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Live Long Live Strong Grant Proposal

Problem: We are a team of public health nutritionists for HEAL (Healthy Eating Active Living), a non-profit organization in Sacramento County. Among our research in Sacramento school districts we have noticed a growing concern in obesity among young adults. Obesity, defined as having a BMI >30, is an ever growing problem in Sacramento County schools and nationwide. A lack of nutrition education and the availability of low cost processed fast foods at schools have led students to eat more high-fat, high-sodium, low nutrient diets. Young adulthood obesity is a complex, multifactorial disease, incorporating both genetics and environmental factors. In addition to rising healthcare costs, the growing adulthood obesity epidemic is associated with several comorbidities such as high blood pressure, type II diabetes mellitus and cardiovascular disease.

Goal: We have two primary purposes of implementing the Live Long Live Strong program at Luther High School and Jefferson High School (the two high schools used in our program). First, we will provide nutrition education classes with a focus on obesity. Our mission is to prevent obesity by providing education to students on the long-term affects of having a high BMI and the comorbidities associated with obesity. Through implementation projects our second goal is for the students to apply their knowledge in real world situations. Utilizing the six stages of learning, students from Jefferson and Luther High schools will complete the program to ultimately "create" their own healthy lifestyles.

Target Group: Our target group will be adolescents in high school aged 13-18 years old in Luther High School and Jefferson High School. Both Luther and Jefferson High are socioeconomically diverse schools, with 30% of the students classified as below middle class. This group is of particular interest to our program because of their low exposure to nutrition education in their Sacramento

County elementary and middle schools. Additionally, 32% of the students in Jefferson and 30% of students in Luther are classified as overweight or obese.

Design: To combat the young adulthood obesity epidemic in our schools, we chose to focus on nutrition education and healthy living implementation. Our program titled "Live Long Live Strong" will be a four-year longitudinal case and control study between Jefferson and Luther High Schools. Jefferson High School will be our case school and Luther High School will be our control school. A four-year mandatory health education and implementation program in Jefferson High School, with the following classes in consecutive order (see approach A and B below) will be taught by a professional registered dietitian.

Method A: Prevention Education (First two years):

A. General Nutrition (Freshman year) - This class is an overview of nutrition. It includes basic information such as simple definitions of carbohydrates, fats, protein, and quantitative information such as how many fruits and vegetables should be incorporated in one's diet each day. We will utilize the principles of Myplate, current RDA recommendations, importance of exercise and physical activity, healthy vs. unhealthy foods, signs/symptoms of malnutrition, how to balance healthy living, and most importantly how to prevent unhealthy habits.

B. Education on obesity and its related co-morbidities (Sophomore year)- This class is an overview of diseases, risks, and complications that accompany obesity. We wish to address cardiovascular disease, metabolic syndrome, and type II diabetes mellitus as our main topics.

I. During the second year, we will also be conducting outreach assemblies (4 each semester). During the assemblies, people with obesity related co-morbidities will speak about their experiences with the complications they have had with obesity. This will allow students to gain insight into the lives of people who are suffering from the disease. Examples of various speakers will be those that currently have or have had experiences with type II diabetes, diabetic neuropathy, hypertension, and cardiovascular disease. Through mandatory assembly attendance, students will understand the importance of early implementation of a healthy lifestyle to prevent obesity and its adverse long-term

social and physiological consequences.

Method B: Implementation of Life Skills (Last two years):

C. Health In Perspective (Junior Year) - This class puts health into perspective for students. For example, what should they buy while grocery shopping? If it is a struggle to eat more processed/energy dense foods because of factors such as time and low-income, how can we try to find solutions together as a group that are practical for students? We will teach them how to use computer software programs such as "supertracker" to learn how to track their food consumption and analyze their diets. We will also teach them how to read and understand common ingredients to avoid on food labels through grocery store field trips with complimentary nutrition assignments. Through prepared food demonstrations by the registered dietitian, we will also teach them how to prepare quick, healthy foods such as fruit smoothies and vegetable salads.

D. Final Senior Project (healthy food demonstrations) (Senior year) - Students will be required to conduct a healthy food demonstration of a nutrient dense food that they enjoy consuming. They will share the recipes and reasons why it is considered a healthy food to the class.

Note: All of these classes will be related to an emphasis on preventing obesity. Each student is required to take one semester of the above health education classes each year in the consecutive order.

In addition, as part of the Live Long Live Strong program, daily counseling by the registered dietitian will be available to students currently enrolled in the class each semester. The registered dietitian will be available during drop-in office hours for students who want help with healthy living, diet management, menu planning, and any other questions pertaining to health. This will also give students the opportunity to discuss any particular issues they may feel uncomfortable discussing during class.

Objectives:

Health Objective: By 2024, (10-year span if program is implemented in 2014), the incidence of

obesity (BMI >30) among adolescents in Jefferson High School will be reduced by 10%.

Behavioral Objective: By 2024, Jefferson High School students who are now adults will increase nutrient dense foods such as fruits, vegetables, whole-grains, and legumes in their diets by 25%.

*Increasing nutrient dense foods in diets pertains to the comparison of what students are currently eating. Our goal here is for students to become aware of what they are consuming and make conscious efforts to incorporate more nutrient dense foods in place of energy dense/processed foods.

Program-based process objective: By 2015, 100% of the freshman students at Jefferson High School will have attended one semester of health education.

Prevention Level: Our program is aimed towards primary prevention because we want to prevent obesity in the first place through health education classes, assemblies, and office hours provided by the registered dietitian. It also covers secondary and tertiary prevention for students who are overweight and heading on the path towards obesity by helping them prevent obesity. For the students who are obese upon entry into the program, this program will hopefully help to minimize risks and avoid associated complications and co-morbidities.

Type of Intervention: Our program is primarily a system-based intervention because we are introducing changes to a California school system (specifically Sacramento County public schools) by incorporating a four-year nutrition education curriculum. The office hours provided by the registered dietitian also provide individual-based intervention by providing daily individual counseling to the students.

Specific Outcome Measurements: Prior to the entry of the program, students at Jefferson and Luther High School will undergo a required physical assessment and complete a survey to evaluate their current health knowledge and practices (specific measurable outcomes are listed below). Ten years after the freshmen class of Jefferson and Luther High School begin the program, we will reassess these measurements to determine the effectiveness of our LSLL program. These initial assessments and ten year follow-up measurements will be required as part of the signed program contract.

1. Anthropometric Measurements: The anthropometrics that will be measured are BMI, weight, waist circumference, biochemical measures, and diabetes risk to compare case and control populations to see the impact the health education program had on our target populations.

2. Survey: Both Jefferson and Luther High School will take an open-ended survey addressing the following questions to see if the program had an effect on their current diets and lifestyles as adults. We will compare the responses of Jefferson High School to Luther High School utilizing some example questions below:

Example questions: 1. How many meals a week do you cook at home? 2. Name three nutrient food dense items that you currently eat and how often? 3. How many days a week are you exercising and for how long? 4. What is obesity and what are its associated co-morbidites?

Data Collection: Both Jefferson and Luther High School will have to attend a "Reunion for LSLL Alumni," which is a one-month period in August of 2024 (ten years after program implementation began). Alumni of the Live Long Live Strong program will undergo non-invasive physical assessments and will answer the open-ended survey questions (as noted above).

Two Confounding Variables:

1. We must acknowledge that some students may have had previous knowledge of nutrition education from their parents or guardians who could be health professionals such as registered dietitians, doctors, or health experts that we did not take into account. We must control for these factors.
2. Home support and resource availability: If parents or guardians were unable to support the healthy lifestyle choices of their student due to financial setbacks and cultural barriers such as religious beliefs and family dynamics, students may have been unable to practice implementing their knowledge; a factor leading toward skewed study results.

Cost-effective Analysis: Our program would be considered cost-effective because we are putting money into implementing nutrition education curriculum and comparing the program outcomes

between Jefferson High School (case) and Luther High School (control). To calculate the cost-effectiveness, we will need the amount of change in behavior, measured through the anthropometric measurements and the survey data. We will need the monetary costs used in implementing the program: salary wages for the registered dietitian, guest speakers incentives/gift cards, cost of recruitment, advertising, compensation for anthropometric measurements, cost of supplies for classes/food demonstrations, survey materials, and statistician compensation to do analysis on survey and anthropometric data.

Operating Effectiveness:

Approach A (Prevention Education): Our program will have full coverage and no leakage because we are only implementing the program in one school and one class. The efficiency ratio will be 1:30 for dietitian/teachers to students. The class will be offered six times in one day for six different groups of students, with a total of 180 students each semester. Education will be measured through responses from survey questions in the ten-year follow-up. The permanency of this approach, however, will be less directly measurable due to the abstract nature of the education, versus the raw data that can be measured at the reunion for Approach B.

Approach B (Implementation of life skills): This approach will have less coverage than Approach A due to the student drop-out rates between freshman and senior year, as well as the ten-year follow-up reunion absences. The program will also not experience leakage because it is only available to our target population class. The efficiency for the program will also be a 1:30 ratio for registered dietitians to students during the junior and senior implementation program. The permanency will be higher if the program is effective because students will be able to take the applied knowledge to their home and future lives. This will be measured by the survey data and biochemical measurements taken at the reunion.