilitators could split the students into groups, give each a variety of foods, and ask them to select a combination of items that they believe would supply an adequate amount of protein for a day. Each group can then share their selections and the facilitator and dietitian can encourage discussion about each group's choices.

At the end of the session, the facilitator will use a laptop/projector to show students how to access the dining services Website and the daily Food Zoo menu (which is posted months in advance). If students access this menu, they can plan ahead and consider alternative protein sources if they know the meat dishes being served are unappealing to them.
DIETARY BEHAVIOR: EATING LESS HIGH FAT AND 'JUNK FOODS' ON CAMPUS

Throughout literature, one of the most common concerns among college students is an increased consumption of high fat 'junk foods' (Brevard & Ricketts, 1996; Luquis et al., 2003). Analysis of data from the needs assessment at The University of Montana revealed a similar theme. Although there are healthy food options at campus dining facilities, there are many more high-fat selections, making it difficult for students to find and choose nutritious meals. Additionally, a large number of students reported eating at least one meal a day in their dormitories and that a lack of food preparation and cooking skills led to the consumption of easy to prepare 'junk foods'.

GOAL #1: LEARNING TO USE POINT-OF-PURCHASE SIGNAGE TO MAKE HEALTHY CHOICES IN A BUFFET-STYLE CAFETERIA (HEALTH ENGINEERING & EDUCATIONAL STRATEGIES)

- Addressing: Belief (predisposing factor) that buffet-style food venues don't offer healthy options, lack of skills (enabling factor) to select healthy portions.

- IMB-based Strategies: Point of Purchase [POP] labels (informational – to address enabling factor 'lack of skills to select healthy portions'), field trip (behavioral – to address enabling factor 'lack of skills to select healthy portions'), discussion (informational, motivational – to address predisposing factor 'belief that buffet-style venues don't offer healthy options').

In collaboration with dining services and the registered dietitian on staff, facilitators will develop and post POP labels in the Food Zoo. The information printed on the food labels will help students to identify healthier food choices and will give a brief description of: (a) the food groups it contains, and (b) why it is a healthy choice. This strategy addresses the predisposing factor 'belief that buffet-style venues don't offer healthy options'. For
example: *This meal is healthy because it contains whole grain, vegetables, and less than 20% of calories come from fat.* Additionally, the POP sign will have a picture of a portion size with a caption that compares it to an easily identifiable item. For example: *One serving of this lasagna would be the same size as a playing card.* This strategy addresses the enabling factor 'lack of skills to select healthy portions'.

During an evening session, participants and the facilitator will go to the Food Zoo where they will actually be selecting foods to eat for dinner – but at the same time will be getting hands-on practice using the POP signage to guide their food selections and portion sizes. First the facilitator will give a mini-tour of the signage at the Food Zoo and show participants how to use the POP labels to guide their food selections. Students will then get a combination of foods they believe to be a nutritious meal and meet the rest of the students and the facilitator at one big table. They will casually discuss their choices, what additions could make their meals healthier, whether or not the POP signs were helpful, and if the behavior is something they could regularly carry out on their own.

**GOAL #2: IMPROVING COOKING SKILLS TO EAT HEALTHFULLY IN A DORM ROOM (EDUCATIONAL STRATEGY)**

- **Addressing:** *Lack of skills (enabling factor) to prepare and cook nutritious meals in dorm rooms.*

- **IMB-based Strategies:** *Cooking demonstration (behavioral), discussion (informational, motivational), resource book (informational).*

To enhance students' food preparation skills and address the enabling factor 'lack of skills to prepare and cook nutritious meals in dorm rooms', this class will consist of an interactive cooking demonstration. The activity can take place in one of the dormitory recreation rooms or in a space reserved in collaboration with the Dining Services. The
facilitator will have purchased the ingredients for the meal in advance and will have separate workstations for the students (who will work in groups). The facilitator and participants will work in sync preparing the ingredients and creating the dish. Large portions of the meal will be made ahead of time so that students and the facilitator can sample the dish together following the demonstration. To further motivate students to experiment with cooking healthful meals in their rooms, thus addressing the enabling factor 'lack of skills to prepare healthy foods in dorm rooms', participants will receive a cookbook at the end of class to give them ideas about dishes they can easily prepare in their dorm rooms with available resources. An example of such a book is *Cooking Healthy with a Microwave* by Lund & Alpert (2005).

**DIETARY BEHAVIOR: EATING HEALTHIER SNACKS ON CAMPUS**

Increased snacking is another concern that commonly came up during this nutritional needs assessment. Silliman et al (2004) reported that 63% of students are inclined to snack one or two times per day. Many of the students expressed that the main issue with their frequent snacking was a lack of quick and healthy snacks available to them on campus, leading to them eating even more 'junk foods'. Several students referred specifically to the Country Store, as many of them have leftover meal money at the end of each week (which they have to spend or they lose it), and are forced to buy junk because that's all that's available.

**GOAL #1: IMPROVING STUDENTS' ABILITY TO FIND AND CONSUME HEALTHY SNACK FOODS ON CAMPUS (EDUCATIONAL STRATEGY)**

- **Addressing:** Perceived lack of healthy snack options (predisposing factor), lack of skills (enabling factor) to put together healthy snacks.
• **IMB-based Strategies:** *Group discussion (informational, motivational – to address the predisposing factor 'lack of healthy snack options'), handouts (informational – to address the enabling factor 'lack of skills to put together healthy snacks').*

This strategy will be mostly casual discussion of two handouts given by the facilitator, and could easily be done during the same session as one of the more interactive, time-consuming strategies. The first handout will list healthier snack choices that can be found in the Country Store (or other on-campus venues carrying snack items); and the second handout will provide basic guidelines for healthy snacking (such as "keep snacks under two hundred calories"), as well as a list of healthy snack ideas that can be stored and prepared in dorm rooms. These educational strategies address the identified predisposing factor 'lack of healthy snack options, and the enabling factor 'lack of skills to put together healthy snacks'. Students will be encouraged to engage in casual discussion with one another and to ask the facilitator questions.

*Figure 6. Summarized table of the Section II strategies.* The information listed in the three columns includes the PER factor(s), IMB constructs employed (I=informational M=motivational, B=behavioral Skills), and a brief description of the session activities.

<table>
<thead>
<tr>
<th>SECTION II STRATEGY RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavior: Eating a Healthy Breakfast</strong></td>
</tr>
<tr>
<td>Belief that healthy breakfast options aren't available (predisposing), lack of time to pick up breakfast (enabling), and lack of knowledge about what a healthy breakfast is (predisposing)</td>
</tr>
<tr>
<td>Lack of skills to cook healthy foods (enabling), hours of operation at the Food Zoo (enabling)</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Behavior: Eating More Fruits &amp; Vegetables</th>
<th>PER Factor(s)</th>
<th>IMB-based Methods</th>
<th>Session Goal &amp; Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief that they cannot obtain adequate servings of fruits and vegetables from campus dining facilities (predisposing)</td>
<td>Posters (I, M)</td>
<td>IMPROVING KNOWLEDGE ABOUT ON-CAMPUS VENUES OFFERING FRUITS AND VEGETABLES: Participants learn about fresh fruits and vegetables available on campus via eye-catching posters throughout the dormitories.</td>
<td></td>
</tr>
<tr>
<td>Lack of knowledge about nutrients contained in different fruits and vegetables (predisposing), as well as skills to incorporate them into meals with available options (enabling)</td>
<td>Discussion (I, M), computer-based (I, B)</td>
<td>IMPROVING ABILITY TO SELECT &amp; CONSUME A NUTRITIONALLY ADEQUATE ARRAY OF FRUITS AND VEGETABLES: Participants learn about nutrients in different fruits and vegetables, also learn how to find reliable nutrition information on the Internet.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Behavior: Consuming Adequate Protein</th>
<th>PER Factor(s)</th>
<th>IMB-based Methods</th>
<th>Session Goal &amp; Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief that inadequate meat is being consumed (predisposing), lack of knowledge about serving sizes and alternative protein sources (predisposing)</td>
<td>Discussion (I, M), food models (B), computer-based (B)</td>
<td>IMPROVING KNOWLEDGE ABOUT PROTEIN RECOMMENDATIONS AND NON-MEAT PROTEIN SOURCES: Participants learn how to identify and select protein from sources other than meat; also learning about daily protein recommendations.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Behavior: Eating Less High Fat and Junk Foods</th>
<th>PER Factor(s)</th>
<th>IMB-based Methods</th>
<th>Session Goal &amp; Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief that buffet-style food venues don't offer healthy options (predisposing), lack of skills to select healthy portions (enabling)</td>
<td>Point of Purchase [POP] labels (I), field trip (B), discussion (I, M)</td>
<td>LEARNING TO USE POINT-OF-PURCHASE SIGNAGE TO MAKE HEALTHY CHOICES IN A BUFFET-STYLE CAFETERIA: Participants learn to use POP signs to guide food choices, as well as their portion sizes. The class includes hands-on practice at the buffet-style cafeteria.</td>
<td></td>
</tr>
<tr>
<td>Lack of skills to prepare and cook nutritious meals in dorm rooms (enabling)</td>
<td>Cooking demonstration (B), discussion (I, M), resource book (I, M)</td>
<td>IMPROVING COOKING SKILLS TO EAT HEALTHFULLY IN A DORM ROOM: Participants learn how to select and prepare nutritious meals in dormitory rooms through a hands-on cooking demonstration. Students will receive a cookbook of healthy recipes that can be prepared in a microwave.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Behavior: Eating Healthier Snacks</th>
<th>PER Factor(s)</th>
<th>IMB-based Methods</th>
<th>Session Goal &amp; Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived lack of healthy options (predisposing), lack of skills to put together healthy snacks (enabling)</td>
<td>Group discussion (I, M), handouts (I)</td>
<td>IMPROVING STUDENTS' ABILITY TO FIND AND CONSUME HEALTHY SNACK FOODS ON CAMPUS: Participants learn what healthy snack options are available on campus and where; as well as quick ideas of snacks that can be stored and prepared in a dorm room.</td>
<td></td>
</tr>
</tbody>
</table>
Summary of Strategy Recommendations

The above sections of programming recommendations were based on data gathered during focus group discussions and key informant interviews. The PRECEDE-PROCEED program planning model was used to guide analysis of that data and to pinpoint the most problematic dietary behaviors; as well as the predisposing, enabling, and reinforcing factors [PER] that influence them. The IMB behavior change model was then used to guide the development of the strategies and methods intended to address the most important and changeable PER factors, with an end goal of positively changing dietary behaviors of the college students. The three components of the IMB model were incorporated into the strategies and methods in order to provide students with information, hands-on skills training, and the opportunity to receive increased support from their peers and the university staff.

Procedural Considerations

Instructor

The focus group participants and key informants provided ideas about who should lead the future nutrition workshops. The main themes that emerged were to have a peer leader and/or someone with knowledge in the area of nutrition. Additionally, several of the key informants suggested using a team approach – involving several of the professionals on campus who offer nutrition-related services to students. It is suggested to combine these three ideas in the following ways:

- The main facilitator for the workshop should be a peer – preferably a graduate student from a field such as Health and Human Performance with a nutrition degree or specific nutrition-based training.
A health professional from an on-campus service would serve a supportive role — attending the sessions, helping to answer questions, and assisting with the activities.

Other health professionals can be asked to play the role of 'guest speaker' during sessions where it would be appropriate to do so. For example, if the class session involves a cooking demonstration, the dining services dietitian may be a good person to invite to lead that portion of the class.

This combination of facilitators will be positive because it provides students with a peer leader whom they relate to, and also the opportunity to get to know a variety of the health professionals on campus in the event they wish to seek out their services in the future.

Location & Time

Research participants from the target population were very adamant about holding future nutrition education classes on site at each of their dormitories. They expressed that they would be more likely to attend if they didn't have to walk across campus to another building, especially in wintertime. On this topic of location, it was interesting that two of the key informants thought the students would not want classes in their dormitories because they spend so much time there already and consider it to be there home. Other suggestions about procedure covered during focus group discussions were to hold the classes in the evening — at seven or eight at night, and to schedule the classes either early in the week or on a Sunday. Participants repeatedly commented that they don't usually attend events held toward the end of the week because they have had to follow a schedule all week and don't want any further commitments late in the week.
Frequency

A majority of the target population and key informants suggested having the nutrition classes meet more than once during the semester. The key informants felt this would give the students a chance to work through a hands-on project or otherwise apply learned knowledge or skills, and then engage in additional discussion with the workshop leader(s) and/or peers. Focus group participants also believed that additional sessions would provide them with the opportunity to develop a deeper rapport with the instructor—especially for future contact after the conclusion of the classes.

Further, it was recommended to offer the class at two different times in order to work around schedules and make it possible for more students to attend. Luquis et al. (2003) had similar findings following their study of college students' health behaviors. Two of the main suggestions for improving health promotion activities were to schedule them close to or in residence halls and at a variety of times.

Style

Focus group discussions, interviews, and the literature all strongly support the theme that health education for young adults needs to be taught in a non-lecture, interactive, discussion-style format. This was one of the strongest themes that emerged from data analysis and should be taken into consideration for future programming. Students attend lecture-based classes all week long and don't care to be 'lectured' about nutrition. Guidelines from the Centers for Disease Control (CDC) also establish important procedural considerations for teaching young adults: (a) teach new skills, not just facts, (b) provide the opportunity to practice nutritious eating skills, and (c) implement nutritious education activities that are fun and innovative (1998).
Procedural Considerations – Summary

In summary, several key themes arose during the data analysis that should be considered for all future nutrition education programs. First, a graduate student should lead the classes with the support from the team of health professionals on campus. The students will likely feel more comfortable working with a graduate student of similar age – but will also benefit from exposure to the assortment of knowledgeable health professionals. Secondly, the classes should meet at least twice in order for students to have an opportunity to ask questions and have discussion after putting their new nutrition knowledge and skills to the test in day-to-day settings. Lastly, the classes should meet (at least initially) on-site at the dormitories during evening hours, and be interactive in nature. The students were adamant that programs should be in a workshop style format – providing some groundwork nutritional information, but leaving most of the time for hands-on activities and casual discussion.

Limitations

- A total of twenty-two members of the target population participated in the focus group discussions, ten less than had initially volunteered. This is one of the downsides, or weaknesses of focus group discussions – individuals who sign up to participate don't always arrive the day of the scheduled group session (Morse & Field, 1995). It may be difficult to generalize findings from twenty-two people onto the rest of the target population.

- There may have been inherent differences between the participants who volunteered for the study and the rest of the target population who did not sign up.
Two of the focus groups had adequate enrollment prior to the focus group date, but at the time of the scheduled discussion only three people were in attendance. It is possible that the group dynamic would have been much different had the groups had more members, potentially producing different data and themes.

Study participants may have altered some responses due to the presence of their peers or the facilitator. For the most part it seemed that the participants enjoyed being able to talk about nutrition with peers – and openly and honestly discussed frustrations and concerns. However, it could also be postulated that some thoughts or options may have been held back for fear of not fitting in with the rest of the group.

Analysis of qualitative data is somewhat subjective. Researchers try their best to objectively analyze data and identify key themes, but it is possible that ones own opinions and preconceived notions influence analysis.

Conclusions

Student Population is interested in Nutrition Education

The findings from this study were consistent with previous nutrition-related research conducted with college students (Cousineau et al., 2004; DeBate et al, 2001; Grace, 1997; Lowry et al., 2000; Luquis et al., 2003; Perez-Rodrigo & Aranceta, 2001; Racette et al., 2005). The focus group discussions revealed strong feelings about an insufficient offering of fresh and healthy foods on campus, a lack of the knowledge and skills necessary to select and prepare healthy foods, and a low awareness and usage of university health resources. An interesting finding from this study is that the participants representing the target population showed a sincere interest in nutrition, as well as a desire to obtain more information, behavioral skills, and support from the university. With this expressed
interest and concern relating to nutrition, it seems unethical to let students crash and burn through their first year of school without at least providing them a convenient and fun option for receiving nutrition education. Some research studies reveal an opinion that freshman college students need to be allowed to experience excesses in order to learn healthy balances. It was the assumption of one of the professionals involved in this study at The University of Montana, that students want and prefer 'junk food' like brownies and chips:

- *When we have brownies for snacks, more people come then when we have vegetable trays. If we want people to come to programs, you have to offer food. And they like brownies, people love those. Ice cream sundaes, root beer floats... (KI)*

However, other key informants involved in this study believed that if given the option, students would rather have 'healthier foods' such as fresh fruit and vegetables. They felt that there is a high level of interest and motivation among students to eat healthfully:

- *The other thing I'd say is to get people to come to programs if they do a floor snack, and think about the things you're serving too, probably don't serve brownies you know... we had an interesting experience with Stress Less events in the UC... it was hard go get enough food for 300 people that I could afford doing fruit and stuff, but we did it and you'd be amazed how appreciative the students were - people came up and said thank you, I haven't had fresh fruit in so long... people noticed and were so appreciative. (KI)*

As the facilitator at the focus group discussions I brought healthy snacks such as fresh fruits and vegetables, and was encouraged by how appreciative the students were to have the healthy foods. I think the problematic dietary problems are more often a result of a lack of such fresh foods - or perceived lack of them - not that they in fact *prefer* to eat 'junk foods'. Future programming should address this issue, by helping to inform students about the healthy options available to them throughout campus dining facilities, as well

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as teaching them the skills necessary to select healthy choices. The dormitory-based nutrition education could also be potentially help to create a link between students and service providers, making students feel empowered and supported in their efforts to eat healthfully while at college. I agree that college is a time for young adults to learn about balances in their life, but I believe that it is the responsibility of the college community to, at the least, provide them with the option to obtain basic information and life skills about topics such as nutrition.

**Suggestions for Future Research**

Future researchers should consider holding more than four focus groups with the target population in order to increase the strength of their findings. It would also be interesting to consider groups other than freshmen in a needs assessment – to see if nutritional concerns change throughout years at college and if students learn any of the knowledge and behaviors on their own. Further, as male students were not considered in this study, it would be interesting to compare their concerns and programming ideas with those of the female students.

Another consideration for future program planners would be to develop a more in-depth supplemental questionnaire addressing nutritional concerns and issues, and distribute it to key informants and focus group participants following their respective sessions. It is possible that following a verbal discussion, additional noteworthy data might be gathered via a written questionnaire that students or interviewees didn't feel comfortable sharing face-to-face.

Other thoughts for future studies would be procedural in nature – to hold focus groups in the dormitories and to work with the resident assistants to ensure adequate
enrollment. It may also be beneficial to hold more than one focus group in each of the dormitories selected for study. Facilitators should be prepared to offer some incentive and/or a snack to encourage student volunteers to participate. If more funding is available, then an increased incentive for partaking in the study may encourage higher enrollment.
REFERENCES


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APPENDIX A

PRECEDE-PROCEED Program Planning Model
PRECEDE-PROCEED Program Planning Model

The most widely known model in program planning, this comprehensive model guides professionals through the planning, implementation, and evaluation processes. The first four phases of the model are used to assess needs: (1) social assessment, (2) epidemiological assessment, (3) behavioral and environmental assessment, and (4) educational and ecological assessment. Phases five through nine of the model cover program implementation and evaluation (McKenzie, Neiger, & Smeltzer, 2005).

![Diagram of PRECEDE-PROCEED model]

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APPENDIX B

Information – Motivation – Behavioral Skills Model
The IMB Model was designed by Fisher and Fisher and is based upon three main components (DiClemente, Crosby, & Kegler, 2002). The *informational* component addresses basic knowledge, clarification of misperceptions, and understanding of risk if the behavior is not adopted. *Motivation* is an influencing factor that determines whether a well-informed individual will adopt the preventive behavior or not. This includes attitude toward the preventive acts, perception of social support, and personal perception of susceptibility to the negative health outcomes. *Behavioral skills* are what are actually used by the already informed and motivated individual to perform the health behavior. Participant's objective ability and their self-efficacy to perform the skills are what will determine their success within this final component of the theory. A visual representation of this model can be seen below.

![The Information – Motivation – Behavioral Skills Model](image-url)
APPENDIX C

Residence Life Occupancy
### The University of Montana

#### Residence Life Housing Facilities

**Beginning Fall Semester 2005 on Sep 8, 2005**

<table>
<thead>
<tr>
<th>Name</th>
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<th>2005 Current Total</th>
<th>2004 Compare Total</th>
</tr>
</thead>
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#### INSTATE APPLICANTS

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**Copies To:**

Dr. George Dennison, President
Theresa Branch, VP Student Affairs
Robert Dwingel, VP Finance/Admin
Director of Business Services
RLO Staff, Hall Secretaries, Supervisory Staff (30)

Charles Thone, Assistant to VP/Student Affairs
Marc LoPardo, Director Dining Services
Mick Hansen, Director of Financial Aid
Jed Leshen, Director of NSS/Admissions
Moxy Malloy, Advocate Coordinator

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APPENDIX D

IRB Report and Approval
**Project Introduction:** College students tend to consume diets that consist of inadequate nutrients. Over half of all college students report eating at fast food restaurants at least three times per week on average, and less than a third consume the recommended serving of five fruits and vegetables a day. First-year freshman are a unique population as many of them may be challenged by the task of selecting and/or preparing their own meals for the first time in their lives (Cousineau, Goldstein, & Franko, 2004). This group of young adults has seen the greatest increases in overweight and obesity (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). According to the 2003 American College Health Assessment, between 30% - 35% of the college population is overweight or obese, and even a higher percentage perceive themselves to be overweight (Journal of American College Health, 2005). Additionally, these poor eating habits can also result in an increased risk for future chronic health problems such as heart disease, cancer, and stroke – all of which begin to manifest during college years (Grace, 1997). Post-secondary institutions nationwide account for over 12 million young adults, which is one in four persons aged 18-24. Thus campus-based programming could be an ideal setting to teach nutrition knowledge and behavioral skills to entire populations of young adults (Lowry, Galuska, Fulton, Wechsler, Kann, & Collins, 2000).

1. **The purpose of the study** is three-fold: (1) to assess the nutritional education needs of college freshman at the University of Montana through focus group discussions with the target population and interviews with health professionals; (2) to develop a dormitory-based nutrition program to address those needs; and (3) to assess the process feasibility of such a program in relation to participant sampling and attendance, program length, topic areas, session formatting, and instructor qualifications. The data from the study will be presented to the University Dining Services dietitian for consideration relating to future programs offered to University of Montana students.

2. **Subject description:** There are two populations from which subjects will be recruited: (1) freshman students (> 18 years old) at The University of Montana who reside in the residence halls on campus; and (2) various health professionals and University of Montana faculty members who work directly with University of Montana students. Both groups of participants will be asked questions (in focus group and interview methods) about nutrition-related programming needs. Neither of these populations would be considered vulnerable populations.

3. **Recruiting and selecting subjects:** (1) The student population will be recruited through collaboration with residence life staff. In the spring 2006 semester, verbal announcements will be made through residence assistant’s in each dormitory building to help recruit freshman volunteers. Additionally, signage may be posted in the dormitories to help with the recruitment process. These posters have yet to be designed, but content would be limited to: “Volunteers needed for nutrition-related focus group discussions. All freshman students over 18 years old, who currently live..."
in residence halls on campus, are welcome to participate.” (2) The faculty and staff population will be recruited and contacted for voluntary participation in interviews with graduate student and study facilitator Kristin Rohfleisch.

4. **Location of study:** The focus groups held with University of Montana freshman will be take place in dormitories on campus. Associate director of residence life Rita Tucker has agreed to help with this process, including using commons areas for the group meetings. The interviews held with University of Montana faculty and staff will be held in each of their respective offices throughout the campus.

5. **Activities the subjects will perform:** The freshman students who participate in the focus group discussions will be asked questions about their perceptions, knowledge, and interests relating to nutrition. It is anticipated that the focus group discussions will last approximately 30 minutes – 60 minutes, depending on the amount of discussion among the participants. The faculty and staff who participate in the interviews will be asked questions about their perception of the knowledge, interests, and nutritional needs of University of Montana students. The interviews will be approximately 30 minutes – 60 minutes, depending on amount of discussion between the interviewer and interviewee. All interviews and focus group discussions will be audio taped.

**Transcription of the focus group interviews:** The graduate student study coordinator (Kristin Rohfleisch) will be trained to accurately transcribe the audiotape and 100% of transcripts will be double-checked for accuracy and completeness. The Project Director (Dr. Blakely Brown) and Ms Rohfleisch will use various qualitative data analysis techniques to rank the responses according to their “frequency and importance” and formulate the nutrition education topics from these common reoccurring themes and topics.

**Process Analysis:** To better understand the process of conducting the focus groups and interviews we will record the number of people who were invited to participate in the interviews and the numbers who actually participate and summarize the data as a participation rate. We will also code and summarize comments participants made about their experience participating in the talking circle groups.

6. **Benefits of the Research:** Data from this study will be used to adapt and plan future nutrition-related programming available to college students at The University of Montana. Therefore, the student participants in the study may benefit from these future programs and resources. Additionally the staff and faculty who help with the needs assessment will also contribute to the development of nutrition-related programming for students.

7. **Risks to participants** will be extremely minimal. Participation is strictly voluntary, the topic area will not be threatening, and responses will not be traceable back to any particular individual.

8. We have minimized the deleterious effects of burden to participants by making the focus groups and interviews voluntary, and participants’ names will not be linked to the data of results of the study. Additionally, deleterious effects are minimized as
participants’ can withdraw from the focus groups or interviews at any time, and referral information will be made available if the nutrition-related discussions bring about any questions relating to current campus resources.

9. **Subject privacy:** Descriptive data such as age, gender, and ethnicity may be reported for student participants, but name or other identifying information will not be used/revealed. A general title of the University of Montana staff or faculty may be used, but no identifiable information will be used/revealed. Only project facilitator Kristin Rohfleisch (HHP Graduate Student) and her advising committee will have access to the information. All interviews and focus group information on the audiotapes and the process analysis information will be de-identified so that any subject data and information obtained in this study can not be traced directly back to the study participants. All audiotapes and data will be stored in a locked cabinet in Dr. Brown’s office. Information and data that could be linked back to study participants will be destroyed 1 year after the study is completed. This includes subject audio-tapes and consent forms.

10. **Informed consent:** See attached

11. **Waiver of written informed consent:** N/A

**Literature Cited**


Date: January 11, 2006
To: Kristen Rohfleisch and Blakely Brown, HHP
From: Sheila Hoffland, IRB Chair
RE: IRB action on your proposal titled: “Assessing Nutritional Needs of College Freshman”

The revisions made and the information you provided satisfactorily address the conditions that the IRB placed on approval of the above referenced proposal. Approval for this study is granted as of the date of this memo and continues for one year from the date of the Conditional Approval (12/22/05). Please use the signed and dated consent forms as the “master” for making the copies.

If the study runs more than one year, a continuation must be requested. Also, you are required to notify the IRB if there are any significant changes in the study or if unanticipated or adverse events occur during the study.

Sheila Hoffland
IRB Chair

Attachments
APPENDIX E

Focus Group Consent Form
Subject Information and Consent Form – Focus Groups

Title: Assessing nutrition needs of college freshman

Study Coordinator: Kristin Rohfleisch
HHP Department
239 McGill Hall
University of Montana
Email: krohfleisch@yahoo.com

Faculty Advisor: Blakely D Brown, PhD, RD
207 McGill Hall, Dept HHP
Phone: 406.243.6524

Special Instructions: This consent form may contain words that are new to you. If you read any words that are not clear to you, please ask the person who gave you this form to explain them to you.

Purpose: The information gathered through focus group discussions will be used to help identify the nutritional needs of college freshman at the University of Montana. The feedback will also help researchers to plan future nutrition programming in the dormitory setting by highlighting areas of interest, group sizes, class lengths, format of activities, and the selection of instructor(s).

Procedures: By signing this consent form, you agree to take part in a focus group session with other students interested in discussing nutritional needs of freshman college students. The session will last approximately 30 – 60 minutes.

Payment for Participation: You will receive a small incentive for your participation in the focus group discussion. This incentive will be in the form of a grocery store or movie voucher, or cash – and will be worth/amount to $5.00 value. You will receive the incentive whether or not you complete the study.

Risk and Discomforts. We do not expect any risks or discomforts associated with participation in this study. However, you may feel that it is bothersome to be in a group discussion about nutritional needs of college freshman with other individuals for ~ 45 minutes. If you experience any discomfort please notify the interviewer.

Benefits: There are no direct benefits to you as a participant in this study. If you are interested we would be pleased to share with you the nutritional education program for UM college freshman that results from this study.

Confidentiality: Your signed consent form and paperwork that associates your identity and your assigned participant number will be held in a secure location only accessible to the study coordinator and her graduate committee chair. If the results of this study are published in a peer-reviewed journal, be assured that your name will not be used.
Compensation for Injury: Although we do not foresee any risk in taking part in this study, the following liability statement is required in all University of Montana consent forms. In the event that you are injured as a result of this research you should individually seek appropriate medical treatment. If the injury is caused by the negligence of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by the Department of Administration under the authority of M.C.A. Title 2. Chapter 9. In this event a claim for such injury, further information may be obtained from the University's Claims representative or University Legal Counsel. (Reviewed by University Legal Counsel, July 6, 1993).

Voluntary Participation/Withdrawal: Your decision to take part in this research study is entirely voluntary. At any time, you may withdraw from this study.

Questions: If you have any questions about the contents of this document or about the study, please contact the project director at the above listed phone number. If you have questions regarding your rights as a research subject, you may contact the IRB Chair, Sheila Hoffland, through the Research Office at The University of Montana at (406) 243-6670.

Subject's Statement of Consent: I have read the above description of this research study. I have been informed of the risks and benefits involved, and all my questions have been answered to my satisfaction. Furthermore, I have been assured that any future questions I may have will also be answered by a member of the research team. I voluntarily agree to take part in this study. I understand I will receive a copy of this consent form.

__________________________
(Printed Name of the Subject)

__________________________
(Subject's Signature)

__________________________
(Subject’s Signature Date)

Approval Expires On 13/11/06

Date Approved by UM IRB 11/06

[Signature]
IRB Chair
APPENDIX F

Focus Group Supplemental Questionnaire
**Supplemental Questionnaire – Focus Group Participants**

**Age:** ______

**Gender:** Male _____ Female _____

**Dormitory of residency:** _____________ Length of time in this dorm ______

**Ethnicity:**

Native American ____ Caucasian ____ African American ____ Asian ____ Other _____

**Year in school:**

Freshman _____ Sophomore _____ Junior _____ Senior _____

**Enrollment in school:** Full time _____ Part time _____

**Current and previous nutrition-related coursework (college and high school):**


**Employment: Do you have a job?** Yes _____ No _____

*If yes, how many hours a week do you work?*

01 – 10 hours _____

11 – 20 hours _____

21 – 30 hours _____

More than 31 hours _____

**Transportation: Do you have a car?** Yes _____ No _____

*If no, do you have or use other sources of transportation? (i.e. bicycle, city buses)*


**Where do you eat most meals?** Dorm room _____ On campus _____ Off campus _____

*If on campus, where?*

*If off campus, where?*
APPENDIX G

Nutritional Services Handout
The following services are provided to students by a registered dietitian (RD):

- **Nutrition Counseling:** Counseling is available to all university students. Nutrition counseling is free of charge for students who live on campus, and offered for a small fee to other students. Students may seek nutrition counseling for a variety of reasons including wellness, weight gain or loss, food allergies, vegetarian diets, eating disorders, and medical conditions such as diabetes and high cholesterol.

- **Nutrition Presentations:** Interactive lectures on many nutrition-related topics are available to the campus at large as well as living groups. Examples of topics include fad diets, the “freshman 15”, and healthy eating for busy college students.

- **Special Diet Accommodation:** Dining Services readily assists students with food allergies, vegetarian and vegan diets, low-fat diets, and other special diets. Students with special dietary needs should contact the dietitian, who works closely with students and chefs to ensure that students have access to nutritious meals.

- **Personal Diet Analysis:** The dietitian can analyze students’ food intakes for calories, protein, and other nutrients, and help students reach their nutrition goals.

- **Nutrition Brochures:** Contact our RD for printed information on topics such as eating on the go, snacking, breakfast, and calcium.

- **Nutrition Labeling:** Health Watch is a nutrition labeling system that uses computer analysis to provide nutrition information, which can help guests make informed decisions about food and eating. Health Watch information is displayed at Dining Services’ facilities across campus.

- **The Hungry Grizzly:** This monthly newsletter is distributed campus-wide at Dining Services’ locations. Watch for nutrition news, practical tips for eating well, and information for upcoming nutrition events.

- **Vegetarian and Vegan Focus Group:** This group meets twice a semester to ensure that Dining Services is in touch with the wants and needs of vegetarian and vegan guests. Students with vegetarian and vegan interests are encouraged to attend or contact our RD with any questions or suggestions.

Please contact our Registered Dietitian at 243-6325 or marya.bruning@mso.umt.edu to ask a question or schedule an appointment.
APPENDIX H

Focus Group Question Guide
Focus Group Question Guide

Icebreaker – What is your favorite & least favorite food?

1. When you think about nutrition what kinds of things come to mind?
2. How has coming to college changed your eating habits?
3. What influences (determines) what you eat?
4. Where do you most commonly eat?
5. What concerns do you have about your nutrition?
6. If nutrition classes were offered in dorms to freshman:
   a. What kinds of nutrition topics would you want to learn about?
   b. Who would you like to teach them?
   c. When would be a good time to hold the classes?
   d. One-time or ongoing?
   e. Class format?
7. Have you received any nutrition information from the UM since you've been a student?
8. Where would you go if you had any nutrition-related questions or concerns?
9. Did you notice the 6-week food pyramid display outside the food zoo?
   a. What do you remember about it?
APPENDIX I

Interview Consent Form
Subject Information and Consent Form - Interviews

Title: Assessing nutrition needs of college freshman

Study Coordinator: Kristin Rohfleisch  
HHP Department  
239 McGill Hall  
University of Montana  
Email: krohfleisch@yahoo.com

Faculty Advisor: Blakely D Brown, PhD, RD  
207 McGill Hall, Dept HHP  
Phone: 406.243.6524

Special Instructions: This consent form may contain words that are new to you. If you read any words that are not clear to you, please ask the person who gave you this form to explain them to you.

Purpose: The information gathered through the interviews with health professionals will be used, along with additional gathered data to help identify the nutrition needs of college freshman at the University of Montana. The feedback will also help researchers to plan future nutrition programming in the dormitory setting by highlighting areas of interest, group sizes, class lengths, format of activities, and the selection of instructor(s).

Procedures: By signing this consent form, you agree to take part in a one-on-one interview covering a series of questions relating to nutritional needs of college freshman at The University of Montana. This interview process will last approximately 30 – 60 minutes.

Risk and Discomforts. We do not expect any risks or discomforts associated with participation in this study. However, you may feel that it is bothersome to be interviewed for ~ 30 minutes and discuss your thoughts on nutritional needs of college freshman. If you experience any discomfort please notify the interviewer.

Benefits: There are no direct benefits to you as a participant in this study. If you are interested we would be pleased to share with you the nutritional education program for UM college freshman that results from this study.

Confidentiality: Your signed consent and paper work that associates your identity and your assigned participant number will be held in a secure location only accessible to the study coordinator and her graduate committee chair. If the results of this study are published in a peer-reviewed journal, be assured that your name will not be used.

Compensation for Injury: Although we do not foresee any risk in taking part in this study, the following liability statement is required in all University of Montana consent forms. In the event that you are injured as a result of this research you should individually seek appropriate medical treatment. If the injury is caused by the negligence of another person or agency, you may file a claim against that person or agency.
of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by the Department of Administration under the authority of M.C.A. Title 2, Chapter 9. In this event a claim for such injury, further information may be obtained from the University's Claims representative or University Legal Counsel. (Reviewed by University Legal Counsel, July 6, 1993).

Voluntary Participation/Withdrawal: Your decision to take part in this research study is entirely voluntary. At any time, you may withdraw from this study.

Questions: If you have any questions about the contents of this document or about the study, please contact the project director at the above listed phone number. If you have questions regarding your rights as a research subject, you may contact the IRB Chair, Sheila Hoffland, through the Research Office at The University of Montana at (406) 243-6670.

Subject's Statement of Consent: I have read the above description of this research study. I have been informed of the risks and benefits involved, and all my questions have been answered to my satisfaction. Furthermore, I have been assured that any future questions I may have will also be answered by a member of the research team. I voluntarily agree to take part in this study. I understand I will receive a copy of this consent form.

__________________________________________
(Printed Name of the Subject)

__________________________________________
(Subject’s Signature)

__________________________________________
(Subject’s Signature Date)
APPENDIX J

Interview Supplemental Questionnaire
APPENDIX K

Interview Question Guide
Interview Question Guide

1. **What types of nutrition related services do you (or your department) offer to students?**
   a. Where are those services based on?

2. **What other on campus services do you refer students to for nutrition related needs?**

3. **Does your department collect any data from students relating to nutrition needs?**

4. **Relating to the concern with the increasing rate of overweight and obese young adults, does your department have any programming to target that topic?**
   a. What about other universities?

5. **Based on your observations and experiences working with students on campus:**
   a. Where do you think most students get their nutrition information?
   b. What types of eating behaviors do you think are common of college students living on their own for the first time?
   c. What are some of the things (barriers) that prevent college students from eating healthy?
   d. How could the college atmosphere help to motivate students to make healthier dietary choices?
   e. What factors within the dorm environment make it especially difficult for students to eat healthy foods?
   f. What are some common complaints from students regarding on-campus dining options?
      i. How about positive feedback relating to on-campus dining services?

6. **If a nutrition education course were offered in the dorms for new students:**
   a. What types of nutrition-related topics would be helpful for them?
   b. Who would they be most receptive to hearing this information from?
   c. What kinds of incentives would make them more likely to attend?
   d. Should it be required?
   e. What other ideas might you have for these educational classes?

7. **Anything else you’d like to share or discuss relating to nutrition and college students?**
APPENDIX L

Needs Assessment Project Timeline
# Nutritional Needs Assessment

## Project Timeline

<table>
<thead>
<tr>
<th>October – November 2005</th>
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<tbody>
<tr>
<td>• Meet with residence life for preliminary project proposal/feasibility</td>
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<tr>
<td>• Review literature</td>
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<tr>
<td>• Write thesis proposal</td>
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<table>
<thead>
<tr>
<th>December 2005 – January 2006</th>
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<tbody>
<tr>
<td>• Propose project to thesis committee</td>
</tr>
<tr>
<td>• Develop consent forms &amp; supplemental questionnaires for focus groups/interviews</td>
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<tr>
<td>• Develop interview guide for interviews &amp; focus groups</td>
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<tr>
<td>• Submit proposal to IRB submission</td>
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<tr>
<td>• Revise proposal</td>
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<tr>
<td>• Schedule professional interviews</td>
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<table>
<thead>
<tr>
<th>February 2006</th>
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</thead>
<tbody>
<tr>
<td>• Hold professional interviews</td>
</tr>
<tr>
<td>• Make RA contacts in dormitories</td>
</tr>
<tr>
<td>• Recruit volunteers for focus groups</td>
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</tbody>
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<table>
<thead>
<tr>
<th>March 2006</th>
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</thead>
<tbody>
<tr>
<td>• Schedule focus group meeting times</td>
</tr>
<tr>
<td>• Conduct (4) focus groups in dormitories</td>
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<tr>
<td>• Transcribe interview and focus group audio tapes</td>
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<table>
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<tr>
<th>April – July 2006</th>
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</thead>
<tbody>
<tr>
<td>• Analyze all data</td>
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<tr>
<td>• Complete writing thesis</td>
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<tr>
<td>• Defend thesis to committee</td>
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