

ABSTRACT

Obesity in the US is more prevalent than ever before and members of the US Military are not immune to its heavy burden.² There are many adverse health effects linked to obesity but none of which are more concerning than metabolic syndrome (MetS). The aim of this project is to evaluate the effectiveness of a 3-wk nutrition education program set on reducing MetS risk factors and improving body composition for the California (CA) National Guard. Thirty high-risk National Guardsmen and women will be assessed for MetS and other cardiometabolic risk factors.

INTRODUCTION

The safety of this nation is upheld everyday by the men and women of the United States Military and, although we are no longer in a time of *active* warfare, we are still very much at war. This time, however, the battle is on our own soil and it involves the fight against cardiometabolic diseases, including obesity, diabetes, and MetS.

Reserve/National Guard members have a non-specific gender obesity rate of 50.3%.⁴

Given the strong association between obesity and MetS, the CA National Guard reached out to Cal Poly requesting assistance to improve the health and retention rates of National Guard members through a nutrition education program. This is significant given the enormous financial strain of \$75,000, on average, per enlistee for recruiting, screening, and training.² Individuals with MetS are twice as likely to develop cardiovascular disease (CVD), and have a 5-fold greater risk of developing type-2 diabetes.¹ Therefore, Cal Poly nutrition students have partnered with the CA National Guard to develop and deliver a pilot nutrition education program toward reducing the prevalence of MetS risk factors and improving the health and retention of service men

and women. Table 1 below displays the five criterion used to diagnose MetS; meeting or exceeding three of these risk factors is the formal MetS diagnostic definition.¹

Table 1. Criteria for Metabolic Syndrome

Criteria For Metabolic Syndrome	
Risk Factors	Criterion for Clinical Diagnosis
Waist Circumference	Men: ≥ 40 in (102cm) - Women: ≥ 34.6 in (88cm)
Elevated Triglycerides	≥ 150 mg/dL (1.7mmol/L)
Reduced High Density Lipoprotein Cholesterol	Men: ≤ 40 mg/dL (1.0mmol/L) - Women: ≤ 50 mg/dL (1.3mmol/L)
High Fasting Glucose	≥ 100 mg/dL (5.6mmol/L)
High Blood Pressure	Systolic: ≥ 130 mmHg, and/or Diastolic: ≥ 85 mmHg

Goal: The goal of this project is to reduce the prevalence of MetS in, and improve the nutritional status of, CA National Guardsmen and women. Accomplishing this goal will help improve retention rates for the CA National Guard and support the *Healthy People 2020* national health objectives.⁵ Further, if successful, this Cal Poly-developed program will be promoted by the CA National Guard for use to improve the overall health of military personnel nationwide.

Purpose: To evaluate the impact of a 3-wk pilot nutrition education program, for improving nutritional status and reducing MetS risk factors in CA National Guard members.

OBJECTIVES

1. The primary objective is to determine the effectiveness of a 3-wk nutrition education program on MetS risk factors after 5-mo of free-living.
2. The secondary objective is to measure body composition before and 5-mo following a 3-wk nutrition education program.

METHODOLOGY

Thirty men and women (ages 18-30y) from the 49th Military Police Brigade have been recruited by the CA National Guard to take part in a novel 3-wk training program. As part of this training, participants will attend an education workshop, led by Cal Poly students, focused on nutrition knowledge and skill development. Participants will be assessed at baseline (June 2016) and 5-mo follow-up (November 2016) for cardiometabolic risk factors including waist circumference, resting blood pressure, fasting blood measures of lipids, glucose, insulin, HgA1c, and hsCRP, body composition using dual-energy x-ray absorptiometry (DXA), height, and weight. Blood draws and analyses will be completed by Pacific Diagnostics; DXA scans will be conducted by licensed DXA technicians (Drs. K Pilolla and S Reaves). Statistical analysis will be used to compare pre-to-post data. Approval by the Cal Poly IRB, and informed consent of participants will be obtained before baseline assessments.

TIMELINE

	2016							2017
	6	7	8	9	10	11		
Assessments (Ht, Wt, Blood, DXA scans)	Baseline					Post		
Intervention Program								
Data Entry & Write up								
Dissemination								

FINAL PROJECT/ DISSEMINATION

The CA National Guard will receive a final report of the findings. This project may also serve as a Senior Project for Nick Gusto and an abstract will be submitted for presentation at an annual meeting for a professional organization such as the Academy of Nutrition and Dietetics or the American College of Sports Medicine (ACSM).

BUDGET JUSTIFICATION

A total of \$5,000 is being requested for this project. Baseline and post-intervention blood analysis will cost \$76.49 per blood draw for a total of \$4,590. The remaining funds (\$410) will be used to supplement the \$585 registration fee for N. Gusto to present data at the ACSM conference.

References:

- 1.) Alberti et al. (2009). Harmonizing the Metabolic Syndrome: A Joint Interim Statement of the International Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity. *Circulation*, 120(16), 1640-1645. doi:10.1161/circulationaha.109.192644
- 2.) Defense Health Board. (2013, November 22). Implications of Trends in Obesity and Overweight for the ... Retrieved April 23, 2016, from <http://www.health.mil/Reference-Center/Reports/2013/11/22/DHB-Implications-of-Trends-in-Obesity-and-Overweight-for-the-DoD-Fit-to-fight-fit-for-life>
- 3.) Reyes-Guzman et al. (2015). Overweight and Obesity Trends Among Active Duty Military Personnel. *American Journal of Preventive Medicine*, 48(2), 145-153. doi:10.1016/j.amepre.2014.08.033
- 4.) Ryan et al. (2007). Millennium Cohort: Enrollment begins a 21-year contribution to understanding the impact of military service. *Journal of Clinical Epidemiology*, 60(2), 181-191. doi:10.1016/j.jclinepi.2006.05.009
- 5.) 2020 Topics and Objectives – Objectives A–Z. (n.d.). Retrieved April 23, 2016, from <https://www.healthypeople.gov/2020/topics-objectives>

Warren J. Baker Endowment

for Excellence in Project-Based Learning

Robert D. Koob Endowment for Student Success

PROPOSAL BUDGET

Student Applicant(s): Nick Gusto, Erin Heidenreich, Cynthia Santee, Amanda Silacci	
Faculty Advisor: Dr. Kari Pilolla	
Project Title:	Requested Endowment Funding
Travel <i>subtotal</i>	\$0
Travel: In-state	\$0
Travel: Out-of-state	\$0
Travel: International	\$0
Operating Expenses <i>subtotal</i>	\$410
Non-computer Supplies & Materials	\$0
Computer Supplies & Materials	\$0
Software/Software Licenses	\$0
Printing/Duplication	\$0
Postage/Shipping	\$0
Registration	\$410
Membership Dues & Subscriptions	\$0
Multimedia Services	\$0
Advertising	\$0
Journal Publication Costs	\$0
Contractual Services <i>subtotal</i>	\$4,590
Contracted Services	\$
Equipment Rental/Lease Agreements	\$
Service/Maintenance Agreements	\$
TOTAL	\$5000



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April 25, 2016

To Baker-Koob Endowment Selection Committee,

Please accept this letter as reflection of my strong support of the application submitted by Nick Gusto and his fellow classmates Erin Heidenreich, Cynthia Santee, and Amanda Silacchi, titled "Operation Nutrition: Assessment of the California National Guard on their Mission Toward Better Health." The students listed on this application are truly some of the finest students Cal Poly has to offer. The opportunity that has been presented to these students is through a partnership between Cal Poly and the California (CA) National Guard and will provide these students with a valuable *Learn by Doing* experience that cannot truly be replicated in the classroom. Though the student team listed on this application have all successfully completed coursework in which they learned the theoretical foundations of cardiometabolic abnormalities and have practiced application skills on fellow classmates, this opportunity will advance their knowledge and skills by tackling a real-life problem with potential for great impact.

As you will read in the student's application, the retention rates of our military personnel is declining due to the increased prevalence of overweight, obesity, and metabolic syndrome among reserve and active-duty personnel. The Food Science and Nutrition Department was approached very recently to design a nutrition workshop to deliver to a select group of CA National Guards who are at risk for being discharged due to their health and nutrition status. Upon hearing this opportunity, the nutrition students voiced their interest in not just developing the program, but assessing its effectiveness for accomplishing a multitude of objectives. This particular team of students is interested in assessing the effectiveness of the nutrition workshop for improving the nutritional status and metabolic syndrome risk factors in the select group of CA National Guards. The results of the study will be provided to the CA National Guard and disseminated to the scientific community in an effort to advance the health of military men and women and reduce health-related service discharge rates.

I am happy to serve as the faculty advisor for this strong student research team. Their project has the potential to make a significant difference in the health of the CA National Guards and the beginnings of advancing the greater welfare of the military and US citizens. I have worked in the area of nutrition and exercise for prevention and reduction of obesity and metabolic syndrome for the past 10 years and can offer guidance at

each step of the project. This project is relatively straightforward – participants have already been recruited by the CA National Guard and the workshop has been developed and is scheduled for the beginning of June. The necessary assessment equipment and relationships between outside resources are all available and ready for use. Students will be trained on proper protocols and will be in regular contact with me during this project. Data generated during this project will be analyzed and submitted for presentation during an annual meeting of professional nutrition or exercise sciences organization.

In summary, I offer my full support of this proposed project and I look forward to working with the excellent student team listed on this application.

Sincerely,



Kari D. Pilolla, PhD, RD
Assistant Professor, Nutrition