ABSTRACT

Title of dissertation: EVALUATION OF BEHAVIORAL THEORY AND INTEGRATED INTERNET/TELEPHONE TECHNOLOGIES TO SUPPORT MILITARY OBESITY AND WEIGHT MANAGEMENT PROGRAMS

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The primary objective of the study was to evaluate the interaction of two different weight management interventions and two methods of follow up counseling on weight loss in overweight active duty military service members after 3 months. Participants (n=172) were randomized to one of four groups using a 2 x 2 factorial treatment structure: (1) Standard 'Class' + 'In-person' follow up counseling every 3 months, (2) 'Class' + weekly 'Internet' weight management follow up, (3) 'Tailored' behaviorally based counseling session + 'In-person' follow up every 3 months, or 4) 'Tailored' + 'Internet'. The secondary objective was to determine the relationship between stages of change for five different weight control behaviors (dietary fat, fruits and vegetables, portion control, beverage choices, exercise) and weight loss after 3 months. Measurements were taken at 0 (baseline) and 3 months and included body weight, body composition, waist circumference, blood pressure, fasting blood glucose, lipid levels,

stages of change and dietary assessment. Analysis of covariance with repeated measures was used to compare outcome differences among groups over time.

There was no significant difference in weight loss or other outcomes among treatment groups at 3 months. However, the 'Tailored + Internet' (-1.33 ± 0.66 kg, $p<0.05$) and 'Class + In-person' (-1.4 ± 0.63 kg, $p<0.05$) groups lost significant weight compared to baseline after 3 months. The 'Tailored + Internet' group also lost significant total fat, trunk fat and percent body fat and had reduced waist circumference after 3 months while the 'Class + In-person' group significantly lost lean body mass but not fat when compared to baseline. Furthermore, being in the action stage for each weight control behavior did not result in significantly more weight loss than being in the pre-action stages.

These results suggest that although the 'Tailored + Internet' group lost significant weight and body fat after 3 months when compared to baseline, no treatment was superior. Future research should explore other approaches, such as those found in an ecological model of health behavior, because of the influence of other environmental factors on weight management in the military.

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By

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DEDICATION

For Stacey and Abbey

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LIST OF ABBREVIATIONS

A-INFO	Army Interactive Nutrition & Fitness On-line
ANOVA	Analysis of variance
ANCOVA	Analysis of covariance
ATP III	Adult Treatment Panel III
AWCP	Army Weight Control Program
BMI	Body mass index
DEXA	Dual Energy X-ray Absorptiometry
DHHS	Department of Health and Human Services
FBG	Fasting blood glucose
HDL	High density lipoprotein cholesterol
LDL	Low density lipoprotein cholesterol
mmHg	Millimeters of mercury
NHLBI	National Heart, Lung and Blood Institute
NIH	National Institutes of Health
POC	Processes of change
PROC FREQ	Frequency procedure in Statistical Analysis Software
PROC MEANS	Means procedure in Statistical Analysis Software
SD	Standard deviation
SE	Standard error
SOC	Stages of change
TG	Triglycerides
TBI	Tailored behavioral intervention

TTM	Transtheoretical Model of Health Behavior
USDA	United States Department of Agriculture
WC	Waist circumference
WRAMC	Walter Reed Army Medical Center
WTS	“Weigh to Stay”

Chapter I: Introduction

Background and significance

The prevalence of overweight and obesity among adults in the United States has reached epidemic proportions. The 1999-2000 National Health and Nutrition Examination Survey (NHANES) revealed that 64.5% of adults ages 20 years and older are overweight or obese, an increase from 55.9% reported from NHANES III data (1988-1994) (1). At the same time, the U.S. military is experiencing trends in overweight similar to the pattern among the general population. A study revealed that 54% of military personnel were classified as overweight in 1998, compared to 50% being overweight in 1995 (2). Currently, 60% of men and 40% of women are considered overweight or obese in the U.S. Army (3).

Not only can excess weight in soldiers affect military duties and performance but it can also increase the risk for disease and obesity-related costs. A study conducted among active duty U.S. Navy personnel revealed that an estimated $5,842,627 in medical expenses was attributed to obesity-related costs, a figure that could be substantially reduced by improving obesity interventions (4). Furthermore, once active duty military service members retire, those who are overweight or obese may experience increased risk of chronic disease and conditions such as diabetes, hypertension and high levels of blood cholesterol compared to their normal weight counterparts (5).

The military is also experiencing problems with recruitment and retention of qualified soldiers because civilians and soldiers are unable to meet military weight standards. Currently, 13-18% of U.S. men and 17-43% of U.S. women would be

ineligible for military duty because they exceed body weight prerequisites (6). Furthermore, 80% of the military personnel that initially exceed the weight standards during recruitment eventually separate from the military before finishing their first term. In addition, more than 1400 personnel were discharged from the military in 2002 because they were unable to meet the body weight and body fat standards (6).

In response to the problem of overweight in the U.S. military, a Subcommittee on Military Weight Management under the Committee on Military Nutrition Research of the Institute of Medicine (IOM) was appointed in 1999 to: 1) Identify strategies for the most effective interventions for weight loss and weight maintenance, 2) Evaluate each intervention's appropriateness or need for research, and 3) Develop a more standard Department of Defense-wide approach to weight management in the military environment (3).

The Military Weight Management Subcommittee released its report, 'State of the Science and Opportunities for Military Weight Management" in 2003. The report recommended using standard methodology to evaluate the effectiveness of current military weight management programs, instituting Internet/computer-based applications for world-wide access, and further exploring established program features such as behavioral modification and structured follow-up. The report concluded that an effective and safe weight loss program should include a combination of increased energy expenditure through exercise and daily activity, reduced energy intake, behavior modification, and lifestyle changes (3).

Unfortunately, the Army's current weight management program, the Army Weight Control Program (AWCP), does not fulfill all of these recommendations. The

AWCP includes a general, classroom presentation called "Weigh to Stay" (WTS). It is similar to other weight control programs in that it is not specifically tailored to an individual's needs and does not address psychosocial issues such as individual weight control behaviors and readiness to change. Even though a technique often cited for improving long-term weight loss is the development of individualized, matched treatments for patients, implementing WTS mistakenly assumes that all enrollees are ready to make weight control related changes (7). The WTS program also has not been closely evaluated for its effectiveness and it lacks the capability to properly track individuals enrolled in the program. The trend of an increasing prevalence of overweight military personnel and low attendance at follow-up appointments (Personal Communication, Wellness Services, Walter Reed Army Medical Center) in WTS confirms the need to re-evaluate this current nutrition education component of the AWCP.

The Transtheoretical Model of Health Behavior (TTM) includes the constructs "stages of change" (SOC) and "processes of change" (POC). Although this model has been used with various populations to understand and predict weight control behaviors and weight loss, these two constructs have not been applied previously to a weight control intervention in soldiers. An effective nutrition and fitness education component, however, is crucial in the AWCP to help soldiers achieve the highest physical standards possible to fulfill the demands of their duties under combat conditions, especially in the time of war.

As far as we know, this is the first study to develop an individualized behavioral-based weight control program for soldiers using the Internet. Our findings

could have a significant impact on reducing the prevalence of overweight men and women in the U.S. Army.

Rationale

According to Brownell, a successful weight control program should be comprehensive and emphasize a number of factors such as: 1) The importance of behaviors and coping skills, 2) Integrative changes in nutrition and eating, exercise, cognition and social support, 3) A combination of cognitive and behavioral factors to focus on weight maintenance and 4) An individualized program tailored to one's aspects of behavior (8).

An effective weight control intervention should help individuals progress from their current stage of change to the action and maintenance stages (9). Most interventions mistakenly just provide information and assume that an individual is ready to lose weight (10). However, many individuals are not ready to take action, as only 25% of them are typically ready to change a health behavior (11). Approximately half of individuals (~50%) are categorized as being in the precontemplation stage, meaning that they may not even realize that they have a problem with their weight (11).

As previously mentioned, WTS does not address psychosocial issues such as individual weight control behaviors and readiness to change, thus it assumes that soldiers enrolled are ready to lose weight. In addition, the impact of WTS has not been closely evaluated for its success and lacks the capability to properly track individuals enrolled in the program.

Another challenge with respect to weight management in the military is the current inability to provide "structured follow-up due to the mobility of the military

population." This issue was addressed by clinicians at the U.S. Military Nutrition Symposium (October, 2003). With rapid increases in Internet and mobile telephone use over the past decade, a web-based weight management system with telephone integration offers opportunities to improve the delivery of weight management care to the military.

The methodology used in previous studies have neither combined the Internet and telephone nor integrated dietary behavioral psychology with currently available technology. Furthermore, the methods and instruments have not been developed or customized for the military environment; hence, their applications are limited to the civilian sector. This study uses the latest research in dietary behavioral therapy for weight loss together with telephone and Internet technology to create an innovative personalized "Web/Telephone Weight Control and Maintenance" account for soldiers as described later. The development of this account is the first of its kind in the military and may serve as a weight management model for all uniform services or for other populations. Furthermore, this study may provide a framework to support future programs that can be implemented in U.S. Army facilities throughout the world to positively impact weight control in soldiers.

Research Objectives and Hypotheses

Primary Objectives:

1. To evaluate four different weight loss treatments consisting of the interaction of two weight management treatments (standard classroom vs. tailored behavioral) and two follow-up counseling methods (in-person vs. Internet only) on weight loss and other weight related parameters (body composition, waist circumference, blood pressure (BP), fasting blood glucose (FBG), blood lipids, diet, exercise, SOC) in active duty military personnel after 3 and 6 months.

Hypothesis: The tailored behavioral-based dietary intervention with Internet follow-up will promote the most weight loss while improving body composition and other weight-related outcomes (waist circumference, BP, FBG, blood lipids, diet, exercise, SOC) compared to the other interventions after 3 and 6 months.

1a. To determine if the tailored behavioral intervention (TBI) promotes more weight loss and weight related improvements (body composition, waist circumference, BP, FBG, blood lipids, diet, exercise, SOC) than a non-tailored, standard classroom intervention (WTS) regardless of the type of follow-up method after 3 and 6 months.

Hypothesis: The tailored behavioral-based dietary intervention will promote the most weight loss and fat reduction while improving body composition and other weight-related outcomes (waist circumference, BP, FBG, blood lipids, diet, exercise, SOC) compared to the standard classroom intervention (Weigh to Stay) regardless of follow-up method after 3 and 6 months.

1b. To determine if the Internet follow-up method promotes more weight loss and weight related improvements (body composition, waist circumference, BP, FBG, blood lipids,

diet, exercise, SOC) than the in-person follow-up regardless of the type of dietary intervention approach after 3 and 6 months.

Hypothesis: The Internet follow-up method will promote the most weight loss and fat reduction while improving body composition and other weight-related outcomes (waist circumference, BP, FBG, blood lipids, diet, exercise, SOC) compared to the in-person follow-up regardless of dietary treatment method type after 3 and 6 months.

Secondary Objective:

2. To determine if there is a relationship between weight control behaviors (using stages of change) and weight loss in active duty military personnel after 3 and 6 months participation in a weight loss study.

Hypothesis: Individuals that are in the action or maintenance stage for each of the five weight control behaviors (dietary fat, fruits and vegetables, portion control, beverages and exercise) will have more weight loss after 3 and 6 months participation in a weight loss study.

Chapter II: Literature review

Overview of weight management approaches in adults

According to the National Heart Lung and Blood Institute (NHLBI) of the National Institutes of Health and the North American Association for the Study of Obesity, the three main components of a successful weight loss program in adults are diet, exercise and behavior modification (12). Successful weight loss and maintenance require lifestyle rather than short-term changes (13). Standard recommendations for diet include restricting energy to a deficit of 500-1000 kilocalories (kcal) per day to result in a 1-2 pound weight loss per week. A diet comprised of 30% kcal from fat, 15% kcal from protein and 55% kcal or more from carbohydrate is typically recommended (12).

In addition to caloric restriction, increased physical activity is recommended to expend calories, spare lean body mass and improve cardiovascular fitness. Physical activity recommendations vary, but a common goal is to participate in 30 minutes of accumulated moderate activity most days of the week. Besides planned bouts of activity, simple lifestyle changes, such as taking the stairs instead of an elevator and parking further away from a destination are also recommended. However, physical activity produces minimal weight loss alone unless accompanied by caloric restriction (14). Increased and sustained physical activity to increase energy expenditure over time is crucial for weight loss maintenance (14).

Behavior change is a cornerstone of successful weight management. Strategies such as self-monitoring, stimulus control, cognitive restructuring, stress management, social support and relapse prevention are vital in efforts to change habits and lose weight (15). Furthermore, an important but often overlooked component of a weight-loss

behavioral intervention is to also assess an individual's readiness to change behaviors to lose weight.

An evidence based algorithm for the treatment of obesity in adults has been established by the NHLBI (14). A 5-10% weight loss over a 6 month time period is typically recommended if an individual has a BMI ≥ 30 kg/m^2. Weight loss is also recommended for individuals with a BMI ≥ 25 kg/m^2 or a high-risk waist circumference (>88 cm for women, >102 cm for men) and at least 2 other risk factors (co-morbidities of obesity) for chronic disease such as hypertension, elevated LDL-cholesterol, low HDL-cholesterol, impaired fasting glucose (≥100 mg/dL), current smoker, family history of coronary heart disease, or older age (≥55 years for women, ≥45 years for men). However, weight loss may not always be recommended. For example, an individual with a BMI of 25–29.9 kg/m^2, fewer than 2 other risk factors (co-morbidities for chronic disease) and who is not ready to lose weight, should be counseled on how to maintain their current weight.

Other options for weight loss, if lifestyle change alone is not effective, are pharmacotherapy or gastric surgery. Pharmacotherapy should only be considered if an individual has a BMI ≥ 27 kg/m^2 and 2 risk factors or a BMI ≥ 30 kg/m^2. Pharmacotherapy should not be provided until an individual has attempted lifestyle changes and has not lost at least 1 lb per week after 6 months (12). Gastric surgery is the most extreme option for individuals with a BMI ≥ 35 kg/m^2 and at least two other risk factors or a BMI ≥ 40 kg/m^2. Surgery only should be considered if all other approaches have failed. Medical monitoring is essential if weight loss approaches involve drugs and/or surgery.

Risk factors associated with obesity

The treatment of overweight and obesity is important for reducing risk factors (comorbidities) commonly associated with obesity including elevated blood pressure, abnormal blood lipids levels and elevated fasting blood glucose levels. Multiple randomized controlled trials have provided strong evidence that weight reduction resulting from lifestyle change can reduce blood pressure in overweight and obese individuals (14). Strong evidence also exists that weight loss through lifestyle change can lower triglycerides and increase HDL-cholesterol levels (14, 16). Weight loss is also associated with reductions in blood levels of total cholesterol and LDL-cholesterol (14, 16, 17). Furthermore, there is compelling evidence from lifestyle trials that weight loss reduces fasting blood glucose levels in overweight and obese individuals who are not diabetic (14).

An individual having multiple risk factors is at risk for developing the metabolic syndrome. The risk factors for metabolic syndrome include: high-risk waist circumference (≥88 cm women, ≥102 cm men), impaired fasting glucose (≥100 mg/dL), elevated triglycerides (≥150 mg/dL), low levels of HDL cholesterol (<50 mg/dL women, <40 mg/dL men) and elevated blood pressure (≥130 mmHg systolic or ≥85 mmHg diastolic). Taking medications to control blood glucose, triglycerides, HDL-cholesterol and blood pressure also qualify as a risk factor regardless of current measurement.

Behavioral Modification

Several health behavior theories and models have been used in the development and implementation of dietary and physical activity interventions. These include the Health Belief Model, Social Cognitive Theory, Theory of Reasoned Action and Theory

of Planned Behavior and the Transtheoretical Model of Health Behavior (TTM). The TTM was chosen for this intervention because it has been used previously to study diet and physical activity behaviors and because two of its constructs, stages of change (SOC) and processes of change (POC) provide a user-friendly framework for an interactive, tailored, computer based-intervention.

The Transtheoretical Model of Health Behavior

Prochaska and DiClemente proposed the Transtheoretical Model (TTM) in the early 1980's to explain the underlying structure of behavior change in smokers (18, 19). The TTM is comprised of four major constructs: stages of change, self-efficacy, decisional balance and processes of change. "Stages of change" is the most commonly used construct of the model and is made up of five stages: precontemplation, contemplation, preparation, action, and maintenance. These stages were identified as the central organizing construct or temporal dimension of the TTM to help determine when individuals would change their attitudes, intentions and behaviors with respect to smoking (20).

Processes of change (POC), another major construct and independent variable dimension of the TTM, is comprised of covert and overt approaches that individuals use to progress through the SOC (20). Although some studies have applied the POC when tailoring interventions, additional research is especially needed on this construct of the TTM because it has been tested the least in dietary interventions (11). A brief summary of the stages and processes of change of the TTM is presented in Table 2.1.

Table 2.1 Stages and Processes of Change of the TTM

STAGE OF CHANGE	DEFINITION	CORRESPONDING PROCESS(ES) OF CHANGE
Precontemplation	No intention of changing behavior in next 6 months or may not realize that behavior is a problem	Consciousness raising, dramatic relief, environmental reevaluation
Contemplation	Intend on changing behavior in next 6 months	Self-reevaluation
Preparation	Plan on changing behavior in next 30 days	Self-liberation
Action	Have changed behavior for ≤ 6 months	Counterconditioning, helping relationships, reinforcement management, stimulus control
Maintenance	Have changed behavior for > 6 months and working to prevent relapse	Counterconditioning, helping relationships, reinforcement management, stimulus control

Since the early 1980's, numerous researchers have used the TTM and/or certain constructs of the TTM to study dietary behavior changes focusing on weight control, fruit and vegetable consumption, fiber intake and dietary fat reduction (21). Dietary fat reduction and weight control have been the most common applications of the SOC construct related to nutrition (11). Furthermore, SOC have been commonly used in physical activity and exercise interventions (22, 23). In particular, several researchers have used the SOC and/or POC construct of the TTM to investigate weight control in a variety of settings including primary care offices, outpatient care, worksites, communities, and colleges (24-29).

Prochaska et al. assessed SOC and POC in 184 hospital staff members during a 10-week work site weight control program (24). Nutrition education, physical exercise and several behavioral strategies such as self-monitoring and stimulus control were emphasized in the weight management sessions. The authors determined that the SOC

and POC of various weight control behaviors were related to attendance and outcomes of the program. For example, participants who were in the action stage had the best attendance and exhibited the greatest weight loss. By the end of the program, more participants were in the action stage than the contemplation stage. This study demonstrated the effectiveness of tailored interventions, especially for individuals who were not initially in the action stage.

Other researchers have used more than one construct of the TTM. In a study involving 264 college students, O'Connell et al. concluded that SOC and decisional balance are valid tools for weight loss related behaviors and may be applicable to a clinically overweight population (28).

It is important to note that "weight control" is not an actual behavior. Specifically, decreasing fat intake, decreasing portion sizes of food, decreasing the amount of high calorie beverages, increasing the amount of fruits and vegetables in the diet and increasing physical activity are behaviors that may lead to weight loss. Successful weight control relies on changing multiple behaviors and it is important to recognize than an individual may have a heterogeneous stage of change profile for different weight control behaviors.

For example, in an obesity intervention involving 284 family practice patients, SOC was assessed for 6 weight-related behaviors including planned exercise, daily activity, fruit consumption, vegetable consumption, dietary fat intake and portion sizes. (30). The data indicated that patients were in different stages for the various behaviors. Patients in the action and maintenance stages for exercise/activity, fruit intake, reduced dietary fat and portion control had lower BMIs or waist circumferences than patients in

the contemplation or preparation stages. The results underscored the importance of using tailored treatments and approaches that are specifically designed for the behavior being considered, and to take into account an individual's readiness to change.

In a weight loss study designed to determine why tailored nutrition education materials are more effective in changing behaviors compared to non-tailored materials in 198 overweight adults, different types of nutrition education materials were evaluated to assess the impact on personal connections, self-efficacy, behavioral intention, self-assessment, and number and polarity of thoughts (31). The results indicated that individuals who received the tailored materials had more positive personal connections with the information, higher behavioral intentions, positive self-assessment and more positive thoughts regarding weight loss compared to individuals receiving the non-tailored materials.

A study based on SOC and involving over 500 adult primary care patients evaluated the effect of a tailored intervention on fat and fruit and vegetable consumption (32). Nutrition messages were generated by a computer program based on each individual's stage of change for fat, fruit and vegetables. A tailored newsletter was then mailed to each participant in the study, and subjects were resurveyed 4 months after receiving the tailored intervention. The results revealed that the patients were more likely to read and remember tailored versus non-tailored information. Furthermore, those receiving the tailored newsletter had significant decreases in total fat and saturated fat intake compared to a control group. Fruit and vegetable intake was not significantly affected but the authors speculated that this was most likely due to a seasonal affect. This study demonstrated how tailored messages based on the SOC can not only help

individuals progress to higher stages (as documented in other studies), but that such messages also promoted actual behavior changes. In addition, it has been estimated that if individuals can advance just one stage for a given behavior, then they double the chances of reaching the action stage for that behavior within a 6 month period. (33).

Alternative methods to weight management follow-up counseling

Conventional approaches to treating obesity have been largely ineffective, and obesity continues to burden the health status of the population. Therefore, seeking alternative methods of treatment are necessary. In-person nutritional counseling by a registered dietitian is a standard option in weight management but it can be financially burdensome, especially if one does not have health care insurance or if the insurance does not cover nutritional counseling. Furthermore, information on physical activity may or may not be addressed by a dietitian. Individual counseling is also time-consuming and qualified nutrition professionals may not be available in all communities. Thus, providing weight loss counseling electronically through the Internet/web should be explored as a potential alternative for treating overweight and obesity.

Internet/Telephone Use for Weight Management

Access and use of the Internet has grown substantially in recent years, making it an ideal channel for disseminating health information (34). However, the majority of nutrition information available on the Internet is not necessarily tailored to an individual but instead, is rather general (e.g. Dietary Guidelines for Americans, http://www.health.gov/dietaryguidelines/dga2005/document/).

Recently, computer technology has offered the capability to individually tailor health education messages, which can be developed using health behavior models such as

the TTM. Because tailoring weight control interventions to individuals during in-person visits can prove to be time consuming for a nutrition counselor, the use of technology such as the Internet offers a promising alternative. Using this technology can decrease demands on nutrition counselors and therefore decrease staff time while allowing greater flexibility in scheduling personal weight management counseling sessions.

Computer-tailored nutrition education has gained popularity in recent years as an innovative approach that is more effective in motivating individuals to change dietary habits than non-tailored nutrition information available by computer (35, 36). A randomized controlled trial of approximately 200 Dutch adults was conducted to evaluate the effect of a tailored computer intervention versus a control intervention (non-tailored and non-computerized) on an individual's awareness and intention to change fat, fruit and vegetable intake (37). After a post-test, participants in the tailored group had significantly higher intentions to reduce fat intake and were more aware of their fat and fruit consumption. In addition, computer literacy did not impact the results, indicating that computer tailoring may still be effective even among individuals who have little prior computer experience.

Although not a randomized trial, Block et al. investigated the impact of a tailored intervention that was mailed electronically to corporate worksite employees over a 12 week period. (38). SOC for fruit and vegetable and fat intake were assessed at baseline and after 12 weeks. A screening questionnaire was used to assess dietary fat and fruit and vegetable intake. Participants reported increased fruit and vegetable intake and decreased dietary fat intake and also progressed to higher SOC after the 12 week

intervention. This program demonstrated promising results using a feasible approach of e-mail tailoring.

Internet technology has been used in previous studies to provide education and behavioral therapy for weight loss (34, 39, 40). A study of individuals with type 2 diabetes being counseled through the Internet was shown to be more effective than the Internet alone in reducing weight (4.4 lbs vs. 2.0 lbs lost respectively) and waist circumference (7.2 cm vs. 4.4 cm lost, respectively) (41). However, this study used an Internet program which was solely educational rather than personally tailored through interaction. In addition, the Internet program was not structured using behavioral models for weight loss. In a different study by Tate et al., the effect of a behavioral versus non-behavioral web-based weight loss program was evaluated in overweight adults (34). The group receiving the behavioral-based Internet education had significantly greater reductions in weight and waist circumference compared to the non-behavioral treatment group.

Harvey-Berino et al. evaluated the feasibility of Internet support for weight maintenance in a pilot study by comparing weight loss of 46 obese individuals after 22 weeks of either in-person or Internet follow up. The results revealed that weight maintenance was no different among groups suggesting that the Internet follow up was equally as effective as the in-person counseling (39). In addition, there were no differences in the drop-out rate between the two groups. The same research team then tested these findings in 255 overweight adults by evaluating weight maintenance after 12 months of standard in-person follow-up or Internet support. This study showed that

Internet support provides comparable results to in-person counseling in regard to weight maintenance and may serve as an alternative to in-person counseling (42).

The use of telephone technology in nutrition counseling has also been tested previously. Robinson et. al. conducted a study using a telephone-based system and showed a reduction in the levels of low density lipoprotein-cholesterol (LDL) in patients who received weekly telephone calls to review laboratory values and receive advice on diet and physical activity (43).

Military weight management programs

Overview

Each branch of the military (Army, Navy, Air Force, Marine Corps) has similar but different programs and resources related to weight management for their active duty military personnel (3). The programs are similar in that they include some sort of nutritional class or counseling but the type of intervention and frequency may vary. Each branch of the military takes measurements such as weight on all active duty personnel at least once annually. With certain exceptions and at some discretion of the commander, each branch of the military enforces consequences for personnel not meeting established weight and/or body fat standards. These consequences include denial of promotion, schooling, awards, and reenlistment, and may be as extreme as being discharged from the military. This, in turn, may foster feelings of resentment and perpetuate poor diet and exercise habits among military personnel in attempts to achieve military weight and body fat standards (44, 45) .

The Army Weight Control Program

In 1980, President Carter requested that the Armed Forces explore ways to

improve overall fitness. Consequently, a panel of experts recommended that the Army Weight Control Program (AWCP) be revised and improved (Army Regulation (AR) 600-9). The AWCP, originally established in 1976, was created to ensure that all Army personnel are able to uphold the physical demands of their duties under combat conditions as well as meet the standards of professional appearance (46).

The AWCP is a comprehensive, multidisciplinary program mandated to assist, educate and motivate overweight soldiers to meet the weight and body fat standards established within AR 600-9. The premise is that physically fit soldiers will have optimal body composition. Fit soldiers presumably are better able to perform physically related tasks, are at less risk of injury, have higher Army Physical Fitness test scores and convey a trim and "soldierly" appearance (3). The objectives of the AWCP include assisting in establishing and maintaining discipline, operational readiness, optimal physical fitness and health among Army personnel. The current AWCP has not been revised since 1987.

Soldiers are weighed every 6 months (with exceptions for pregnant women, women up to 6 months postpartum, and hospitalized and medically treated soldiers) and weight is assessed using height and weight tables based on age and gender. If a soldier exceeds these standards, body "tape" circumference measurements are taken to calculate body fat percentage. Male soldiers are measured at specified areas around the abdomen and neck and female soldiers are measured around the neck, forearm, wrist, and hip. These measurements are included in a previously validated regression equation to predict percent body fat. The acceptable age-dependent body fat range is 20-26% for men and 30-36% for women. If a soldier exceeds the body fat cut-offs

based on age and gender, then the soldier's record(s) are flagged and s/he is required to enter the AWCP. While enrolled in the AWCP, the soldier cannot be considered for promotion, authorized to attend military and civilian schools or assigned to command positions.

Once enrolled in the AWCP, the soldier is required to receive counseling by a registered dietitian (discussed later) for weight management. AWCP enrollees are also required to engage in mandatory physical activity typically consisting of running and calisthenics 5 days a week. The type and duration of physical activity are at the discretion of the company commander. Soldiers are also weighed on a monthly basis. After receiving dietary counseling, the soldier must experience weight loss in any 2 consecutive months. Satisfactory progress is considered weight loss of 3-8 pounds per month. However, soldiers are not dismissed from the AWCP until they meet body fat standards as assessed by the body "tape" circumference measurements established by the Army. If soldiers do not make satisfactory progress while in the AWCP, they may be considered for dismissal from the Army.

Weigh-to-Stay for Weight Control

Weigh-to-Stay (WTS) is the name of the nutrition and fitness educational component for the AWCP (AR 600-9) throughout the Army. Soldiers receive three, 1-hour classroom lessons (consisting of a Microsoft PowerPoint slide presentation) on various weight loss topics presented by registered dietitians. These classes are typically scheduled 3 months apart from each other. However, soldiers are only required to attend the first session in accordance with AR 600-9.

In the first session, soldiers receive information on topics such as causes of weight gain, nutrition basics, fad diets hazards, nutrition myths, food labels, dining out, exercise, and dietary supplement use. The second session covers topics such as meal planning, weight loss strategies, behavior modification, hunger, and diet history. Finally, in the third session, soldiers receive information regarding physical activity.

Previous military research

Although the TTM has not been utilized for the AWCP, weight control interventions have been conducted among U.S. military personnel. In a study of 39 Air Force men, SOC-matched health information was applied within an Internet program that was designed to enhance fitness during a 6 month intervention (47). Although fitness was not significantly improved in the treatment group, weight, body fat and BMI improved as a result of the intervention.

A study conducted aboard a deployed U.S. Navy ship tested the impact of a cognitive behavioral-based intervention that included exercise. A control group received standard exercise information only. Although both groups of men experienced weight and body fat losses, weight loss, body fat and triglycerides were significantly improved in the cognitive-behavioral group when compared to the control group (48).

Studies conducted by James et al. and Davis focused on comprehensive weight-loss programs in active duty service members (49, 50). Both programs resulted in weight loss among the soldiers enrolled. However, both approaches included at least 12 months of intervention (including some in-patient care) which is not feasible or realistic for the AWCP because of cost and time constraints. The treatment approaches also were not

tailored according to each soldier's SOC, assuming instead that each subject was "ready" to change certain weight control behaviors.

As mentioned previously, WTS does not address psychosocial issues such as individual weight control behaviors and readiness to change. It is similar to other weight control programs in that it assumes that enrolled soldiers are ready to lose weight. In addition, the impact of WTS has not been closely evaluated for its success and it lacks the capability to properly track individuals enrolled in the program. In short, it uses an approach that disseminates general nutrition information in a classroom setting to groups of soldiers (up to 25 people). A major shortcoming of this approach is that it does not address individual dietary and/or exercise issues. The trend of an increasing prevalence of overweight military personnel and low attendance at follow-up appointments (Personal Communication, Wellness Services) in WTS confirms the need to re-evaluate the effectiveness of the current dietary component of the AWCP.

Chapter III: Development of a weight control stages of change instrument and interactive nutrition & fitness website for military weight management programs

Overview

A "stages of change" (SOC) weight control instrument underwent a two-phase test before being implemented in a weight loss study for active duty military service members. In the first phase, the instrument was tested using cognitive interviews. The second phase involved criterion validation of the instrument using 7 day food records provided by a group of volunteer soldiers.

Once the SOC instrument was finalized, it was integrated into a weight management website for use in a research study with overweight, active duty military service members. This website, "Army Interactive Nutrition & Fitness On-line (A-INFO)" was developed and tested in addition to the SOC instrument prior to the research study.

Development of Stages of Change Instrument

A stages of change instrument was developed to assess multiple weight control behaviors: 1) reducing "dietary fat", 2) increasing "fruit & vegetable" intake, 3) reducing portion sizes/ "portion control", 4) limiting high kcal "beverages," and 5) increasing "exercise." These behaviors are commonly used in weight control interventions and are the main focus of the current Army Weight Control Program. In addition, previous research has revealed that individuals tend to have a heterogeneous profile in regard to stages of change profile for various weight control behaviors thus a single staging algorithm would not be valid or appropriate in these instances (30). Where possible, the survey questions and staging algorithms for addressing each of the five target weight

control behaviors and determining stages of change were adapted from previous studies (30, 51-53).

Cognitive Interviewing for Stages of Change Instrument

It has been suggested that survey tools be tested and revised using cognitive interviewing methods prior to being administered to a target population. Cognitive interviewing is a relatively new technique that is intended to improve the quality of data collected from questionnaires (54). This technique is commonly used to pre-test survey instruments developed by the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC), the Bureau of Labor Statistics and the Census Bureau (54).

Cognitive interviews were conducted with active duty overweight and normal weight volunteers (n=5) prior to study recruitment. Volunteers were interviewed while they filled out the test instrument and after completing it to ascertain potential problems encountered with terminology, ambiguous information, or question format. We used both concurrent (participants verbalize thoughts as they answer questions) and retrospective (participants describe how they arrived at their answers immediately after they complete the instrument) "think aloud" interviews, as well as probes, to determine how the participants arrived at their answers (Appendix A). The interviews were conducted using previously published techniques (54).

Although only five active duty soldiers participated in the cognitive interviews, this number was deemed adequate, as the comments and other information collected provided invaluable insight for making needed corrections and improving the stages of change instrument. Cognitive interview guidelines do not specify the number of

interviews that are needed for pre-testing, but recommend that no more than 12-15 be conducted on one version of an instrument (55). Feedback may become redundant after only about five interviews (Personal Communication with Dr. Paul Beatty, National Center for Health Statistics, Fall 2004). Indeed, we found that comments made during the fourth and fifth interviews were mostly repetitive of the earlier feedback and provided little new information. More important than the number of subjects, our volunteers were active duty soldiers of various ages, gender and ethnic backgrounds and reflected our target population.

Key Findings from Cognitive Interviews

Only one set of cognitive interviews was conducted on the initial instrument due to time and resource constraints. Comments and suggestions from the volunteers led to changes in formatting, word order, rephrasing some questions, and deleting certain terms. For example, instead of asking subjects a single question about such behaviors, as "controlling portion sizes," several questions were added to assess specific actions and intentions. Drop down menus were also added to provide forced-choice answers for some items.

The goal behavior for dietary fat ("low fat diet") and fruits and vegetables ("5 fruits and vegetables") was removed from the original list because subjects seemed more inclined to provide the desired or expected response rather than their actual practice. Instead, subjects were asked to estimate how many servings of fruits and vegetables they ate per day and their intention about changing this behavior. They also were asked a series of questions related to reducing fat in the diet rather than being asked if they were eating a low fat diet.

The target frequency for a behavior was moved from the end of a sentence to the beginning because subjects ignored this information when it came at the end. The word "week" was defined as 7 days because subjects interpreted a "week" as being 5 days. Confusion was experienced with the original terminology of "clean your plate," "red meat," and "tracking what you eat" so questions were reworded to clarify the meaning of these phrases. Text boxes were added to provide examples of fruit and vegetable serving sizes and types of physical activities considered to be "moderate exercise."

Furthermore, subjects who were required to exercise were asked about their exercise habits prior to the exercise becoming mandatory. Individuals who are required to exercise may automatically be placed into the "action" or "maintenance" stage even though this might not necessarily reflect their true readiness to change. Therefore, such individuals needed to be assessed twice to attempt to accurately assess their stage of change for exercise.

Validation of Stages of Change Instrument

Although challenging, it is prudent to validate an instrument before using it to ensure that the data collected reflect the original intent of the researchers. An individual's stage of change indicates readiness to change a behavior based on what one is currently doing and intends to do in the future, although it may not necessarily reflect their actual current behavior. Thus, the stages of change for diet (intention or current behavior related to dietary fat, fruits and vegetables, and portion control) were compared to current dietary intake as assessed by 7 day food records.

In short, criterion validity (concurrent) was determined by comparing the answers from the weight control instrument (pre-action vs. action stages for dietary fat, fruit and

vegetable intake, portion control, and beverages) to the results of the 7 day diet records. Seventeen active duty service members from Walter Reed Army Medical Center volunteered to complete a seven day food record and the computerized stages of change instrument. A food diary booklet was provided to each volunteer for their 7 day food record. The returned dietary records were reviewed and the data were analyzed using the Minnesota Nutrition Data System for Research (NDS-R). The 7 day average intake for calories, macronutrients, and servings of the five food groups (as previously defined by USDA Food Guide Pyramid, 1992) were derived from the food records.

However, only 8 subjects completed the food records and corresponding stages of change surveys. Due to time and budget constraints related to the A-INFO website development, the validation was completed using this small sample of volunteers.

To determine the association between instrument results and the 7 day diet record results, each individual was classified into either "action" or "pre-action" based on the average of 7 day dietary results and criteria in Table 3.1. They also were classified into "action" or "pre-action" based on the results of the stages of change survey (Appendix B). "Action" was defined as action or maintenance stages and "pre-action" was defined as precontemplation, contemplation or preparation stages. The exercise section of the stages of change questionnaire was not validated because it was not altered substantially from another questionnaire that previously had been validated in adults (51, 53).

The results were analyzed as a series of 2x2 contingency tables for each weight control behavior (dietary fat, fruit & vegetables, portion control and beverages) using SAS System for Windows V8.2 (SAS Institute, Cary, NC). Because of small frequencies in each cell, Fisher's Exact Test was used instead of Chi-Square analysis to

test for significant associations ($p<0.05$) between the dietary analysis results and stages of change instrument results.

Table 3.1 Weight Control Behavior Criteria for "Action"

Weight Control Behavior	Action Criterion	Rationale
Dietary Fat*	≤ 35 % of total kcal per day	Maximum recommended level for % kcal from fat**
Fruit & Vegetables	5 combined servings per day	Minimum number of combined servings recommended by USDA Food Pyramid***
Portion Control	Below all maximum recommended serving ranges according to Food Guide Pyramid [maximum grains= 11 servings, fruit =4 servings, vegetable= 5 servings, dairy =3 servings, meat =3 servings]	USDA Food Pyramid*** recommended ranges
Beverages	≤250 kcal from sweetened and/or alcoholic beverages per day	Within range for discretionary calories recommended by USDA for 2000 kcal diet; Liberal recommendation for beverage intake by some dietitian counselors
Exercise	30 minutes of moderate activity 5 times per week	Army Weight Control Program recommendation

*Original definition before validation= ≤30% of total kcal
**Dietary Reference Intakes for Fat, Food and Nutrition Board/IOM 2005
***USDA Food Guide Pyramid, 1992 (Revised 2005 MyPyramid was introduced after instrument development)

Key Findings from Validation

Responses derived from the stages of change instrument were significantly associated with the dietary analysis stage results for portion control ($p=0.02$) and beverages ($p=0.03$) but not for dietary fat ($p=0.14$) or fruit and vegetables ($p=0.43$). A key finding that emerged from the validation study was that subjects sometimes overestimated their consumption of fruits and vegetable intake and underestimated their fat intake. Overestimation of fruits and vegetables by adults is consistent with previous

research (56). Therefore, we included a description of fruit and vegetable standard serving sizes.

Percent kcal from fat was used to validate the dietary fat stage of change. A cutoff point of <30% kcal from fat was the initial action criteria for the instrument, but the current Dietary Reference Intakes (Institute of Medicine) and Dietary Guidelines for Americans (USDA/DHHS) recommend limiting fat consumption to no more than 35% of total daily kcal. When the cutoff was raised to 35% kcal from fat, more individuals were classified into the action stage for dietary fat, resulting in an association approaching significance ($p=0.07$) between that behavior and the stages of change instrument results. Thus, the instrument questions were not changed, but with the understanding that the current instrument would classify individuals as being in "action" when dietary fat comprised up to 35% (rather than 30%) total kcal from fat. Other researchers studying SOC and dietary fat intake also have classified individuals as being in the action stage for fat with diets at or above 35% kcal from fat (32, 57-59).

It is common for people to believe they are following a low fat diet when in fact they are not, so it appears that the SOC instrument may have miscategorized individuals in the action/maintenance stages for eating a low fat diet. However, our instrument used several behavioral questions related to fat intake, rather than a single question, which minimized the possibility that subjects would be misclassified. This approach has been used by other researchers (21, 30).

Several studies have discussed the complexities involved in staging individuals based on self-reported dietary intake and/or validating stages of change with dietary intake (9, 30, 51, 52). One approach to validate the SOC for dietary fat was to

investigate the relationship of dietary fat intake to stages of change. A few studies have reported an inverse relationship between % kcal from fat and stage of change for dietary fat (i.e. the higher the stage of change such as action or maintenance, then the lower the % kcal from fat), although the difference in fat intake among the stages was small (57, 58). Thus, it can be challenging to stage individuals discretely into categories for dietary fat using food record analyses.

The final SOC instrument contained 37 questions (Appendix B) and took approximately 15 minutes to complete. The instrument was integrated into the Army Interactive Nutrition & Fitness On-line (A-INFO) Web site (described later). It was also available on compact disk for assessing SOC in soldiers who were not assigned a website account.

Once the survey was completed, a final profile with stages of change for five different weight control behaviors was generated. This profile had tailored weight control messages contained in a "message library" that corresponded to each behavior. These messages were developed by registered dietitians using the TTM's processes of change construct for specific weight control behaviors. Table 3.2 contains an example of how these weight management interventions/messages were developed for exercise. A sample "message library" can be found in Appendix C for weight control messages related to dietary fat, fruits & vegetables, portion control and exercise. The messages were later incorporated into tailored behavioral counseling sessions as part of a weight loss study for active duty military personnel (described in Chapter IV).

Table 3.2 Sample Weight Control Intervention for Exercise

Processes of Change	Example of Weight Control Intervention for Exercise
Consciousness raising	Learning the health/employment consequences of not exercising
Dramatic relief	Identifying and addressing any negative emotions (anxiety, embarrassment, boredom) that accompany exercise
Environmental reevaluation	Realizing/identifying the positive impact that exercise may have on one's social environment (family/friends) (e.g. increased energy, bonding with others)
Self-reevaluation	Realizing/identifying how exercise is an important part of being a soldier (e.g. assessing one's image of being sedentary versus being active)
Self-liberation	Making a commitment contract or promises, plans for a specific exercise goal
Counterconditioning	Substituting exercise/activity for snacking when bored
Helping relationships	Seeking a friend/relative to partner with during exercise or who is willing is able to provide support to them for being active
Reinforcement management	Using non-food rewards (e.g. new clothes, music) when succeeding at exercise goal
Stimulus control	Removing stimuli that encourage behaviors that may counteract exercise (e.g. unplugging television set) and replacing them with stimuli that encourage exercise (e.g. placing running shoes by door)

Development of Army Interactive Nutrition & Fitness On-line (A-INFO) Web site

An interactive nutrition and fitness website was created based on the '5A's (advise, assess, assist, anticipatory guidance, arrange follow up) for producing effective health behavior changes using an interactive website (60). At least 4 of these 5 criteria were addressed on the A-INFO website. The construction of A-INFO involved collaboration with the United States Department of Agriculture's (USDA) Center for Nutrition Policy and Promotion, which provided the food composition database and

physical activity web codes. Specific components of the website are discussed in detail below.

The HEALTH-e Forces (HeF) department at WRAMC developed the integrated secure website and telephone support system account for active duty military personnel to use during a weight loss study. HeF also provided support for the Internet with telephone integration through the Internet/Intranet system at WRAMC. This website was used for follow-up care and included monitoring, assessment, education, and dietary behavioral therapy based on the stages and processes of change constructs of the TTM. Subjects were provided with a random username and password to ensure the security of their protected health information.

Specific features of the website included an on-line food record and physical activity entry and analysis section (based on tools from the USDA's Healthy Eating Index) that generated personalized reports for goal setting and monitoring. Subjects also had the opportunity to enter other data such as weight, waist circumference, and lab values (blood glucose and lipids) for additional monitoring of goals by the soldier and/or clinician. A goals section was available and was linked to a "tracking goals" section which provided progress reports. A "calorie checkbook" section summarized the calorie balance of all diet and exercise entries to provide feedback on positive and negative energy balance. This section also allowed subjects to enter their goal weights and calculate their estimated calorie needs per day. Appendix D contains a sample of the website layout and components.

A message section of the website also allowed subjects to post messages for the dietitian if they had questions, comments or concerns regarding their treatment. A "help" screen was available for technical support.

A voice response (IVR) capability telephone system was integrated with each subject's website account and program data warehouse. When subjects called, they had the opportunity to access any messages posted for them in their account.

Security and Confidentiality of the A-INFO Web site

The security of information traffic met the requirements of government and private agencies in the U.S. High levels of security and confidentiality were assured for users inputting, transmitting and retrieving sensitive data such as patient information. The platform supported compliance with U.S. government data privacy standards both for storage and transmission. The system was not visible on public networks.

The connection between user workstations and the HeF servers utilized a HTTPS 128-bit secure socket layer encryption. Users of the system received a secure and global user ID and password. The HeF Patient Portal was used for authentication and access to the application. The system provided the same security whether a user accessed the system via the web or the telephone. Data were stored in an Oracle 9i database at the National Naval Medical Center within its firewall. No data transferred to other systems. Users only had access to data as authorized. Users were verified at all levels of the system's architecture. If a user was not active on the system for a predetermined period, their login session expired and the user was required to log in again to regain access. The security items previously mentioned passed a security accreditation process.

A-INFO Testing

Once the A-INFO website was complete, a "test" account of the website was shared with numerous Army personnel (officers and enlisted), nutrition students and the lay public for further testing. Once suggestions were compiled, adjustments such as the website color scheme and certain components were made before A-INFO was implemented as a follow-up treatment for a research study with overweight active duty military service members.

Chapter IV: Comparison of the impact of four weight management interventions on body weight, risk factors associated with obesity and other parameters related to overweight and obesity in active duty military service members

Abstract

The prevalence of overweight and obesity among American soldiers has been increasing similar to the trend observed in the general population. The primary objective of this study was to evaluate the interaction of two different weight management interventions and two methods of follow up counseling on weight loss in overweight active duty military service members after 3 months. Participants (n=172) were randomized to one of four groups using a 2 x 2 factorial treatment structure: (1) Standard nutrition 'Class' + 'In-person' follow up counseling every 3 months, (2) 'Class' + weekly 'Internet' weight management follow up, (3) 'Tailored' counseling session based on the Transtheoretical Model of Health Behavior + 'In-person' follow up every 3 months, or 4) 'Tailored + Internet'. Measurements were taken at 0 (baseline), 3 and 6 months and included body weight, body composition (DEXA), waist circumference, blood pressure, fasting blood glucose, lipid levels and dietary assessment. Analysis of covariance (ANCOVA) with repeated measures was used to compare outcome differences among groups at the different time points.

The results revealed that there were no significant differences in weight or other outcomes among groups after 3 months. However, the 'Tailored + Internet' (-1.33 ± 0.66 kg, $p<0.05$) and 'Class + In-person' (-1.40 ± 0.63 kg, $p<0.05$) interventions lost modest, but significant weight after 3 months compared to baseline. Specifically, the 'Tailored + Internet' group lost significant total fat (-1.09 ± 0.50 kg, $p<0.05$), trunk fat (-0.76 ± 0.34 kg, $p<0.05$) and percent body fat (-0.71 ± 0.37 percent, $p<0.05$) and had reduced waist

circumference (-1.85 ± 0.94 cm, $p<0.05$) after 3 months while the 'Class + In-person' group significantly lost lean body mass (-0.73 ± 0.37 kg, $p<0.05$) but not fat compared to baseline. These results suggest that the "Tailored + Internet' group made healthier changes, thus resulting in improvements in body composition. However, because no treatment was superior, further research should explore what treatments are most effective for weight loss in a military population. Several levels of intervention beyond an individual level, such as those found in an ecological model of health behavior, may be needed within a military weight management program because of the numerous factors that can influence weight status.

Introduction

The U.S. Army is experiencing trends in overweight similar to the pattern among the U.S. population. If soldiers exceed weight and body fat standards, they are required to enroll in a mandatory weight control program. Soldiers enrolled in the Army Weight Control face repercussions such as the inability to be promoted, attend schools, and receive awards. Furthermore, they may eventually be discharged from military service. The standard Army Weight Control Program is a general nutrition and fitness class that does not take into account an individual's readiness to change behaviors to lose weight. In response to recent problems with overweight and obesity in the military, the Institute of Medicine/National Academies of Science issued a call for the evaluation of military weight management programs (3). This report included a recommendation to closely evaluate the various components of the weight management programs and to explore the capabilities of Internet use as a resource for weight management for military service members.

Previous research has utilized the Transtheoretical Model of Health Behavior in various diet related interventions (24-29, 32). Matching or tailoring interventions to an individual has been shown to provide significant positive behavior changes (31, 32, 35-38). The use of the Internet for weight loss has also shown promise in previous studies especially when the intervention is behaviorally based (34, 39, 41, 42). Thus, the primary objective of this study was to evaluate four different weight loss treatments in overweight active duty military service members over 3 months. Participants (n=172) were randomized to one of four groups: (1) Standard nutrition 'Class' + 'In-person' follow up counseling every 3 months, (2) 'Class' + weekly 'Internet' weight management follow up, (3) 'Tailored' counseling session based on the Transtheoretical Model of Health Behavior + 'In-person' follow up every 3 months, or 4) 'Tailored + Internet' group. The secondary outcomes included changes in body fat as well as improvements in other weight related parameters (waist circumference, blood pressure, blood lipids, blood glucose, and diet) in overweight active duty soldiers over a 3 month time period.

Materials and Methods

This project was approved by the Institutional Review Boards for Human Subjects at Walter Reed Army Medical Center, Washington, D.C. and the University of Maryland, College Park, MD (Appendix E).

Subjects

All male and female active duty military service members (ages 18+) newly enrolled in the Army Weight Control Program and/or with a body mass index of ≥ 28 kg/m^2 were eligible. Prospective participants were identified as they were referred to Wellness Services for dietary counseling by company commanders (as part of the

AWCP) or in response to posted and e-mailed advertisements in facilities. Recruitment was extended to other military units and services within the North Atlantic Regional Medical Command and/or in the Capital Area Region.

Sample size estimation:

The minimal total sample size needed to show a significant difference in weight loss (5 lb mean difference and 10 lb standard deviation) between groups was calculated to be 128 (using a two-sided test with significance level equal to 0.05 and 80% power). Assuming an attrition rate of 10%, a total of 140 subjects were initially recruited. As a result of higher than expected attrition rates within the first year of the study, 32 additional subjects were recruited for a total of 172 subjects. At the end of study enrollment, there were equal numbers of subjects in each of the four treatment groups (n=43 per group) (Figure 4.1).

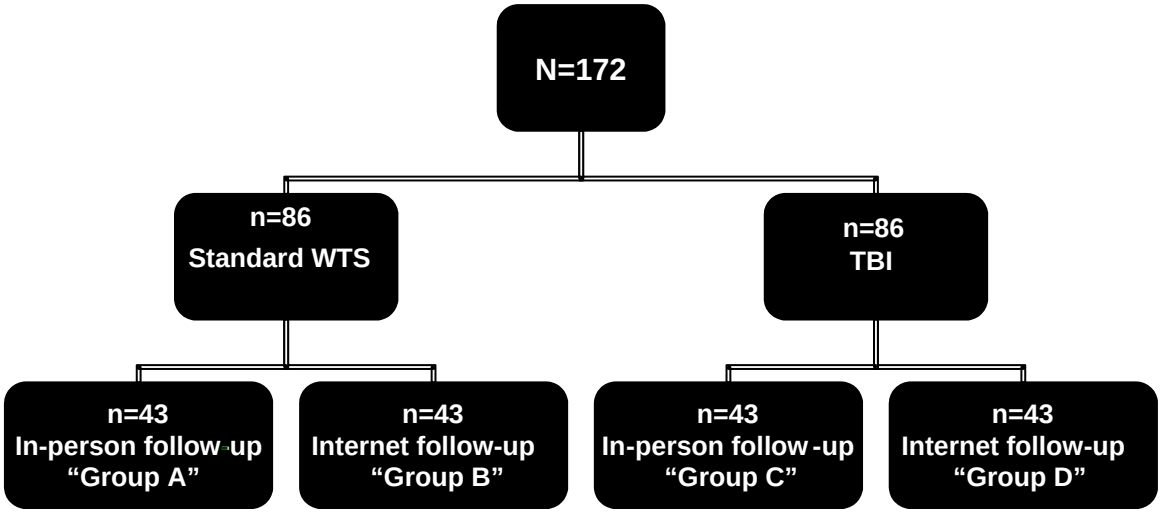


Figure 4.1 Study Design
WTS="Weigh to Stay" class
TBI=Tailored Behavioral Intervention

Inclusion and exclusion criteria:

All potential participants were screened prior to consent for eligibility in the study (Appendix F).

Inclusion criteria Criteria for inclusion in the study included: 1) Enrollment in the AWCP and referral for initial dietary counseling and/or other active duty military service members with a BMI $\geq$ 28 kg/m^2, 2) Assigned to a unit within North Atlantic Regional Medical Command and/or in the Capital Area Region for at least 6 months after enrollment into the study and 3) Able to visit WRAMC for outcome measurements at baseline, 3 months, and 6 months.

Exclusion criteria Criteria for exclusion from the study included those military service members with: 1) medical conditions or who were taking certain medications that predispose them to be overweight and/or obese who were screened out, 2) medical treatment and not permitted to enter the AWCP in accordance with Army Regulation 600-9, 3) known pregnancy or planning pregnancy 4) known medications that may alter energy balance and, 5) no previous use of or current access to the Internet. A list of exclusion medical conditions and medications can be located in Appendix G.

Consent process:

The principal investigator, project coordinator, and/or representatives obtained written, informed consent from all subjects after screening for those who decided to participate using the guidelines of the Department of Clinical Investigation at WRAMC (Appendix H). The study was explained and time was allowed for soldiers to read the consent form and ask questions. Subjects were also required to provide authorization to collect their "Protected Health Information" according to the

guidelines of the Health Insurance Portability and Accountability Act (HIPAA) (Appendix I). Soldiers/service members who were not willing to provide informed consent, HIPAA authorization and/or participate did not have data collected for research purposes and were referred for dietary counseling at Wellness Services in WRAMC if interested in counseling on their own. Subjects did not receive any compensation for participating in the study.

Once subjects provided written consent, they were randomly assigned to a study group. Each subject was assigned a unique identifier (based on study group and order of enrollment) for data collection and to protect their identity. The data collection forms were secured in a locked file cabinet in room 7Z82 (Nutrition Research Laboratory) at WRAMC between clinic visits. A master list of study codes was also kept secured in the Nutrition Research Laboratory. The research source documents and data file will be kept for at least 3 years after the completion of the study.

Study Design and Treatment

The study was a longitudinal, randomized, clinical weight loss trial. The experimental design consisted of one of two methods of follow-up counseling within one of two types of dietary interventions (Figure 4.1). Thus, the treatment structure was a 2x2 factorial with diet and follow up method serving as the two main factors.

Participants in the Weigh to Stay (WTS) group received weight management counseling by the standard classroom instruction by a weight management counselor while the Tailored Behavioral Intervention (TBI) group received individual stages of change-matched weight management counseling. Each group was further divided into

two weight management follow-up interventions: either face-to-face counseling every 3 months or weekly weight management counseling via their "Web/Telephone Weight Control and Maintenance" account. Those assigned "Web/Telephone Weight Control and Maintenance" accounts only received additional weight management counseling via accounts through WRAMC Internet/Intranet services. A weight management counselor (registered dietitian) reviewed the Web accounts once per week and provided feedback within the account system.

The following outlines the interventions for the respective groups as shown in Figure 4.1:

Group A: WTS (Class) + In-person Follow-up: Initial weight management counseling consisted of a 1.5 hour class that is part of the Weigh to Stay program as previously described. Follow-up consisted of a 1 hour general in-person session at 3 months.

Group B: WTS (Class) + Internet Follow-up: Initial weight management counseling consisted of a 1.5 hour class that is part of the Weigh to Stay program as previously described. Follow-up was provided via a "Web/Telephone Weight Control and Maintenance" accounts (Web/telephone follow-up) as described previously and was conducted weekly for a total of up to 24 sessions over 6 months.

Group C: TBI (Tailored) + In-person Follow-up: Initial weight management counseling consisted of a 1-hour individual Tailored-behavioral intervention (TBI) session based on the stages and processes of change for five different weight control behaviors which were assessed prior to the session. Follow-up consisted of a 1 hour in-person tailored session based on the stages and processes of change assessed prior to the session at 3 months.

Group D: TBI (Tailored) + Internet Follow-up: Initial weight management counseling consisted of a 1-hour individual Tailored-behavioral intervention (TBI) session based on the stages and processes of Change for five different weight control behaviors. Follow-up was provided via a "Web/Telephone Weight Control and Maintenance" accounts (Web/telephone follow-up) as described previously and was conducted weekly for a total of up to 24 sessions over 6 months.

Subjects in the groups with Internet follow-up received a personal A-INFO account (described previously) with a secure and unique login name and password. Personal instruction was provided to each subject by the study coordinator on how to use their account. Account access was available via any Internet connection 24 hours a day/7 days a week. A message was e-mailed every two weeks to remind subjects to use their account.

One primary registered dietitian (same dietitian who provided the classes and counseling) reviewed the accounts weekly and posted feedback within each account regarding dietary intake, physical activity, and/or behavior modification according to their current profile. Each subject in the Internet follow-up group also had the option of utilizing their account via a second system component, a voice response (IVR) capability telephone system which was integrated with their A-INFO account. When subjects called and entered a pin number, they had the opportunity to access any messages posted for them in their account.

Website use was tracked using the total number of sessions that each subject entered information into the food/beverage intake, physical activity and/or messages section during the course of the study. Each day that a subject entered something into the

food/beverage section, activity section or posted a message for the nutritionist was counted as one "user session" each. These sections of the website were selected for tracking because they reflected actual interactive use by the subject. Thus, the maximum number of sessions per day was three because A-INFO use could only be tracked once per section per day and not by frequency within sections if more than once per day. Furthermore, A-INFO use in minutes or hours was not available from website programmers. Our method of tracking also seemed more appropriate than counting "hits" of the website because hits do not reflect actual use.

Subjects were asked to complete a brief questionnaire about their use of the A-INFO account and barriers to use at their 3 month follow up appointment. Common barriers to use were identified by those who were seldom or never using their account. This questionnaire can be located in Appendix J.

Data collection:

A timetable of study procedures and measurements are outlined in Table 4.1.

Table 4.1 Timetable of research project procedures and outcome measures

	Month			
Measurements and/or Procedures	**- 1**	**0**	**3**	**6**
Screening	X			
Describe and Obtain Informed Consent	X			
Randomization	X			
General Questionnaire (demographic & medical history)		X	X	X
Height		X		
Weight		X	X	X
Waist Circumference		X	X	X
DEXA (body composition)		X	X	X
Blood Pressure		X	X	X
3 day food record		X	X	X
Physical Activity Assessment (via Accelerometer)		X	X	X
Stages of Change Assessment (only used in counseling for TBI group)		X	X	X
Fasting Lipid Panel		X	X	X
Fasting Blood Glucose		X	X	X

General Information (Demographic & Medical History)

A general questionnaire was administered to collect information including age, gender, ethnicity, education level, marital status, medical history, family medical history, medication use, smoking status & tobacco use, Internet usage, and dietary supplement use (Appendix K). Some of the information was used for further screening and/or used for covariance adjustments and/or post hoc analyses. The instrument was adapted from previous instruments used in obesity assessment and is intended to collect demographic information and a brief medical history (61).

Anthropometric Assessment

Anthropometric measurements including weight, height, and waist circumference were taken at 0, 3 and 6 months using standard techniques and equipment in the Walter Reed Nutrition Research Laboratory (62). Subjects were instructed to wear lightweight clothing such as their physical training t-shirt and shorts for all measurements. Height was measured in cm to the nearest 0.1 cm using a wall mounted digital stadiometer. Subjects removed shoes prior to measurement and standard techniques of measurement were used to position their head in the Frankfort plane and align their body along the wall. Weight was measured twice without shoes using an electronic digital floor scale (Seca 770, Seca Corporation, Hanover, MD) in lbs and the average of the two measurements were recorded to the nearest 0.1 lb. Waist circumference was measured in cm to the nearest 0.1 cm in a horizontal plane at the top of the right iliac crest using a measuring tape (Myotape, QuickMedical brand).

Body Composition Assessment

Body composition (lean body mass and body fat) of the whole body was measured using a linear fan beam dual energy X-ray densitometer (DEXA) (Windows XP version software, Hologic Inc., DISCOVERY-Wi, Bedford, MA) in the WRAMC Nutrition Research Laboratory. Quality control was ensured by daily calibration with an anthropometric spine phantom of known density and weekly with a full body composition step phantom. Lean body mass, whole body fat, trunk fat and percent body fat measurements were recorded for each subject.

Clinical and Biochemical Assessment

Blood pressure (systolic/diastolic in mmHg) was measured twice using a digital automatic sphygmomanometer (Omron IntelliSense Blood Pressure Monitor, Model HEM-907XL, Vernon Hills, IL) during each visit (baseline, 3 and 6 month follow-ups) after sitting at rest for at least 5 minutes. The average of the two measurements were recorded and used for analysis.

Approximately 15 cc of blood were drawn from each participant at 0, 3 months, and 6 months (45 cc total over 6 months) in the laboratory at WRAMC. On-site technicians in laboratory services at WRAMC performed the biochemical analyses within 24 hours. Total cholesterol and triglycerides were determined enzymatically with the use of commercial kits. HDL-cholesterol and LDL-cholesterol were analyzed after precipitation of LDL in infranatant fluid with heparin and magnesium chloride. Blood glucose was analyzed using an automated sequential multiple auto analyzer.

Dietary Assessment

Subjects completed a 3-day food record consisting of two weekdays and one weekend day prior to each clinic visit (baseline, 3 and 6 months). Detailed instructions on completing the food record were given to the participants prior to the baseline visit by a Registered Dietitian. A food diary booklet was provided to each subject at each appointment. The returned dietary records were reviewed and the data was analyzed using the Minnesota Nutrition Data System for Research (NDS-R) (2005, Program Number 051105). The 3 day average intake for calories, macronutrients, and servings of the five food groups (as previously defined by USDA Food Guide Pyramid, 1992) were derived from the food records. These dietary parameters were selected because they are a focus of the current AWCP program and commonly indicated as primary targets in weight loss interventions.

Physical Activity Assessment

Participants wore a water resistant, lightweight omnidirectional accelerometer (Actical®, Mini Mitter Company, Inc, Bend, OR) on their hip during three separate occasions in the study (baseline, 3 and 6 months) to assess changes in physical activity. Accelerometers were activated using a serial port computer interface. A blue arrow on the accelerometer indicated the direction of the most sensitive axis during wearing time. Subjects were asked to wear the accelerometer all day (24 hours) for seven consecutive days with the unit on their left side and blue arrow positioned upward at each visit (baseline, 3 and 6 month follow-up).

Stages of Change Assessment

A stages of change weight control instrument (Appendix B) was developed and tested in a small group of soldiers prior to the study to ensure unambiguous classification of individuals into one of the five stage categories (precontemplation, contemplation, preparation, action and maintenance) for 5 weight control behaviors (dietary fat, fruits & vegetables, portion control, beverages, exercise) (see Chapter III).

Stage of change was assessed for multiple weight control behaviors (dietary fat, fruit & vegetable intake, portion control, beverages, exercise) because they are the most commonly targeted areas in interventions to help create a negative energy balance for weight loss and are the main focuses of the current AWCP. In addition, previous research has revealed that individuals tend to have a heterogeneous profile in regard to stages of change for various weight control behaviors thus, a single staging algorithm is not valid or appropriate in these instances (30).

A weight control behavioral profile was generated for each soldier once they completed the instrument. This profile generated corresponding tailored weight control messages from a "message library" for each behavior. A sample "message library" can be found in Appendix C for weight control messages related to dietary fat, fruits & vegetables, portion control and exercise. Only the participants in the TBI groups received these tailored interventions.

Dietary counseling was conducted by one primary registered dietitian affiliated with the study. Three other dietitians provided classes as an alternate if needed however; this occurred less than 10% of the time when the WTS classes were taught. A standard

protocol for counseling sessions and classes was developed for the study to reduce the possibility of inter-rater error.

Data analysis

Statistical calculations were performed using the SAS System for Windows V9.1 (SAS Institute, Cary, NC, 2003). All tests were considered significant at $p < 0.05$.

The assumptions for the Analysis of Variance (ANOVA) were verified prior to data analysis by examining normality of plotted residuals and the homogeneity of residual variances. One outlier was identified during the analysis of changes in lean body mass and two outliers were identified during the analysis of changes in triglycerides. These outliers were kept in the data set because they did not significantly affect the main outcome(s) of the analysis when they were removed and the data reanalyzed.

PROC MEANS and PROC FREQ were used to summarize descriptive statistics for each group and overall for all subjects at baseline. ANOVA and Chi-Square testing were conducted as appropriate to determine if differences existed for the characteristics among groups at baseline.

Data were analyzed using mixed model techniques which included sources of random variation within and among subjects and fixed effects of diet, follow-up and visit. Analysis of Covariance (ANCOVA) with repeated-measures was used to characterize changes in anthropometric, biochemical and clinical measurements (i.e. weight loss, waist circumference, body fat, lean body mass, dietary parameters, blood pressure, blood lipids, blood glucose) for the groups at different time periods. Compound symmetry, heterogeneous compound symmetry, first order autoregressive, heterogeneous first order autoregressive and unstructured repeated measures covariance structures were examined

with each model. Goodness of fit statistics were used to determine which structure best fit the data. Compound symmetry was the best fitting structure for the 3 month analysis of all dependent variables while first order autoregressive was the best fitting structure for the 6 month analysis of changes in body weight and body mass index.

ANCOVA with repeated measures was run two different ways on the weight loss and body mass index dependent variables. One analysis was run using only the individuals who completed the measurements ("completers") at 3 and 6 months and a second analysis was run with all subjects regardless if they dropped out before their follow-up appointment ("intent-to-treat") at 3 months. The "intent-to-treat" analysis included baseline values in place of the missing 3 month values for those subjects that did not return for their 3 month appointment. The rationale for the two different analyses on the primary outcome is that many weight loss research studies conduct "intent-to-treat" analyses using baseline or last observation data in their model to reduce any bias that may occur from not including subjects that drop out. Subjects who drop out tend to do so because they have not lost weight. Thus, including only subjects who complete the study may potentially overestimate the positive impact of an intervention.

The full mixed model contained all of the covariates (age, gender, ethnicity, education level, marital status, mandatory enrollment in the AWCP status, smoking status) and their interactions with the 2 factors (diet, follow-up) identified that could potentially influence the primary outcome of weight loss. Interactions between covariates were not included. The full model was reduced using previously described procedures (63). Specifically, nonsignificant ($p>0.05$) covariate*factor interactions were removed one by one starting with the highest order interactions. The covariates and/or

their interactions were left in the model if they significantly affected the outcome ($p<0.05$).

The full mixed models for the secondary outcomes (body fat, lean body mass, waist circumference, blood pressure, blood lipids, blood glucose, dietary intake) contained only the covariates of age, gender, ethnicity to keep the model small, preserve degrees of freedom, and because they were deemed the 3 covariates that may most affect the results of the other outcomes.

ANCOVA was also conducted to explore the relationship of frequency of A-INFO use on weight loss. Weight loss was modeled as a dependent variable and A-INFO use (total # 'sessions') was modeled as an observational factor. A-INFO use was classified into three categories based on frequency of use: 1) 'never' (0 sessions), 2) 'low' (1-9 sessions) or 3) 'high' (10+ sessions). These categories were selected because approximately 1/3 of subjects in the groups receiving Internet follow-up were classified into each category. Age, gender and ethnicity were also included as covariates.

All continuous covariates (age, education level, AWCP) were centered by subtracting the mean of the observed value to make interpretation of the results simpler. Categorical/class covariates (gender, ethnicity, marital status, smoking status) were interpreted at equal proportions to match an ideal experiment of equal replication. Ethnicity/race was collapsed into three main categories (white, black, other) to increase cell counts for analysis.

Test of hypotheses for planned (*a priori*) comparisons were done using estimate statements. Six pairwise comparisons (A vs. B, A vs. C, A vs. D, B vs. C, B vs. D, C vs. D)* and two main effect comparisons (AB vs. CD, AC vs. BD)* were conducted to

address the study objectives. In results, "Diet" refers to the treatment type of either the standard class or tailored counseling while "followup" refers to in-person or Internet followup counseling. "Visit" refers to the appointment at baseline, 3 or 6 months. Results were reported with adjustments for significant covariate and covariate interactions with the treatment factors of diet and followup.

*Treatment group codes: A=Class+In-person, B=Class + Internet, C=Tailored + In-person, D=Tailored+Internet

Results

Baseline characteristics

Of the 172 active duty military service members who enrolled in the study, 164 were from the U.S. Army, 4 were from U.S. Navy, 3 from U.S. Air Force and 1 from the U.S. Public Health Service. Baseline demographics, measurements, biochemical parameters and dietary intake are presented in Tables 4.2, 4.3, 4.4, and 4.5 respectively.

Baseline demographic characteristics did not vary significantly among groups (Table 4.2). Overall, the mean (SD) age of the 172 subjects was 33.1 (8.6) years and the majority were male (63%). In addition, almost half of the subjects classified themselves as White, non-Hispanic (49%) and more than one third classified themselves as Black, non-Hispanic (35%). This is consistent with the military population which has a higher proportion of males and Black, non Hispanic minorities than the general U.S. population (3).

Table 4.2 Baseline Demographics

Baseline Characteristic[⊗]	Class + In-person (n=43)	Class + Internet (n=43)	Tailored + In-person (n=43)	Tailored + Internet (n=43)	Overall (n=172)
Age, mean years (SD)	32.3 (7.2)	33.5 (10.2)	33.4 (8.3)	33.1 (8.8)	33.1 (8.6)
Gender, n (%)					
Female	13 (30)	16 (37)	18 (42)	16 (37)	63 (37)
Male	30 (70)	27 (63)	25 (58)	27 (63)	109 (63)
Race/Ethnicity, n (%)					
White, non Hispanic	23 (54)	21 (49)	19 (44)	22 (51)	85 (49)
Black, non Hispanic	16 (37)	15 (35)	16 (37)	14 (33)	61 (35)
Hispanic	1 (2)	3 (7)	3 (7)	5 (11)	12 (7)
Asian	1 (2)	2 (5)	1 (2)	0 (0)	4 (2)
Other	2 (5)	2 (5)	4 (9)	2 (5)	10 (6)
Education, n (%)					
High school degree or equivalent	6 (14)	7 (16)	4 (9)	4 (9)	21 (12)
Some college	14 (32)	12 (28)	21(49)	16 (37)	63 (37)
Associate's degree	6 (14)	5 (12)	3 (7)	7 (16)	21 (12)
Bachelor's degree	8 (19)	7 (16)	7 (16)	11 (26)	33 (19)
Advanced degree	9 (21)	12 (28)	8 (19)	5 (12)	34 (20)
Marital Status, n (%)					
Married	29 (67)	26 (60)	29 (67)	23 (53)	107 (62)
Unmarried	14 (33)	17 (40)	14 (33)	20 (47)	65 (38)
Current Smoker, n (%)					
Yes	9 (21)	8 (19)	4 (9)	7 (16)	28 (16)
No	34 (79)	35 (81)	39 (91)	36 (84)	144 (84)
Dip Tobacco, n (%)					
Yes	4 (9)	2 (5)	1 (2)	3 (7)	10 (6)
No	39 (91)	37 (95)	40 (98)	38 (93)	154 (94)
Currently in AWCP, n (%)					
Yes	29 (67)	24 (56)	24 (56)	20 (47)	102 (59)
No	14 (33)	19 (44)	19 (44)	23 (53)	70 (41)
Dietary supplement use, n (%)					
Yes	16 (37)	17 (40)	21 (49)	20 (43)	74 (43)
No	27 (63)	26 (60)	22 (51)	23 (57)	98 (57)
Dieting history, n (%)					
Yes	35 (81)	34 (81)	34 (79)	31 (74)	134 (79)
No	8 (19)	8 (19)	9 (21)	11 (26)	36 (21)

Because of missing values, the total n is not the same for all variables.

[⊗]There were no significant differences (P>0.05) among groups on any of the demographic characteristics using ANOVA or Chi-Square analysis as appropriate.

"Smoker", "Dip Tobacco" and "Dietary supplement use" = daily use of cigarettes, chewing tobacco and/or dietary supplements respectively.

"Dieting history" = attempting to lose at least 10 lbs several times in the past.

Table 4.3 Baseline Anthropometric and Clinical Measurements

Baseline Measurement	Class + In-person (n=43)	Class + Internet (n=43)	Tailored + In-person (n=43)	Tailored + Internet (n=43)	Overall		
					Male (n=109)	Female (n=63)	Overall (N=172)
Height (cm)*	173.8 (10.5)	173.4 (10.2)	171.1 (9.1)	173.7 (10.0)	178.6 (6.5)	163.4 (7.1)	173.0 (9.9)
Weight (kg)*	95.6 (17.0)	98.1 (17.0)	93.8 (16.2)	96.9 (16.6)	104.5 (13.5)	81.6 (10.4)	96.1(16.6)
Body Mass Index (kg/m^2)*	31.4 (2.8)	32.5 (3.5)	31.9 (3.5)	31.9 (3.0)	32.7 (3.0)	30.5 (3.1)	31.9 (3.2)
Waist Circumference (cm)*	100.7 (9.0)	102.7 (10.5)	101.8 (11.0)	101.6 (9.9)	105.6 (8.9)	94.9 (8.2)	101.7 (10.0)
Body Fat							
Total (kg)	29.0 (5.2)	30.7 (5.8)	30.3 (7.7)	29.2 (6.6)	29.6 (6.8)	30.2 (5.7)	29.8 (6.4)
Trunk (kg)*	14.3 (3.2)	15.2 (3.4)	14.4 (4.0)	14.5 (4.4)	15.2 (3.9)	13.5 (3.2)	14.6 (3.8)
Percent body fat (%)*	31.1 (5.4)	32.4 (5.9)	32.7 (6.3)	30.8 (5.5)	28.6 (4.1)	37.2 (4.1)	31.8 (5.8)
Lean Body Mass (kg)*	62.4 (13.8)	62.0 (12.5)	59.5 (11.6)	63.2 (12.5)	69.7 (7.7)	47.9 (5.4)	61.8 (12.6)
Blood Pressure (mmHg)							
Systolic*	123 (13)	121 (13)	121 (14)	124 (11)	127 (11)	114 (11)	122 (13)
Diastolic*	83 (9)	79 (10)	80 (11)	82 (9)	83 (9)	78 (9)	81 (10)

Values are expressed as mean (SD).
Because of missing values, the total n is not the same for all variables.
†P<0.05 among groups at baseline
*P<0.05 among genders at baseline
Data were stratified by gender to interpret baseline measurements of waist circumference and percent body fat compared to reference values.

Table 4.4 Baseline Biochemical Parameters

Baseline Biochemical Parameters	Class + In-person (n=37)	Class + Internet (n=35)	Tailored + In-person (n=37)	Tailored + Internet (n=35)	Overall		
					Male (n=94)	Female (n=50)	Overall (N=144)
Cholesterol (mg/dL)							
Total Cholesterol†	196 (40)	195 (33)	172 (35)	187 (37)	192 (40)	180 (33)	188 (38)
High Density Lipoprotein*	48 (13)	52 (14)	50 (12)	53 (17)	45 (11)	61 (13)	51 (14)
Low Density Lipoprotein†*	129 (37)	122 (33)	106 (30)	118 (34)	124 (37)	109 (27)	119 (34)
Triglycerides (mg/dL)*	135 (80)	129 (93)	95 (70)	102 (51)	134 (83)	78.6 (42)	115 (76)
Fasting Blood Glucose (mg/dL)	93 (9)	93 (9)	90 (10)	95 (10)	94 (10)	91 (9)	93 (10)

Values are expressed as mean (SD).
Because of missing values, the total n is not the same for all variables.
†P<0.05 among groups at baseline
*P<0.05 among genders at baseline
Data were stratified by gender to interpret baseline high density lipoprotein cholesterol compared to reference values.

Table 4.5 Baseline Diet

Baseline Dietary Assessment	Class + In-person Group (n=32)	Class + Internet Group (n=31)	Tailored + In-person Group (n=34)	Tailored + Internet Group (n=33)	Overall (n=130)
Total Calories (Kcal)	1800 (700)	1900 (830)	1940 (560)	2040 (840)	1930 (730)
Macronutrients					
Carbohydrate					
Total grams	197 (77)	233 (121)	223 (81)	237 (123)	223 (102)
% total kcal	44 (10)	48 (8)	45 (8)	46 (9)	46 (9)
Fat					
Total grams	75 (36)	69 (29)	81 (30)	83 (46)	77 (36)
% total kcal	36 (7)	33 (8)	37 (8)	36 (10)	36 (8)
Protein					
Total grams	77 (28)	82 (37)	81 (21)	80 (26)	80 (28)
% total kcal	17 (4)	18 (5)	17 (4)	16 (4)	17 (4)
Food Groups (# servings)					
Fruit	0.9 (0.9)	1.7 (2.5)	1.5 (1.4)	1.4 (1.7)	1.4 (1.7)
Vegetables	3.2 (2.0)	2.9 (1.4)	3.0 (1.9)	2.9 (1.6)	3.0 (1.7)
Grain	5.6 (2.3)	5.8 (2.9)	5.5 (2.3)	5.8 (3.0)	5.6 (2.6)
Dairy	2.0 (1.6)	1.9 (1.7)	1.7 (1.0)	1.8 (1.6)	1.9 (1.5)
Meat, meat substitutes	6.5 (3.4)	6.5 (2.8)	6.9 (3.0)	7.1 (2.9)	6.7 (3.0)

Values expressed as mean (SD) for subjects completing a 3 day food record at baseline.

[⊗]No significant difference found among groups for each dietary outcome at baseline.

More than half (51%) of subjects had at least an associate's college degree while another 37% had at least some college education. Although all military personnel must have at least a high school degree or equivalent, the higher education among subjects is reflective of the study site at WRAMC. WRAMC is a medical facility that harbors a large majority of health professionals with college degrees.

The majority of subjects were also married (62%), currently enrolled in the Army Weight Control Program (59%), had a history of attempting to lose at least 10 lbs several times in the past (79%), did not smoke cigarettes (84%), did not dip tobacco (94%) and did not take dietary supplements (57%).

Baseline outcome measurements (with the exception of total and LDL cholesterol) did not vary significantly among groups (Table 4.3, Table 4.4, Table 4.5). Overall, subjects were classified as obese according to their mean (SD) body mass index of 31.9 (3.2) kg/m^2. Mean (SD) systolic pressure of 122 (13) mmHg and diastolic blood pressure of 81 (10) mmHg were slightly elevated overall according to NHLBI guidelines. Mean cholesterol, triglycerides and fasting blood glucose were in normal ranges ("normal"=<200 mg/dL for total cholesterol, <130 mg/dL for LDL, >40 mg/dL for HDL men, <150 mg/dL for triglycerides, <100 mg/dL for glucose) (64, 65).

When data were stratified by gender, mean waist circumference and body fat exceeded recommended healthy ranges for men and women (optimal waist circumference=<88 cm women, <102 cm men; optimal body fat=21-33% for women, 8-20% for men) (64, 66). All parameters with the exception of total body fat, total blood

cholesterol and fasting blood glucose were significantly different when comparing men and women at baseline.

Mean baseline dietary intake for total calories (kcal), macronutrients and food group servings did not vary significantly among groups (Table 4.5). Mean (SD) overall total kcal was 1924 (734.2) with approximately 46% from carbohydrates, 36% from fat and 17% from protein. The Food and Nutrition Board of the Institute of Medicine set Dietary Reference Intakes for macronutrients at: 45-65% kcal from carbohydrate, 20-35% kcal from fat and 10-35% kcal from protein.

The mean (SD) overall food group servings were: fruit 1.4 (1.7), vegetables 3.0 (1.7), grains 5.6 (2.6), dairy 1.9 (1.5) and meat/meat substitutes 6.7 (3.0) servings (Table 4.4). At the time of the study development, the USDA food pyramid recommended 2-4 servings from fruit, 3-5 servings from vegetables, 6-11 servings from grain, 2-3 servings from dairy and 2-3 servings from meat/meat substitutes.

Data used for analyses

The study is on-going, thus, 3 month follow-up data were primarily used for all parameters on those subjects (n=123) who completed their 3 month visit. Preliminary results at 6 months are presented for those subjects who completed a 3 and 6 month visit (n=66) for the variables of body weight and body mass index at the time of data analysis. Additional data analysis was performed for all subjects (n=172) regardless of 3 month completion to mimic an "intent-to-treat" analysis for body weight and body mass index.

Physical activity data assessed via accelerometry was not presented or included in the analysis due to questionable validity of the Actical© software default cutoff points for moderate and vigorous activity in overweight and obese adults. It appears that the

accelerometers may be overestimating the amount of minutes spent in moderate and vigorous intensity activities by overweight and obese adults. In addition, because wear time of monitors varied by subject per day, estimates of % time engaged in the different activity intensity categories cannot be made at this time. The physical activity data will be examined at a later date when research is available on the validity of Actical© accelerometers in overweight and obese adults.

Changes in weight and body mass index

Select baseline values were also compared among groups for subjects (n=123) completing at least the 3 month appointment (Table 4.6). No significant differences were detected among groups.

Overall, approximately 60% of the 123 subjects completing a 3 month appointment lost weight. The remaining subjects either maintained or gained weight. Weight change ranged from a loss of 9.59 kg (21.1 lbs) to a gain of 9.07 kg (19.9 lbs) over the 3 months.

The interaction of diet*followup*visit approached statistical significance (p=0.06) in the final ANCOVA model for weight for those completing the 3 month appointment (n=123).

Results were adjusted for significant covariates and/or covariate*factor interactions including: gender ($p<0.001$), ethnicity (p=0.004), education level*diet (p=0.02), marital status (p=0.02), marital status*followup (p=0.03) and marital status*diet*followup (p=0.0007). Tables 4.7, 4.8 and 4.9 provide further information about the influence of the significant covariate interactions.

Table 4.6 Select Characteristics of Subjects Who Completed 3 Month Appointment

	Class + In-person (n=32)	Class + Internet (n=29)	Tailored + In-person (n=33)	Tailored + Internet (n=29)	Overall (n=123)
Age (yrs)	32.3 (6.8)	35.9 (11.0)	33.4 (7.9)	33.3 (9.2)	33.7 (8.8)
Height (cm)	173.4 (11.1)	172.5 (10.1)	170.0 (8.7)	174.6 (9.9)	172.5 (10.0)
Weight (kg)	95.3 (18.1)	97.2 (14.8)	91.0 (14.3)	98.6 (16.9)	95.4 (16.2)
Body Mass Index (kg/m^2)	31.2 (3.0)	32.6 (3.2)	31.4 (3.4)	32.1 (3.1)	31.2 (3.2)
Waist Circumference (cm)	39.6 (3.7)	40.0 (4.0)	39.7 (3.9)	40.2 (4.1)	39.9 (3.9)
Body Fat					
Total (kg)	29.0 (5.9)	31.4 (5.4)	30.1 (7.1)	29.0 (6.7)	29.9 (6.3)
Percent body fat	31.2 (5.6)	33.2 (6.3)	33.5 (6.2)	30.0 (5.0)	32.0 (5.9)
Lean Body Mass (kg)	62.0 (14.1)	61.6 (13.1)	57.1 (10.4)	65.2 (12.5)	61.3 (12.8)
Education Level (yrs)	14.6 (1.8)	14.9 (2.1)	14.4 (1.9)	14.7 (1.7)	14.6 (1.9)
Gender, n (%)					
Female	10 (31)	13 (45)	16 (48)	9 (31)	48 (39)
Male	22 (69)	16 (55)	17 (52)	20 (69)	75 (61)
Race/Ethnicity, n (%)					
White	17 (53)	13 (45)	16 (48)	17 (59)	63 (51)
Black	11 (34)	14 (48)	10 (30	7 (24)	42 (34)
Other	4 (13)	2 (7)	7 (21)	5 (17)	18 (15)
Married, n (%)	21 (66)	14 (48)	21 (64)	16 (55)	72 (59)
Current Smoker, n (%)	7 (22)	2 (7)	2 (6)	5 (17)	16 (13)
Enrolled in AWCP, n(%)	23 (72)	14 (48)	18 (55)	16 (55)	71 (58)

‡P<0.05 for difference among groups.

Table 4.7 reveals that education level had an impact on follow up. In-person follow up was more effective regardless of education. Furthermore, Internet follow up was more effective for those with less education.

Marital status also had an influence on the effect of follow up and diet*followup. Subjects who were not married improved most when they had in-person follow-up. Internet follow up was slightly more effective for subjects who were married (Table 4.8) . Furthermore, Table 4.9 reveals that the 'Class+ Internet' treatment was most effective for married subjects while the 'Class + In-person' treatment was most effective for subjects who were not married.

Table 4.7 Impact of education level*follow up interaction on weight (n=123)

	12 years of education	17 years of education
In-person follow up	88.3 ± 2.4 kg	90.1 ± 2.4 kg
Internet follow up	91.5 ± 2.6 kg	93.4 ± 2.5 kg

Values are expressed as mean body weight ± SE.
Education levels were selected as comparison points based on the 10^{th} and 90^{th} percentile of the data

Table 4.8 Impact of marital status*follow up interaction on weight (n=123)

	Married	Not Married
In-person follow up	89.4 ± 2.2 kg	89.7 ± 2.4 kg
Internet follow up	88.0 ± 2.5 kg	97.2 ± 2.2 kg

Values are expressed as mean body weight ± SE.

Table 4.9 Impact of marital status*diet*follow up interaction on weight (n=123)

Married				**Not Married**		
	Class	Tailored			Class	Tailored
In-person follow up	90.8±2.7 kg	87.9± 2.7 kg		In-person follow up	85.6± 3.1 kg	93.8± 3.3 kg
Internet follow up	84.2± 3.3 kg	91.7± 3.0 kg		Internet follow up	101.9± 3.0 kg	92.6± 3.0 kg

Values are expressed as mean body weight ± SE.

The interaction of diet*followup*visit also approached statistical significance ($p=0.06$) in the final ANCOVA model for weight in the "intent-to-treat" the analysis (n=172). Results were adjusted for significant covariates and/or covariate*factor interactions including: gender ($p<0.0001$), ethnicity ($p<0.005$), and marital status*diet*followup ($p=0.01$). Table 4.10 provides further information about the influence of the marital status*diet*followup interaction. The interaction reveals that the 'Tailored + In-person' treatment was most effective for married subjects while the 'Class + In-person' treatment was most effective for subjects who were not married.

Table 4.10 Impact of marital status*diet*follow up interaction on weight (n=172)

Married			Not Married		
	Class	Tailored		Class	Tailored
In-person follow up	91.8±2.4 kg	89.3± 2.5 kg	In-person follow up	85.0± 3.2 kg	95.0± 3.4 kg
Internet follow up	90.6± 2.5 kg	91.9± 2.8 kg	Internet follow up	100.8± 3.0 kg	94.6± 2.7 kg

Values are expressed as mean body weight ± SE.

The changes in weight were not significantly different among groups when the completers (n=123) were analyzed. However, weight significantly decreased within the 'Class + In-person' group (-1.40 ± 0.63 kg, p=0.03) and 'Tailored + Internet' group (-1.33 ± 0.66 kg, p=0.04) after 3 months in subjects that completed at least the 3 month appointment (n=123) (Table 4.11 and Figure 4.2). Changes in weight for the other two groups were not significant. The weight loss among groups was significantly different (p=0.03) when all subjects (n=172) were included in the "intent-to-treat" analysis. Table 4.12 and Figure 4.3 reveal that weight also significantly decreased in the 'Class + In-person' group (-1.04 ± 0.46 kg) and 'Tailored + Internet' group (-0.90 ± 0.46 kg) in the "intent-to-treat" analysis. There were no significant differences in weight loss when conducting pairwise comparisons among groups or for the main effects of diet or follow-up for the 'completers' and 'intent-to-treat' analyses.

Table 4.11 Changes in Weight after 3 months for completers only (n=123)

Measurement	Class + In-person (n=32)	Class + Internet (n=29)	Tailored + In-person (n=33)	Tailored + Internet (n=29)	P value‡
Weight (kg) [% weight change]	-1.40 ± 0.63† [-1.47]	+0.03 ± 0.66 [+0.03]	-0.31 ± 0.62 [-0.34]	-1.33 ± 0.66† [-1.35]	0.29
Body Mass Index (kg/m^2)	-0.46 ± 0.21†	+0.02 ± 0.22	-0.13 ± 0.21	-0.41 ± 0.22	0.05

Values are expressed as mean ± standard error.
†P<0.05 for difference from baseline within group.
‡ Significance of difference among group

Table 4.12 Changes in Weight after 3 months, 'Intent-to-Treat' Analysis (n=172)

Measurement	Class + In-person Group (n=43)	Class + Internet Group (n=43)	Tailored + In-person Group (n=43)	Tailored + Internet Group (n=43)	P value‡
Weight (kg)	-1.04 ± 0.46†	+0.02 ± 0.46	-0.24 ± 0.46	-0.90 ± 0.46†	0.03
Body Mass Index (kg/m^2)	-0.34 ± 0.15†	+0.01 ± 0.15	-0.09 ± 0.15	-0.30 ± 0.15	0.05

Values are expressed as mean ± standard error.
†P<0.05 for difference from baseline within group.
‡ Significance of difference among groups

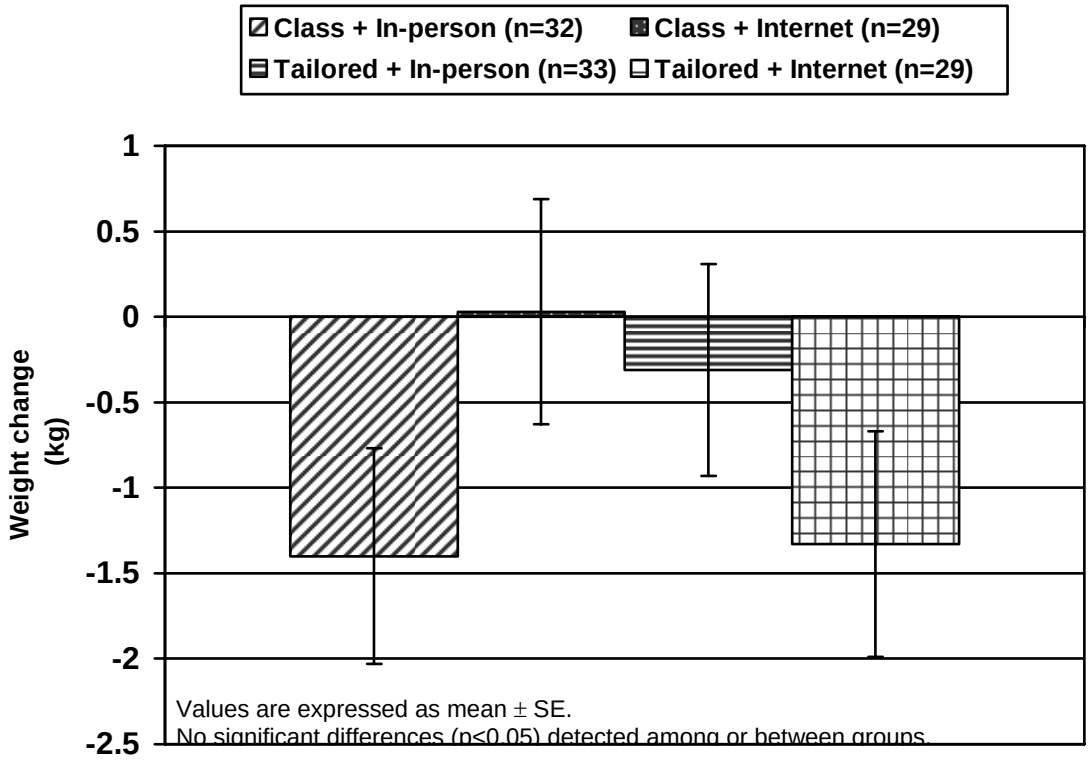


Figure 4.2 Weight change after 3 months for completers only (n=123)

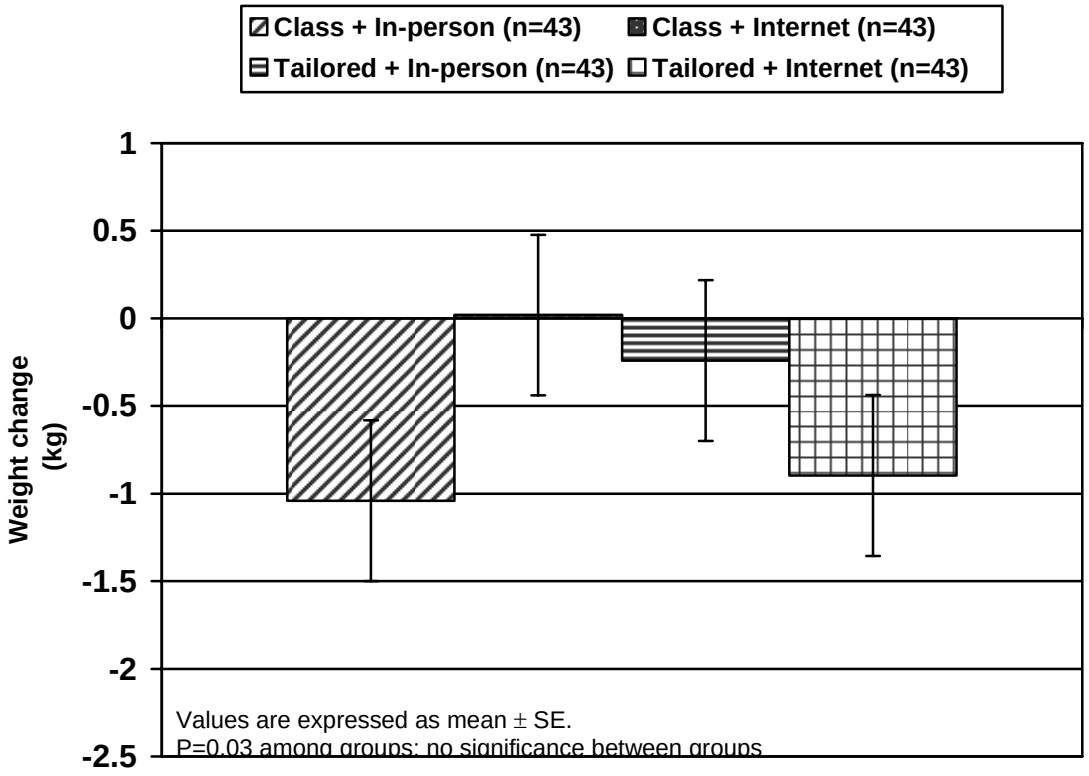


Figure 4.3 Weight change after 3 months, "intent-to-treat" analysis (n=172)

The interaction of diet*followup*visit was not significant (p=0.08) in the BMI ANCOVA model for those completing the 3 month appointment (n=123). The interaction of diet*followup*visit was also not significant (p=0.08) in the BMI final model in the "intent-to-treat" analysis (n=172).

Changes in body mass index (BMI) were borderline significantly different (p=0.05) among groups in subjects completing a 3 month appointment (n=123). BMI significantly decreased in the 'Class + In-person' group (-0.46 ± 0.21 kg/m^2, p=0.03) after 3 months (Table 4.11). BMI also decreased in the 'Tailored + Internet' group and was approaching significance (p=0.06). Changes in BMI were also statistically significant (p=.002) among groups for all subjects (n=172) in the "intent-to-treat" analysis. BMI significantly decreased in the 'Class + In-person' group (-0.34 ± 0.15

kg/m^2, p=0.03) after 3 months (Table 4.12). BMI also decreased in the 'Tailored + Internet' group and was approaching significance (p=0.07) (Table 4.12). There were no significant differences in BMI when conducting pairwise comparisons among groups or for the main effects of diet or follow-up for the 'completers' and 'intent-to-treat' analyses.

Changes in body composition

Reductions in percent body fat among groups was borderline significant (p=0.05) after 3 months while reductions in total fat and trunk fat were not significant among groups. Total fat (-1.09 ± 0.50 kg, p=0.03), trunk fat (-0.76 ± 0.34 kg, p=0.03) and percent body fat (-0.71 ± 0.37 percent, p=0.05) were significantly decreased within the 'Tailored + Internet' group (Table 4.13) after 3 months.

There was a significant difference among the groups in relation to loss of lean body mass after 3 months (p=0.03) (Table 4.13). However, the 'Class + In-person' treatment group had a significant loss of lean body mass within when compared to baseline (-0.73 ± 0.37 kg, p<0.05). There were no significant differences in total body fat, trunk fat or percent body fat when conducting pairwise comparisons between groups or for the main effects of diet and follow-up.

Changes in risk factors associated with obesity

There was no significant difference among groups for changes in waist circumference, however the 'Tailored + In-person' group (-2.46 ± 0.94 cm, p=0.01) and the 'Tailored + Internet' group (-1.85 cm ± 0.94 cm, p<0.05) had significant decreases within groups after 3 months (Table 4.13). There were no significant differences when conducting pairwise comparisons or for main effects of diet and follow-up.

There were no significant changes in systolic blood pressure, diastolic blood pressure, total cholesterol, low density lipoprotein cholesterol, high density lipoprotein cholesterol, triglycerides or fasting blood glucose within or among groups after 3 months (Table 4.13, Table 4.14). However, there was a significant difference (p=0.04) when comparing the change in fasting blood glucose of the 'Class + Internet' group (-2.41 ± 1.68 mg/dL) to the 'Tailored + In-person' group (+2.61 ± 1.67 mg/dL). No other significant pairwise comparisons or main effects of diet and follow-up were detected.

Table 4.13 Changes in Anthropometric and Clinical Measurements after 3 months

Anthropometric and Clinical Measurements	Class + In-person (n=30)	Class + Internet (n=27)	Tailored + In-person (n=29)	Tailored + Internet (n=28)	P value‡
Waist Circumference (cm)	-1.44 ± 0.89	-1.40 ± 0.96	-2.46 ± 0.94†	-1.85 ± 0.94†	0.37
Body Fat					
Total (kg)	-0.37 ± 0.49	-0.18 ± 0.50	-0.35 ± 0.49	-1.09 ± 0.50†	0.34
Trunk (kg)	-0.19 ± 0.34	-0.39 ± 0.34	-0.08 ± 0.34	-0.76 ± 0.34†	0.37
Percent body fat (%)	-0.01 ± 0.36	-0.10 ± 0.37	-0.20 ± 0.36	-0.71 ± 0.37†	0.05
Lean Body Mass (kg)	-0.73 ± 0.37†	-0.05 ± 0.38	-0.07 ± 0.37	-0.24 ± 0.38	0.03
Blood Pressure (mmHg)					
Systolic	-0.6 ± 1.9	+2.3 ± 2.0	-1.3 ± 1.8	-2.0 ± 1.9	0.70
Diastolic	-0.6 ± 1.5	+0.2 ± 1.6	+0.1 ± 1.5	-1.3 ± 1.5	0.41

Values are expressed as mean ± standard error.
Because of missing values, the total n is not the same for all variables.
†P<0.05 for difference from baseline within group.
‡ Significance of difference among groups

Table 4.14 Changes in Biochemical Parameters after 3 months

Biochemical Parameters	Class + In-person (n=22)	Class + Internet (n=17)	Tailored + In-person (n=20)	Tailored + Internet (n=17)	P value‡
Cholesterol (mg/dL)					
Total	-8.1 ± 5.4	-0.6 ± 6.1	+9.1 ± 5.6	+1.1 ± 6.0	0.58
HDL	+0.2 ± 1.5	-0.8 ± 1.7	+1.1 ± 1.6	-0.0 ± 1.7	0.63
LDL	-5.7 ± 5.1	+4.2 ± 5.7	+9.3 ± 5.2	-1.5 ± 5.6	0.34
Triglycerides (mg/dL)	-19.8 ± 13.3	-16.0 ±14.8	-4.2 ± 13.5	+10.5 ± 14.5	0.79
Fasting Blood Glucose (mg/dL)	-2.4 ± 1.7	-1.2 ± 1.9	+2.6 ± 1.7	-0.9 ± 1.8	0.63

Values are expressed as mean ± standard error.
Because of missing values, the total n is not the same for all variables.
†P<0.05 for difference from baseline within group.
‡ Significance of difference among groups

Changes in diet

There were no significant changes in diet among the four treatment groups after 3 months (Table 4.15). There was a significant reduction in percent kcal from fat in the 'Tailored + In-person' group from baseline (-8.8 ± 3.2 percent, p=0.01) (Table 4.15). The 'Class + In-person' group had a significant increase in percent kcal from protein compared to baseline (+3.6 ± 1.4 percent, p=0.01) (Table 4.15). There were no significant pairwise comparisons or main effects of diet and follow-up. It should be noted that the dietary results should be interpreted with caution because only 35% of the food records (n=43/123) from subjects completing their 3 month appointment were returned at follow up.

Table 4.15 Changes in Diet after 3 months

Dietary Analysis	Class + In-person (n=13)	Class + Internet (n=12)	Tailored + In-person (n=8)	Tailored + Internet (n=10)	P value‡
Total Calories	-160 ± 170	-100 ± 170	-30 ± 200	-170 ± 190	0.85
Macronutrients					
Carbohydrate					
Total grams	-1.4 ± 22.9	-2.1 ± 23.6	+26.4 ± 27.3	-22.7 ± 25.8	0.49
% total kcal	+2.0 ± 2.7	+3.3 ± 2.8	+5.7 ± 3.2	-0.4 ± 3.1	0.23
Fat					
Total grams	-15.9 ± 8.6	-5.2 ± 8.8	-16.2 ± 10.1	-12.1 ± 9.6	0.99
% total kcal	-5.2 ± 2.7	-2.4 ± 2.8	-8.8 ± 3.2†	-2.7 ± 3.0	0.66
Protein					
Total grams	+3.3 ± 6.9	-3.6 ± 7.1	+1.2 ± 8.3	-1.3 ± 7.8	0.86
% total kcal	+3.6 ± 1.4†	-0.2 ± 1.5	+0.4 ± 1.7	+0.5 ± 1.6	0.38
Food Groups (#servings)					
Fruit	+0.6 ± 0.5	-0.6 ± 0.6	+0.2 ± 0.7	+0.2 ± 0.6	0.87
Vegetables	+0.3 ± 0.6	+0.5 ± 0.6	+0.6 ± 0.7	-0.3 ± 0.6	0.64
Grain	-0.6 ± 0.7	-0.0 ± 0.7	+0.3 ± 0.8	+0.6 ± 0.8	0.52
Dairy	+0.2 ± 0.5	+0.3 ± 0.5	+0.8 ± 0.6	-0.2 ± 0.6	0.50
Meat, meat substitutes	+1.2 ± 0.7	-0.6 ± 0.7	-1.4 ± 0.8	-0.6 ± 0.8	0.12

Values are expressed as mean ± standard error.
Because of missing values, the total n is not the same for all variables.
†P<0.05 for difference from baseline within group.
‡ Significance of difference among groups

Preliminary 6 months results for weight and body mass index

Approximately 56% of the 66 subjects completing a 6 month appointment lost weight while the rest maintained or gained weight. Weight change ranged from a loss of 16.2 kg (35.7 lbs) to a gain of 6.79 kg (14.9 lbs) over the 6 months.

Select baseline values were compared among groups for those subjects (n=66) completing a 6 month appointment. Significant differences were detected among groups for body weight (p=0.02), percent body fat (p=0.02) and lean body mass (p=0.004) (Table 4.16). Thus, body weight was adjusted using baseline weight as a covariate during the analysis. The difference in baseline body weight among groups at 6 months is most likely secondary to the high attrition rate at the time of analysis. Adjustments were not made for percent body fat or lean body mass because they were not included in the preliminary analysis.

Table 4.16 Select Characteristics of Subjects Who Completed 6 Month Appointment

	Class + In-person (n=16)	Class + Internet (n=17)	Tailored + In-person (n=18)	Tailored + Internet (n=15)	Overall (n=66)
Age (yrs)	32.5 (6.3)	36.3 (9.7)	34.1 (7.7)	36.2 (9.0)	34.8 (8.2)
Height (cm)	172.3 (13.8)	175.0 (9.3)	168.2 (8.8)	177.1 (8.0)	172.9 (10.5)
Weight (kg)‡	92.2 (18.5)	99.3 (16.0)	88.1 (14.1)	103.8 (11.1)	95.6 (16.1)
Body Mass Index (kg/m^2)	30.7 (2.7)	32.4 (3.7)	30.9 (2.9)	33.1 (2.2)	31.7 (3.0)
Waist Circumference(cm)	39.1 (3.6)	40.3 (3.8)	38.8 (3.2)	40.7 (2.6)	39.7 (3.4)
Body Fat					
Total (kg)	27.6 (5.8)	31.7 (5.9)	29.8 (7.3)	28.9 (5.0)	29.5 (6.2)
Percent body fat‡	30.7 (5.1)	32.6 (5.4)	34.1 (6.1)	28.3 (4.8)	31.6 (5.7)
Lean Body Mass (kg)‡	60.5 (14.1)	63.4 (12.8)	54.5 (9.8)	70.2 (9.6)	61.8 (12.8)
Education Level (yrs)	14.7 (1.9)	15.3 (2.0)	14.7 (1.8)	15.0 (1.6)	14.9 (1.8)
Gender, n (%)					
Female	5 (31)	7 (41)	10 (56)	3 (20)	25 (38)
Male	11 (69)	10 (59)	8 (44)	12 (80)	41 (62)
Race/Ethnicity, n (%)					
White	10 (63)	8 (47)	9 (50)	9 (60)	36 (55)
Black	4 (25)	8 (47)	4 (22)	4 (27)	20 (30)
Other	2 (12)	1 (6)	5 (28)	2 (13)	10 (15)
Married, n (%)	11 (69)	9 (53)	13 (72)	10 (67)	43 (65)
Current Smoker, n (%)	4 (25)	1 (6)	1 (6)	2 (13)	8 (12)
Enrolled in AWCP, n(%)	12 (75)	10 (59)	10 (56)	6 (40)	38 (58)

‡P<0.05 for difference among groups.

The interaction of diet*followup*visit was not significant (p=0.63) in the final ANCOVA model for weight loss after 6 months for subjects that completed their appointment (n=66). Results were adjusted for significant covariates and/or covariate*factor interactions including: baseline weight (p=0.0001), education level*followup (p=0.04), and marital status*followup (p=0.02). Tables 4.17 and 4.18 provide further information about the influence of the significant covariate interactions.

According to Table 4.17, subjects that were married lost more weight when they had Internet follow up. The opposite is true for those who were not married. They lost weight when they received in-person follow up but gained weight when they had Internet follow up. According to Table 4.18, subjects who had less education lost more weight when they had Internet follow up. Subjects with more education lost weight when they received in-person follow up but gained weight when they received Internet follow up.

These results suggest that Internet follow up is more effective for weight loss when military service members are married and less educated. Furthermore, those military service members that are more educated and single appear to lose more weight when they have in-person weight management follow up.

Table 4.17 Impact of marital status*follow up interaction on weight (n=66)

	Married	Not Married
In-person follow up	94.4 ± 0.96 kg	93.3± 1.25 kg
Internet follow up	92.0 ± 1.11 kg	96.1± 1.14 kg

Values are expressed as mean body weight ± SE.
Reference weight is 95.6 kg.

Table 4.18 Impact of education level*follow up interaction on weight (n=66)

	12 years of education	17 years of education
In-person follow up	94.9 ± 1.2 kg	93.1± 1.2 kg
Internet follow up	90.4 ± 1.5 kg	96.7 ± 1.2 kg

Values are expressed as mean body weight ± SE.
Reference weight is 95.6 kg.
Education levels were selected as comparison points based on the 10^{th} and 90^{th} percentile of the data

The trend in mean adjusted body weight over the 6 month time period for subjects that completed their appointments (n=66) is presented in Figure 4.4. Preliminary data of the subjects who completed the 6 month appointment (n=66) revealed that there was no significant difference (p=0.78) in weight loss among the four treatment groups after 6 months (Table 4.19). However, the change in weight was significant within the 'Tailored + Internet' groups (-1.92 ± 0.93 kg, p=0.04) as presented in Figure 4.5 and Table 4.19 for subjects completing all appointments (n=66). There were no significant main effects or pairwise comparisons.

Body mass index was also adjusted (using baseline body mass index as a covariate) because baseline weights were significantly different among groups at baseline and body weight is a function of BMI. The interaction of diet*followup*visit was not significant (p=0.62) in the final ANCOVA model for BMI for those completing the 6 month appointment (n=66).

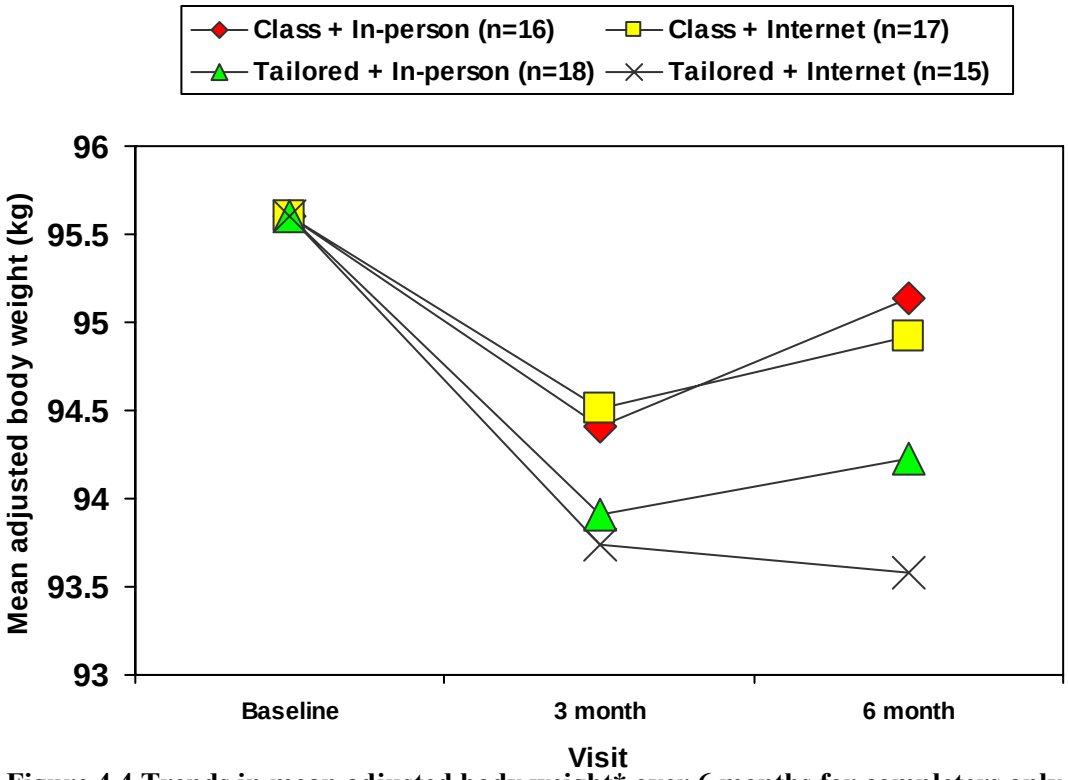


Figure 4.4 Trends in mean adjusted body weight* over 6 months for completers only (n=66) *adjusted for baseline weight

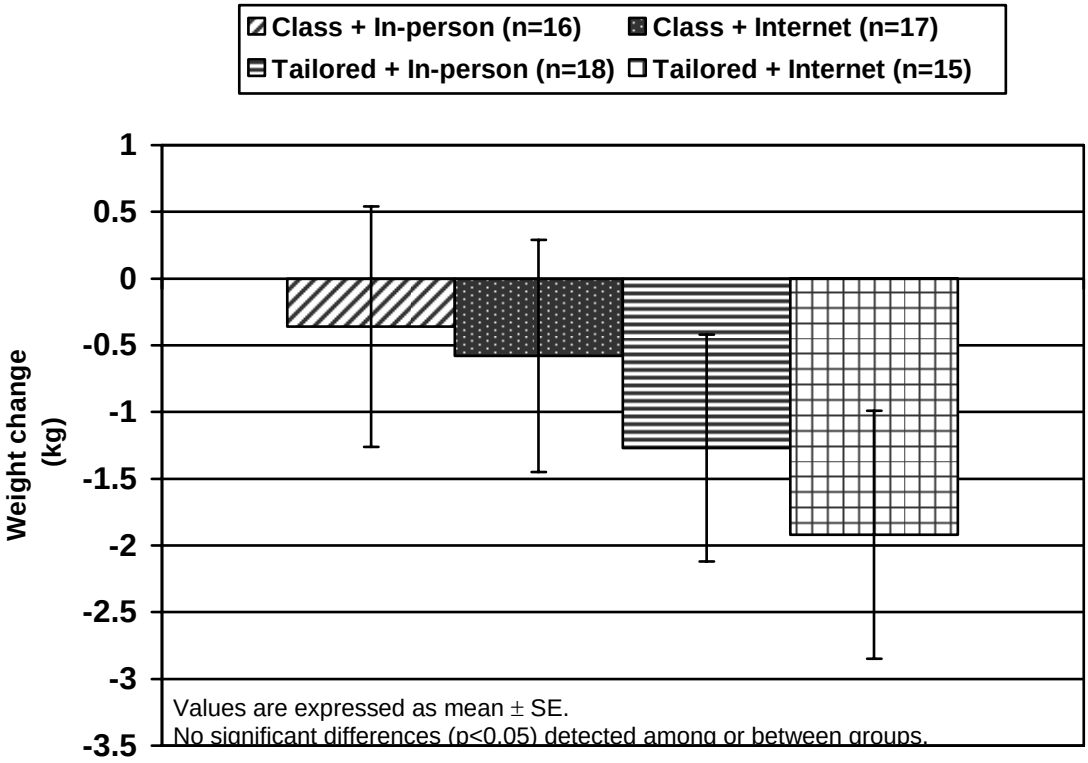


Figure 4.5 Weight change after 6 months for completers only (n=66)

Table 4.19 Changes in Weight for Completers (n=66) after 6 months (Preliminary Data)

Measurement	Class + In-person Group (n=16)	Class + Internet Group (n=17)	Tailored + In-person Group (n=18)	Tailored + Internet Group (n=15)	P value‡
Weight (kg)	-0.36 ± 0.90	-0.58 ± 0.87	-1.27 ± 0.85	-1.92 ± 0.93†	0.78
Body Mass Index (kg/m^2)	-0.11 ± 0.30	-0.21 ± 0.29	-0.43 ± 0.28	-0.58 ± 0.31	0.78

Values are expressed as mean ± standard error.
†P<0.05 for difference from baseline within group.
‡ Significance of difference among groups

The changes in BMI were not significantly different among or within groups after 6 months (Table 4.19). However, the change in BMI (-0.58 ± 0.31 kg/m^2, p=0.06) within the 'Tailored + Internet' group was approaching significance after 6 months when compared to baseline. Furthermore, there were no significant main effects or pairwise comparisons.

Average use and barriers to use of the A-INFO Web site during 3 months

As previously mentioned, A-INFO website use was tracked using the total number of sessions that each subject entered information into the food/beverage intake, physical activity and/or messages section during the course of the study. Each day that a subject entered something into the food/beverage section, activity section or posted a message for the nutritionist was counted as one "user session" each. These sections of the website were selected for tracking because they reflected actual interactive use by the subject. Thus, the maximum number of sessions per day was three because A-INFO use could only be tracked once per section per day and not by frequency within sections if more than once per day.

Overall, the mean (SD) total use of the A-INFO site was 17 (33) sessions for all of the subjects who were assigned an A-INFO Web site account (n=76) over the first 3

months of the study (Appendix L). The mean (SD) usage of the A-INFO site by group was 17 (37) total sessions for the 'Class + Internet' group and 17 (30) total sessions for the 'Tailored + Internet' group. The median usage of A-INFO was 1 in the Class + Internet group and 5 in the Tailored + Internet group. More commonly, subjects did not use their A-INFO account at all according to the mode result (0) for each group and overall. Specifically, 35% of the subjects reported never using their A-INFO account. In addition, participants did not ever use the phone component of the A-INFO accounts most likely because the phone component only offered a computerized retrieval of messages which could also be accessed via their A-INFO account.

Subjects were also surveyed on self-reported use of the A-INFO site. Of the 53 responses, 15 (28%) reported that they never used their account, 8 (15%) used it <1 time/month, 9 (17%) used it 1-3 times/month, 2 (4%) used it 1 time/week, 7 (13%) used it several times/week and 12 (23%) used it 1 or more times/day (Appendix M). However, of the 12 that used their account 1+ times/day, 11 of them reduced their usage to minimal or stopped using the account after 3 or 4 weeks of initiation. The most common reasons for not using the A-INFO account or using it less than once per week were 1) lack of time (n=22), 2) forgot (n=12) or 3) 'other reasons' (n=19) such as difficulty finding exact matches for food items and problems remembering login or password.

Further statistical analysis was conducted to determine if frequency of A-INFO use (based on total number of sessions) was associated with weight change after 3 months. There was no significant correlation ($r=0.16$, $p=0.23$) between using the A-INFO account and weight change after 3 months in both 'Class + Internet' and 'Tailored + Internet' groups using Spearman's correlation.

Furthermore, A-INFO use was classified into 3 usage categories: 1) 'never' (0 times used over 3 months), 2) 'low use' (1-9 total times over 3 months) or 3) 'high use' (10 or more times over 3 months). These categories were selected because approximately 1/3 of subjects in the groups receiving Internet follow-up were classified into each category. There was no significant influence (p=0.29) of A-INFO use on weight loss and no significant difference (p=0.20) in weight change after 3 months among subjects in the three A-INFO frequency of use categories.

Attrition

At the time of data analysis, 75 (44%) of the 172 subjects had dropped out of the study before their 6 month appointment (Table 4.20). More than half (n=44, 59%) of the 75 subjects dropped out before their 3 month appointment. When examining 3 month follow up data alone, 44 (26%) of the 172 subjects dropped out of the study before their 3 month appointment.

Approximately 37% (n=28/75) of the subjects dropped out secondary to military-related reasons such as relocation, deployment, retirement or were discharged from military during the study (Table 4.20). The discharges were unrelated to their weight status as reported by the subjects. The second most common reason cited for dropout (n=15, 20%) was 'lack of time'.

Statistical tests of significance (t-test or chi-square as appropriate) were conducted to determine if there were significant differences in select characteristics of subjects who dropped out before their 3 month appointment and subjects who completed their 3 month

appointment (Appendix N) overall and by group. When all subjects were averaged together, there were no significant differences between 3 month completers and dropouts.

Table 4.20 Total Dropouts and Pending Appointments from Study

Reasons for dropout	Number that dropped out before 3 month appointment	Number that dropped out after 3 month but before 6 month appointment	Total dropouts n (%)*
Unknown	12	1	13 (8)
Lack of time	11	4	15 (9)
Medical reason (such as pregnancy)	6	5	11 (6)
Relocated by military or deployed	6	11	17 (10)
No longer in military or retired	4	7	11 (6)
Family/personal reasons	4	0	4 (2)
Other (desired different diet, no weight loss)	1	3	4 (2)
Total dropouts n (%)*	44 (26)	31 (18)	75 (44)
Pending follow-up appointment	5	26	31
Maximum total dropouts possible	49	57	106 (62)

* Percent based on total baseline sample size (n=172)

When comparing treatment groups, the subjects who dropped out of the 'Tailored + In-person' group significantly weighed more (p=0.04) and had higher lean body mass (p=0.009) than those assigned to the 'Tailored + In-person' group who completed their 3 month appointment. In addition, subjects who dropped out of the 'Class + Internet' group were more likely to be married (p=0.01), currently smoke cigarettes (p=0.006) and classified as 'other' for race/ethnicity (p=0.005).

Statistical tests of significance (t-test or chi-square as appropriate) were also conducted to determine if there were significant differences in select characteristics of subjects who dropped out before their 6 month appointment and subjects who completed their 6 month appointment (Appendix O) overall and by group. When all subjects were

averaged together, subjects that dropped out were significantly younger in age (p=0.04) than those that completed their 6 month appointment. When comparing treatment groups, the subjects who dropped out of the 'Tailored + In-person' group significantly weighed more (p=0.05) and had higher lean body mass (p=0.01) than those assigned to the 'Tailored + In-person' group who completed their 3 month appointment. The opposite was true for subjects that dropped out of the 'Tailored + Internet' group who significantly weighed less (p=0.04) and had less lean body mass (p=0.01 than those assigned to the 'Tailored + Internet' group completing their 6 month appointment.

Discussion:

The purpose of this study was to compare the impact of 4 different treatment interventions (2 x 2 factorial treatment consisting of 2 types of weight management intervention and 2 types of follow up counseling) on weight loss and other related outcomes in active duty military service members. The overall finding was that there was no significant difference in weight loss or other outcomes among treatment groups at 3 and 6 months.

Furthermore, the mean weight loss at 3 months was less than the weight loss goal for the Army Weight Control Program (required 3-8 lbs/month) and less than the recommended 5-10% weight loss over 6 months by NIH/NHLBI in all four treatment groups (Table 4.11). In addition, the % weight lost (<2%) over 3 and 6 months was not clinically significant according to other studies and guidelines (67-69). Total reductions in BMI were less than 1.0 kg/m^2, hence, not enough to reclassify an individual into a lower BMI category. Similar results were reported in a weight loss study comparing a self help program to a commercial program for overweight and obese men and women

(70). The self help intervention was similar to some components of our intervention because it included minimal counseling sessions (2) with a nutritionist and referral to resources such as health promotion websites. After 1 year, subjects in the self help group only lost an average of 1.3 kg and had a 0.5 kg/m^2 reduction in BMI (70). Furthermore, some subjects experienced weight gain of up to 15 kg over 1 year during the study.

Other studies utilizing Internet programs and/or or behaviorally based interventions also only detected modest weight loss of less than 2 kg in adults after study periods of 3 to 6 months (34, 71, 72). Furthermore, Logue et al. compared the effect of a tailored intervention (based on multiple stages of change for weight control) to a standard intervention for weight loss in adults. No significant differences in weight loss were detected between groups (72).

Although no treatment was superior in our study, the 'Tailored + Internet' and 'Class + In-person' group did have significant weight loss after 3 months and there was a significant difference in weight loss among groups according to the "Intent-to-treat" analysis. Furthermore, the 'Tailored + Internet' group had significant reductions in total, trunk, percent body fat and waist circumference (Table 4.13). Although the 'Class + In-person' group had significant weight loss after 3 months, they also had a significant reduction in LBM. These trends indicate that individuals in the 'Tailored + Internet' group were making healthier changes in their weight loss attempts than the 'Class + In-person' group. Although we do not have data to support the specific reasons why the two groups lost weight with varying changes in body composition, it is possible that the 'Class + In-person' group was not eating enough calories and/or not exercising which would help preserve lean body mass (73).

The preliminary 6 month data for our study revealed that differences in weight loss were also not significant among groups. However, the 'Tailored + Internet' group was the only group to experience significant weight loss after 6 months compared to baseline. This suggests that the combination of a tailored intervention with Internet follow up provides the most promise of the four interventions. It should be noted that the 6 month results should be interpreted with caution because they are preliminary.

Our findings were somewhat disappointing but they reinforce the fact that not all methods of weight loss work for all individuals or in all populations. Schwartz and Brownell surveyed 33 leading weight management experts to identify characteristics that indicated or contraindicated the use of various weight loss approaches for overweight adults (74). The variety of responses and lack of agreement by the experts for many of the factors reveal that there is much to consider when matching an individual to a weight loss program and that further research needs to be done.

Our study was developed to intervene on an individual level of behavior change. However, more recently, experts have highlighted the importance of ecological models of health behavior interventions for obesity (75-79). Ecological models consider the interaction between people and their environments. There are several levels of influence within an ecological model of health behavior including the following factors: 1) intrapersonal/individual, 2) interpersonal, 3) institutional, 4) community and 5) policy (80). Booth et al. identified several environmental factors that are key influences on nutrition and physical activity such as local government, schools, community, employers, family, and the food and restaurant industry (75) . Clearly, the current environment is complex and contains many factors that can influence behaviors related to obesity. For

example, soldiers may have the desire to eat healthier but if there are no healthy food choices available to them at their military base, they may opt for higher calorie choices. Furthermore, if they had little or no support from family, friends or colleagues, they may not have been able to succeed in their weight loss attempts. In addition, the AWCP itself is a policy enforced by the military.

It was expected that all of the military service members participating in the study would have lost some weight given the fact that their job is dependent on meeting specific weight criteria. As previously described, enrollment in the Army Weight Control Program means an individual is required to lose at least 3-8 lbs per month for at least two consecutive months until they meet military standards. However, 40% of the subjects completing their appointment(s) did not lose weight after 3 months and 44% did not lose weight after 6 months. Another military study of the U.S. Navy's weight control program reported that 17% of subjects maintained or gained body fat during the course of their intervention regardless of their enrollment in a weight control program (81).

Unfortunately, the underlying approach of a mandatory weight loss program, such as the Army Weight Control Program, is essentially an opposing force in the motivation to lose weight. Williams et al. concluded that autonomous motivation for weight loss is of utmost importance in the ability to lose and maintain weight (82). Autonomous behavior is a behavior that is chosen by oneself as opposed to a controlled behavior by an external force. Participation in the AWCP is clearly a controlled behavior being enforced by an outside entity. The use of stages of change within the study is consistent with the self-determination theory which suggests that it is important to one's self or choice to change a behavior. However, the stages of change were not used as a deciding factor on

whether or not an individual was enrolled into the study. Thus, they may have not been ready to change and/or not exhibited autonomous behavior to lose weight.

Furthermore, the NIH recommends that individuals with a BMI <30 kg/m^2, <2 risk factors (comorbidities) and not ready to lose weight should strive to maintain their body weight rather than attempt weight loss (69). Unfortunately, this is not an option for military personnel thus there may be a disproportionate amount of failure due to the mandatory approach to weight loss.

Frequency of intervention and/or human contact for the in-person follow up groups may have also been a factor in why there was not more success with weight loss after 3 months. Interventions providing a "high intensity" treatment (>once/month) have resulted in more weight loss than less frequent intensity trials (83). However, although this may be desirable, it was not feasible for the intervention or for future implementation. One of the primary purposes of the study was to test an intervention that could be implemented without frequent in-person contact because of proximity and travel issues to medical facilities with trained personnel. If an intervention was proposed and tested at a weekly frequency, it is likely it would not be implemented as policy because of impracticalities. In addition, scheduling subjects for their follow up appointments present challenges due to frequent duty related commitments and last minute assignments. Therefore, imposing a more frequent intervention may not be a viable solution.

As previously mentioned, a 5-10% weight loss has been shown to significantly reduce associated risk factors (comorbidities) of obesity including high blood pressure, and elevated levels of blood lipids and blood glucose (67-69, 84). Thus, it is not surprising that these risk factors associated with obesity did not change significantly in

any of the groups secondary to the modest weight loss (<2%) over 3 months and the fact that the baseline levels were at or near normal at the onset of the study.

Approximately 76% of the 3 day food records were returned at baseline, however only about 1/3 (35%) of the 3 day food records were returned by subjects completing their 3 month appointment. This is most likely due to the lack of incentive for returning the food records. The subjects did not receive personalized feedback on their food records and were not provided with compensation for returning them. The records were being used merely as an outcome measure. Thus, compliance to return food records was low. This may provide some additional explanation on why some subjects did not lose weight during the study. Self monitoring, such as recording food and beverage intake, is a behavior that has been correlated to weight loss. Studies by Baker and Kirschenbaum and Boutelle and Kirschenbaum provide convincing evidence of the relationship of frequency of self monitoring and weight loss in adults (85, 86). Unfortunately, we were unable to provide incentives to the military population for participating in any component of the study. However, in retrospect, it may have been prudent to incorporate the results of the food records into their treatment to help motivate them to complete the records or to use a different method of dietary assessment such as a 24 hour recall. Although all dietary assessment methods have limitations, a 24 hour recall may have been a better choice because it can be conducted during a follow up appointment rather than relying on a subject to return food records.

There were no significant changes in diet among groups after 3 months. However, the 'Class + In-person' group had a significant increase in the % kcal from protein compared to baseline. Although evidence is limited, previous research has

indicated that a high protein diet (25% kcal from protein) may promote weight loss (87). Furthermore, the 'Tailored + In-person' group had a significant decrease in % kcal from fat compared to baseline but not a significant reduction in total kcal possibly explaining why weight loss was not significant after 3 months. The minimal changes detected in diet could also be secondary to the limited number of food records returned at 3 months.

Tailoring nutrition education tends to be more effective than non-tailored information but it may not be enough to change behavior. Other factors such as learning style, media type, and cultural differences may need to be addressed in the development of an intervention (88). Furthermore, some studies have found that a tailored intervention based on SOC does not always promote significant differences in primary measurements compared to a control group (47, 72, 89).

Despite the numerous studies using the SOC in dietary and physical activity interventions, not all of them have reported positive results or associations of SOC with outcomes (26, 72, 89, 90). Some experts have even criticized the use of the stages of change for changing dietary and physical activity behaviors (91-94). Such criticisms include that: 1) nutrition and exercise are not necessarily 'addictive behaviors' that can be clearly defined, 2) there is no consistent method for staging individuals, 3) behavior is complex and cannot be simplified into 5 stages, and 4) there are discrepancies between perceived behavior and actual behavior (91-93). We attempted to alleviate some of these issues by using components of previously validated SOC instruments and by assessing five stages of change for weight control rather than one. However, our tailored intervention based on SOC for weight loss was not superior to the nontailored, classroom approach. Other researchers also evaluated the impact of a tailored intervention using

multiple weight control behaviors versus a standard intervention and found no significant differences between groups (72).

Furthermore, not all of the constructs of the TTM were used in our study for the purposes of simplifying the intervention. Self-efficacy and decisional balance are the two other constructs of the TTM that may have potentially strengthened the intervention. Greene et al. recommended utilizing all constructs of the TTM to increase effectiveness of dietary interventions (11). However, only the stages and processes of change were used to keep the intervention streamlined and to reduce potential burden on the subject and/or dietitian in the assessment of other TTM constructs.

The failure of subjects to meet recommended weight loss goals could possibly be attributed to the A-INFO Internet program itself. While some previous studies have shown beneficial effects of using the Internet for weight loss, others have shown little or no effect (71, 95, 96). Previous studies have reported a positive relationship between computer usage for weight loss and actual weight loss (71, 97). Our study found no significant relationship between weight change and the total number of A-INFO sessions. In other words, using A-INFO frequently (based on sessions), did not result in significantly more weight loss. Thus, even though 35% of our subjects never used their A-INFO account, it was not related to their success or failure with weight loss. One explanation may be due to the method of how we tracked A-INFO usage. We were only able to track the days when items were entered into three main sections of A-INFO but not actual total login time. Some researchers have used login time to evaluate their findings (98). Unfortunately, this type of information was not available to us. It is

unclear if another method of evaluation of A-INFO use would have produced different results.

Furthermore, the most common reason cited for not using the account was 'lack of time' or they forgot. It may be necessary to have more human contact. Several subjects reported that they appreciated having accountability to us about their weight loss habits. They felt that even if they did not lose weight, they had at least learned useful information from the appointment during the study. Thus, it may have been helpful to have someone contact them via the phone weekly about their account. The phone component of the study was not useful to the subjects, potentially because it was voice automated. It may have been more effective to alter the phone component of the study by having a dietitian or health professional call the subjects once each week which was found to be effective in previous research (43).

Even though technology is convenient and information is available, it does not necessarily indicate that individuals will use them for weight loss or that they will be effective (71). Other researchers have recommended that computer/Internet based programs should only be used by those interested in that type of communication and motivated to change (99). In addition, other studies have also reported less than desirable effects of an Internet based weight management program on weight loss in adults (71, 95). For instance, a study evaluating weight loss in adults after using a popular, commercialized interactive weight management website revealed that participants only lost 1.3 ± 3.3 percent of their initial weight after 16 weeks compared to 4.0 ± 3.7 percent weight loss in participants using a behaviorally-based self help program (71).

Other technological aspects of the Internet may be more feasible in delivering dietary interventions. E-mail was readily used in communicating with the majority of the research subjects. Some subjects also reported that they preferred to receive and communicate via e-mail rather than a website. A 12 week e-mail worksite program described by Block et al. demonstrated improved stage of change for fat and fruits and vegetables as well as increased estimated intake of fruits and vegetables assessed by a food frequency questionnaire (38). Although the study was not a randomized, controlled trial, it did reveal the feasibility of an e-mail intervention with little time commitment and positive results. However, because personal health information was being discussed, e-mail was not a secure venue for communicating protected health information in this study.

Through observation, it was apparent that subjects who lost weight had specific and strong motivating forces. The most commonly cited reasons to lose weight were personal health/family reasons and that they wanted to be promoted in rank or attend school. Stages of change and processes of change of the TTM are theoretically intended to help motivate an individual into action for a given behavior however; it may not be enough to result in weight change. Certain weight loss motivational categories have been identified as potential factors in matching individuals to appropriate weight loss treatments (74). These categories include: 1) medically motivated (e.g. diagnosis of disease) 2) internally motivated (e.g. feel better about self) 3) externally motivated (e.g. spouse influence) 4) temporally motivated (e.g. upcoming wedding) (74). Furthermore, Klem et al. reported that weight loss motivators can even vary by gender (100). Men are more motivated by medical reasons while women are more motivated by emotional

reasons to lose weight (100). Although we did not assess specific motivators or categories of motivation, informal reports from our subjects warrant further investigation in future military weight management programs. Information about the type of motivation or lack of motivation would be helpful in tailoring a weight loss program to an individual.

Other researchers have suggested the option of allowing individuals to prioritize their own target behaviors for an intervention rather than having someone else tell them what to change, thus relating more to their "intrinsic motivation" to change (101). Allowing an individual to prioritize the behaviors they desire to change may provide more of a sense of control and empowerment (102). This is currently not an option for military service members in relation to the current weight management program.

A limitation of the study was the attrition rate of 26% at 3 months. Although other studies have reported similar attrition rates in weight loss studies, our attrition rate was more often due to military related obligations (103, 104). Hence, the dropouts were unforeseen and unavoidable. The characteristics of subjects that dropped out were similar to other studies such as they were younger and had higher BMIs than completers (70, 103, 104).

In conclusion, based on the 3 month data for completers (n=123), there was no significant difference in weight loss among treatment groups. There were no significant overall main effects of tailored counseling compared to classroom, or Internet follow up counseling compared to in-person follow up counseling. Subjects in the 'Class + In-person' treatment and 'Tailored + Internet' treatment lost significant weight after 3 months when compared to baseline. However, the subjects in the 'Tailored + Internet'

group had body composition and waist circumference improvements not observed in the standard WTS group. Furthermore, although differences were not significant among groups, the 'Tailored + Internet' group was the only group to lose significant weight after 6 months compared to baseline. Our results do not provide a specific explanation at this time on why this group lost significant weight, body fat and had reduced waist circumference after 3 months and significant weight after 6 months. It may have been because this group had an initial tailored session based on their personal readiness to change multiple behaviors coupled with the availability of a weight management website offering weekly feedback. Our findings did not support the fact that increased Internet session usage was related to weight loss however, there may have been other characteristics of the website that we did not track that were useful to the subjects and promoted weight loss. Their weight loss may have also been secondary to changes in their physical activity but these results were not available for inclusion in this analysis.

These findings reinforce the fact that other mediators of weight loss may need to be considered within a military weight management program. The stages of change may not have been an appropriate tool for a military population because they are often influenced by job demands rather than personal motivations to lose weight. Furthermore, although Internet technology is touted as a novel and feasible option for weight management counseling, it may not be effective for all individuals. An ecological model may be a more appropriate approach in the military population because of the potential influence of unique environmental factors on obesity. For instance, environmental factors such as physical activity resources and healthy food selections are often controlled and vary by military institution location. Furthermore, policies such as the mandatory AWCP

may produce negative connotations towards weight loss and potentially result in unhealthy weight loss practices. Although the Institute of Medicine's report, "Weight Management: State of the Science and Opportunities for Military Programs," did not specify that ecological models be explored for military weight management, it did highlight the importance of providing appropriate resources in the environment such as fitness facilities and healthy food choices for military personnel (3). Thus, future research utilizing an ecological based program that addresses different levels of environmental factors influencing weight loss is needed in the military population.

Innovative strategies are still needed to reduce face-to-face time with a health professional especially for the maintenance of weight loss. Future studies should continue to explore the use of other types of technology for weight management in the military because of the continued challenge to reach individuals in remote areas and sustain follow up. Technology should not be limited to the Internet, but possibly explore the use of electronic mail or cellular telephones which were popular with our study subjects. Characteristics of frequent users of a weight management website should also be identified and considered for future website development. Our study revealed that education level and marital status may be related to success with Internet usage for weight loss. For instance, Internet follow up was more effective for military personnel who were married and less educated (12 years vs. 17 years of education). These preliminary findings may be of interest for further research if the military continues to explore the use of Internet technology weight management programs.

Furthermore, if an Internet program was to be continued or further implemented, sufficient time and access to the Internet should be provided to the participants. Frequent

reminders, possibly made by a health professional via phone on weekly basis may also be needed to prevent soldiers from forgetting about their Internet account.

Until successful methods are developed, researchers should continue to explore the vast capabilities of various methods of technology and behaviorally-based methods within comprehensive programs to treat overweight and obesity in the military population.

Chapter V: **Changes in weight control "stages of change" behaviors and corresponding weight loss in active duty military service members during participation in a weight loss study**

Abstract

The "stages of change" is a commonly used construct of the Transtheoretical Model of Health Behavior in dietary and exercise interventions. Theoretically, individuals who advance into the action stage for a behavior are actively engaging in a goal criterion, thus improving their health. While not all quantitative outcomes such as weight loss may change over time, assessment of stages of change may detect intentions to change behaviors or "intermediate outcomes" related to weight loss. The objectives of this study were to 1) assess changes in stages of change for five different weight control behaviors after 3 months for subjects participating in a weight loss study and 2) determine if there was a relationship between being in the action and/or maintenance stages for each weight control behavior and actual weight loss during enrollment in a research study.

A previously validated stages of change instrument for multiple weight control behaviors was used to assess stages of change for dietary fat, fruits and vegetables, portion control and exercise in overweight, active duty military service members participating in a weight loss study. The results revealed that subjects significantly advanced into the action stage for portion control ($p<0.05$) after 3 months. Furthermore, being in the action or maintenance stages was not associated with more weight loss than being in the pre-action stages. These results indicate that individual weight control behaviors alone based on stages of change are not significantly associated with weight loss after 3 months. However, portion control is a behavior that should be assessed when

developing weight loss programs for active duty military service members. Other comprehensive approaches to obesity (e.g. ecological model) beyond an individual level of intervention may be necessary for an effective military weight management program.

Introduction

Prochaska and DiClemente proposed the Transtheoretical Model (TTM) in the early 1980's to understand the underlying structure of behavior change in smokers (18, 19). The TTM is comprised of four major constructs: stages of change, self-efficacy, decisional balance and processes of change. "Stages of change" is the most commonly used construct of the model and is made up of five stages (precontemplation, contemplation, preparation, action, maintenance). These stages were identified as the central organizing construct or temporal dimension of the TTM to help determine when individuals would change their attitudes, intentions and behavior in regard to smoking (20). Since the early 1980's, numerous studies have utilized the TTM and/or certain constructs of the TTM for weight control, exercise/physical activity fruit and vegetable consumption, fiber intake and dietary fat reduction (21, 105).

An effective weight control intervention should help an individual to progress from their current stage of change to the action and maintenance stages (9). Evaluating the movement or progression of the stages of change can be used as an indicator of an intervention's success (9). Most interventions either just provide information or assume that an individual is ready to lose weight (10). However, the majority of individuals are not ready to take action, with only 25% of them ready to change a health behavior (11). The majority of individuals (50%) are categorized in the precontemplation stage, suggesting that they may not even realize they have a problem with their weight (11).

Furthermore, the action and maintenance stages of the TTM are intended goals in the stages of change paradigm. If an individual is categorized in these higher stages, it is interpreted that she/he is currently achieving a target behavior. Previous research that staged overweight participants in a weight loss study for multiple weight control behaviors reported a positive relationship between time in action and maintenance stages for weight control behavior and weight loss (106). Prochaska et al. reported that being in the action stage for weight control was a strong predictor of weight loss for hospital staff workers in a worksite wellness program (24). Other studies utilizing stages of change and relating it to weight loss or weight control behaviors have reported mixed results (26, 90, 107).

Thus, the objectives of this study were to 1) assess stages of change for five different weight control behaviors (reducing "dietary fat", increasing "fruit and vegetables" consumption, reducing portion sizes/"portion control", limiting high kcal "beverages" and increasing "exercise") in subjects participating in a weight loss study before and after 3 months of treatment and 2) determine if being in action and/or maintenance stages for each weight control behavior was significantly associated with actual weight loss during enrollment in a weight loss study.

Materials and Methods

This research was approved by the Institutional Review Boards for Human Subjects of Walter Reed Army Medical Center, Washington, D.C. and the University of Maryland, College Park, MD (Appendix E).

Subjects

Subjects were 172 male and female active duty military service members (ages 18+) enrolled in a 6 month weight loss study at Walter Reed Army Medical Center in Washington, DC.

Data Collection

Anthropometric Assessment

Weight was measured at 0 (baseline), 3 and 6 months using standard techniques and equipment in the Walter Reed Nutrition Research Laboratory (62). Subjects were instructed to wear lightweight clothing such as their physical training t-shirt and shorts for all measurements. Weight was measured twice without shoes using an electronic digital floor scale (Seca 770, Seca Corporation, Hanover, MD) in lbs and the average of the two measurements were recorded to the nearest 0.1 lb. The 6 month weights were not used in this study because all follow up appointments were not yet completed.

Stages of Change Assessment

A stages of change weight control instrument (Appendix B) was developed using a validated questionnaire and components of other questionnaires from previous studies (30, 51-53). The final instrument was also tested in a small group of soldiers during a pilot study prior to the study (see Chapter III). The instrument's purpose was to assess stages of change (precontemplation, contemplation, preparation, action and maintenance) for each of five different weight control behaviors (dietary fat, fruits & vegetables, portion control, exercise, beverages) and provide a profile of the stages for each person enrolled in the study.

The instrument results were also used in weight management counseling of research subjects in two of four treatment groups ('Tailored + In-person' and 'Tailored + Internet' groups) during a weight loss study (previously described). It was hypothesized that subjects receiving tailored counseling based on the SOC for weight control would advance significantly into the action stage each of the weight control behaviors and lose significantly more weight than subjects receiving general, non-tailored weight control information ('Class + In-person' and 'Class + Internet' groups).

Data Analysis

Statistical calculations were performed using the SAS System for Windows V9.1 (SAS Institute, Cary, NC, 2003). Supplemental software containing the GLIMMIX (Generalized Linear Mixed Model) procedure was downloaded from the SAS website (http://www.sas.com) for use in some analyses. All tests were considered significant at $p < 0.05$.

The assumptions for the Analysis of Variance (ANOVA) were verified prior to data analysis by examining normality of plotted residuals and the homogeneity of residual variances.

PROC FREQ was used to summarize the proportion of subjects (n=172) in precontemplation, contemplation, preparation, action and maintenance stages for each of the weight control behaviors by group and overall at baseline. Chi-square analysis was used to determine if the stages of change proportions were significantly different ($p<0.05$) among groups for each weight control behavior at baseline.

Logistic analysis of covariance was used in analyzing changes in the stages of change for all five weight control behaviors (fruits and vegetables, dietary fat, portion

control, beverages and current exercise) after 3 months for subjects completing at least the 3 month appointment (n=123). The five stages of change categories were dichotomized into stages of "pre-action" (precontemplation, contemplation or preparation) and "action" (action or maintenance). The rationale behind this was to 1) allow for sufficient cell counts in the analysis and 2) determine differences in the forward or backward movement of subjects in the "action" stages versus the "pre-action" stages within the groups. Previous research has dichotomized stages of change categories in a similar manner for dietary parameters (30, 108).

The full generalized linear mixed model contained three main covariates (age, gender, ethnicity) and their interactions with the 2 factors (diet, follow-up) to adjust for any significant influence on the dependent variables. Interactions between covariates were not included because they were not of interest and to keep the model small to preserve degrees of freedom. The full model was reduced using previously described procedures (63). Nonsignificant ($p>0.05$) covariate*factor interactions were removed one by one starting with the highest order interactions. The covariates and/or their interactions were left in the model if they significantly affected the outcome ($p<0.05$).

Analysis of covariance was used to determine the impact of stages of change (dichotomized as "action" or pre-action") for each weight control behavior (dietary fat, fruits & vegetables, portion control, beverages, exercise) on weight loss after 3 months. Individuals that remained or advanced into action stages after 3 months were classified as "action" and those that remained or reverted back into "pre-action" stages after 3 months were classified as "pre-action". Only those completing at least the 3 month measurement of weight (n=123) were included in the analysis.

Age was centered by subtracting the mean of the observed value to make interpretation results simpler. Categorical/class covariates (gender, ethnicity) were interpreted at equal proportions to match an ideal experiment of equal replication. Ethnicity/race was collapsed into three main categories (white, black, other) to increase cell counts for analysis.

Results

Baseline 'stages of change'

Overall at baseline (n=172), the majority of subjects were classified in the maintenance stage for dietary fat (n=114, 77%), preparation stage for fruits and vegetables (n=71, 48%), preparation for portion control (n=82, 55%), maintenance for beverages (n=69, 47%) and preparation for current exercise (n=69, 46%) according to the results of the stages of change instrument (Table 5.1). No significant differences were detected among groups. Stages of change for 'prior exercise' were used exclusively for study treatment purposes. 'Prior exercise' was defined as exercise habits when exercise was not mandatory by the military. More subjects were classified in the action or maintenance stages (47% vs. 35%) when comparing their 'current' versus their 'prior' exercise stage of change.

Changes in 'stages of change' at 3 months

To determine differences in the 'stages of change' for each of the 5 weight control behaviors, the stages were dichotomized into 'action' and 'pre-action' stages.

Table 5.1 Baseline Weight Control Behaviors (Stages of Change)

Baseline Weight Control Stages of Change[⊗]	Class + In-person (n=43)	Class + Internet (n=43)	Tailored + In-person (n=43)	Tailored + Internet (n=43)	Overall (n=172)
Dietary Fat, n (%)					
Precontemplation	0 (0)	0 (0)	0 (0)	1 (2)	1 (<1)
Contemplation	1 (3)	0 (0)	0 (0)	0 (0)	1 (<1)
Preparation	1 (3)	2 (5)	2 (5)	0 (0)	4 (3)
Action	4 (11)	11 (27)	11 (27)	9 (24)	28 (19)
Maintenance	30 (83)	27 (67)	27 (67)	28 (74)	114 (77)
Fruits and Vegetables, n (%)					
Precontemplation	2 (6)	1 (3)	2 (5)	5 (13)	10 (7)
Contemplation	4 (11)	3 (9)	3 (7)	6 (16)	16 (11)
Preparation	15 (42)	15 (44)	24 (60)	17 (45)	71 (48)
Action	4 (11)	5 (15)	2 (5)	2 (5)	13 (9)
Maintenance	11 (31)	10 (29)	9 (22)	8 (21)	38 (26)
Portion Control, n (%)					
Precontemplation	6 (16)	4 (12)	10 (25)	12 (32)	32 (22)
Contemplation	1 (3)	1 (3)	3 (7)	1 (3)	6 (4)
Preparation	23 (64)	23 (68)	18 (45)	18 (47)	82 (55)
Action	5 (14)	3 (9)	4 (10)	5 (13)	17 (11)
Maintenance	1 (3)	3 (9)	5 (12)	2 (5)	11 (7)
Beverages, n (%)					
Precontemplation	2 (6)	4 (12)	5 (12)	7 (18)	18 (12)
Contemplation	2 (6)	2 (6)	1 (2)	1 (3)	6 (4)
Preparation	10 (28)	8 (23)	10 (25)	8 (21)	36 (24)
Action	3 (8)	6 (18)	5 (12)	5 (13)	19 (13)
Maintenance	19 (53)	14 (41)	19 (47)	17 (45)	69 (47)
Exercise, n (%)					
Current habits					
Precontemplation	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Contemplation	2 (6)	2 (6)	4 (10)	3 (8)	10 (7)
Preparation	16 (44)	14 (41)	21 (52)	18 (47)	69 (46)
Action	6 (17)	8 (23)	5 (12)	7 (18)	26 (18)
Maintenance	13 (36)	10 (29)	10 (25)	10 (26)	43 (29)
Prior habits*					
Precontemplation	0 (0)	0 (0)	0 (0)	2 (5)	2 (1)
Contemplation	2 (6)	2 (6)	5 (13)	4 (10)	13 (9)
Preparation	18 (51)	17 (50)	26 (67)	18 (47)	79 (54)
Action	4 (11)	5 (15)	1 (2)	5 (13)	15 (10)
Maintenance	11 (31)	10 (29)	7 (18)	9 (24)	37 (25)

Because of missing values, the total n is not the same for all variables.
Total percent may not add up to 100 due to rounding.
*"Prior habits" represents exercise "stage of change" when exercising was not mandatory.
[⊗]No significant difference found among groups for each weight control behavior at baseline.

'Action' was defined as being in the action or maintenance stage for a behavior and 'pre-action' was defined as being in the precontemplation, contemplation or preparation stages for a behavior.

When dichotomized, there were no significant changes in stages of change for dietary fat within or among groups at 3 months (Table 5.2). There was a significant increase ($p=0.02$) in the proportion of subjects in the 'action' stage for fruits and vegetables in the 'Class + In-person' group at 3 months (Table 5.2). However, baseline proportions of action versus pre-action stages for fruits and vegetables were significantly different among groups. Specifically, the 'Class + In-person' group had a lower proportion of subjects in action at baseline.

All four treatment groups had significant increases ($p<0.05$) in the proportion of subjects classified in the action stage for portion control at 3 months (Table 5.2). However, the differences among groups were not significant. The changes in SOC for beverages and exercise were not statistically significant within or among groups (Table 5.2).

Relationship of 'stages of change' to weight loss after 3 months

Because the overwhelming majority of subjects were classified in the "action" stage for dietary fat, it was not possible to determine significant differences between the 3 month weight changes of those in 'pre-action' versus those in 'action' (Table 5.3).

There were no significant differences in weight change after 3 months for subjects classified in action versus pre-action for fruits and vegetables, portion control, beverages or exercise within the four treatment groups (Table 5.3).

Table 5.2 Weight Control Behaviors (Stages of Change) before and after 3 months

Weight Control Stages of Change	Class + In-person (n=26)		Class + Internet (n=22)		Tailored + In-person (n=27)		Tailored + Internet (n=24)		P value Across groups
	Base n (%)	3 mo n (%)	Base n (%)	3 mo n (%)	Base n (%)	3 mo n (%)	Base n (%)	3 mo n (%)	After 3 mo
Dietary Fat									
"Pre-action"	2 (8)	1 (4)	1 (5)	0 (0)	2 (7)	0 (0)	0 (0)	0 (0)	0.99
"Action"	24 (92)	25 (96)	21 (95)	22 (100)	25 (93)	27 (100)	24 (100)	24 (100)	
Fruits and Vegetables									
"Pre-action"	20 (77)	11(42)	9 (41)	13 (59)	18 (67)	16 (59)	18 (75)	16 (67)	0.32
"Action"‡	6 (23)	15 (68)†	13 (59)	9 (41)	9 (33)	11 (41)	6 (25)	8 (33)	
Portion Control									
"Pre-action"	21 (81)	10 (39)	18 (82)	7 (32)	20 (74)	10 (37)	17 (71)	9 (37.5)	0.90
"Action"	5 (19)	16 (61)†	4 (18)	15 (68)†	7 (36)	17 (63)†	7 (29)	15 (62.5)†	
Beverages									
"Pre-action"	9 (35)	7 (27)	7 (32)	2 (9)	9 (33)	4 (15)	8 (33)	3 (12.5)	0.35
"Action"	17 (65)	19 (73)	15 (68)	20 (91)	18 (67)	23 (85)	16 (67)	21 (87.5)	
Current Exercise habits									
"Pre-action"	15 (58)	12 (46)	9 (41)	9 (41)	16 (59)	15 (56)	12 (50)	10 (42)	0.86
"Action"	11 (42)	14 (54)	13 (59)	13 (59)	11 (41)	12 (44)	12 (50)	14 (58)	

"Pre-action" = precontemplation, contemplation or preparation stages
"Action" = action or maintenance stages
‡P<0.05 for difference among groups at baseline.
†P<0.05 for difference after 3 months within group.

Table 5.3 Relationship of Stages of Change to Weight Change

Weight Control Stages of Change	Class + In-person Group (n=26)		Class + Internet Group (n=22)		Tailored + In-person Group (n=27)		Tailored + Internet Group (n=24)	
	Weight Change after 3 months (kg)	P-value*	Weight Change after 3 months (kg)	P-value*	Weight Change after 3 months (kg)	P-value*	Weight Change after 3 months (kg)	P-value*
Dietary Fat								
"Pre-action"	+0.32 ± 3.60	0.68	NA	NA	NA	NA	NA	NA
"Action"	-1.17 ± 0.74		-0.12 ± 0.82		-0.28 ± 0.70		-1.28 ± 0.75	
Fruits and Vegetables								
"Pre-action"	-1.31 ± 1.11	0.85	-0.49 ± 1.05	0.49	-0.41 ± 0.92	0.86	-0.89 ± 0.91	0.43
"Action"	-1.04 ± 0.94		+0.59 ± 1.24		-0.15 ± 1.09		-2.12 ± 1.30	
Portion Control								
"Pre-action"	-1.28 ± 1.12	0.82	-0.72 ± 1.39	0.50	+1.13 ± 1.13	0.12	-0.41 ± 1.22	0.38
"Action"	-0.97 ± 0.94		+0.41 ± 0.99		-1.08 ± 0.88		-1.74 ± 0.92	
Beverages								
"Pre-action"	-0.40 ± 1.37	0.49	+2.67 ± 2.52	0.25	+1.48 ± 1.76	0.27	-0.83 ± 0.78	0.08
"Action"	-1.48 ± 0.81		-0.40 ± 0.84		-0.65 ± 0.75		-4.65 ± 2.03	
Current Exercise habits								
"Pre-action"	-1.29 ± 1.03	0.86	-0.63 ± 1.27	0.58	+0.45 ± 0.92	0.24	-1.71 ± 1.15	0.62
"Action"	-1.03 ± 1.04		+0.35 ± 1.14		-1.23 ± 1.08		-0.98 ± 0.98	

Weight change expressed as mean ± SE.
"Pre-action" = precontemplation, contemplation or preparation stages at 3 months
"Action" = action or maintenance stages at 3 months
*Significance of difference of "pre-action" versus "action" weight change
NA=Not available because all subjects within group classified into action.

Discussion

The purpose of this study was to evaluate changes in SOC for five weight control behaviors after 3 months in overweight and obese military service personnel participating in a weight loss study and to determine if there was a significant relationship between each SOC and weight loss. The primary finding was that SOC for five weight control behaviors were not associated with weight loss. Furthermore, SOC for portion control was the only behavior where subjects advanced significantly into the action stage after 3 months. This was the first study, to our knowledge, to assess multiple stages of change for weight control in military service members. Furthermore, it was the first study to assess stages of change for beverage choices.

Overall, the majority of all subjects at baseline (>50%) were at least in the preparation stage for all five weight control behaviors (Table 5.1). This is important because it is recommended that individuals should be in at least preparation if not the action stage for a behavior before a weight control intervention is implemented (30). However, there were several individuals in each group who were classified in the precontemplation and contemplation stages especially for portion control (n=38), fruits and vegetables (n=26), and beverages (n=24) (Table 5.1). Thus, changing their weight control behaviors may not have been appropriate for them at this time.

Furthermore, higher proportions of action and maintenance for SOC may have been falsely inflated because the majority of subjects in the study were also in a mandatory military program to lose weight. Overall, 47% of the subjects were classified in the action or maintenance stage for exercise. However, since many of the subjects were mandated to exercise in accordance to the military weight management program, we

decided to also assess their exercise habits prior to mandatory exercise. As expected, only 35% compared to 47% were in the action or maintenance stage prior to the mandated exercise.

The results for dietary fat stage of change revealed that the majority of individuals were classified in action and maintenance. Dietary fat classification had the least heterogeneity among individuals and groups of the five behaviors assessed for stages of change. One possibility is that individuals may be answering the questions with a belief that they are truly engaging in fat reducing behaviors but may not actually be executing these behaviors. Another possibility is that the message to eat less fat has been exploited in the past and it may have become a negative connotation with individuals and thus they may be less likely to report their true intake of fat. It is not uncommon for overweight or obese individuals to underestimate their food intake (109, 110). In particular, individuals tend to underestimate their fat intake (111). Although the exact cause is unknown, previous research has revealed that the majority of individuals tend to be staged in action and maintenance when assessing stages of change for dietary fat (57, 59).

Assessing stages of change progression or relapse is important for program evaluation as well. The changes in SOC may reflect intermediate outcomes. Previous research has suggested the assessment of "partial behavior change" using stages of change in cost-effectiveness analyses of behavioral interventions (112). Stages of change may offer a more sensitive detection of behavior change than other types of objective measurements. However, an individual may advance into a higher stage of change for a behavior but not have this change equate into an objective change such as weight loss (26).

Significant progression into action was observed in all groups for portion control possibly because it was a major focus of both the tailored counseling sessions and in the standard, classroom sessions. The standard weight loss class provided by the Army contains a large focus on how to control portion sizes. Furthermore, portion control was the most problematic behavior when assessed by the stages of change instrument and had the most individuals classified in the 'pre-action' stages at baseline (Table 5.1, Table 5.2). Thus, portion control was emphasized by the dietitian during the tailored counseling sessions. However, there were no significant differences detected for forward progression into the action stage among groups.

Regardless of weight loss treatment type, theoretically, those individuals in the action SOC should be engaging in behaviors that may eventually result in change and weight loss. Yet, other studies utilizing SOC for weight control detected advances in SOC over time but no significant relationship between SOC and weight loss (26, 90). For example, Jeffery et al. assessed weight change and SOC for weight control yearly in adult women over a 3 year period (26). The results revealed that there was no significant association between SOC and weight change. Furthermore, women in the contemplation stage lost weight while those in the action stage gained weight after 1 year. Macqueen et al. assessed SOC for weight control in overweight and obese men and women to determine its association with weight loss (90). There was no significant correlation between the SOC score and weight loss in subjects after 4-6 weeks.

Despite the numerous studies using the SOC in dietary and physical activity interventions, not all of them have reported positive results or associations of SOC with outcomes (26, 72, 89, 90). Some experts have even criticized the use of the stages of

change for changing dietary and physical activity behaviors (91-94). Such criticisms include that: 1) nutrition and exercise are not necessarily 'addictive behaviors' that can be clearly defined, 2) there is no consistent method for staging individuals, 3) behavior is complex and cannot be simplified into 5 stages, and 4) there are discrepancies between perceived behavior and actual behavior (91-93). We attempted to alleviate some of these issues by using components of previous validated SOC instruments and by assessing five stages of change for weight control rather than one. However, our tailored intervention based on SOC for weight loss was not superior to the nontailored, classroom approach for advancing individuals into the action SOC for any of the weight control behaviors.

One major reason for not detecting significant advances into the action SOC or being able to associate the action SOC to weight loss may be due to the complex nature of obesity and the potential influence of the environment on behavior. The SOC are intended for an individual level of behavior change. However, more recently, experts have highlighted the importance of ecological models of health behavior interventions for obesity (75-79). Ecological models consider the interaction between people and their environments. Booth et al. identified several environmental factors that are key influences on nutrition and physical activity such as local government, schools, community, employers, family, and the food and restaurant industry (75) . For example, soldiers may have the desire to eat healthier but if there are no healthy food choices available to them at their military base, they may opt for higher calorie choices. Furthermore, if they had little or no support from family, friends or colleagues, they may not have been able to succeed in their weight loss attempts. In addition, Army policy

mandates a weight control program if weight standards are not met. Hence, there are numerous other factors that may have been influencing the outcomes of this study.

Another explanation for the lack of significant difference between action and pre-action associated weight change is that SOC may not have been assessed frequently enough. We only assessed SOC at 3 month intervals and may have missed changes in SOC that occurred between intervals. For instance, individuals in the preparation stage could have advanced into action after 1 month and lost weight but then relapsed into a lower stage before we assessed them at 3 months. Thus, their 3 month SOC would have been assessed as "pre-action" but, they also would have lost weight. To the contrary, an individual may have just recently advanced into the action stage for one or more weight control behaviors but it may not have been for a long enough period of time to detect changes in body weight or other measures at their 3 month appointment. Thus, they may have been assessed in the "action" stage, but were not in it long enough yet to actually experience weight loss. Some studies have assessed SOC at earlier time intervals such as 5 weeks or 2 months (24, 72). Furthermore, the majority of previous studies have been cross-sectional rather than longitudinal, thus little evidence is available to determine the impact of SOC on quantitative outcomes over time (91).

Although previous studies have collapsed the SOC into two categories similar to our study, our results may have varied if stages were collapsed differently (30, 108). For instance, many individuals who were exercising regularly may have been staged in preparation because they were not meeting a goal of 30 minutes of exercise each day for at least 5 days per week. Specifically, if they were exercising for 3 or 4 days a week, then they were classified in the preparation stage. The results when relating weight loss

to SOC for exercise indicate that those in pre-action for three of the four treatment groups faired better, but not significantly, in regards to weight loss (Table 5.3). Thus, the magnitude of weight loss according to SOC for exercise may have been different if preparation was included as "action" rather than "pre-action". In addition, only the 3 month weight change data were used in the analysis of SOC association with weight change. Different results may materialize once the final 6 month data become available for analysis.

Forward progression of individuals into the action stage was observed, but not significant, in most cases for the five weight control behaviors over time. This was promising because this may equate to dietary and/or weight loss over time. However, because weight loss is the result of multiple factors and changes, attempting to associate one single behavioral stage of change with weight loss may not have been powerful enough to detect a significant association. Specifically, some behaviors may not promote weight loss alone but rather in combination with other behaviors. Previous research has indicated that time spent in action or maintenance for five total weight control behaviors is associated with weight loss (106). Thus, it may have been more prudent to develop a model utilizing all five of the behaviors and associating them to weight loss as a cluster over a longer period of time.

In conclusion, portion control was the only weight control behavior where subjects advanced significantly into the 'action' stages after a 3 month weight loss intervention. There was no significant relationship between SOC and weight loss after 3 months for any of the weight control behaviors. Although further evidence should be assessed at 6 month, these results indicate that SOC for weight control may not be

enough to assist military service members in losing weight and/or that SOC are not strong predictors of weight loss. These are both valid arguments. Motivations by military service members to lose weight may sometimes be related to other environmental forces including the food choices in their environment, social support and/or policies within the Army such as the mandatory Army Weight Control Program. Thus, the complex interaction of a military service member's weight control behaviors and their environment warrants further exploration. Furthermore, some experts have argued that SOC may be more useful for understanding behavior rather than predicting behavior change. Less longitudinal and quantitative evidence is available relative to the vast amount of cross sectional and qualitative research conducted on SOC for dietary and physical activity interventions to determine these relationships (94).

At minimum, the relationship of SOC for portion control habits and weight loss should be further explored because it was the only behavior to significantly change in military service members after 3 months. Furthermore, an effective weight control program for military service members may need to go beyond the individual level of intervention and consider environmental influences in the quest to improve military weight management programs.

Chapter VI. Conclusions

Major findings

It was expected that the 'Tailored + Internet' group would lose significantly more weight and body fat and concurrently have the most improvement in waist circumference, blood lipids, blood glucose, blood pressure, SOC and diet over 3 months when compared to the other groups. There were no significant differences among the four treatment groups on any of the outcomes after 3 months for those completing the study (n=123). However, there were notable and positive changes within the 'Tailored + Internet' group. Subjects lost an average of 1.33 kg over 3 months ($p<0.05$). Body mass index was reduced by 0.41 kg/m^2. Body composition was improved with respect to weight loss. Specifically, there were statistically significant reductions in total, trunk and percent body fat after 3 months indicating a healthy approach to weight loss. Furthermore, the 'Tailored + Internet' group had a significant reduction in waist circumference.

While the 'Class + In-person' group (current nutrition and exercise educational component of the AWCP) also experienced comparable weight losses and reductions in BMI at 3 and 6 months to the 'Tailored + Internet' group, they also had significant loss in lean body mass after 3 months. Thus, their weight change may be partially attributed to loss of lean body mass rather than body fat. Accordingly, they did not have significant reductions in body fat measurements or waist circumference. This may indicate that they were not making healthy changes (e.g. exercising, not fasting, eating at least 1200 kcal/day) as recommended to preserve lean body mass.

It is most likely that changes in the risk factors associated with obesity

(comorbidities) were not observed in any of the groups secondary to the modest weight loss of <2% over the 3 months. Furthermore, when main effects of dietary treatment and follow up counseling method were examined, no significant differences existed.

Although not statistically significant between groups, subjects significantly progressed forward into the action stage for portion control in all groups after 3 months but not for the other weight control behaviors. Being in the action stage for each weight control behavior was not significantly associated with more weight loss than being in the pre-action stages after 3 months.

In conclusion, although not statistically different from the other treatment approaches, the 'Tailored + Internet' group had positive changes in weight loss, body mass index and body composition after 3 months. Further research is warranted to determine what factors or treatments are most effective for weight loss in a military population. Several levels of intervention beyond an individual level, such as those found in an ecological model of health behavior, may be needed within a military weight management program because of the numerous environmental factors that may affect weight loss. Other methods of weight loss follow up counseling should continue to be explored in light of the perpetual challenge to provide follow up with active duty military service members.

Strengths

The strengths of the study were that it was a longitudinal study with multiple clinical outcomes that were measured by standard equipment and techniques. Anthropometric, body composition, clinical, dietary and behavioral measures were

collected during analysis to provide insight into the various changes over 6 months.

Furthermore, the study was successful in developing an interactive, secure website and an innovative, interactive behavioral-based instrument with a corresponding treatment scheme for use in the management of weight loss in the military. It is the first study to our knowledge to closely evaluate the standard dietary intervention of the Army Weight Control Program and to assess stages of change for beverages along with four other weight control behaviors.

Limitations

Limitations of the study include that subjects were free living and could be exposed to outside information. The final attrition rate was higher than anticipated although the rate was not uncommon for a weight loss study. However, 40% of participants dropped out due to military related reasons. There was also potential error introduced from using self-reported dietary data. Inter-rater error could have also existed because of the involvement of three other registered dietitians in providing the intervention. However, one primary dietitian provided more than 90% of the treatment over 6 months.

Caution should be used in extrapolating the data not only to the U.S. population but to the Army itself. Walter Reed Army Medical Center (WRAMC) is not necessarily representative of all Army bases because of its high concentration of health and administrative professions, thus further research should be conducted at other installations.

The study was not designed to offer frequent treatment which may be warranted. It was also not developed to evaluate weight loss and weight maintenance

over a longer period of time which is a huge gap in obesity research.

Future Directions

During the study, we observed that there were some strong and specific reasons that motivated the subjects to lose weight. Surveys conducted with individuals in the National Weight Control Registry (a group of over 700 men and women able to sustain at least 30 lbs of weight loss for at least 1 year) reveal that there are common triggers among individuals that instigate successful weight loss. The most common trigger among women was related to emotions while the most common among men was related to medical reasons (100). Our subjects did informally report various motivations for weight loss such as job promotion, schooling, marriage, family etc. however we cannot link these triggers to long term success because they were not assessed. Furthermore, it was not the primary objective to investigate motivation to lose weight although it appears to be an important trigger and predictor of success. If motivation is a key predictor of success for weight loss, it would seem prudent to further explore methods to trigger and increase internal and/or external motivators.

The military is a unique population with respect to weight control. Not only do soldiers have specific job related pressures to maintain weight but they have a unique set of stressors influencing their behaviors. Individuals in the military are at constant alert especially in war time. Job duties can change instantly thus inducing stress related to moving, family and life in general. Further research should explore the different types and impact of stressors unique to the military population and how these stressors can be managed for weight management.

Several of the subjects (% unknown) in the study were enrolled because of

recent weight gain secondary to physical injury. It seems that a preventive intervention should be considered to educate soldiers on how to prevent weight gain when they are injured and cannot exercise as usual.

Other methods of technology such as the use of cellular telephones and electronic mail should be further explored in delivering weight management interventions. An overwhelming majority of our research subjects used cell phones and electronic mail in daily communication. This may be a more feasible option than an Internet based program.

Although Internet use for weight loss is highly touted as a novel option for weight control in civilian and more recently military populations, further characteristics (such as marital status and education level) should be determined about successful users of these programs. It was clear from our results that an Internet account is not desirable or useful to all individuals. Furthermore, the subjects reported lack of time, forgetfulness and lack of Internet access at work as barriers to using the weight management website. These barriers need to be addressed before implementing an Internet based weight management program for military personnel.

Finally, it cannot be denied that obesity is a multifaceted disease that can be affected by numerous factors. Our study was developed to intervene on an individual level of behavior change. However, more recently, experts have highlighted the importance of ecological models of health behavior interventions for obesity (75-79). Ecological models consider the interaction between people and their environments. There are several levels of influence within an ecological model of health behavior including the following factors: 1) intrapersonal/individual, 2) interpersonal, 3)

institutional, 4) community and 5) policy (80). One specific example was indicated by the food environment's influence on subjects' eating habits as indicated by their food records. Subjects working at WRAMC most often ate 1-2 of their meals at WRAMC. Thus, their diet could be easily influenced by the food choices offered at work. Unfortunately, fast food restaurants were readily available and highly desirable to many of the research subjects making it more difficult for them to lose weight. It is important that the environment be altered to offer healthier choices and/or that individuals should be educated and provided with nutrition information about the food choices available to them so that they can make healthier choices. Furthermore, if subjects had little or no support from family, friends or colleagues, they may not have been able to succeed in their weight loss attempts. In addition, the AWCP is an Army wide policy that mandates military personnel to take action if they exceed certain weight standards. Thus, it is essential that the military considers the multiple levels of environmental impact when developing weight management interventions.

APPENDIX A
Cognitive Interviewing Questions

Overview for cognitive interview:

This interview will take approximately 1 hour of your time.

I will be asking you to complete a questionnaire on a computer screen. It contains ~30 questions.

I will be asking you to stop at certain points to ask you questions about how you have responded to the questions.

There are no right or wrong answers to the questions. We are primarily interested in how you determine your answers rather than your answers themselves.

Your responses are very important, even if they are just small details, because they will help provide us with feedback on how to better construct our questionnaire.

Standard Probing Questions

FAT
*Most is equal to 4 out of seven days of a week.

1. Do you avoid high fat meats such as red meat, regular hot dogs, bacon and regular lunch meats most* days of the week?

How did you determine your answer?
What does "high fat meat" mean to you?
What does "red meat" mean to you?
Are the answer choices sufficient?
When you answered the question, did you consider "Most" days of the week?

2. Do you avoid fried foods such as fried chicken, fish and French fries most days of the week?

What does "fried food" mean to you?
How did you arrive at your answer/determine how much fried food you ate?

3. Do you avoid fast foods most* days of the week?
What does "fast food" mean to you?
How did you arrive at your answer?

4. Do you remove the skin from chicken and turkey most* times during of the week when you eat them?
How did you arrive at your answer?

5. Do you trim the fat off of meat most* times during the week when you eat it?

What does "meat" mean to you?
How about "trim the fat off"?

6. Do you avoid snacks such as regular potato chips, corn chips and nuts most* days of the week?

What does the word "snacks" mean to you?
Did any other snacks come to mind?
How did you arrive at your answer?

7. Do you avoid baked goods such as cake, cookies, pies, donuts and pastry most* days of the week?

What does "baked goods" mean to you?
Did any other baked goods come to mind? Brownies, muffins?

8. Do you avoid using butter and margarine on bread, rolls, muffins or bagels most* days of the week?

How did you arrive at your answer?
Are there any other foods that you add butter and margarine to besides bread, rolls etc.? such as vegetables?

9. Do you avoid chocolate candy or chocolate dessert most* days of the week?

What does "chocolate candy" mean to you?
How about "chocolate dessert"?
How did you arrive at your answer?

10. Do you replace regular dairy products with low fat or nondairy products such as skim or 1% milk, low fat or nonfat ice cream, yogurt and cheese even if making a milkshake or other recipes with dairy most* days of the week?

Was this question easy or hard to answer?
How did you arrive at your answer?
Is this question too long?
What does "nonfat" and "low fat" mean to you?

11. Do you replace regular salad dressing, gravy and mayonnaise with low fat or nonfat versions most* days of the week?

Was this question easy or hard to answer?
How did you arrive at your answer?
Were there too many foods grouped together in this question?

FR/VEG

Think about your breakfast, lunch, dinner and snacks. On average, how many servings do you eat per day of:

Fruit:

Vegetable:

What does the word "serving" mean to you?
How did you arrive at this many servings?
Do the serving size examples help you to answer this question?
How sure are you of your answer?

EXERCISE

Exercise includes activities such as physical training (PT), calisthenics, full court basketball, flag football, road marching, brisk walking, jogging, swimming, aerobic dancing, biking, rowing, etc. Activities that are primarily sedentary such as police call, softball, rifle range, bowling or playing golf with a golf cart would not be considered exercise.

Do you <u>currently</u> exercise for at least 5 days a week for at least 30 minutes total each day?

Is this question easy or difficult to answer?
What does the word "exercise" mean to you?
How did you determine how often you exercise?
How sure are you of your answer?

Are you <u>currently</u> required to do PT with your unit?

Prior to mandatory exercise/PT enforced by your unit, did you exercise for at least 5 days a week for at least 30 minutes each day?
What does "PT" and "your unit" mean to you?

PORTION CONTROL

Think about your eating habits and how you control your portion sizes.

1. Do you control the amount of food you eat by taking at least 20 minutes to eat each meal most days of the week?

How did you answer in regard to "Most" days of the week?
What does "control the amount of food that you eat" mean to you?
What does the word "meal" mean to you?
How did you arrive at your answer?

2. Do you control the amount of food you eat by stopping eating when you feel full each time you eat most days of the week?

Was this question easy or difficult to answer?
What does "feel full" mean to you?

3. Do you control the amount of food you eat by avoiding eating when you are feeling nervous, stressed, depressed or upset most days of the week?

What does "avoiding eating" mean to you?
What do the terms "nervous, stressed, depressed or upset" mean to you?

4. Do you control the amount of food you eat by resisting the urge to clean your plate when you are full at each meal most days of the week?

What does “clean your plate” mean to you?
How did you arrive at your answer?

5. Do you control the amount of food you eat by drinking a glass of water before each meal most days of the week?

Was this question easy or difficult to answer?
What does “glass of water” mean to you?
How did you arrive at your answer?

6. Do you control the amount of food you eat by saying "no" to second helpings at each meal most days of the week?

What does “second helping” mean to you?

7. Do you control the amount of food you eat by tracking how much you eat during the day each day of the week?

What does “track how much you eat” mean to you? (by memory or paper)

8. Do you control the amount of food you eat by avoiding buffet style eating most days of the week?

What does “Buffet style eating” mean to you?
How did you arrive at your answer?

9. Do you control the amount of food you eat by buying smaller portions of foods at restaurants or the grocery store most days of the week?

What does “smaller portions” mean to you?
What about “restaurant” or “grocery store”?

10. Do you control the amount of food you eat by using smaller plates or bowls at each meal most days of the week?

Was this question easy or difficult to answer?
How did you arrive at your answer?

BEVERAGES

Think about your daily intake of the following beverages and check the types that you drink on a daily basis.
-Alcohol (beer, wine, wine cooler, mixed drink, liquor, etc.)
-Regular soft drinks (such as Pepsi, Coke, Mountain Dew, Sprite, etc.)
-Regular sweetened iced tea
-Sports drinks (such as Gatorade, PowerAde, etc.)
-Fruit flavored drinks (such as lemonade, fruit punch, Kool-Aid, regular Snapple, Sobe, etc.)
-Fruit juice (such as orange, apple, grape, etc.)
-Coffee drinks (such as regular latte, mocha, etc), Note: Coffee without sugar does not count.
-Other sweetened drinks (such as Red Bull energy drink, non-alcoholic mixed drinks, etc)

Do you drink less than or equal to 24 fl oz (two cans) of these a day?

Is this question easy or difficult to answer?
How did you determine how many fl oz you drink in a day?
How sure are you of your answer?
Do you drink any beverages that are not listed? Should we list beverages that would not count in this answer?

GENERAL Web site Questions:

Navigation Problems:

Color scheme of site:

APPENDIX B
Stages of Change Instrument

Army Interactive Nutrition & Fitness On-line
Nutrition & Fitness Prescription

Instructions:
Your answers are completely confidential and will only be used strictly during dietary counseling. Please be hones when answering each question.

The questionnaire consists of 37 questions divided into 5 categories (Dietary Fat, Fruits and Vegetables, Exercise, Portion Control and Beverages). You will receive feedback and tips on your nutrition and fitness habits after you complete all of the questions.

Please leave yourself at least half an hour to complete the survey. You will be asked to complete it several times throughout the study.

Please click "Start" to begin the questionnaire.

Section 1

DIETARY FAT

1. Do you currently eat red meat, regular hot dogs, bacon, ham or regular lunch meats?

NO=computer skipped to next question (maintenance=stage 5)
YES=computer prompted the following questions:

On average, how often do you eat [list of foods provided]?

- o Everyday or more than once per day
- o 4-6 days per week
- o 1-3 days per week
- o Less than 1 day per week

If answer was 1-3 days per week or Less than 1 day per week then prompted:
How long have you been limiting [list of foods provided]?

- o For more than 6 months (Maintenance=stage 5)
- o For less than 6 months (Action =stage 4)

If answer was 4-6 days per week or Everyday or more than once per day the prompted:
Do you plan on decreasing the number of times that you eat [list of foods provided] **to less than FOUR days per week?**

- o Yes, in the next 30 days (Preparation=stage 3)
- o Yes, in the next 6 months (Contemplation=stage 2)
- o No, I do not plan on it or have not thought about it (Precontemplation=stage 1)

2. Do you currently eat fried foods such as fried chicken, fish or French fries?

Same answer choices as question #1

3. Do you currently eat fast foods?
Same answer choices as question #1

4. Do you currently eat chicken or turkey?
NO=computer skipped to question #5 (maintenance=stage 5)
YES=computer prompted the following question:

When you eat chicken or turkey, do you ever remove the skin?
NO=computer skipped to 4b
YES=computer prompted 4a:
4a. How often do you remove the skin from chicken or turkey?

- o Every time that I eat them
- o At least half of the time
- o Less than half the time or NEVER

If answer was "Every time that I eat them OR At least half of the time" the prompted:
How long have you been removing the skin from chicken or turkey?

- o For more than 6 months (maintenance=stage 5)
- o For less than or equal to 6 months (action = stage 4)

If answer was "Less than half the time or NEVER" then prompted:
4b. Do you plan on removing the skin from chicken or turkey at least half of the time when you eat them?

- o Yes, in the next 30 days (preparation=stage 3)
- o Yes, in the next 6 months (contemplation=stage 2)
- o No, not planning on it or haven't thought about it (precontemplation=stage 1)

5. Do you eat meat?
NO=skip to question #6 (maintenance=stage 5)
YES=computer prompted the following:

Do you trim the fat off of your meat?
YES=prompted question 5a
NO=prompted question 5b

5a. On average, how often do you trim the fat off of your meat?

- o Every time that I eat it
- o At least half of the time
- o Less than half the time or NEVER

If answer was "Every time that I eat it OR At least half of the time" then prompted:
How long have you been trimming the fat off of your meat?

- o For more than 6 months (maintenance=stage 5)
- o For less than or equal to 6 months (action = stage 4)

If answer was "Less than half the time or NEVER" then prompted:
5b. Do you plan on trimming the fat from meat at least half the time when you eat it?

- o Yes, in the next 30 days (preparation=stage 3)
- o Yes, in the next 6 months (contemplation=stage 2)
- o No, not planning on it or haven't thought about it (precontemplation=stage 1)

6. Do you currently eat snacks such as potato chips, corn chips or nuts?
Same answer choices as question #1

7. Do you currently eat baked goods such as cake, cookies, pies, donuts or pastries?
Same answer choices as question #1

8. Do you currently use butter or margarine on your foods such as vegetables, bread, rolls or muffins?
Same answer choices as question #1

9. Do you currently eat chocolate candy such as candy bars?
Same answer choices as question #1

10. Do you currently eat dairy products such as milk, yogurt or cheese?
NO=computer skipped to next question (maintenance=stage 5)
YES=computer prompted the following questions:

Do you ever use low fat (1%) or nonfat (skim) dairy products instead of regular?
NO=computer skipped straight to question 10b.
YES=computer then prompted question 10a:

10a. On average, how often do you use low fat or nonfat dairy products instead of regular versions?

- o Every time that I eat them (go to question 10aa)
- o At least half of the time (go to question 10aa)
- o Less than half of the time or NEVER (go to question 10b)

If answer was "Every time that I eat them OR At least half of the time" then prompted:
10aa. How long have you been doing this?

- o For more than 6 months (maintenance=stage 5)
- o For less than 6 months (action=stage 4)

If answer was "Less than half of the time or NEVER" then prompted:
10b. Do you plan on replacing regular dairy products with low fat or nonfat versions at least half the time when you use them?

- o Yes, in the next 30 days (preparation=stage 3)
- o Yes, in the next 6 months (contemplation=stage 2)
- o No, not planning on it or haven't thought about it (precontemplation=stage 1)

11. Do you use regular salad dressing, gravy or mayonnaise?
Same answer choices as question #1

12. Do you currently eat ice cream or other frozen desserts?
Same answer choices as question #1

FINAL STAGE for Dietary Fat = sixth lowest stage of 12 stages when they are put in rank order

Section 2

FRUITS AND VEGETABLES
A serving of fruit or vegetable equals:

- ½ cup of cooked, canned or raw fruit or vegetables (the size of ½ of a baseball) OR
- 1 cup of raw, leafy greens such as lettuce OR
- 1 medium piece of fruit or vegetable (the size of a tennis ball) OR
- ¼ cup of dried fruit such as raisins (the size of a golf ball) OR
- ¾ cup (6 fl oz) of 100% fruit or vegetable juice

Think about your breakfast, lunch, dinner and snacks. On average, how many servings do you eat per day of:

Fruit: [drop down menu with choices of 0-10+ servings/day]
Vegetables: [drop down menu with choices of 0-10+ servings/day]

If total ≥ 5 servings per day then computer prompted:
How long have you been eating this many fruits and vegetables?
Answer options:
More than 6 months (maintenance=stage 5)
Less than 6 months (action=stage 4)

If total < 5 servings per day then computer prompted:
Do you plan on increasing your fruits and vegetables to at least 5 servings per day?
Yes, in the next 30 days (preparation=stage 3)
Yes, in the next 6 months (contemplation=stage 2)
No (precontemplation=stage 1)

Section 3

EXERCISE
Exercise includes activities such as physical training (PT), calisthenics, full court basketball, flag football, road marching, brisk walking, jogging, swimming, aerobic dancing, biking, rowing etc.

Activities that would NOT be considered exercise include police call, softball, rifle range, bowling or playing golf with a golf cart.

1. Do you currently exercise for at least 5 days a week for at least 30 minutes total each day?

- o Yes, I have been for more than 6 months (maintenance= "current" stage 5)
- o Yes, I have been for less than or equal to 6 months (action= "current" stage 4)
- o No, but I do exercise some, but not 5 days a week for at least 30 minutes each time (preparation= "current" stage 3)
- o No, but I am planning on starting in the next 6 months (contemplation= "current" stage 2)
- o No, I am not intending to or had not thought about it (precontemplation= "current" stage 1)

2. Are you currently required to do PT with your unit?

- o No=computer skipped to PORTION CONTROL section and no "prior"stage was determined
- o Yes, 1-3 times per week=computer skipped to PORTION CONTROL section and no "prior"stage was determined
- o Yes, 4-5 times per week= go to question #3 to determine prior stage
- o Yes, more than 5 times per week=go to question #3 to determine prior stage

3. Prior to mandatory exercise/PT enforced by your unit, did you exercise for at least 5 days a week for at least 30 minutes each day?

Yes, I was doing this for more than 6 months (maintenance= "prior" stage 5)
Yes, I was doing this for less than or equal to 6 months (action = "prior" stage 4)
No, but I did exercise some but not 5 days a week for at least 30 minutes each time (preparation = "prior" stage 3)
No, but I was planning on starting in the next 6 months (contemplation = "prior" stage 2)
No, I was not thinking to or have not thought about it (precontemplation = "prior" stage 1)

Section 4

PORTION CONTROL
Think about your eating habits and how you control your portion sizes.
Note: "MOST" = 4 of the 7 days of the week

1. During most days of the week, do you control the amount of food that you eat by taking at least 20 minutes to eat each meal?

- o Yes, I have been doing this for more than 6 months (maintenance=stage 5)
- o Yes, I have been doing this for less than 6 months (action=stage 4)
- o No, but I am planning on starting in the next 30 days (preparation=stage 3)
- o No, but I am planning on starting in the next 6 months (contemplation=stage 2)
- o No, I am not planning on it or have not thought about it (precontemplation=stage 1)

2. During most days of the week, do you control the amount of food that you eat by stopping eating when you feel full each time you eat?
Same answer choices as question #1

3. During most days of the week, do you control the amount of food that you eat by avoiding eating when you are feeling nervous, stressed, depressed or upset?
Same answer choices as question #1

4. During most days of the week, do you control the amount of food that you eat by saying "no" to second helpings at each meal?
Same answer choices as question #1

5. During most days of the week, do you control the amount of food that you eat by drinking a glass of water before each meal?
Same answer choices as question #1

6. During most days of the week, do you control the amount of food that you eat by saying "no" to second helpings at each meal?
Same answer choices as question #1

7. During most days of the week, do you control the amount of food that you eat by writing down everything you eat during the day?
Same answer choices as question #1

8. During most days of the week, do you control the amount of food that you eat by avoiding buffet style eating?
Same answer choices as question #1

9. During most days of the week, do you control the amount of food that you eat by buying smaller portions of foods at the grocery store?
Same answer choices as question #1

FINAL STAGE for Portion Control = Median stage (or 5th lowest stage) calculated from of all stages from above questions

Section 5

BEVERAGES
Think about your daily intake of the following beverages.

- Alcohol (beer, wine, wine cooler, mixed drink, liquor etc.)
- Regular soft drinks (such as Pepsi, Coke, Mountain Dew, Sprite etc.)
- Regular sweetened iced tea
- Sports drinks (such as Gatorade, PowerAde etc.)
- Fruit flavored drinks (such as lemonade, fruit punch, Kool-Aid, regular Snapple, Sobe etc.)

- Fruit juice (such as orange, apple, grape, etc.)
- Coffee drinks (such as regular latte, mocha etc.)
- Other sweetened drinks (such as Red Bull energy drink, non-alcoholic mixed drinks etc.)

1. Do you currently drink alcohol?
NO=computer skipped to next question in section
YES=computer prompted question:
On average, how often do you usually drink [beverage name]?
Drop down menu provided options:
- 2+ times per day 1 time per day
- 4-6 times per week
- 1-3 times per week
- Less than 1 time per week

(Corresponding calories for selection were calculated based on each frequency and table below)

2. Do you currently drink regular soft drinks?
Same answer options as #1 but corresponding calories may differ

3. Do you currently drink regular sweetened iced tea?
Same answer options as #1 but corresponding calories may differ

4. Do you currently drink sports drinks (NOT counting sports waters such as Propel)?
Same answer options as #1 but corresponding calories may differ

5. Do you currently drink fruit flavored drinks?
Same answer options as #1 but corresponding calories may differ

6. Do you currently drink fruit juice?
Same answer options as #1 but corresponding calories may differ

7. Do you currently drink coffee drinks? Note: Coffee without sugar does not count.
Same answer options as #1 but corresponding calories may differ

8. Do you currently drink other sweetened drinks?
Same answer options as #1 but corresponding calories may differ

Computer calculated calories based on answers above and table below:

Beverage (Average calories per serving)	2+ times per day	1 time per day	4-6 times per week	1-3 times per week	Less than 1 time per week
Alcohol (150 kcal)	300 kcal	150 kcal	107 kcal	43 kcal	0
Regular Soft Drinks (150 kcal)	300 kcal	150 kcal	107 kcal	43 kcal	0
Regular Sweetened Tea (100 kcal)	200 kcal	100 kcal	71 kcal	29 kcal	0
Sports Drinks (120 kcal)	240 kcal	120 kcal	85 kcal	34 kcal	0

Fruit Flavored Drinks (120 kcal)	240 kcal	120 kcal	85 kcal	34 kcal	0
Fruit Juice (120 kcal)	240 kcal	120 kcal	85 kcal	34 kcal	0
Coffee Drinks (250 kcal)	500 kcal	250 kcal	178 kcal	71 kcal	0
Other Specialty Drinks (110 kcal)	220 kcal	110 kcal	79 kcal	31 kcal	0

FINAL STAGE for Beverages =

If average daily calories <250 calories/day then computer prompted:
How long have you been limiting these beverages in your diet?

- For more than 6 months (maintenance=stage 5)
- For less than 6 months (action=stage 4)

If average daily calories ≥ 250 calories/day then computer prompted:
Do you plan on decreasing the amount of these beverages to less than 24 fl oz total per day?

- Yes, in the next 30 days (preparation=stage 3)
- Yes, in the next 6 months (contemplation=stage 2)
- No, do not plan on it or haven't thought about it (precontemplation=stage 1)

END OF SURVEY
"You have completed all of the questions for your Nutrition and Fitness Prescription. Press the "Previous" button to review your questions, or Press "Finish" to proceed to the results.

Overall Final Stages Provided to Dietitian and Study Coordinator Only:

Stages of Change Profile for Weight Control Behaviors				
Portion Control	**Beverages**	**Dietary Fat**	**Fruits and Vegetables**	**Exercise**
Stage #	Stage #	Stage #	Stage #	Current-stage # Previous-stage #

APPENDIX C

"Message Library"

Sample Weight Control Intervention Messages based on Processes of Change

[These messages were merged together and provided to soldiers in the TBI groups (either in person or via the Internet) once they complete the stages of change instrument. Multiple tips will be available in each behavioral area and rotated so that soldiers will not receive stale information if they do not advance in a stage over a few months. In addition, an introductory message recognizing their "stage" will be used so that the information does not appear choppy when merged together.]

DIETARY FAT

-Precontemplation

Consciousness raising

- A high fat diet can cause weight gain and an increased risk of heart disease.
- Fat contains the most concentrated amount of calories compared to other nutrients such as protein or carbohydrate.
- Watch out for foods that contain the words "fried, crispy, battered, breaded, creamy or super-size" because they tend to be higher in fat and calories.

Dramatic relief

- Reducing the fat in your diet doesn't mean reducing the taste. There are many lower fat or fat free options out there. Many foods such as fruits and vegetables are naturally low in fat and taste great too.

Environmental reevaluation

- A diet high in fat can cause sleepiness and affect your work performance or time spent with family or friends.
- Choosing foods higher in fat may encourage others to eat these foods as well and increase their risk of weight gain and certain diseases.

-Contemplation

Self reevaluation

- Reducing the fat in your diet isn't as difficult as you may think. Making small changes such as eating less fast food or putting less salad dressing or mayonnaise on your food can reduce calories in your diet helping you to lose weight.

-Preparation

Self liberation

- Read food labels to help you track fat grams during the day so that you don't exceed your goal for the day.
- Identify one high fat food that you tend to eat often and set a commitment to reduce the amount of that food or replace it with a lower fat option.
- Limit red meat to 2 servings a week.

-Action

Counterconditioning

- *Include an "Instead of" lists with substitute suggestions*
- Try substituting lower fat dairy products, salad dressing, mayonnaise, sour cream for regular versions.
- Use lemon, a small amount of vinegar and oil or low fat salad dressing instead of regular salad dressing.
- Choose a side salad or a grilled chicken sandwich instead of higher fat items such as French fries, hamburger or fried chicken if you eat fast food.

Helping relationships

- Encourage other family members and friends to eat lower fat foods and meals with you. It will provide you with support and help everyone eat healthy.

- Purchase a low fat cookbook for the cook in your family or yourself to help make small changes during meal preparation.

Reinforcement management

- Reward yourself with new clothes, music or something you enjoy (non food related) when meeting your goal of eating lower fat. You deserve it!

Stimulus control

- Keep higher fat snacks (such as potato chips and corn chips) and foods (such as ice cream, doughnuts, cookies other desserts) out of sight and only purchase them in small amounts or packages if at all. Instead, be sure to stock up on lower fat foods such as fruits or vegetables and make them easy to access.
- If you are craving a favorite high fat food or snack, eat just a small portion to satisfy your taste and then put the food out of site.

-Maintenance (will use some Action tips to prevent relapse):

FRUITS & VEGETABLES

-Precontemplation

Consciousness raising

- A diet high in fruits and vegetables can help with weight loss and reduce your risk of high blood pressure and cancer.
- Fruits and vegetables are rich sources of vitamins and minerals and are naturally low in fat and calories.
- Fruits and vegetables are high in fiber and can help you feel full faster.
- *Produce for better health information on why to eat 5 A day*

http://www.5aday.com/html/colorway/colorway_home.php

Dramatic relief

- There is a wide variety of fruits and vegetables available for a variety of tastes. Fruits and vegetables don't have to be boring or bland—try a low fat yogurt based dip on the side.
- A diet with plenty of fruits and vegetables can help boost your immune system and possibly prevent you from becoming sick.

Environmental reevaluation

- Not keeping your home or work stocked with fruits and vegetables will prevent others from enjoying the benefits of a diet high in fruits and vegetables as well.

-Contemplation

Self reevaluation

- Eating five fruits and vegetables each day is easier than you think. Choosing a fruit for breakfast and a snack and a vegetable during lunch and dinner can help you achieve this goal without much effort.

-Preparation

Self liberation

- Set a weekly goal to gradually increase the number of fruits and/or vegetables that you eat. Your ultimate goal should be to eat at least 5 fruits and vegetables each day. Start slowly with adding a fruit and vegetable to one of your meals or snacks.
- Try eating one vegetarian (no meat) meal each day.
- Reconstruct your plate when eating so that at least half of it contains vegetables or fruit.

-Action

Counterconditioning

- Cut up or keep cut-up fruits and vegetables in your refrigerator for quick and easy snacks instead of other high fat snacks such as potato or corn chips.
- Some fruits are easy to take with you on the run such as bananas, apples and grapes for quick snacks instead of fast food or snacks from a vending machine.
- *Include an "Instead of" lists with substitute suggestions*
- Try eating a sliced apple instead of apple pie.
- Add fresh or frozen berries to frozen yogurt instead of eating ice cream.
- Sneak vegetables into recipes (soup, chili, pasta) or on sandwiches or salad.

Helping relationships

- Involve your family and friends in your goal to eating fruits and vegetables during the day. If you have children, have them help you prepare fruits and vegetables snacks. Encourage your friends to eat more fruits and vegetables as well so they can enjoy the benefits too.

Stimulus control

- Pack your lunch every day or a few days a week instead of eating out at work to ensure that you include at least one fruit and/or vegetable.
- Do your own grocery shopping to ensure that you purchase plenty of fruits and vegetables for the week so that they are readily available for you to eat.

-Maintenance (use some Action tips)

PORTION CONTROL

-Precontemplation

Consciousness raising

- Foods purchased at restaurants tend to contain more than one serving and can contribute excess calories to your diet.
- Eating too fast can cause you to eat more food than you typically would if you took 20 minutes to eat your meal. This can add calories to your diet and make it difficult to lose weight.
- Eating second helpings or always cleaning your plate can make you feel bloated and uncomfortable and can cause additional weight gain.

Dramatic relief

- Losing weight doesn't mean eliminating all of your favorite foods. All foods can fit in your diet, some may need to be in moderation.
- Learn to identify the difference between true hunger (needing to eat) and appetite (wanting to eat). If you have a craving or "appetite" for something, you can still eat that food but just a taste or a small amount.

Environmental reevaluation

- Eating larger portions could cause others to eat more too and possibly contribute to weight gain.
- Eating on the run or in a hurry takes away quality time from enjoying a meal with friends and family. Instead, plan at least 20 minutes to eat a meal.

-Contemplation

Self reevaluation

- Binge eating or eating large amounts of food at one time or too fast can not only make you feel uncomfortable and disappointed in yourself but can also cause weight gain. Learning to eat slowly and plan your meals ahead of time can help you from overeating.

-Preparation

Self liberation

- Set a goal to take at least 20 minutes to eat a meal.
- Drink a glass of water before meals to help you feel full faster.

- Eat a snack before you go grocery shopping so that you're not hungry and purchase more food or foods that are higher in calories.
- Purchase a kitchen scale and start weighing your food to help track your portions.

-Action

Counterconditioning

- Get up a few minutes earlier to provide time to eat a small breakfast rather than eating on the run or not eating breakfast at all. Eating breakfast can help prevent you from overeating later in the day.
- Be sure to eat at least 3 meals a day so that you do not become too hungry and overeat. Frequent, smaller meals with snacks are better than eating 2-3 large meals.

Helping relationships

- Split an entrée with a friend when eating out to help cut back on portion sizes.
- Learn to politely refuse high calorie foods and beverages at parties or special events. Let you friends and family know about you new lifestyle changes so they can help you achieve your goals.

Stimulus control

- Turn the TV off during dinner time to give yourself quiet time to eat and prevent overeating.
- Turn off your phone or schedule a lunch break to prevent interruptions during lunchtime and the possibility of rushing through lunch and eating too much food.
- Use the smallest plates and bowls that you have when eating to help control portion sizes.

-Maintenance (use some Action tips)

EXERCISE

-Precontemplation

Consciousness raising

- Regular exercise can help reduce blood pressure.
- Regular exercise can help control appetite.
- Exercise increases your metabolism.
- Exercise can protect against heart disease and stroke.
- Exercise strengthens bones and tones muscles.
- Exercise can reduce stress and depression.
- Exercise increases your resistance to stress and illness.
- Regular exercise can help lower your "bad" (LDL) cholesterol and increase your "good" (HDL) cholesterol.

Dramatic relief

- Find fun activities like canoeing, hiking or volksmarching to do with family and friends to increase your activity level and prevent boredom.

- Choose fitness activities you like, and that are convenient to you.

Environmental reevaluation
- Joining a team or exercise group, such as a softball team or a bicycling group, is a great way to have fun and encourage others to become more physically active.

-Contemplation
Self reevaluation
- Staying active year round can make preparing for your PT test easier.
- Scoring highly on your APFT can earn promotion points, and is a great bullet for an OER or NCOER.

-Preparation
Self liberation
- Set weekly workout goals (e.g. I will run for 30 minutes five times this week) to help you achieve your overall objective.
- Sign up for a 5 or 10k race or a bicycle ride and train for the event.
- List ways at work to move more, such as using "smoke breaks" to walk or climb stairs, and set a goal of doing these activities at least once each day.

-Action
Counterconditioning
- Try going for a walk or playing your favorite sport when bored or stressed out.
- Incorporate exercise into your vacations by playing volleyball at the beach, snorkeling, or hiking.
- Try taking the stairs instead of the elevator or escalator.

Helping relationships
- Working out with a friend can help keep your motivation level up.
- Joining an exercise class, such as an aerobics, spinning or kickboxing, can help motivate you to exercise regularly.
- Find a workout partner and set goals together.
- Take classes to learn a new sport like tennis, racquetball

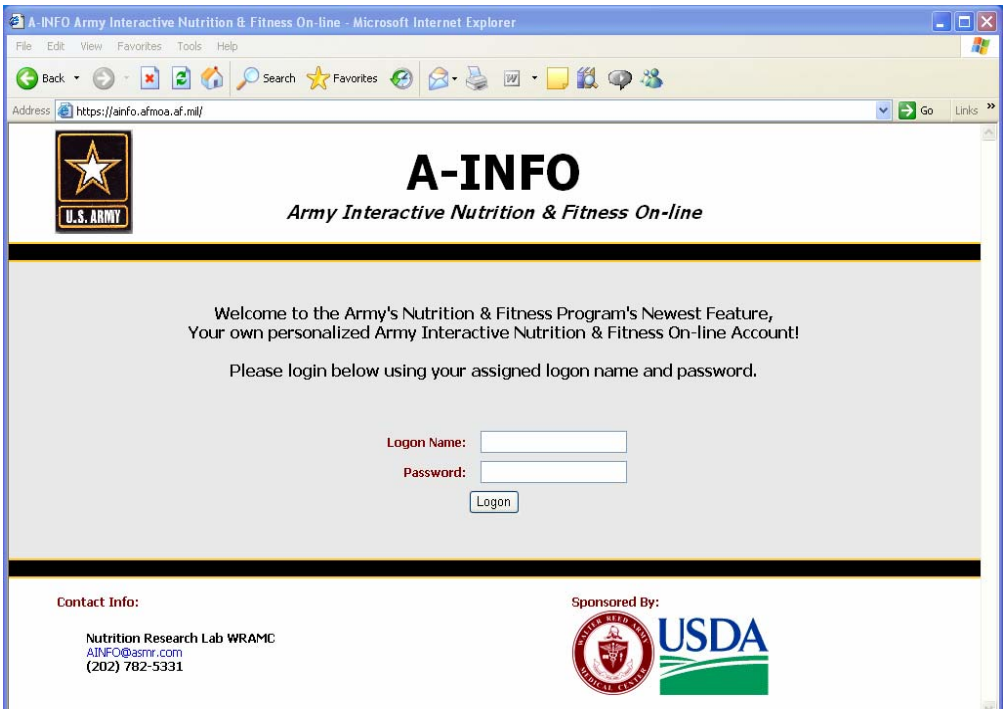
Reinforcement management
- Plan rewards for yourself after achieving fitness goals, such as buying a new CD, DVD, or clothing.

Stimulus control
- Place your gym bag or running shoes by the door or in the passenger seat of your car to help encourage you to workout.
- Change into your workout clothes immediately after coming home from work and don't take them off until you have worked out.

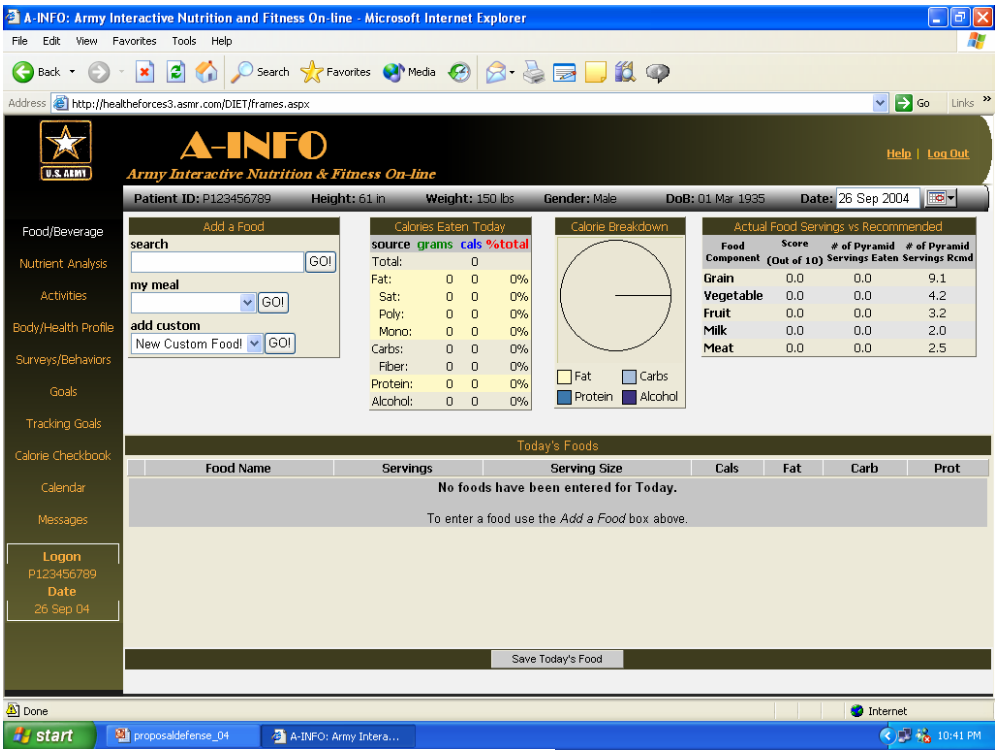
-Maintenance (use some Action tips)

- If you find your self getting bored with your workout routine, try a new sport such as racquetball or golf (without the cart).
- Join a workout class like spinning or water aerobics to decrease workout burnout

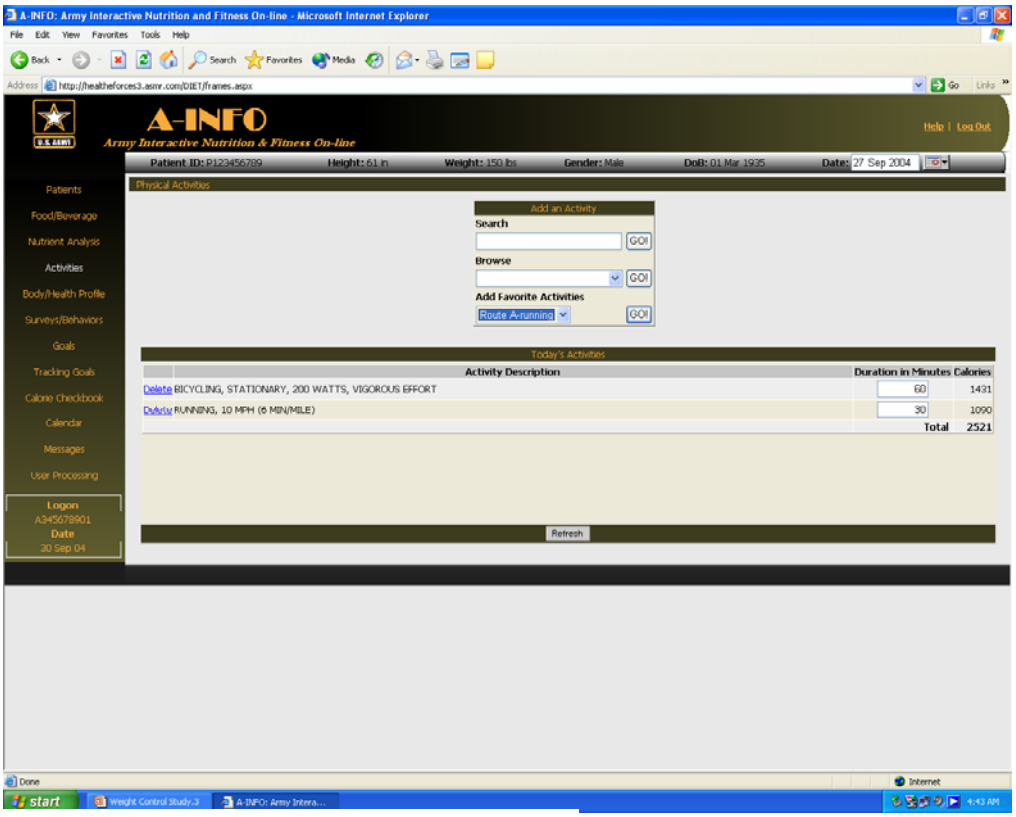
APPENDIX D
Sample Screen Shots of A-INFO



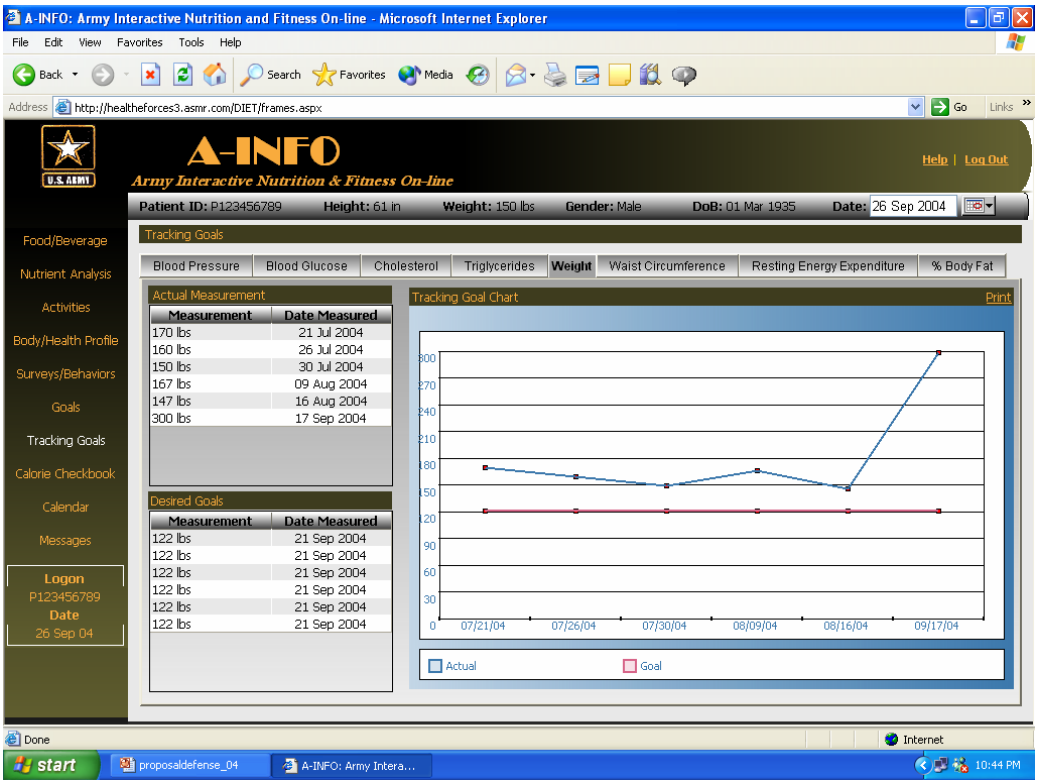
Screen 1. Login Screen



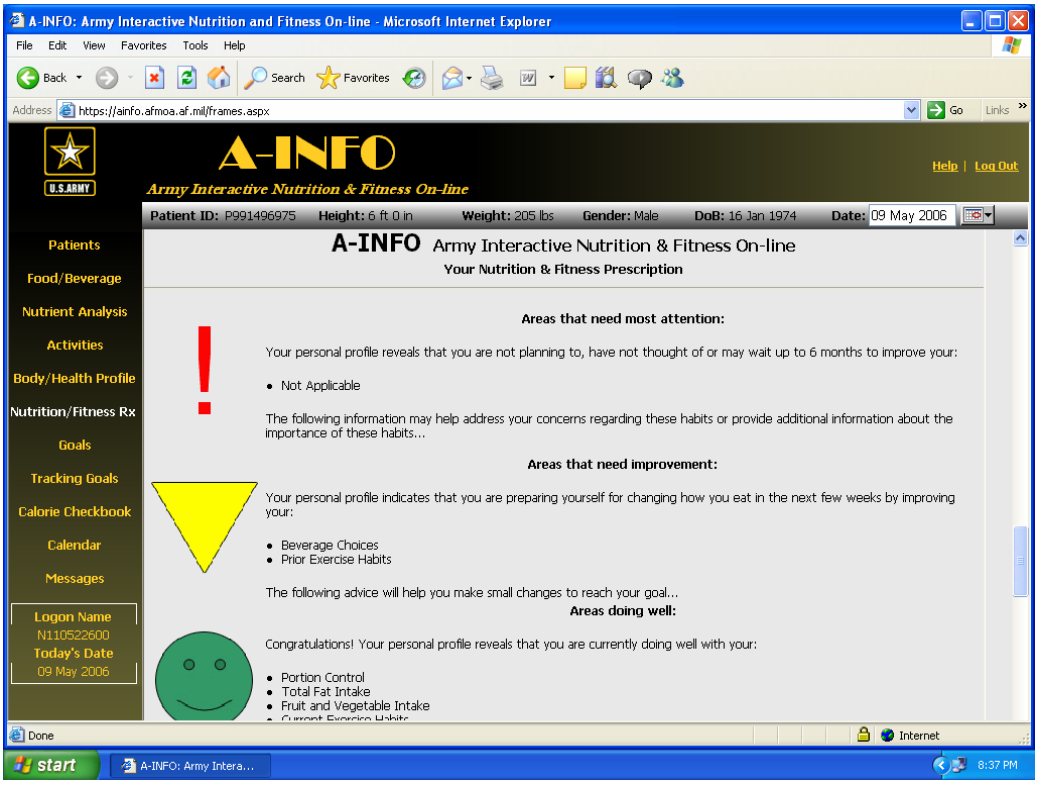
Screen 2. Diet/Beverage Entry Screen



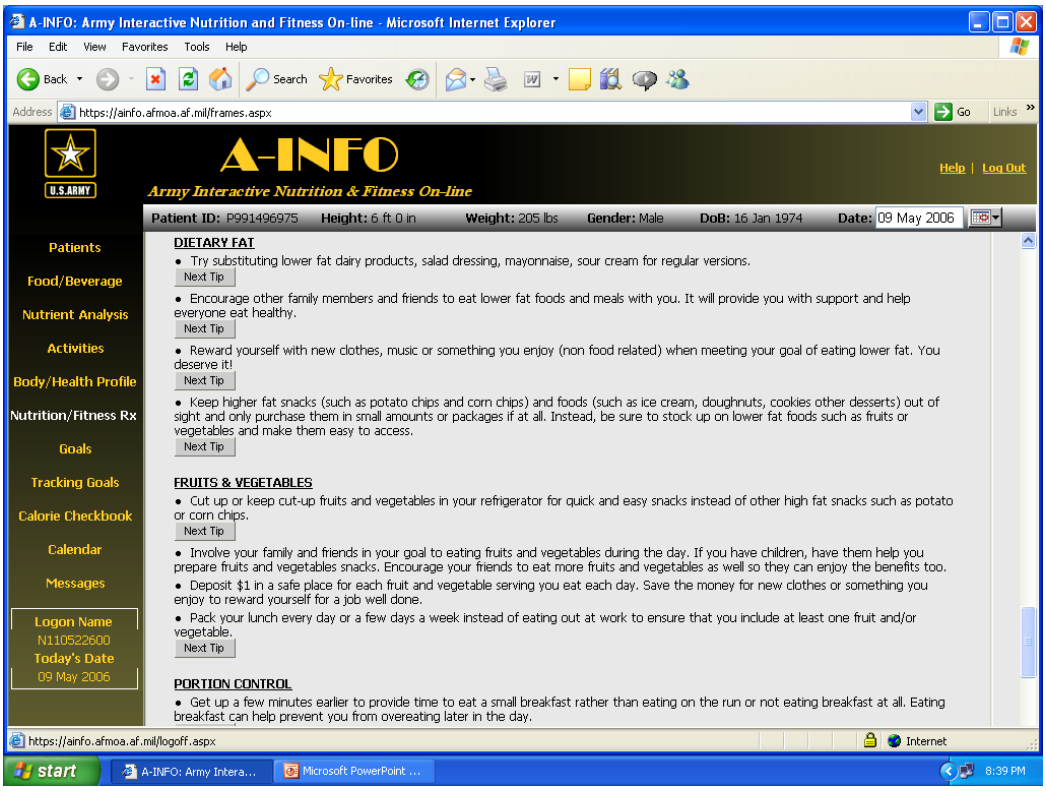
Screen 3. Physical Activity Entry Screen



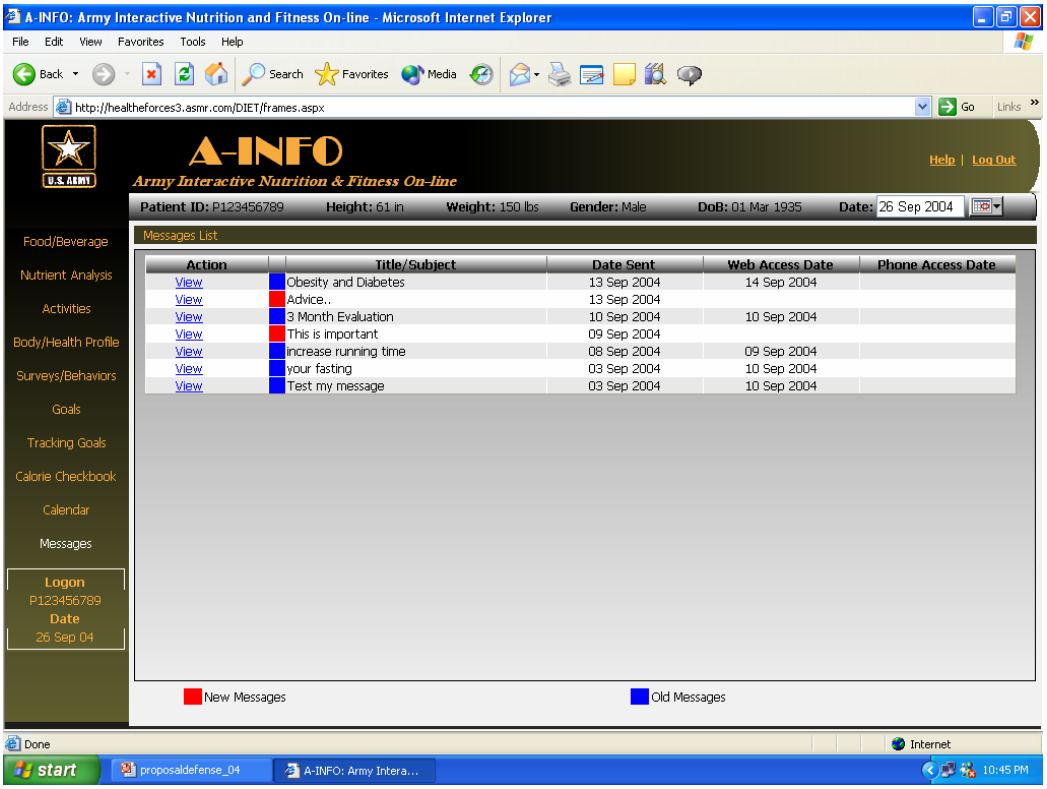
Screen 4. Goal Tracking Screen



Screen 5. Stage of Change Report



Screen 6. Weight Control Tips Based on Processes of Change



Screen 7. Message Screen Between Patient and Research Dietitian

APPENDIX E

UNIVERSITY OF MARYLAND
INSTITUTIONAL REVIEW BOARD

2100 Lee Building
College Park, Maryland 20742-5121
301.405.4212 TEL 301.314.1475 FAX

To:	Dr. Mark Kantor, Ms. Amy Mobley; Department of Nutrition and Food Science
From:	Roslyn Edson, M.S., CIP RE IRB Manager University of Maryland, College Park
Re:	Application Number and Project Title: 01581; "Evaluation of Behavioral Theory and Integrated Internet/ Telephone Technologies to Support Military Obesity and Weight Management Programs"
Approval Date:	March 10, 2005
Expiration Date:	March 10, 2006
Type of Application:	Initial
Type of Research	Nonexempt
Type of Review For Application:	Full Board

The University of Maryland, College Park Institutional Review Board (IRB) approved your IRB application. The research was approved in accordance with 45 CFR 46, the Federal Policy for the Protection of Human Subjects, and the University's IRB policies and procedures. Please reference the above-cited IRB application number in any future communications with our office regarding this research.

Recruitment/Consent: For research requiring written informed consent, the IRB-approved and stamped informed consent document is enclosed. The IRB approval expiration date has been stamped on the informed consent document. Please keep copies of the consent forms used for this research for three years after the completion of the research.

Continuing Review: If you want to continue to collect data from human subjects or analyze data from human subjects after the expiration date for this approval, you must submit a renewal application to the IRB Office at least 30 days before the approval expiration date.

Modifications: Any changes to the approved protocol must be approved by the IRB before the change is implemented except when a change is necessary to eliminate apparent immediate hazards to the subjects. If you want to modify the approved protocol, please submit an IRB addendum application to the IRB Office.

UNIVERSITY OF MARYLAND
INSTITUTIONAL REVIEW BOARD

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March 3, 2006

MEMORANDUM

To: Dr. Mark Kantor
Ms. Amy Mobley
Department of Nutrition and Food Science

From: Roslyn Edson, M.S., CIP
IRB Manager
University of Maryland, College Park

Re: IRB Number: 01581
Project Title: "Evaluation of Behavioral Theory and Integrated Internet/ Telephone Technologies to Support Military Obesity and Weight Management Programs"

Approval Date: February 23, 2006

Expiration Date: February 23, 2007

Type of Application: Renewal

Type of Research: Nonexempt

Type of Review For Application: Full Board

The University of Maryland, College Park Institutional Review Board (IRB) approved your IRB application. The research was approved in accordance with 45 CFR 46, the Federal Policy for the Protection of Human Subjects, and the University's IRB policies and procedures. Please reference the above-cited IRB application number in any future communications with our office regarding this research.

Recruitment/Consent: For research requiring written informed consent, the IRB-approved and stamped informed consent document is enclosed. The IRB approval expiration date has been stamped on the informed consent document. Please keep copies of the consent forms used for this research for three years after the completion of the research.

Continuing Review: If you want to continue to collect data from human subjects or analyze private, identifiable data collected from human subjects after the expiration date for this approval, you must submit a renewal application to the IRB Office at least 30 days before the approval expiration date.

Modifications: Any changes to the approved protocol must be approved by the IRB before the change is implemented, except when a change is necessary to eliminate apparent immediate hazards to the subjects. If you would like to modify the approved protocol, please submit an addendum request to the IRB Office. The instructions for submitting a request are posted on the IRB web site

DEPARTMENT OF THE ARMY
WALTER REED ARMY MEDICAL CENTER
WALTER REED HEALTH CARE SYSTEM
WASHINGTON, DC 20307-5001

REPLY TO ATTENTION OF
MCHL-CT (40-38a)

20 September 2004

MEMORANDUM FOR 1LT Stacey L. Mobley, SP, Nutrition Care Directorate, Walter Reed Army Medical Center, Washington, DC 20307-5001

SUBJECT: Approval of Protocol **Work Unit #04-93002**: Evaluation of Behavioral Theory and Integrated Internet/Telephone Technologies to Support Military Obesity and Weight Management Programs

1. Congratulations! Your protocol was approved by the Clinical Investigation Committee (CIC) on 9 July 2004 as an expedited protocol, was reported to the Human Use Committee (HUC) on 24 August 2004 and has been assigned Work Unit #04-93002. Please use the assigned seven digit work unit for all correspondence with the Department of Clinical Investigation (DCI) regarding this study. This includes Annual Progress Reports (APRs), publication clearance, travel orders and funding requests, addenda submission and adverse events reports.

2. The last required revisions were received by 28 July 2004. The Army Clinical Investigation Regulatory Office (CIRO) approval dated 17 September 2004 was received 17 September 2004. A copy of the minutes from the applicable committee(s) and a final copy of the approved research protocol are attached for your administrative files. **Also, enclosed is the stamped approved consent forms that must be duplicated and used for enrolling subjects and the "STEP-BY-STEP GUIDE..." to be used when consenting subjects**. Your research protocol was approved for an enrollment of up to 140 subjects. You may begin work on the project upon receipt of this letter. This approval is only for **one year**.

3. Funding for this study is through the AMEDD Telehealth Initiative by the U.S. Army Medical Research and Materiel Command. Nutrition Care Directorate will manage these funds through an Account Processing Code (APC) at Directorate of Resource Management (DRM) at Walter Reed Army Medical Center (WRAMC). The MIPR is MIPR4EWCDM4058.

4. As the principal investigator, you are required by WRAMC 70-1 and other Federal regulations to submit the following in a timely fashion to the Department of Clinical Investigation: (a) addenda delineating any changes in the protocol, (b) notification of significant or unexpected side effects, and (c) APRs. As part of your continuing review and re-approval, you are required to submit an APR in the first week **June of each year** as long as your protocol is ongoing.

5. **Also enclosed is a copy of the WRAMC Federal-Wide Assurance (FWA) that all investigators agree to adhere to in conducting research, as attested to by your submission of a signed Principal Investigator Responsibilities Statement.** If you have any questions, please feel free to contact Ms. Marty Green at (202) 782-7864.

5 Encls
as

for Susan Fracisco COL, MC
SUSAN FRACISCO EMANUEL
LTC, MC
Chief, Research Review Service
Asst Chief, Dept of Clinical Investigation
Co-Chairperson, Human Use Committee

CF: Research Administration Service

APPENDIX F
SCREENING FOR ELIGIBILITY

Subject Number:_____ **Date: _____**

INCLUSIONS

	YES	NO
1. Will the subject be in the Washington D.C. Capital Area over the next 6 months?	( )	( )
2. Is the subject an active duty service member?	( )	( )
3. Does the subject have a BMI ≥ 28?	( )	( )
4. Is the subject free of chronic diseases that may influence energy balance?	( )	( )
5. Has the subject agreed to give written informed consent?	( )	( )
6. Is the subject at least 18 years of age?	( )	( )

IF ANY OF THE ABOVE ARE ANSWERED NO THE SUBJECT CAN NOT ENTER THE STUDY UNLESS APPROVED BY THE PRINCIPAL INVESTIGATOR.

EXCLUSIONS

1. Does the subject have a medical condition preventing him/her from being eligible for the AWCP?	( )	( )
2. Is the subject taking medications and/or supplements that may affect energy balance?	( )	( )

IF ANY OF THE ABOVE ARE ANSWERED YES THE SUBJECT CAN NOT ENTER THE STUDY UNLESS APPROVED BY THE PRINCIPAL INVESTIGATOR

Comments:

APPENDIX G
Exclusion Criteria List

List of Factors that May Affect Energy Balance

A. Herbal Supplements that may promote weight loss:

- Ephedra (stimulant)
- Garcinia Cambogia (appetite suppressant)
- Green tea extract (increase metabolism)
- Guarana (appetite suppressant)
- Bitter orange extract (CNS stimulant)
- Glucomannan (Impairs fat absorption)
- Starch blockers (Starch Away, Starch Buster, Carbo Grabbers)
- Chitosan (impairs fat absorption)
- Conjugated Linoleic Acid (alters fat metabolism)
- Carnitine (alters fat metabolism)
- Chromium
- Pyruvate (appetite suppressant)

B. Medications that may promote weight loss

- Orlistat (Xenical)
- Sibutramine(Meridia)
- CNS stimulants
- Levothyroxine (Synthroid)

C. Medications that may promote weight gain

- Antipsychotics (Phenothiazines, Butyrophenones)
- Antidepressants (Elavil)
- Lithium
- Neuroleptics
- Antiepileptics (Lithium, Valproate)
- Corticosteroids (Prednisone)
- Megestrol Acetate (Megace)
- Insulin
- Sulfonylureas

D. Medical conditions that may predispose individuals to be obese:

- Hypothalamic Obesity
- Cushing's Syndrome (97%)
- Hypothyroidism
- Polycystic Ovary Syndrome (10-80%)
- Growth Hormone Deficiency
- Drug-Induced Weight Gain
- Binge-Eating Disorders
- Genetic Disorders (Bardet-Biedl Syndrome, Prader Willi Syndrome, Alstrom Syndrome, Cohens Syndrome

APPENDIX H

VOLUNTEER AGREEMENT AFFIDAVIT

For use of this form, see AR 70-25 or AR 40-38; the proponent agency is OTSG

PRIVACY ACT OF 1974

Authority: 10 USC 3013, 44 USC 3101, and 10 USC 1071-1087.

Principle Purpose: To document voluntary participation in the Clinical Investigation and Research Program. SSN and home address will be used for identification and locating purposes.

Routine Uses: The SSN and home address will be used for identification and locating purposes. Information derived from the study will be used to document the study; implementation of medical programs; adjudication of claims; and for the mandatory reporting of medical conditions as required by law. Information may be furnished to Federal, State and local agencies.

Disclosure: The furnishing of your SSN and home address is mandatory and necessary to provide identification and to contact you. If future information indicates that your health may be adversely affected. Failure to provide the information may preclude your voluntary participation in this investigational study.

PART A(1) – VOLUNTEER AFFIDAVIT

Volunteer Subjects in Approved Department of the Army Research Studies

Volunteers under the provisions of AR 40-38 and AR 70-25 are authorized all necessary medical care for injury or disease which is the proximate result of their participation in such studies.

I, _____, SSN _____

having full capacity to consent and having attained my _____ birthday, do hereby volunteer/give consent as legal representative for _____ to participate in _____

EVALUATION OF BEHAVIORAL THEORY AND INTEGRATED INTERNET/TELEPHONE TECHNOLOGIES TO SUPPORT MILITARY OBESITY AND WEIGHT MANAGEMENT PROGRAMS

under the direction of LTC Veronica Thurmond, AN, PhD, Nursing Research Service (202) 782-9887

conducted at WALTER REED ARMY MEDICAL CENTER (WRAMC), WASHINGTON, DC 20307-5001

(Name of Institution)

The implications of my voluntary participation/consent as legal representative; duration and purpose of the research study; the methods and means by which it is to be conducted; and the inconveniences and hazards that may reasonably be expected have been explained to me by

LTC Veronica Thurmond, AN, PhD, Nursing Research Service (202) 782-9887 or her designee

I have been given an opportunity to ask questions concerning this investigational study. Any such questions were answered to my full and complete satisfaction. Should any further questions arise concerning my rights/the rights of the person I represent on study-related injury, I may contact

CENTER JUDGE ADVOCATE OFFICE – (202) 782-1550 OR DSN 662-1550

at WALTER REED ARMY MEDICAL CENTER, WASHINGTON, DC 20307-5001

(Name, Address and Phone Number of Hospital (Include Area Code))

I understand that I may at any time during the course of this study revoke my consent and withdraw/have the person I represent withdrawn from the study without further penalty or loss of benefits; however, I /the person I represent may be required (military volunteer) or requested (civilian volunteer) to undergo certain examination if, in the opinion of the attending physician, such examinations are necessary for my/the person I represent's health and well-being. My/the person I represent's refusal to participate will involve no penalty or loss of benefits to which I/the person I represent is otherwise entitled.

Approved by the WRAMC HUC/IRB on 10 January 2006 for WU # 04-93002.
This form expires on 9 July 2006 Initials AWS

LIMITATIONS TO MEDICAL CARE ARE DESCRIBED IN PART B

PART A (2) – ASSENT VOLUNTEER AFFIDAVIT *(MINOR CHILD)*

I, _____, SSN _____ having full capacity to assent and having attained my _____ birthday, do hereby volunteer for _____ to participate in _____

under the direction of _____

Conducted at _____

(Name of Institution

IRB APPROVED
VALID UNTIL
FEB 23 2007

(Continue on Reverse)

PART A(2) – ASSENT VOLUNTEER AFFIDAVIT (MINOR CHILD) (Cont'd)

The implications of my voluntary participation; the nature, duration, and purpose of the research study; the methods and means by which it is to be conducted; and the inconveniences and hazards that may reasonably be expected have been explained to me by

I have been given an opportunity to ask questions concerning this investigational study. Any such questions were answered to my full and complete satisfaction. Should any further questions arise concerning my rights I may contact

at

[Name, Address, and Phone Number of Hospital (Include Area Code)]

I understand that I may at any time during the course of this study revoke my assent and withdraw from the study without further penalty or loss of benefits; however, I may be requested to undergo certain examinations if, in the opinion of the attending physician, such examinations are necessary for my health and well-being. My refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled.

LIMITATIONS TO MEDICAL CARE ARE DESCRIBED IN PART B

PART B - TO BE COMPLETED BY INVESTIGATOR

INSTRUCTIONS FOR ELEMENTS OF INFORMED CONSENT: (Provide a detailed explanation in accordance with Appendix C, AR 40-38 or AR 70-25

DESCRIPTION OF THE STUDY

You are being asked to be in this research study because you are currently enrolled in the Army Weight Control Program (AWCP) or your body mass index is greater than or equal to 28. Your participation is entirely voluntary. Refusal to participate will not result in any penalty or loss of benefits to which you are otherwise entitled.

The purpose of the study is to determine the best weight loss treatment for soldiers and/or military service members. Studies have shown that specific and individual weight control treatments provide better results for weight loss. Also, other studies have shown that use of the Internet for weight management counseling can produce weight loss results similar to one-on-one counseling.

If you agree to be in this study, you will be randomly assigned (similar to the flip of a coin) to one of four groups. Group 1 Weigh to Stay (WTS) and Standard Follow-up, Group 2 Weigh to Stay (WTS) and Web/Telephone Follow-up, Group 3 Tailored-behavioral Intervention (TBI) and Standard Follow-up, or Group 4 Tailored-behavioral Intervention (TBI) and Telephone Follow-up. Your chances are 1 in 4 of being assigned to each group.

Group 1- WTS + Standard Follow-up: Initial weight management counseling will consist of a 1-hour class that is part of the Weigh-to-Stay program as previously described. Follow-ups will consist of 2 additional 1-hour classes within 1-6 months.

I do ☐ do not ☐ (check one & initial) consent to the inclusion of this form in my outpatient medical treatment record.

SIGNATURE OF VOLUNTEER	DATE	SIGNATURE OF LEGAL GUARDIAN (If volunteer is a minor)
PERMANENT ADDRESS OF VOLUNTEER	TYPED NAME OF WITNESS	
	SIGNATURE OF WITNESS	DATE

REVERSE OF DA FORM 5303-R, MAY 89

PART B – TO BE COMPLETED BY INVESTIGATOR (Cont'd)

Group 2- WTS + Web/Telephone Follow-up: Initial weight management counseling will consist of a 1-hour class that is part of the Weigh-to-Stay program as previously described. Follow-ups will consist of "Web/Telephone Weight Control and Maintenance" accounts (Web/telephone follow-up) as described later and they will be conducted weekly.

Group 3- TBI + In-person Follow-up: Initial weight management counseling will consist of a 1-hour individual Tailored-behavioral intervention (TBI) session based on the Stages and Process of Change for weight control behaviors. Follow-ups will consist of 2 additional 1-hour TBI sessions at 3 and 6 months.

Group 4- TBI + Web/Telephone Follow-up: Initial weight management counseling will consist of a 1-hour individual Tailored-behavioral intervention (TBI) session based on the Stages and Process of Change for weight control behaviors. Follow-ups will consist of "Web/Telephone Weight Control and Maintenance" accounts (Web/telephone follow-up) as described later and they will be conducted weekly.

You will be asked to complete several forms to collect general information about your personal and medical background, dietary intake, physical activity level, and weight control behaviors. During this time, you will be asked to visit the Wellness Center and Nutrition Research Laboratory at WRAMC for an initial visit, 3 month visit, and 6 month visit. Each visit will last about 1½ hours. Height, weight and waist size will be measured. Your body fat and lean body mass will be measured using a machine called DEXA (Dual Energy X-ray Absorptiometry) at WRAMC. This is the same painless scan that is used routinely for determining a person's bone mineral density in screening for osteoporosis. The scan is performed using an X-ray like machine that delivers less radiation than a chest X-ray and takes about 10 minutes to complete. In addition, about 2 tablespoons of blood will be taken from your arm to measure your blood glucose and lipids at each visit (a total of 6 tablespoons over 6 months). All of these measurements will be taken three times total (initial visit, 3 month and 6 month follow-up appointments). The questionnaire information, waist size, and DEXA measurements are for research purposes.

Depending on your group assignment, you may be asked to access the Internet at various time points during the 6 month time period in addition to your visits to WRAMC. During your time on the Internet, you will be asked to enter various items including information about your eating and physical activity habits as well as your current weight, waist size, and lab values (e.g. blood cholesterol), if available. Once you enter this type of information, you will receive instructions and weight loss tips from the Internet program and guidance from a health professional who will be monitoring your progress to aid you with your weight loss. You will be asked to visit the Internet at least weekly.

Research data such as anthropometric, biochemical and clinical measurements (i.e. body mass index (BMI), weight, waist circumference, lean body mass, % body fat, dietary parameters, physical activity parameters, blood lipids, and glucose), age, sex, ethnicity, physical activity level, smoking status, Internet usage/experience, percent weight loss goal, dieting history, and dietary supplement use will be forwarded to the University of Maryland and/or Purdue University for assistance in data analysis and manuscript preparations. No personal health identifiers will be included in the data set; however, the data will contain

SIGNATURE OF VOLUNTEER	DATE	SIGNATURE OF LEGAL GUARDIAN (If volunteer is a minor)
PERMANENT ADDRESS OF VOLUNTEER	TYPED NAME OF WITNESS	
	SIGNATURE OF WITNESS	DATE

REVERSE OF DA FORM 5000-R, MAY 00

PART B – TO BE COMPLETED BY INVESTIGATOR (Cont'd)

subject codes. Your identity will be kept confidential with respect to unauthorized personnel. The results of this study may be published in medical reports, but your identity will remain confidential. Data collection sheets will contain subject number, gender, ethnicity, and date of birth. You will be assigned study codes (subject number) and/or secure user passwords using letters and numbers. A master code sheet listing your ID code and secure and global user ID and password of the "Web/Telephone Weight Control Maintenance" accounts will be maintained during data collection and secured by the PI. Only the PI will have access to the master list. All data will be secured in a locked file cabinet located in building 2. Your research documents and data file will be kept for at least 3 years after the completion of the study. The master code will be destroyed upon completion of the data collection (approximately 1 year after the study begins).

AMOUNT OF TIME FOR YOU TO COMPLETE THIS STUDY

You will be part of this study for a total of 6 months. During this time, you will be asked to visit the Wellness Center and Nutrition Research Laboratory at WRAMC three times. Each visit will last about 1½ hours.

APPROXIMATE NUMBER OF PEOPLE TAKING PART IN THIS STUDY

There will be up to 180 people taking part in this study: 45 control subjects (standard AWCP weight loss intervention and follow-up counseling), 45 subjects receiving standard AWCP with follow-up counseling via the Internet/telephone, 45 subjects receiving a tailored intervention with in-person follow-up counseling and 45 subjects receiving a tailored intervention with follow-up counseling via the Internet/telephone.

POSSIBLE RISKS OR DISCOMFORT FROM BEING IN THIS STUDY

There will be some discomfort from drawing blood, and you will have swelling and a bruise at the site of the needle stick. Some people feel dizzy or light-headed for a few minutes after blood is drawn.

There will be some radiation exposure from the DEXA scan. The total effective dose equivalent from each DEXA scan is approximately 1.5 mrem. If you complete all three DEXA scans in this study the total effective dose will be about 4.5 mrem. When this dose is compared to the average annual U.S. natural background radiation level of about 300 mrem, any effects from this additional exposure are too small to be determined.

POSSIBLE BENEFITS OF BEING IN THIS STUDY

The possible benefit to you from being in this study may be faster and more effective weight loss as well as improved diet, physical activity level, reduced body fat, blood pressure, waist size, blood glucose and blood lipids (e.g. cholesterol). However, no benefit can be guaranteed. The information we learn from your participation may help us identify the most effective strategies in helping soldiers and/or military service members to lose weight.

CONFIDENTIALITY (PRIVACY) OF YOUR IDENTITY AND YOUR RESEARCH RECORDS

The principal investigator will keep records of your being in this study. These records may be looked at by people from the Walter Reed Department of Clinical Investigation, the Walter Reed Human Use Committee, the Army Clinical Investigation Regulatory Office (CIRO), and other government agencies as part of their duties. These duties include making sure that research subjects are protected. Confidentiality of your records

Approved by the WRAMC HUC/IRB on 10 January 2006 for WU # 04-93002.
This form expires on 9 July 2006 Initials AWS

SIGNATURE OF VOLUNTEER	DATE	SIGNATURE OF LEGAL GUARDIAN (If volunteer is a minor)
PERMANENT ADDRESS OF VOLUNTEER	TYPED NAME OF WITNESS	
IRB APPROVED VALID UNTIL FEB 2 3 2007	SIGNATURE OF WITNESS	DATE

REVERSE OF DA FORM 5000-R, MAY 00

PART B – TO BE COMPLETED BY INVESTIGATOR (Cont'd)

will be protected to the extent possible under existing regulations and laws. Complete confidentiality cannot be promised, particularly for military personnel because information bearing on your health may be required to be reported to appropriate medical and command authorities. Your name will not appear in any published paper or presentation related to this study.

This research study meets the confidentiality requirements of the Health Insurance Portability and Accountability Act (HIPAA). A HIPAA Authorization form for this study will be provided to you separately, and you will be asked to sign that form.

CONDITIONS UNDER WHICH YOUR TAKING PART IN THIS STUDY MAY BE STOPPED WITHOUT YOUR CONSENT

Your taking part in this study may be stopped without your consent if remaining in the study might be dangerous or harmful to you. Your taking part in this study may also be stopped without your consent if the military mission requires it, or if you become ineligible for medical care at military hospitals.

ELIGIBILITY AND PAYMENT FOR BEING IN THIS STUDY

You will not receive any payment for being in this study.

STEPS THAT WILL BE TAKEN BEFORE AND DURING THIS STUDY TO PROTECT YOU

If you think you are pregnant or trying to become pregnant, then you should not take the DEXA scan at this time.

COMPENSATION TO YOU IF INJURED AND LIMITS TO YOUR MEDICAL CARE

Should you be injured as a direct result of being in this study, you will be provided medical care for that injury at no cost to you. You will not receive any compensation (payment) for injury. You should also understand that this is not a waiver or release of your legal rights. You should discuss this issue thoroughly with the principal investigator before you enroll in this study.

Medical care is limited to the care normally allowed for Department of Defense health care beneficiaries (patients eligible for care at military hospitals and clinics). Necessary medical care does not include in-home care or nursing home care.

WHAT WILL HAPPEN IF YOU DECIDE TO STOP TAKING PART IN THIS STUDY AND INSTRUCTIONS FOR STOPPING EARLY

You have the right to withdraw from this study at any time. This can be done by contacting the principal investigator or her designee at the number listed on the first page of this form. By leaving this study at any time, you in no way risk losing your right to medical care. Some testing or period of observation by the investigators may be recommended for you in order for you to safely stop taking part in this study.

Please feel free to ask any questions that will allow you to clearly understand this study.
A copy of this consent form will be provided to you.

Approved by the WRAMC HUC/IRB on 10 January 2006 for WU # 04-93002.
This form expires on 9 July 2006 Initials AWS

SIGNATURE OF VOLUNTEER	DATE	SIGNATURE OF LEGAL GUARDIAN (If volunteer is a minor)
PERMANENT ADDRESS OF VOLUNTEER	TYPED NAME OF WITNESS	
	SIGNATURE OF WITNESS	DATE

IRB APPROVED
VALID UNTIL
FEB 2 3 2007

REVERSE OF DA FORM [illegible]

APPENDIX I
Authorization for Research Use of Protected Health Information

Protocol Title: EVALUATION OF BEHAVIORAL THEORY AND INTEGRATED INTERNET/TELEPHONE TECHNOLOGIES TO SUPPORT MILITARY OBESITY AND WEIGHT MANAGEMENT PROGRAMS

Principal Investigator: LTC Veronica Thurmond, AN, PhD Work Unit #: 04-93002

The Federal Health Insurance Portability and Accountability Act (HIPAA) includes a Privacy Rule that gives special safeguards to Protected Health Information (PHI) that is identifiable, in other words, can be directly linked to you (for example, by your name, Social Security Number, birth date, etc.). We are required to advise you how your PHI will be used.

1. What information will be collected?
For this research study, we will be collecting information about your diet, physical activity, weight control behaviors, personal and medical background, height, weight, waist size, body fat and lean body mass as well laboratory measurements related to weight loss. Your name, e-mail address, telephone number, and date of birth will also be collected.

2. Who may use my PHI within the Military Healthcare System?
The members of the WRAMC research team will have access to your health information in order to find out if you qualify to participate in this study, to administer research treatments, to monitor your progress, and to analyze the research data. Additionally, your PHI may be made available to health oversight groups such as the WRAMC Department of Clinical Investigation and Human Use Committee.

3. What persons outside of the Military Healthcare System who are under the HIPAA requirements will receive my PHI?
The Principal Investigator or designee will send your research data that is collected to the University of Maryland for analysis by a statistician; however, all personal identifiers will be removed and the identity of the data will be unknown

4. What is the purpose for using or disclosing my Protected Health Information (PHI)?
The members of the WRAMC research team need to use your PHI in order to analyze the information to find out whether the weight loss therapy is effective and to relate weight loss to improvements in your blood lipids and glucose.

5. How long will the researchers keep my Protected Health Information?
The WRAMC research team in the Nutrition Care Directorate will keep the research data for up to three years after the end of the study. Then all the

information will be destroyed. The master code will be destroyed as soon as all data collection is completed.

6. Can I review my own research information?
You may look at your personal research information at any time.

7. Can I cancel this Authorization?
Yes. If you cancel this Authorization, you will no longer be included in the research study. However, the information that has already been collected will be kept by the research team to assure patient safety. If you want to cancel your Authorization, please contact the Principal Investigator at **(202) 782-9887.**

8. What will happen if I decide not to sign this Authorization?
If you decide not to sign this Authorization, you will not be able to participate in this research study. Refusal to sign this Authorization will not result in any loss of medical benefits to which you are otherwise entitled.

9. Can my Protected Health Information be disclosed to parties not included in this Authorization who are not under the HIPAA requirements?
There is a potential that your research information will be shared with another party not listed in this Authorization in order to meet legal or regulatory requirements. Examples of persons who may access your PHI include representatives of the Army Clinical Investigation Regulatory Office, the Food and Drug Administration, the DHHS Office for Human Research Protections, and the DHHS Office for Civil Rights. This disclosure is unlikely to occur, but in that case, your health information would no longer be protected by the HIPAA Privacy Rule.

10. Who should I contact if I have any complaints?
If you believe your privacy rights have been violated, you may file a written complaint with the WRAMC Privacy Officer, 6900 Georgia Ave., NW, Washington, DC 20307. Telephone: (202) 782-3501.

The signature below acknowledges receipt of this Authorization:

Signature: _____ Date: _____

If you are a parent, court-appointed representative, or acting as power of attorney, indicate your authority to act for the participant: _____

Print Name: _____

A copy of this signed Authorization will be provided to you.

7/21/03

APPENDIX J
A-INFO Usage Survey

You are being asked to complete this questionnaire because you have been assigned an Army Interactive Nutrition & Fitness On-line account (A-INFO).

- **Your answers are confidential and will remain anonymous.**
- **This information will be used to determine if Internet accounts are useful to soldiers for weight loss.**

1. On average, how often have you used your A-INFO Web site account? (please check one)

- ☐ Never
- ☐ Less than 1 time per month
- ☐ 1-3 times a month
- ☐ 1 time per week
- ☐ Several times a week
- ☐ 1 or more times a day

2. If you have never used your account OR have used it less than once per week, what are some of the reasons why?
Check all that apply.

- ☐ Lack of time
- ☐ Forgot
- ☐ Problem with logging into Web site
- ☐ No current access to Internet
- ☐ A-INFO Website is difficult to use
- ☐ A-INFO Website is not helpful for weight loss
- ☐ Need more contact or feedback from nutritionist
- ☐ Prefer in-person feedback
- ☐ Other (please explain)_____

3. Please list any additional comments you would like to share about your A-INFO account.

APPENDIX K
General Information (Demographic & Medical History)

Participant ID#:_____ **Date:**_____

1] Gender

- ☐ Male
- ☐ Female

2] Date of birth

☐☐ ☐☐ ☐☐☐☐

Month **Day** **Year**

3] Enter your military grade (e.g. E 2) in the boxes: ☐☐

4] Which one category best describes your ethnic background?

- ☐ Asian or Pacific Islander
- ☐ Black, not Hispanic
- ☐ Chicano, Latino, Hispanic
- ☐ Native American, Native Alaskan, Indian
- ☐ White, not Hispanic
- ☐ Other (Describe):_____

5] What is the highest educational level you have completed? Check one.

- ☐ High school diploma, GED, or equivalent
- ☐ Some college but no degree
- ☐ Associate's degree
- ☐ Bachelor's degree
- ☐ Graduate or professional degree beyond a Bachelor's degree

6] What is your current marital status? Check one.

- ☐ Not married
- ☐ Married

7] a) What is your approximate <u>monthly household</u> income after taxes? Check one.

- ☐ $700-$1000
- ☐ $1001-$2000
- ☐ $2001-$4000
- ☐ $4001 or more

b) How many people are supported by this income? ☐

9] Have you ever been diagnosed with any of the following health problems?

	NO	YES
Heart disease	☐	☐
Diabetes	☐	☐
High blood pressure	☐	☐
High blood cholesterol	☐	☐
Stroke	☐	☐
Cancer	☐	☐
Hypo or hyperthyroidism	☐	☐
Arthritis	☐	☐
Other,	☐	☐

Please Describe:_____

10] Do (did) any of your relatives have any of the health conditions listed below?
YES NO→Skip to question #11

Please check all that apply.

	Mother	Father	Grandparent	Sister or Brother
Heart Disease	☐	☐	☐	☐
Diabetes	☐	☐	☐	☐
High blood pressure	☐	☐	☐	☐
High blood cholesterol	☐	☐	☐	☐
Stroke	☐	☐	☐	☐
Cancer	☐	☐	☐	☐
Hypo or hyperthyroidism	☐	☐	☐	☐

11] If you are female, please answer the following questions, if not please skip to QUESTION #12

a) Are you pregnant?

NO YES→You have completed the survey, thank you for your time.
b) Have you delivered a baby in the past 12 months?
YES NO

How many months ago?
☐☐

c) Are you breastfeeding?
YES NO

12] Are you currently taking any prescription medication(s) or drugs on a regular basis?

YES NO→Please skip to question #13

List all medicines/drugs you are currently taking, the daily dose (if known) and reason for taking.

Name of medication/drug	Daily dose	Reason for taking

13] Are you currently taking any vitamin, mineral, herbal or other dietary supplements?
YES NO→Please skip to question #14

Name or type of supplement	Brand name	Dose per tablet	# tablets taken per week		Reason for taking

14]
a) Do you smoke cigarettes now?

YES NO→Please skip to #14c

b) On average, how many cigarettes do you smoke per day now?
- ☐ **5 or fewer**
- ☐ **6-14**
- ☐ **15-24**
- ☐ **25-34**
- ☐ **35 or more**

c) Do you consider yourself a past smoker (smoked more than 100 cigarettes in your lifetime)?
YES NO→Please skip to question #14e

d) When did you stop smoking?
- ☐ **Less than 1 year ago**
- ☐ **1-5 years ago**
- ☐ **6-10 years ago**
- ☐ **More than 10 years ago**
- ☐ **Not sure**

e) Do you chew (dip) tobacco?
YES NO→Please skip to question #15

f) How often do you chew (dip) tobacco per day?
☐☐ (please enter total in boxes)

15]
a) Are you currently enrolled in the Army Weight Control Program?
YES NO→skip to question #16

b) Please enter the number of times you have been enrolled previously: ☐☐

16]
a) Have you ever tried to lose 10 pounds or more at one time?
YES NO→skip to question #17

b] How would you describe the frequency of your attempts to lose 10 pounds or more at one time?
Check one answer.
- ☐ **I am almost always trying to at 1east 10 pounds of weight**
- ☐ **I have attempted to lose 10 pounds approximately ☐☐☐ times in my life**

17]
a) Have you ever used the Internet?

YES NO→you have now completed the survey, thank you for your time

b) On average, how many <u>hours</u> do you spend on the Internet <u>per week</u>? Enter number of hours in boxes: ☐☐☐

Thank you for your time! You have completed the survey.

APPENDIX L
Measured Use of A-INFO Web Account Over 3 Months (Total Usage)

Session Use Statistic*	Class + Internet Group (n=37)	Tailored + Internet Group (n=39)	All subjects assigned A-INFO account (n=76)
Mean (SD)	17 (37)	17 (30)	17 (33)
Median	1	5	3
Mode	0	0	0
Range	0-173	0-161	0-173

*One session is defined as entering information into the food/beverage, activity or message section of the A-INFO site per day

APPENDIX M
Responses to A-INFO Web Usage Survey

Survey Question	Response Option	Number of Subjects Responding* n (%)
On average, how often have you used your A-INFO Web site account?	Never	15 (28)
	<1 time/month	8 (15)
	1-3 time/month	9 (17)
	1 time/week	2 (4)
	Several times/week	7 (13)
	1+ times/day	12 (23)
If you have never used your account OR have used it less than once per week, what are some of the reasons why†?	Lack of time	22
	Forgot	12
	Problems with login	2
	No current access to Internet	3
	Site was difficult to use	6
	Site was not helpful	0
	Needed more feedback from dietitian	3
	Preferred in-person feedback	2
	"Other" reasons: -difficulty finding exact matches for foods eaten -unable to remember assigned login/password -lost password -not learning new information	19

*Total responses on survey=53
†More than one response could be chosen per subject

APPENDIX N

Select Characteristics of Subjects Who Completed 3 Month Appointment

	Class + In-person (n=32)	Class + Internet (n=29)	Tailored + In-person (n=33)	Tailored + Internet (n=29)	Overall (n=123)
Age (yrs)	32.3 (6.8)	35.9 (11.0)	33.4 (7.9)	33.3 (9.2)	33.7 (8.8)
Height (cm)	173.4 (11.1)	172.5 (10.1)	170.0 (8.7)	174.6 (9.9)	172.5 (10.0)
Weight (kg)	95.3 (18.1)	97.2 (14.8)	91.0 (14.3)	98.6 (16.9)	95.4 (16.2)
Body Mass Index (kg/m^2)	31.2 (3.0)	32.6 (3.2)	31.4 (3.4)	32.1 (3.1)	31.2 (3.2)
Waist Circumference (cm)	39.6 (3.7)	40.0 (4.0)	39.7 (3.9)	40.2 (4.1)	39.9 (3.9)
Body Fat					
Total (kg)	29.0 (5.9)	31.4 (5.4)	30.1 (7.1)	29.0 (6.7)	29.9 (6.3)
Percent body fat (%)	31.2 (5.6)	33.2 (6.3)	33.5 (6.2)	30.0 (5.0)	32.0 (5.9)
Lean Body Mass (kg)	62.0 (14.1)	61.6 (13.1)	57.1 (10.4)	65.2 (12.5)	61.3 (12.8)
Education Level (yrs)	14.6 (1.8)	14.9 (2.1)	14.4 (1.9)	14.7 (1.7)	14.6 (1.9)
Gender, n (%)					
Female	10 (31)	13 (45)	16 (48)	9 (31)	48 (39)
Male	22 (69)	16 (55)	17 (52)	20 (69)	75 (61)
Race/Ethnicity, n (%)					
White	17 (53)	13 (45)	16 (48)	17 (59)	63 (51)
Black	11 (34)	14 (48)	10 (30	7 (24)	42 (34)
Other	4 (13)	2 (7)	7 (21)	5 (17)	18 (15)
Married, n (%)	21 (66)	14 (48)	21 (64)	16 (55)	72 (59)
Current Smoker, n (%)	7 (22)	2 (7)	2 (6)	5 (17)	16 (13)
Enrolled in AWCP, n (%)	23 (72)	14 (48)	18 (55)	16 (55)	71 (58)

Select Characteristics of Subjects Who Dropped Out Before 3 Month Appointment

	Class + In-person (n=11)	Class + Internet (n=14)	Tailored + In-person (n=10)	Tailored + Internet (n=14)	Overall (n=49)
Age (yrs)	32.2 (8.7)	28.9 (6.1)	33.4 (9.9)	32.7 (8.3)	31.6 (8.2)
Height (cm)	175.1 (8.8)	175.3 (10.3)	175.3 (9.6)	171.8 (10.3)	174.3 (9.7)
Weight (kg)	96.5 (13.8)	100.0 (21.3)	103.1 (19.1)	93.2 (15.8)	97.9 (17.7)
Body Mass Index (kg/m^2)	31.4 (2.5)	32.2 (4.1)	33.3 (3.7)	31.4 (2.7)	32.0 (3.3)
Waist Circumference (cm)	39.8 (2.7)	41.4 (4.5)	41.3 (5.7)	39.5 (3.6)	40.5 (4.2)
Body Fat					
Total (kg)	28.9 (2.4)	29.2 (6.7)	30.7 (10.0)	29.8 (6.7)	29.6 (6.6)
Percent body fat (%)	30.9 (5.3)	30.7 (4.8)	30.0 (6.1)	32.8 (6.4)	31.2 (5.6)
Lean Body Mass (kg)	63.5 (13.5)	62.9 (11.4)	67.7 (12.1)	58.9 (12.0)	62.9 (12.2)
Education Level (yrs)	13.9 (1.9)	13.9 (1.6)	13.7 (1.6)	13.4 (1.2)	13.7 (1.5)
Gender, n (%)					
Female	3 (27)	3 (21)	2 (20)	7 (50)	15 (31)
Male	8 (73)	11 (79)	8 (80)	7 (50)	34 (69)
Race/Ethnicity, n (%)					
White	5 (45.5)	8 (57)	3 (30)	5 (36)	21 (43)
Black	5 (45.5)	1 (7)	6 (60)	7 (50)	19 (39)
Other	1 (9)	5 (36)	1 (10)	2 (14)	9 (18)
Married, n (%)	8 (73)	12 (86)	8 (80)	7 (50)	35 (71)
Current Smoker, n (%)	2 (18)	6 (43)	2 (20)	2 (14)	12 (25)
Enrolled in AWCP, n (%)	6 (55)	10 (71)	6 (60)	9 (64)	31 (63)

Numerical values are expressed as mean (SD).

Because of rounding, categorical percentages may not add to 100.

APPENDIX O

Select Characteristics of Subjects Who Completed 6 Month Appointment

	Class + In-person (n=16)	Class + Internet (n=17)	Tailored + In-person (n=18)	Tailored + Internet (n=15)	Overall (n=66)
Age (yrs)	32.5 (6.3)	36.3 (9.7)	34.1 (7.7)	36.2 (9.0)	34.8 (8.2)
Height (cm)	172.3 (13.8)	175.0 (9.3)	168.2 (8.8)	177.1 (8.0)	172.9 (10.5)
Weight (kg)	92.2 (18.5)	99.3 (16.0)	88.1 (14.1)	103.8 (11.1)	95.6 (16.1)
Body Mass Index (kg/m^2)	30.7 (2.7)	32.4 (3.7)	30.9 (2.9)	33.1 (2.2)	31.7 (3.0)
Waist Circumference (cm)	39.1 (3.6)	40.3 (3.8)	38.8 (3.2)	40.7 (2.6)	39.7 (3.4)
Body Fat					
Total (kg)	27.6 (5.8)	31.7 (5.9)	29.8 (7.3)	28.9 (5.0)	29.5 (6.2)
Percent body fat (%)	30.7 (5.1)	32.6 (5.4)	34.1 (6.1)	28.3 (4.8)	31.6 (5.7)
Lean Body Mass (kg)	60.5 (14.1)	63.4 (12.8)	54.5 (9.8)	70.2 (9.6)	61.8 (12.8)
Education Level (yrs)	14.7 (1.9)	15.3 (2.0)	14.7 (1.8)	15.0 (1.6)	14.9 (1.8)
Gender, n (%)					
Female	5 (31)	7 (41)	10 (56)	3 (20)	25 (38)
Male	11 (69)	10 (59)	8 (44)	12 (80)	41 (62)
Race/Ethnicity, n (%)					
White	10 (63)	8 (47)	9 (50)	9 (60)	36 (55)
Black	4 (25)	8 (47)	4 (22)	4 (27)	20 (30)
Other	2 (12)	1 (6)	5 (28)	2 (13)	10 (15)
Married, n (%)	11 (69)	9 (53)	13 (72)	10 (67)	43 (65)
Current Smoker, n (%)	4 (25)	1 (6)	1 (6)	2 (13)	8 (12)
Enrolled in AWCP, n (%)	12 (75)	10 (59)	10 (56)	6 (40)	38 (58)

Select Characteristics of Subjects Who Dropped Out Before 6 Month Appointment

	Class + In-person (n=27)	Class + Internet (n=26)	Tailored + In-person (n=25)	Tailored + Internet (n=28)	Overall (n=106)
Age (yrs)	32.1 (7.9)	31.7 (10.3)	32.9 (8.9)	31.5 (8.3)	32.0 (8.7)
Height (cm)	174.7 (8.1)	172.5 (10.8)	173.1 (9.0)	171.9 (10.6)	173.0 (9.6)
Weight (kg)	97.7 (16.0)	97.3 (17.9)	97.9 (16.5)	93.1 (18.0)	96.4 (17.0)
Body Mass Index (kg/m^2)	31.8 (2.9)	32.5 (3.5)	32.5 (3.8)	31.2 (3.2)	32.0 (3.3)
Waist Circumference (cm)	40.0 (3.4)	40.5 (4.5)	41.0 (4.8)	39.6 (4.5)	40.2 (4.3)
Body Fat					
Total (kg)	29.8 (4.6)	30.1 (5.8)	30.6 (8.2)	29.4 (7.4)	30.0 (6.6)
Percent body fat (%)	31.4 (5.7)	32.4 (6.3)	31.6 (6.4)	32.2 (5.5)	31.9 (5.9)
Lean Body Mass (kg)	63.5 (13.7)	61.0 (12.4)	63.2 (11.6)	59.3 (12.4)	61.7 (12.5)
Education Level (yrs)	14.2 (1.8)	14.0 (1.8)	13.8 (1.7)	13.9 (1.6)	14.0 (1.7)
Gender, n (%)					
Female	8 (30)	9 (35)	8 (32)	13 (46)	38 (36)
Male	19 (70)	17 (65)	17 (68)	15 (54)	68 (64)
Race/Ethnicity, n (%)					
White	12 (44)	13 (50)	10 (40)	13 (46)	48 (45)
Black	12 (44)	7 (27)	12 (48)	10 (36)	41 (39)
Other	3 (11)	6 (23)	3 (12)	5 (18)	17 (16)
Married, n (%)	18 (67)	17 (65)	16 (64)	13 (46)	64 (60)
Current Smoker, n (%)	5 (18)	7 (27)	3 (12)	5 (18)	20 (19)
Enrolled in AWCP, n (%)	17 (63)	14 (54)	14 (56)	19 (68)	64 (60)

Numerical values are expressed as mean (SD).
Because of rounding, categorical percentages may not add to 100.

APPENDIX P

ID	Group	Visit	Gender	Age	Ethnicity	EdLevel	Married	Smoker	Tobacco	DietHx	Height	Weight
D001	**4**	**1**	F	24	Black	16	no	no	0	1	162.77	70.55
D002	**4**	**1**	F	20	Black	12	no	no	0	0	161.29	85.2
D003	**4**	**1**	M	23	Black	13	no	no	0	0	188.11	128.35
B004	**2**	**1**	M	32	Black	12	yes	no	0	0	175.6	102
A005	**1**	**1**	F	24	White	14	no	yes	0	1	164.53	77.85
C006	**3**	**1**	M	44	Other	17	yes	no	0	1	177.49	100.95
D007	**4**	**1**	M	24	White	13	yes	no	1	1	192.02	120.9
D008	**4**	**1**	F	24	Black	13	no	no	0	1	161.03	78.95
D009	**4**	**1**	M	24	White	13	yes	yes	0	1	186.3	123.59
D010	**4**	**1**	M	41	White	14	yes	no	0	1	179.34	112.65
B011	**2**	**1**	M	31	Other	14	yes	no	0	1	185.02	110.5
A012	**1**	**1**	M	38	Black	13	no	no	0	1	167.68	90.8
A013	**1**	**1**	M	21	White	12	yes	yes	0	1	171.3	81.1
B014	**2**	**1**	F	28	Black	17	yes	no	0	1	171.39	82.55
A015	**1**	**1**	M	39	White	17	yes	no	0	1	182.73	105.5
C016	**3**	**1**	M	39	White	16	yes	no	0	0	173.02	89.93
B017	**2**	**1**	F	32	White	16	no	no	0	0	172.52	93.47
C018	**3**	**1**	M	36	White	12	yes	no	0	1	176.94	90.87
C019	**3**	**1**	M	28	White	13	yes	no	1	1	173.25	84.15
C020	**3**	**1**	F	25	Black	13	no	no	0	1	159.91	74.34
D021	**4**	**1**	M	46	White	16	yes	no	0	1	170.99	90.8
C022	**3**	**1**	F	28	White	14	yes	yes	0	0	155.19	63.65
B023	**2**	**1**	M	41	White	14	yes	no	0	1	180.47	125.7
B024	**2**	**1**	F	38	White	16	no	no	0	1	166.49	81.57
B025	**2**	**1**	F	41	Black	14	no	no	0	1	158.77	100.32
D026	**4**	**1**	M	24	White	13	no	no	0	0	181.3	108
D027	**4**	**1**	F	29	White	17	yes	no	0	1	167.67	84.3
C028	**3**	**1**	M	23	Other	13	yes	no	0	1	175.87	100
C029	**3**	**1**	M	37	White	16	yes	no	0	1	176.55	96.5
B030	**2**	**1**	F	21	White	12	no	yes	0	1	161.27	74.1
A031	**1**	**1**	M	44	White	17	yes	no	1	1	183.24	110.9

ID	Group	Visit	Gender	Age	Ethnicity	EdLevel	Married	Smoker	Tobacco	DietHx	Height	Weight
C032	**3**	**1**	M	51	Black	13	yes	no	0	1	184.05	138.36
A033	**1**	**1**	M	40	White	17	yes	no	0	1	183.31	121.8
C034	**3**	**1**	F	37	White	13	yes	no	0	1	167.39	77.68
A035	**1**	**1**	M	28	Black	13	yes	yes	0	1	185.93	118
B036	**2**	**1**	M	37	White	13	yes	no	0	1	167.32	80.2
A037	**1**	**1**	M	34	White	16	yes	no	0	0	172.71	91.59
A038	**1**	**1**	F	20	Other	12	no	yes	0	1	149	57.43
B039	**2**	**1**	M	25	Other	13	yes	no	0	1	183.55	106.47
A040	**1**	**1**	M	35	Black	13	yes	no	0	1	178.3	92.27
D041	**4**	**1**	M	28	Black	16	yes	no	0	1	170.1	99.43
B042	**2**	**1**	F	27	Other	13	yes	yes	0	1	152.27	67.15
A043	**1**	**1**	M	24	White	13	no	no	0	1	176.2	93.9
C044	**3**	**1**	M	34	White	13	yes	no	0	0	186	118.1
C045	**3**	**1**	F	45	Black	13	no	no	0	1	166.62	97
D046	**4**	**1**	F	50	White	17	yes	no	0	1	159.15	72.2
A047	**1**	**1**	M	25	Black	12	yes	no	0	0	172.8	96.75
C048	**3**	**1**	F	32	Black	16	yes	no	0	1	162.56	82.15
B049	**2**	**1**	F	35	Other	14	no	no	0	1	156.7	87.7
A050	**1**	**1**	M	36	White	12	yes	no	0	0	176.27	91.54
B051	**2**	**1**	M	26	White	12	yes	no	0	1	181.1	102.45
C052	**3**	**1**	M	30	Black	13	yes	no	0	0	183.04	113.13
C053	**3**	**1**	M	38	White	17	yes	no	0	1	189.98	112.15
D054	**4**	**1**	M	43	White	16	yes	no	0	1	175.6	102.13
C055	**3**	**1**	F	46	Black	13	no	no	0	0	167.43	86.5
D056	**4**	**1**	M	58	White	16	no	no	0	1	182.47	103.35
D057	**4**	**1**	M	27	White	17	yes	no	0	0	188.93	109.5
B058	**2**	**1**	M	21	White	13	yes	no	0	.	179.3	106.5
D059	**4**	**1**	M	40	White	13	yes	no	1	1	185.42	106.5
B060	**2**	**1**	M	21	White	12	no	no	0	1	178.63	110.32
B061	**2**	**1**	M	39	Black	17	yes	no	.	0	193.17	127.32
B062	**2**	**1**	F	57	White	17	no	no	0	0	161.67	79
A063	**1**	**1**	M	29	White	17	yes	no	0	0	182.9	100.5

ID	Group	Visit	Gender	Age	Ethnicity	EdLevel	Married	Smoker	Tobacco	DietHx	Height	Weight
B064	**2**	**1**	F	26	Black	16	no	no	0	1	173.48	90.18
A065	**1**	**1**	M	34	Black	13	yes	no	0	0	182.41	111.8
C066	**3**	**1**	F	32	Other	13	yes	no	0	1	158.55	91.95
A067	**1**	**1**	F	36	Black	16	no	no	0	1	163.71	82.45
A068	**1**	**1**	M	32	White	13	yes	yes	3	1	182.66	114.68
C069	**3**	**1**	M	26	White	13	yes	yes	0	1	179.54	99.54
D070	**4**	**1**	M	26	White	14	yes	no	.	.	176.26	83.07
A071	**1**	**1**	M	28	Black	12	yes	yes	0	1	178.11	99.34
B072	**2**	**1**	F	53	White	17	yes	no	.	1	166.3	79.23
A073	**1**	**1**	M	34	Black	14	no	no	0	1	176.27	112.57
D074	**4**	**1**	F	44	Black	17	yes	no	0	0	162.49	88.5
D075	**4**	**1**	M	41	White	14	yes	no	0	1	174.45	98
B076	**2**	**1**	M	34	Black	16	yes	no	0	0	183.87	99.11
C077	**3**	**1**	M	24	Black	13	yes	no	0	1	179.84	121.84
D078	**4**	**1**	M	31	White	16	yes	no	0	1	184.67	105.55
A079	**1**	**1**	M	21	White	13	yes	yes	0	1	177.68	97.27
C080	**3**	**1**	F	50	White	17	yes	no	0	1	165.58	77.02
B081	**2**	**1**	M	27	Black	16	yes	no	0	1	180.33	106.86
B082	**2**	**1**	M	43	Black	16	yes	no	.	1	177.9	108.75
D083	**4**	**1**	F	24	White	12	no	yes	0	0	169.1	78.3
A084	**1**	**1**	F	32	Black	13	yes	no	0	1	174.2	81
C085	**3**	**1**	F	28	Black	13	no	no	0	1	154.3	68.64
D086	**4**	**1**	M	25	Other	13	no	no	0	1	175.42	97.32
D087	**4**	**1**	M	22	Other	13	no	no	0	0	175.48	89.45
C088	**3**	**1**	F	26	Black	13	no	no	0	1	171	102.77
A089	**1**	**1**	M	36	White	14	yes	no	5	1	187.73	128.95
D090	**4**	**1**	F	33	Black	16	yes	no	0	1	165.94	86.91
A091	**1**	**1**	M	27	Black	13	yes	no	0	1	185.83	130.95
A092	**1**	**1**	M	29	White	13	yes	no	0	1	171.68	105.68
B093	**2**	**1**	M	22	White	12	no	yes		1	183.07	109.64
D094	**4**	**1**	F	40	Other	13	yes	no	0	1	158.75	78.03
B095	**2**	**1**	M	39	White	13	yes	no	0	1	168.07	92.73

ID	Group	Visit	Gender	Age	Ethnicity	EdLevel	Married	Smoker	Tobacco	DietHx	Height	Weight
C096	**3**	**1**	F	30	Other	13	no	no	0	1	168.81	71.97
A097	**1**	**1**	F	35	Black	16	yes	no	0	1	156.29	80.91
C098	**3**	**1**	F	37	White	13	yes	no	0	0	170.13	82.86
B099	**2**	**1**	F	56	Black	13	no	no	0	1	154.93	91.79
C100	**3**	**1**	M	27	Other	13	yes	no	.	1	174.75	105.09
A101	**1**	**1**	F	53	White	17	no	no	0	1	170.18	80
C102	**3**	**1**	M	47	White	17	yes	no	0	1	167.67	86.27
A103	**1**	**1**	M	26	Other	12	no	yes	0	1	168.59	80.23
A104	**1**	**1**	F	37	Other	17	yes	no	0	1	142.32	57.95
D105	**4**	**1**	M	36	Black	12	yes	no	0	0	177.39	92
D106	**4**	**1**	M	40	Black	17	yes	no	0	1	182.63	120.91
D107	**4**	**1**	M	26	White	16	no	yes		1	187.22	111.05
B108	**2**	**1**	F	32	White	13	yes	yes	0	1	167.01	83.27
C109	**3**	**1**	M	30	Other	16	yes	no	0	0	168.71	92.64
A110	**1**	**1**	M	39	White	17	yes	no	0	1	188.06	102.73
B111	**2**	**1**	F	53	Black	17	yes	no	0	1	154.1	67.48
D112	**4**	**1**	M	42	White	14	no	no	0	1	186.64	140.68
B113	**2**	**1**	M	49	White	17	yes	no	0	1	189.5	107.61
C114	**3**	**1**	F	27	White	16	no	no	0	1	171.25	89.95
B115	**2**	**1**	M	37	Other	17	yes	no	0	1	171.19	90
C116	**3**	**1**	M	41	White	17	yes	no	0	1	173	83.32
A117	**1**	**1**	F	35	Black	16	no	no	0	1	153.49	73.64
C118	**3**	**1**	F	21	White	12	no	no	0	1	154.98	65
D119	**4**	**1**	F	44	Black	14	yes	no	0	1	175.28	110.25
D120	**4**	**1**	M	27	Black	13	no	no	0	1	172.77	102
B121	**2**	**1**	F	42	Black	17	no	no	0	1	174.14	94.55
D122	**4**	**1**	M	38	White	14	yes	no	8	1	172.72	108.95
C123	**3**	**1**	M	47	Black	17	no	no	.	1	174.62	114.61
A124	**1**	**1**	M	25	White	13	yes	no	1	1	179.29	107.34
B125	**2**	**1**	M	20	White	13	no	no	0	1	179.78	112.45
A126	**1**	**1**	F	38	Black	17	no	no	0	1	166.68	91.5
A127	**1**	**1**	M	36	White	13	no	no	0	1	172.59	98.32

ID	Group	Visit	Gender	Age	Ethnicity	EdLevel	Married	Smoker	Tobacco	DietHx	Height	Weight
C128	**3**	**1**	F	33	Black	17	no	no	0	1	164.64	96.5
B129	**2**	**1**	F	33	Black	16	no	no	0	1	162.56	89.09
B130	**2**	**1**	F	47	Black	17	yes	no	0	1	161.74	74.75
D131	**4**	**1**	F	29	Other	13	no	no	0	1	168.88	90.59
D132	**4**	**1**	M	34	Other	13	no	no	0	1	170.79	98.77
C133	**3**	**1**	F	40	Other	16	yes	no	0	0	164.89	77.55
B134	**2**	**1**	M	23	White	13	yes	yes	1	0	173.1	99.14
D135	**4**	**1**	F	39	Black	13	no	no	0	0	169.77	84.86
C136	**3**	**1**	M	37	Black	13	yes	no	0	1	164.57	99.55
A137	**1**	**1**	F	27	Black	13	yes	no	0	1	169.83	80.66
A138	**1**	**1**	F	28	White	16	yes	no	0	1	169.65	78.3
B139	**2**	**1**	M	43	White	17	yes	no	0	1	179.04	92.86
C140	**3**	**1**	F	37	Black	17	no	no	0	1	168.1	87.73
D141	**4**	**1**	M	27	White	16	no	yes	0	0	184.73	101.64
B142	**2**	**1**	M	25	White	13	no	no	1	1	169.19	104.32
B143	**2**	**1**	M	25	Other	13	yes	yes	0	0	188.25	149.55
A144	**1**	**1**	M	30	Other	14	yes	no	0	0	185.24	114.68
C145	**3**	**1**	F	29	Black	16	no	no	0	1	149.58	78.52
D146	**4**	**1**	F	40	Black	13	no	no	0	1	169.56	94.95
A147	**1**	**1**	F	29	White	17	yes	no	0	1	171.81	89.73
C148	**3**	**1**	M	26	Black	13	yes	no	0	1	171.44	109
D149	**4**	**1**	F	29	White	13	no	no	0	1	157.58	71.41
A150	**1**	**1**	M	32	White	14	yes	no	0	1	182.12	105.18
D151	**4**	**1**	M	33	White	16	yes	no	0	1	169.45	88.11
C152	**3**	**1**	M	25	Other	13	no	yes	0	1	184.73	109.48
B153	**2**	**1**	M	23	White	12	no	yes	0	1	183.99	112.05
B154	**2**	**1**	M	30	Black	13	yes	no	0	1	174.02	96.55
C155	**3**	**1**	M	25	White	13	no	no	0	1	178.91	111.95
A156	**1**	**1**	M	22	White	14	no	no	0	1	173.18	88.37
C157	**3**	**1**	M	23	White	12	yes	yes	0	0	166.62	80.68
D158	**4**	**1**	M	24	Other	12	yes	yes	0	0	182.88	92.64
B159	**2**	**1**	M	27	Black	12	no	no	0	1	181.74	130.64

ID	Group	Visit	Gender	Age	Ethnicity	EdLevel	Married	Smoker	Tobacco	DietHx	Height	Weight
A160	**1**	**1**	M	22	White	13	no	no	0	0	165.1	83.41
B161	**2**	**1**	M	32	Other	14	yes	yes	0	0	171.25	95.27
A162	**1**	**1**	M	38	Black	16	no	yes	0	1	186.89	111.73
C163	**3**	**1**	M	35	White	14	yes	no	0	1	182.72	104.61
D164	**4**	**1**	F	40	White	16	yes	no	0	1	160.13	73.57
A165	**1**	**1**	M	40	Other	16	yes	no	0	0	182.78	111.66
A166	**1**	**1**	F	46	Black	16	yes	no	0	1	163.12	81.77
B167	**2**	**1**	M	27	White	17	yes	no	0	1	182.67	92.84
C168	**3**	**1**	M	43	Black	14	yes	no	0	1	174.73	101.23
D169	**4**	**1**	M	32	Other	14	no	yes	0	1	175.31	110.28
B170	**2**	**1**	M	24	White	17	no	no	0	1	178.92	110.78
D171	**4**	**1**	F	33	Black	13	no	yes	0	1	151.23	70.77
C172	**3**	**1**	M	21	White	12	yes	no	0	1	176.63	96.5

ID	Visit	WC	BMI	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM	WBF	TrFM	BF
D001	**1**	30.7	26.63	202	97	94	56	87	120	89	44396.3	23163.2	8603.6	32.9
D002	**1**	36.4	32.75	.	.	.	.	.	121	70	54264.3	27637.1	12067.1	32.7
D003	**1**	45.9	36.27	130	49	72	58	92	139	87	80361.9	42083.4	22439.2	33.4
B004	**1**	40.2	33.08	193	47	137	59	85	123	87	71289.7	26305.7	12376.9	26
A005	**1**	38.2	28.76	190	60	119	103	88	116	79	45736.2	29351.3	13563.6	38
C006	**1**	44.3	32.04	177	60	95	106	108	139	82	61863.6	35447.9	17981	35.3
D007	**1**	44.1	32.79	138	23	98	100	96	136	88	76832.2	38232.4	19587.9	32.1
D008	**1**	32.1	30.45	208	52	149	58	99	127	83	46529.6	28927.6	12636	37
D009	**1**	42.5	35.61	206	66	134	79	96	145	84	81111.9	37680.4	16364.6	30.8
D010	**1**	44.9	35.02	171	51	112	74	95	115	76	73946.7	33774.6	18224.9	30.4
B011	**1**	42	32.28	182	39	89	266	97	142	98	74119.1	32269.3	18231.1	29.4
A012	**1**	39.4	32.29	173	41	102	150	89	126	88	61054	25949.4	13370.5	28.8
A013	**1**	35.4	27.64	152	.	.	.	121	130	83	59181.8	17868.7	9278.2	22.4
B014	**1**	36.6	28.10	195	67	131	51	70	94	64	50556.2	28170.8	9711.5	34.7
A015	**1**	41.7	31.60	232	26	168	233	101	126	86	68963	32718	19373.8	31.3
C016	**1**	41.5	30.04	237	51	160	174	90	112	77	59917	25798	13017.7	29.2
B017	**1**	39.6	31.40	187	71	103	55	93	112	83	52139	37768.7	15938.8	40.9
C018	**1**	41.5	29.02	256	31	157	417	92	124	78	60965.4	26701.3	15120.6	29.5
C019	**1**	34	28.04	141	34	96	61	89	125	85	61985.4	17485.4	8689.9	21.2
C020	**1**	32.5	29.07	134	84	56	32	91	105	74	44863.5	26281	9664.6	35.8
D021	**1**	40.6	31.06	212	70	129	136	100	147	92	64156.9	22966.1	8600.3	25.4
C022	**1**	33.54	26.43	184	35	134	76	85	105	69	42454.7	18448.5	8304.8	29.2
B023	**1**	48.25	38.59	145	39	83	205	99	133	62	75227	44874.5	22521.5	36.3
B024	**1**	35	29.43	165	66	84	105	84	107	80	43696.8	34977	20906.9	43.3
B025	**1**	42.5	39.80	245	50	159	277	96	123	84	55911.2	41281	17824.4	41.4
D026	**1**	41.1	32.86	.	.	.	.	.	127	72	72652.4	30676.7	15323.3	28.8
D027	**1**	40.9	29.99	193	71	116	57	92	115	70	48847.1	32370.3	11769.5	38.6
C028	**1**	41.5	32.33	130	31	93	53	95	117	65	69822.6	26393	12100	26.4
C029	**1**	41.4	30.96	227	56	162	72	82	114	80	63044.6	29414.9	15091	30.8
B030	**1**	42	28.49	133	49	68	71	110	106	72	42317.9	28717	14168.6	39.3
A031	**1**	43.25	33.03	202	31	122	345	89	129	90	76093.1	29426.6	18102.2	27

ID	**Visit**	**WC**	**BMI**	**TCHL**	**HDL**	**LDL**	**TG**	**FBG**	**BPS**	**BPD**	**LBM**	**WBF**	**TrFM**	**BF**
C032	**1**	53.94	40.85	174	52	92	182	91	136	92	76083.3	55322	26554	40.9
A033	**1**	44	36.25	187	36	119	141	112	130	83	78134.6	37899.3	17579.4	31.8
C034	**1**	38.25	27.72	162	72	77	63	86	96	60	44965.3	29712.4	13672	38.7
A035	**1**	40.55	34.13	283	73	200	80	90	111	78	77624.6	35313.9	15805.7	30.1
B036	**1**	37.4	28.65	.	.	.	.	.	125	69	60075.5	16441.7	9253.8	20.8
A037	**1**	40.1	30.71	178	25	105	239	91	112	87	64413.5	23442.8	13261	25.9
A038	**1**	36	25.87	189	53	125	105	84	93	65	36024.5	19009.9	10110.4	33.6
B039	**1**	40.5	31.60	211	26	144	204	88	131	90	71864	29939.3	14151.8	28.5
A040	**1**	33	29.02	180	67	111	53	80	119	75	69616.9	18739	6258.7	20.4
D041	**1**	38.5	34.36	121	79	34	67	88	105	64	72400.8	21026.9	8854.9	21.6
B042	**1**	38.2	28.96	.	.	.	.	.	92	63	43491.4	20517.6	8607.8	30.9
A043	**1**	38.5	30.25	159	43	104	73	83	114	68	63828.5	26320.9	11187.8	28.4
C044	**1**	43.07	34.14	157	58	99	51	88	124	76	72297	40285	17599.3	34.6
C045	**1**	38.58	34.94	193	52	128	110	108	122	88	57450.7	37562.5	18704.4	38.6
D046	**1**	40.55	28.51	213	67	123	113	95	120	92	42625.3	26702.8	13723.7	37.4
A047	**1**	41.88	32.40	.	.	.	.	93	127	83	66825.1	26620.4	11975.9	27.7
C048	**1**	36.9	31.09	158	70	86	52	92	109	71	51066.8	27618.1	11654.3	33.9
B049	**1**	40	35.72	152	44	93	110	91	121	86	45622.2	38785.5	18010.4	44.6
A050	**1**	38.25	29.46	236	54	151	274	85	114	79	63531.5	24373.1	14643	26.9
B051	**1**	42.67	31.24	234	50	173	89	102	123	79	70706.7	27615.7	15090.3	27.2
C052	**1**	45.27	33.77	152	50	93	38	102	108	73	74410.5	32904.5	17056.1	29.6
C053	**1**	41.7	31.07	.	.	.	.	.	135	83	76613.3	30147.1	13921.4	27.2
D054	**1**	40.4	33.12	174	36	112	231	113	126	90	71208.3	26593.4	13466.4	26.3
C055	**1**	38.3	30.86	156	50	93	65	91	106	70	53132.2	29658.9	12362	34.5
D056	**1**	43.58	31.04	162	42	109	62	108	122	83	68792.5	30478.1	19061.8	29.8
D057	**1**	40.7	30.68	197	53	124	136	95	135	91	82062.7	22489.4	11029.4	20.7
B058	**1**	42.9	33.13	.	.	.	.	95	121	86	70907.3	31664	16864.8	29.9
D059	**1**	46	30.98	226	60	138	121	90	126	87	67426.2	35489.2	19815.3	33.7
B060	**1**	41.5	34.57	177	36	122	128	87	130	73	73742.5	31697.4	15618.9	29.2
B061	**1**	44	34.12	234	37	174	117	112	147	95	88406.8	33153.6	18370.5	26.4
B062	**1**	32.5	30.23	216	64	144	80	93	104	73	41325	34411	15422.1	44.3
A063	**1**	41.5	30.04	170	47	107	104	102	121	83	62245.8	33872.7	14859.3	34.2

ID	Visit	WC	BMI	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM	WBF	TrFM	BF
B064	**1**	35.25	29.96	176	70	95	70	93	134	90	54734	32052.6	13695.6	35.7
A065	**1**	39.5	33.60	181	54	107	182	94	148	97	80583.2	26675.1	12823	24.1
C066	**1**	38.39	36.58	.	.	.	.	.	136	97	45200.8	43230.8	18846.9	47.7
A067	**1**	34	30.76	.	.	.	.	.	97	63	46523.9	32662.1	12559.2	40.1
A068	**1**	41.93	34.37	233	46	139	314	90	155	104	80382.5	28421.3	12139.2	25.2
C069	**1**	41.7	30.88	.	.	.	.	.	110	70	70393.3	24185.1	13850.5	24.8
D070	**1**	36	26.74	.	.	.	.	.	123	83	58509.7	19848.5	11552.8	24.5
A071	**1**	36.1	31.31	241	51	181	102	85	116	73	66412.5	28162.4	11368.1	28.8
B072	**1**	36.4	28.65	212	89	105	90	95	124	82	53565	22484.4	8972	28.7
A073	**1**	42.75	36.23	256	62	183	53	90	114	85	76192.1	32431.5	15509.5	29
D074	**1**	36.8	33.52	139	53	82	55	90	133	97	52416.1	32833.5	12724	37.4
D075	**1**	40.55	32.20	191	53	112	129	94	122	79	65285.7	28301.4	15870.6	29.3
B076	**1**	37.2	29.32	182	52	105	121	101	112	78	64108.7	29803.2	15428.1	30.7
C077	**1**	43.11	37.67	.	.	.	.	90	131	86	85085.7	32031.6	11622.6	26.5
D078	**1**	42.75	30.95	237	37	168	159	105	135	90	69487.6	30360.6	15864.6	29.4
A079	**1**	39.3	30.81	179	36	117	134	89	121	86	70604.6	22830.3	11282.1	23.6
C080	**1**	36.02	28.09	153	55	95	34	86	109	69	43724.9	29996.4	12110.8	39.4
B081	**1**	41.34	32.86	209	54	141	69	.	123	85	76652.9	24970.7	12313.7	23.7
B082	**1**	41.34	34.36	250	47	184	166	104	138	90	69083.7	35231	14742	32.8
D083	**1**	40	27.38	125	41	73	59	98	91	57	47173.3	28073.5	14075.7	36.2
A084	**1**	37.4	26.69	151	48	96	69		108	72	46358.3	31103.2	15755	38.7
C085	**1**	33.27	28.83	203	66	136	82	80	113	82	46337.4	19314.8	8036.3	28.5
D086	**1**	37	31.63	235	42	177	108	80	125	81	69756.8	22036.1	11215.2	23.2
D087	**1**	37.64	29.05	158	43	100	70	93	117	76	63025	22468.8	11050	25.4
C088	**1**	40.75	35.15	152	52	89	56	93	116	83	56573.6	42148.9	17805.7	41.5
A089	**1**	48	36.59	266	30	181	274	107	149	96	86887.4	34675.7	20288.2	27.5
D090	**1**	39	31.56	201	73	128	37	94	115	81	50076.9	33565.2	15217.9	38.9
A091	**1**	42.35	37.92	251	40	185	131	81	133	88	88612.5	35690.1	19547.9	27.8
A092	**1**	43.7	35.86	188	52	123	132	83	119	75	69318.1	31837.5	17651.2	30.5
B093	**1**	41.06	32.71	181	33	103	227	91	133	87	74429.8	29376.1	17201	27.3
D094	**1**	39.3	30.96	.	.	.	.	.	125	91	49634.9	36726.1	19023.1	41.3
B095	**1**	39.17	32.83	221	41	151	169	87	132	97	57434.4	31721.4	18283	34.7

ID	Visit	WC	BMI	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM	WBF	TrFM	BF
C096	**1**	37	25.26	.	.	.	.	.	112	84	49529	29842.6	11026.1	36.4
A097	**1**	36.34	33.12	.	.	.	.	.	117	84	49297.8	28317.6	13462.1	35.4
C098	**1**	34.45	28.63	229	58	133	188	94	118	85	48462.5	31019.8	14513.3	37.8
B099	**1**	45.83	38.24	195	51	132	65	88	130	91	48961.7	39427.7	20676.4	43.5
C100	**1**	41.34	34.41	140	44	78	103	89	115	75	62918	37955.1	19008.4	36.6
A101	**1**	43.5	27.62	214	70	116	131	97	113	80	44480.3	31869.9	14486.4	40.3
C102	**1**	39.75	30.69	201	46	129	90	103	134	90	55100.3	26805.1	15188.9	31.5
A103	**1**	36.29	28.23	295	37	232	125	.	122	84	54301.5	22282.1	11513.9	28.2
A104	**1**	32.28	28.61	144	58	73	115	93	131	85	37414.1	17505.9	8354.8	30.7
D105	**1**	38.98	29.24	.	.	.	.	115	118	83	63997	23447.4	13452.5	25.9
D106	**1**	43	36.25	190	49	129	60	98	138	86	81866.7	33274.3	17757.1	27.9
D107	**1**	42	31.68	198	37	137	108	91	134	89	76704.9	29909.6	17305.9	27.2
B108	**1**	35	29.85	.	.	.	.	.	117	74	48847.6	30620.8	14145.6	37.3
C109	**1**	38.58	32.55	205	47	144	62	69	124	75	64611.8	23473.9	12480	25.8
A110	**1**	39.65	29.05	209	46	145	102	82	138	91	72912.7	25232.1	13813.8	24.9
B111	**1**	31.25	28.42	169	58	104	60	107	114	76	40391.7	24554.1	12037.9	36.6
D112	**1**	53.23	40.39	162	28	95	195	111	114	84	82786	51696.7	31158.1	37.6
B113	**1**	41.73	29.97	247	39	111	452	94	111	73	75241.3	27126.6	15423.6	25.6
C114	**1**	38.58	30.67	159	60	91	79	.	121	83	52295.4	33193.9	15287.1	37.5
B115	**1**	40.43	30.71	216	47	155	85	92	102	63	62180.3	23992.5	12001.3	27.1
C116	**1**	38	27.84	184	45	124	66	92	137	92	62286.7	17988.4	9974.2	21.6
A117	**1**	35	31.26	173	54	107	54	108	114	80	43674.5	26926.3	13732.2	37
C118	**1**	35.43	27.06	135	61	63	88	102	107	76	36473.2	25873.7	11888.5	40.3
D119	**1**	39.17	35.89	.	.	.	.	.	127	71	.	.	.	.
D120	**1**	40	34.17	265	46	190	145	90	121	89	70103	25168.1	13096.7	25.5
B121	**1**	38	31.18	244	79	149	134	.	102	62	60499.4	29924.8	12593.3	31.9
D122	**1**	42	36.52	182	36	114	126	108	125	82	74294	30018.1	16453.9	27.9
C123	**1**	51.73	37.59	130	41	61	116	115	123	88	64375.8	44557.1	26380.1	39.6
A124	**1**	42.8	33.39	204	36	141	132	93	126	79	68440.1	33862.3	18831.6	32.1
B125	**1**	42.5	34.79	.	.	.	.	.	112	65	73031.1	35202.1	16872.2	31.6
A126	**1**	38.46	32.93	.	.	.	.	.	126	91	55785.5	31196	15408.7	34.6
A127	**1**	40	33.01	170	52	86	237	92	145	88	66046.2	27083.6	11794	28

ID	Visit	WC	BMI	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM	WBF	TrFM	BF
C128	**1**	41.5	35.60	103	32	61	38	82	111	75	54450.5	37756.3	18013.2	39.7
B129	**1**	42.5	33.71	.	.	.	.	.	111	76	52596.6	32551.5	14666	37
B130	**1**	33.27	28.57	233	56	163	95	94	99	61	44590.5	26386.3	9784.3	35.7
D131	**1**	37	31.76	194	69	106	104	81	124	82	54714.2	32126.3	13597.4	35.9
D132	**1**	39	33.86	.	.	.	.	93	136	93	73407.9	20083.3	10388.1	20.8
C133	**1**	37.8	28.52	206	55	138	63	85	103	70	44417.6	29812.1	14186.8	38.8
B134	**1**	43	33.09	.	.	.	.	.	137	63	67899.3	26942.3	14607.1	27.5
D135	**1**	36.5	29.44	190	59	120	58	103	111	70	55247.1	25326	11709.6	30.2
C136	**1**	40.83	36.76	181	31	125	126	96	131	76	71549.6	20876.9	11280.6	21.8
A137	**1**	39.17	27.97	138	.	.	.	93	114	80	46919	30324	13026.1	37.9
A138	**1**	37.25	27.21	204	61	131	55	.	100	68	43985.9	30819.3	13972.7	39.7
B139	**1**	39.65	28.97	150	67	69	88	.	113	73	60091.8	28927.4	15280.6	31.4
C140	**1**	38	31.05	137	61	65	55	80	122	72	52737.1	30361.6	13726.9	35.3
D141	**1**	40.75	29.78	110	42	49	185	84	142	87	74134.9	22852.3	12189.4	22.8
B142	**1**	42.13	36.44	152	51	85	63	76	132	85	74226.4	25298.6	13761.4	24.7
B143	**1**	52.17	42.20	220	55	149	82	86	140	89	.	.	.	.
A144	**1**	43	33.42	165	26	110	153	87	123	70	78273.1	31138.9	16352.4	27.4
C145	**1**	41.61	35.09	204	58	136	43	75	117	84	45136.5	30020.5	13696.6	38.8
D146	**1**	40	33.03	.	.	.	.	.	128	95	55056.8	35740.8	16966.7	38.1
A147	**1**	42.13	30.40	188	65	113	66	88	123	84	51234.5	34873.7	18835.5	39.4
C148	**1**	42	37.09	160	46	104	72	84	124	84	67918.2	36544.5	17395.9	33.9
D149	**1**	32.28	28.76	216	87	116	67	73	122	75	44972.6	22805.6	8992.9	32.5
A150	**1**	40.43	31.71	152	48	94	49	107	120	86	65777.9	35232.8	18082.9	33.9
D151	**1**	40.71	30.69	254	36	183	189	90	121	91	58207	26285.5	14642.3	30.2
C152	**1**	47.73	32.08	186	42	131	120	104	124	78	72741.3	31087.1	16933.4	28.8
B153	**1**	42	33.10	166	51	110	53	92	116	76	70125	36737.1	17869.1	33.3
B154	**1**	41.75	31.88	241	55	179	77	100	125	70	62329.9	29847.6	14896.4	31.4
C155	**1**	40.83	34.97	123	50	66	63	64	134	80	71665.3	35135.3	15435.4	31.7
A156	**1**	41.5	29.47	202	56	138	43	93	132	83	57303.3	26876.8	12884.4	30.8
C157	**1**	37.2	29.06	184	39	113	158	89	132	89	55501.8	21429.3	11065.4	26.9
D158	**1**	40.75	27.70	194	37	150	68	92	115	73	61753.9	26920.4	13770.1	29.4
B159	**1**	49.21	39.55	.	.	.	.	.	131	87	82573.9	42058	22968.5	32.9

ID	Visit	WC	BMI	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM	WBF	TrFM	BF
A160	**1**	37.4	30.60	.	.	.	.	.	128	90	53054	26653.7	12490.6	32.5
B161	**1**	41.25	32.49	172	31	80	369	90	122	89	64400.9	26381.3	15814.1	28.1
A162	**1**	43.5	31.99	.	.	.	.	95	132	101	71785	34743.2	19898.8	31.5
C163	**1**	42.4	31.33	.	.	.	.	.	131	73	71701.6	27569	15476.5	26.8
D164	**1**	36.73	28.69	158	64	90	34	88	125	83	47169.9	23248	8097.4	31.9
A165	**1**	44.41	33.42	133	44	65	108	97	139	80	75183	31629	16045	28.8
A166	**1**	34.65	30.73	190	55	120	73	92	129	84	42466.1	35233.7	14519.3	43.9
B167	**1**	37.79	27.82	171	50	105	87	85	121	76	60996	27712.3	13060.2	30.3
C168	**1**	40.25	33.16	211	38	138	174	84	178	127	72371.9	23829.5	13508.3	23.8
D169	**1**	41.73	35.88	223	46	141	180	107	122	80	68355.9	37179	19914.8	34.2
B170	**1**	41.73	34.61	163	56	95	58	87	143	82	73038	33420.7	16401	30.5
D171	**1**	37.79	30.94	179	55	119	76	74	101	78	39864.2	27956.1	11892.4	40
C172	**1**	39.57	30.93	153	42	96	75	93	128	76	66062.9	25869.9	10859.6	27.4

ID	Visit	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	kcal	Fat	CHO	Pro	Per Fat
D001	**1**	1	5	5	5	5	3	1049	19	131	37	16
D002	**1**	4	4	4	5	5	5	1495	74	151	56	44
D003	**1**	3	5	3	4	3	3	2488	101	283	113	36
B004	**1**	3	3	3	5	5	3	1731	71	206	67	37
A005	**1**	1	5	5	5	5	1	1983	70	215	62	33
C006	**1**	1	3	3	5	5	3	1385	62	151	56	40
D007	**1**	3	3	3	5	5	4	2788	102	365	107	33
D008	**1**	3	3	3	4	3	4	1350	58	142	62	39
D009	**1**	4	4	5	5	1	3	1886	107	140	88	51
D010	**1**	1	5	5	4	2	2	2080	74	228	93	32
B011	**1**	3	3	3	5	2	2	2117	83	256	96	35
A012	**1**	3	3	3	5	2	2	1774	80	160	78	40
A013	**1**	4	5	3	5	3	5	2116	64	274	93	27
B014	**1**	1	4	4	5	5	3	1821	75	233	64	37
A015	**1**	.	.	.	.	.	.					
C016	**1**	3	2	2	3	3	4	2352	133	193	108	51
B017	**1**	3	3	3	5	5	5	1857	94	168	92	45
C018	**1**	5	5	3	5	3	3	1517	52	203	62	31
C019	**1**	2	3	3	5	1	5	2744	102	363	103	33
C020	**1**	3	3	3	4	3	5	2026	95	179	101	42
D021	**1**	1	3	3	5	1	1	2059	85	262	63	37
C022	**1**	5	4	3	5	5	3	1653	80	183	60	43
B023	**1**	1	2	2	5	3	3					
B024	**1**	3	5	5	5	4	3	1750	73	212	74	37
B025	**1**	3	2	2	5	5	3	2056	85	245	85	37
D026	**1**	.	.	.	.	.	.					
D027	**1**	3	3	3	5	5	5	1713	42	276	73	22
C028	**1**	4	5	3	4	3	3					
C029	**1**	3	2	2	5	5	3	2688	118	284	126	39
B030	**1**	3	5	3	5	1	2					
A031	**1**	3	3	3	5	5	3	1844	86	194	77	42
C032	**1**	5	3	3	5	3	5	2151	91	253	89	38

ID	Visit	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	kcal	Fat	CHO	Pro	Per Fat
A033	**1**	1	3	3	5	5	5	1657	83	127	104	45
C034	**1**	5	5	5	5	5	5	2145	84	272	78	35
A035	**1**	.	.	.	.	.	.	1042	59	73	45	51
B036	**1**	3	4	4	5	1	5	1984	97	189	82	44
A037	**1**	3	5	5	4	5	3	2808	126	290	131	40
A038	**1**	3	3	2	4	3	3	1766	59	220	56	30
B039	**1**	5	5	5	5	5	3	1783	59	223	88	30
A040	**1**	4	5	5	5	2	2	1454	56	152	88	35
D041	**1**	3	5	5	5	5	5	1565	54	156	88	31
B042	**1**	.	.	.	.	.	.					
A043	**1**	3	4	4	5	5	5	2241	91	253	105	36
C044	**1**	1	5	5	5	1	3	2033	97	176	98	43
C045	**1**	3	3		4	5	3	2219	96	259	85	38
D046	**1**	3	5	5	5	5	5	1234	41	108	53	30
A047	**1**	1	5	5	5	5	5	1063	46	108	52	39
C048	**1**	3	3	3	5	5	3	1769	79	204	62	40
B049	**1**	1	5	5	5	5	1	1137	43	133	56	34
A050	**1**	1	3	3	5	5	3	1634	56	230	57	30
B051	**1**	4	3	3	5	5	3					
C052	**1**	1	4	2	4	1	3	2642	135	238	114	46
C053	**1**	.	.	.	.	.	.					
D054	**1**	1	3	1	4	5	2	1664	56	217	71	30
C055	**1**	4	4	3	4	4	2	1876	119	129	91	57
D056	**1**	3	3	3	5	5	2	3786	239	276	118	56
D057	**1**	3	3	3	5	4	3	3903	206	380	133	47
B058	**1**	.	.	.	.	.	.					
D059	**1**	1	4	2	5	3	1					
B060	**1**	1	4	3	5	3	3	1366	31	211	66	20
B061	**1**	3	4	5	3	1	5	2988	99	438	75	30
B062	**1**	3	3	3	5	5	5	1750	90	170	69	46
A063	**1**	3	3	3	3	5	3	2936	126	304	111	38

ID	Visit	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	kcal	Fat	CHO	Pro	Per Fat
B064	**1**	3	3	3	4	4	2	1602	58	226	50	32
A065	**1**	.	.	.	.	.	.					
C066	**1**	4	3	3	5	5	3	935	38	86	62	37
A067	**1**	3	3	3	5	5	3					
A068	**1**	1	5	3	5	5	5					
C069	**1**	.	.	.	.	.	.					
D070	**1**	.	.	.	.	.	.					
A071	**1**	.	.	.	.	.	.					
B072	**1**	3	3	3	5	5	3	1796	68	177	87	34
A073	**1**	3	4	4	5	4	5	2056	100	221	69	44
D074	**1**	4	3	3	5	3	5	1754	74	207	68	38
D075	**1**	3	3	3	5	5	2	1314	57	144	55	39
B076	**1**	3	3	3	4	1	3					
C077	**1**	1	3	3	4	3	3	3682	153	471	108	37
D078	**1**	1	3	3	5	5	2	2480	95	257	147	34
A079	**1**	3	5	5	5	4	4	1245	47	138	66	34
C080	**1**	2	2	2	5	3	3	1206	51	130	58	38
B081	**1**	3	5	5	4	3	5	1761	89	167	82	45
B082	**1**	3	3	3	5	5	5	3215	110	494	79	31
D083	**1**	3	2	2	4	3	3	2562	103	345	73	36
A084	**1**	.	.	.	.	.	.					
C085	**1**	1	3	5	5	1	1	1840	80	216	68	39
D086	**1**	3	4	4	5	3	3	1987	92	184	101	41
D087	**1**	2	3	3	4	5	2	1370	41	160	61	27
C088	**1**	3	3	3	5	3	3					
A089	**1**	3	4	3	5	3	3	2177	114	141	116	47
D090	**1**	1	3	3	5	1	3	2197	113	230	64	46
A091	**1**	3	5	5	5	3	3	883	33	100	45	33
A092	**1**	3	4	4	5	5	2	1585	62	191	67	35
B093	**1**	3	4	3	5	4	4	1110	25	150	45	20
D094	**1**	.	.	.	.	.	.					
B095	**1**	3	5	5	5	3	3	3331	97	249	111	37

ID	Visit	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	kcal	Fat	CHO	Pro	Per Fat
C096	**1**	1	5	5	5	5	3	1562	54	215	56	31
A097	**1**	.	.	.	.	.	.					
C098	**1**	5	5	5	3	3	3	1781	91	182	64	46
B099	**1**	.	.	.	.	.	.					
C100	**1**	4	5	5	5	3	3	1701	69	205	73	36
A101	**1**	1	4	4	5	1	5	1660	64	203	73	34
C102	**1**	3	3	3	5	5	3	1514	46	226	53	27
A103	**1**	4	3	3	5	3	4	1210	29	196	45	21
A104	**1**	3	3	3	5	4	4	1739	72	210	65	37
D105	**1**	1	2	2	1	1	3	4481	132	732	107	27
D106	**1**	3	5	5	5	5	3	2117	110	196	86	47
D107	**1**	3	3	3	5	4	3	1433	54	175	62	34
B108	**1**	.	.	.	.	.	.	1696	78	173	74	41
C109	**1**	1	5	5	5	5	3	2612	113	269	131	39
A110	**1**	3	5	5	2	5	3	3310	162	366	106	44
B111	**1**	.	.	.	.	.	.	948	25	133	50	23
D112	**1**	1	4	4	5	5	3	2574	134	284	76	46
B113	**1**	3	5	5	5	5	3	1702	45	268	66	23
C114	**1**	3	3	3	5	5	5	2107	100	224	87	42
B115	**1**	3	3	3	4	5	5	1315	37	163	84	25
C116	**1**	3	2	2	5	5	5	2273	83	272	96	33
A117	**1**	4	3	3	5	5	3					
C118	**1**	1	3	3	5	4	2	1908	82	224	70	39
D119	**1**	.	.	.	.	.	.					
D120	**1**	4	4	4	5	4	3	2787	74	466	74	24
B121	**1**	.	.	.	.	.	.	1500	76	137	74	45
D122	**1**	3	4	4	4	4	5	2126	71	268	103	30
C123	**1**	3	3	3	5	5	3	1388	51	180	59	33
A124	**1**	3	5	3	5	3	5	1366	63	141	57	42
B125	**1**	4	4	4	5	4	4	1090	30	166	43	25
A126	**1**	2	2	2	5	5	2	947	32	130	43	29

ID	Visit	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	kcal	Fat	CHO	Pro	Per Fat
A127	**1**	3	3	5	5	3	3	1721	69	191	86	36
C128	**1**	2	3	3	4	1	5	2213	42	394	69	17
B129	**1**	.	.	.	.	.	.					
B130	**1**	5	3	3	5	5	5	1691	68	208	66	36
D131	**1**	5	5	5	5	3	3					
D132	**1**	4	5	3	5	1	3					
C133	**1**	.	.	.	.	.	.					
B134	**1**	.	.	.	.	.	.					
D135	**1**	3	3	3	4	3	3	1288	44	165	61	30
C136	**1**	3	3	3	4	4	3	1304	55	128	74	38
A137	**1**	.	.	.	.	.	.					
A138	**1**	5	3	3	5	5	3	1418	53	153	69	33
B139	**1**	3	3	3	5	5	3	1748	65	209	85	33
C140	**1**	3	3	3	5	5	4	1396	48	156	92	31
D141	**1**	3	5	5	5	1	3	2406	67	256	85	25
B142	**1**	5	5	5	5	2	5	2092	58	312	93	25
B143	**1**	4	4	4	5	4	4					
A144	**1**	3	5	5	5	3	5	3534	152	420	124	38
C145	**1**	3	3	3	4	4	3					
D146	**1**	1	3	3	5	5	1	2162	84	267	89	35
A147	**1**	3	5	5	5	5	5	1423	50	195	64	31
C148	**1**	3	4	3	5	5	5	1279	38	156	83	27
D149	**1**	3	3	3	5	5	3	1117	32	147	68	26
A150	**1**	3	4	3	5	5	3	3160	155	230	133	44
D151	**1**	1	2	2	5	1	5	844	42	77	39	45
C152	**1**	1	3	3	5	5	5	1674	42	210	91	22
B153	**1**	3	5	5	5	3	4					
B154	**1**	3	5	3	5	3	5	1239	44	145	64	32
C155	**1**	3	5	4	5	5	3					
A156	**1**	4	5	5	5	1	4					
C157	**1**	3	5	3	4	2	2					

ID	Visit	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	kcal	Fat	CHO	Pro	Per Fat
D158	**1**	5	5	5	5	5	5					
B159	**1**	2	4	4	5	4	4	870	26	68	83	27
A160	**1**	3	3	3	5	3	5					
B161	**1**	3	3	5	5	3	3					
A162	**1**	3	3	3	4	3	3	1770	69	196	87	35
C163	**1**	3	3	3	5	5	3					
D164	**1**	1	3	3	5	5	1	1322	50	160	53	64
A165	**1**	3	3	3	4	5	1	1145	57	82	79	45
A166	**1**	3	3	3	5	5	3	1021	24	192	19	21
B167	**1**	.	.	.	.	.	.	4758	134	638	256	25
C168	**1**	3	4	3	4	4	3	2660	103	362	79	35
D169	**1**	3	3	1	4	4	1					
B170	**1**	3	3	3	5	3	3	3333	119	454	125	32
D171	**1**	.	.	.	.	.	.					
C172	**1**	1	3	3	5	5	1	1791	81	189	56	41

ID	Visit	FRUIT	VEG	GRAIN	MEAT	DAIRY
D001	**1**	1.4	2.1	2.8	1.6	0.8
D002	**1**	0.2	2.3	3.5	4.9	1.2
D003	**1**	1.2	6.5	4.8	11.9	0.8
B004	**1**	0.0	0.5	4.9	6.2	1.8
A005	**1**	3.0	3.0	7.0	3.3	1.3
C006	**1**	0.3	2.6	7.0	4.0	2.0
D007	**1**	3.9	1.6	7.6	10.6	2.7
D008	**1**	1.0	1.6	4.4	6.0	0.4
D009	**1**	1.9	4.5	3.2	10.3	0.1
D010	**1**	2.5	3.4	5.6	9.5	2.2
B011	**1**	1.9	4.9	3.1	8.0	3.3
A012	**1**	0.7	2.4	3.7	7.7	0.0
A013	**1**	0.0	2.4	7.2	10.0	0.3
B014	**1**	1.4	2.4	7.1	6.7	1.8
A015	**1**					
C016	**1**	1.5	9.5	7.0	10.1	0.5
B017	**1**	0.0	5.4	3.9	9.3	1.2
C018	**1**	0.0	2.7	5.4	5.3	2.5
C019	**1**	3.7	2.3	9.7	5.7	3.3
C020	**1**	2.5	1.2	4.4	12.6	0.5
D021	**1**	0.4	1.2	10.1	4.8	4.4
C022	**1**	1.3	6.3	1.1	2.4	2.8
B023	**1**					
B024	**1**	0.5	2.2	8.7	4.3	1.4
B025	**1**	7.0	2.1	5.8	6.1	2.4
D026	**1**					
D027	**1**	2.6	2.9	9.1	3.6	1.7
C028	**1**					
C029	**1**	3.8	3.4	8.1	10.3	3.5
B030	**1**					
A031	**1**	0.7	7.4	6.6	6.6	0.8

ID	Visit	FRUIT	VEG	GRAIN	MEAT	DAIRY
C032	**1**	1.2	1.7	6.5	11.6	0.3
A033	**1**	1.6	4.2	6.0	7.4	2.8
C034	**1**	0.7	2.1	8.5	7.4	1.5
A035	**1**	0.0	1.0	2.9	5.0	0.3
B036	**1**	0.7	2.0	4.6	7.4	3.1
A037	**1**	1.0	5.5	6.1	13.7	2.5
A038	**1**	2.8	2.1	3.4	3.5	1.8
B039	**1**	0.5	2.6	6.0	7.8	0.4
A040	**1**	0.7	4.5	2.9	10.1	1.2
D041	**1**	3.0	2.9	2.8	9.8	1.4
B042	**1**					
A043	**1**	1.4	2.7	10.1	9.2	1.4
C044	**1**	1.9	2.0	4.8	9.1	2.2
C045	**1**	2.8	5.8	3.5	8.5	0.6
D046	**1**	1.8	5.1	1.3	5.1	1.2
A047	**1**	0.0	0.9	4.5	4.5	0.9
C048	**1**	0.6	3.6	4.6	5.6	1.4
B049	**1**	0.0	1.7	4.8	5.7	0.2
A050	**1**	2.2	0.2	6.9	3.3	1.7
B051	**1**					
C052	**1**	0.0	2.4	5.8	9.0	3.0
C053	**1**					
D054	**1**	1.3	1.2	6.9	6.7	2.0
C055	**1**	2.5	2.6	2.3	12.2	1.8
D056	**1**	0.3	2.4	7.6	10.9	0.5
D057	**1**	0.0	1.9	13.6	8.9	3.9
B058	**1**					
D059	**1**					
B060	**1**	1.0	3.0	6.2	4.1	1.6
B061	**1**	3.4	5.4	8.1	6.1	0.9
B062	**1**	2.2	3.1	4.1	6.5	2.1
A063	**1**	0.0	5.9	5.6	10.7	2.8

ID	Visit	FRUIT	VEG	GRAIN	MEAT	DAIRY
B064	**1**	1.4	1.1	6.0	2.1	3.5
A065	**1**					
C066	**1**	0.0	3.1	2.2	8.3	0.9
A067	**1**					
A068	**1**					
C069	**1**					
D070	**1**					
A071	**1**					
B072	**1**	0.3	2.5	5.5	8.3	1.6
A073	**1**	1.0	4.2	4.6	5.6	0.7
D074	**1**	3.2	3.7	4.1	7.1	0.4
D075	**1**	0.0	0.0	5.1	3.3	1.4
B076	**1**					
C077	**1**	0.7	2.1	10.9	7.4	1.4
D078	**1**	0.0	7.3	8.4	13.3	2.6
A079	**1**	0.8	3.3	2.9	2.9	0.8
C080	**1**	0.3	2.4	5.1	4.1	2.1
B081	**1**	0.0	3.2	3.7	11.3	1.2
B082	**1**	9.7	3.2	4.6	10.2	1.3
D083	**1**	1.1	2.3	6.8	5.1	2.1
A084	**1**					
C085	**1**	0.1	1.5	4.9	5.3	2.6
D086	**1**	2.1	2.9	6.5	10.9	1.2
D087	**1**	0.0	2.7	0.5	6.3	0.6
C088	**1**					
A089	**1**	0.0	3.8	5.7	13.3	1.3
D090	**1**	1.0	3.4	7.3	5.2	5.7
A091	**1**	0.0	1.4	3.6	4.5	0.7
A092	**1**	1.0	1.8	4.3	4.0	3.9
B093	**1**	1.0	3.3	3.3	3.4	0.6
D094	**1**					
B095	**1**	0.0	3.5	6.1	10.3	1.3

ID	Visit	FRUIT	VEG	GRAIN	MEAT	DAIRY
C096	**1**	4.0	3.8	5.0	3.0	1.2
A097	**1**					
C098	**1**	0.0	1.8	6.9	4.7	1.5
B099	**1**					
C100	**1**	2.7	3.6	2.4	5.2	2.9
A101	**1**	1.8	1.6	6.4	3.7	3.5
C102	**1**	3.8	1.7	7.3	1.7	2.1
A103	**1**	2.6	1.3	3.2	3.2	1.4
A104	**1**	0.3	5.3	7.3	3.8	1.4
D105	**1**	9.0	1.4	11.3	9.0	0.1
D106	**1**	0.4	3.2	7.1	8.9	0.7
D107	**1**	0.0	3.9	5.5	5.0	1.1
B108	**1**	0.0	2.2	5.2	5.9	0.7
C109	**1**	0.0	5.6	4.5	13.1	3.2
A110	**1**	1.0	2.1	10.1	8.9	3.9
B111	**1**	3.9	0.0	1.5	4.7	0.5
D112	**1**	0.0	5.1	8.4	4.9	0.5
B113	**1**	0.4	2.2	7.0	2.0	4.9
C114	**1**	0.3	3.7	6.0	7.3	1.5
B115	**1**	0.0	3.4	5.8	4.8	1.8
C116	**1**	1.3	4.7	7.6	7.5	0.8
A117	**1**					
C118	**1**	0.1	4.7	6.4	4.3	1.3
D119	**1**					
D120	**1**	0.7	1.8	7.7	6.3	2.5
B121	**1**	1.4	4.0	2.6	6.0	2.3
D122	**1**	2.0	1.3	7.6	7.6	4.6
C123	**1**	2.0	0.7	7.0	4.0	1.4
A124	**1**	0.0	0.5	6.6	3.9	1.8
B125	**1**	3.5	1.5	6.3	2.9	0.7
A126	**1**	0.3	1.7	4.7	2.6	1.1
A127	**1**	0.3	6.1	8.0	6.8	3.1

ID	Visit	FRUIT	VEG	GRAIN	MEAT	DAIRY
C128	**1**	4.3	1.8	4.5	4.0	2.9
B129	**1**					
B130	**1**	0.0	2.5	5.5	5.0	1.7
D131	**1**					
D132	**1**					
C133	**1**					
B134	**1**					
D135	**1**	0.6	4.1	2.4	6.4	0.0
C136	**1**	0.7	1.2	5.3	6.7	0.4
A137	**1**					
A138	**1**	1.2	3.2	4.5	5.8	3.1
B139	**1**	1.0	4.2	5.0	6.9	1.2
C140	**1**	2.8	5.3	0.9	8.3	0.7
D141	**1**	0.0	4.3	6.0	7.2	1.2
B142	**1**	8.7	4.6	5.2	4.7	3.5
B143	**1**					
A144	**1**	0.0	4.9	10.1	10.3	7.3
C145	**1**					
D146	**1**	0.7	1.4	5.2	9.9	0.7
A147	**1**	1.7	2.4	5.3	3.3	3.1
C148	**1**	2.5	1.1	3.2	7.9	1.4
D149	**1**	1.9	4.0	2.0	4.9	4.0
A150	**1**	0.0	6.7	7.1	11.2	3.9
D151	**1**	0.0	2.1	3.4	3.2	1.2
C152	**1**	1.7	4.9	4.5	8.1	2.0
B153	**1**					
B154	**1**	1.2	1.3	6.0	4.7	0.7
C155	**1**					
A156	**1**					
C157	**1**					
D158	**1**					
B159	**1**	0.0	2.2	2.7	9.3	0.0

ID	Visit	FRUIT	VEG	GRAIN	MEAT	DAIRY
A160	**1**					
B161	**1**					
A162	**1**	1.7	1.5	7.7	10.3	5.3
C163	**1**					
D164	**1**	0.9	3.0	2.1	3.9	6.2
A165	**1**	1.6	1.3	2.1	8.4	1.1
A166	**1**	1.3	6.4	0.6	1.4	0.6
B167	**1**	0.9	3.6	16.0	15.1	8.4
C168	**1**	0.0	2.1	8.4	6.3	0.0
D169	**1**					
B170	**1**	2.1	6.2	13.7	5.7	4.1
D171	**1**					
C172	**1**	0.0	0.1	4.2	3.7	2.3

ID	Visit	Visit type	Gender	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM
D001	**2**	**R**	F	74.72	28.20	37.4						118	89	46739.7
D002	**2**	**R**	F	83.52	32.11	37.5	186	65	118	79	80	107	67	51925.1
D003	**2**	**D**	M	.	.	.						.	.	.
B004	**2**	**D**	M	102.73	33.32	.						.	.	.
A005	**2**	**R**	F	76.93	28.42	39.37	173	52	110	116	93	97	68	45367.9
C006	**2**	**R**	M	98.63	31.31	42.91	167	62	91	97	118	130	85	63414.2
D007	**2**	**R**	M	117.9	31.98	41.73						120	81	76427.2
D008	**2**	**D**	F	.	.	.						.	.	.
D009	**2**	**R**	M	114	32.85	42.5	192	46	122	146	96	123	84	76990.4
D010	**2**	**R**	M	107.22	33.34	42.79	171	51	112	74	95	103	67	72497.2
B011	**2**	**D**	M	.	.	.						.	.	.
A012	**2**	**R**	M	90.41	32.16	38.5	186	44	110	159	94	138	97	61826.3
A013	**2**	**S**	M	75	25.56	.						.	.	.
B014	**2**	**R**	F	80.68	27.47	35.24	235	63	169	53	82	107	72	49493.3
A015	**2**	**D**	M	.	.	.						.	.	.
C016	**2**	**R**	M	90.55	30.25	41.34	259	36	196	167	97	117	82	60818.5
B017	**2**	**R**	F	92.98	31.24	37.5					87	108	75	49663.2
C018	**2**	**R**	M	94.64	30.23	42.75	259	36	196	167	97	123	84	61421.5
C019	**2**	**R**	M	87.86	29.27	35.63	223	46	172	82	94	126	85	63269.3
C020	**2**	**D**	F	.	.	.						.	.	.
D021	**2**	**D**	M	.	.	.						.	.	.
C022	**2**	**R**	F	59.48	24.70	33	177	32	120	158	84	110	71	40728.6
B023	**2**	**D**	M	.	.	.						.	.	.
B024	**2**	**R**	F	84.09	30.33	35.2	207	76	128	79	92	114	84	45751.9
B025	**2**	**R**	F	101.95	40.44	41.5	238	43	163	227	101	117	85	57317.6
D026	**2**	**D**	M	.	.	.						.	.	.
D027	**2**	**S**	F	80	28.46	.	179	69	100	53	88	.	.	.
C028	**2**	**R**	M	99.36	32.12	41.25						114	73	68801.7
C028	**2**	**R**	M	99.36	32.12	41.25						114	73	68801.7
C029	**2**	**R**	M	92.84	29.79	38.39	195	46	131	91	80	109	65	64305.9
B030	**2**	**D**	F	.	.	.						.	.	.
A031	**2**	**R**	M	111.39	33.17	42.5	187	31	115	298	88	132	90	79195.4

ID	Visit	Visit type	Gender	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM
C032	**2**	**D**	M	.	.	.						.	.	.
A033	**2**	**S**	M	118.18	35.17	42	201	42	134	163		.	.	.
C034	**2**	**L**	F	84.25	30.07	40.35	188	84	102	69	86	95	66	44205.2
A035	**2**	**R**	M	119.27	34.50	41.06	257	76	175	73	92	117	77	77573.1
B036	**2**	**D**	M	.	.	.						.	.	.
A037	**2**	**R**	M	89.79	30.10	38.77	160	28	90	210	86	116	84	61644.9
A038	**2**	**R**	F	57.64	25.96	35.15						117	75	35225.5
B039	**2**	**D**	M	.	.	.						.	.	.
A040	**2**	**R**	M	93.86	29.52	34.45	223	74	140	58	84	121	74	72911.1
D041	**2**	**R**	M	95.68	33.07	36.22	155	91	55	46	85	118	71	71772
B042	**2**	**D**	F	.	.	.						.	.	.
A043	**2**	**D**	M	.	.	.						.	.	.
C044	**2**	**R**	M	118.27	34.19	42.99	171	58	105	40	92	136	89	75229.7
C045	**2**	**D**	F	.	.	.						.	.	.
D046	**2**	**R**	F	72.64	28.68	39.57	247	75	153	104	98	112	83	42118.7
A047	**2**	**D**	M	.	.	.						.	.	.
C048	**2**	**R**	F	84.45	31.96	39.37	157	66	84	47	97	104	75	51854.2
B049	**2**	**S**	F	87.7	35.72									
A050	**2**	**R**	M	92.52	29.78	39.5	207	52	147	157	93	122	79	63126
B051	**2**	**R**	M	110.18	33.59	.						119	70	72976.4
C052	**2**	**D**	M	.	.	.						.	.	.
C053	**2**	**D**	M	.	.	.						.	.	.
D054	**2**	**R**	M	100.5	32.59	37.75	172	36	118	92	88	134	91	70837.5
C055	**2**	**R**	F	85	30.32	35						108	74	52601.5
D056	**2**	**R**	M	104.8	31.48	44	165	38	114	71	104	119	74	68419.4
D057	**2**	**R**	M	102.7	28.77	37.79						128	87	77958.9
B058	**2**	**D**	M	.	.	.						.	.	.
D059	**2**	**D**	M	.	.	.						.	.	.
B060	**2**	**L**	M	102.23	32.04	37.79						123	76	69025
B061	**2**	**R**	M	129.09	34.59	43.18	186	40	127	97	97	164	120	91553.5
B062	**2**	**R**	F	81.09	31.02	35.25	211	61	133	113	98	110	72	41466.7
A063	**2**	**R**	M	100.84	30.14	41.57						117	76	61492.6

ID	Visit	Visit type	Gender	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM
B064	**2**	**R**	F	97.32	32.34	.	176	70	95	49	81	.	.	52974.3
A065	**2**	**D**	M	.	.	.						.	.	.
C066	**2**	**R**	F	93.95	37.37	.	255	70	160	124	92	121	75	
A067	**2**	**R**	F	82.22	30.68	35.83	217	73	141	66	86	110	67	45861.7
A068	**2**	**D**	M	.	.	.						.	.	.
C069	**2**	**D**	M	.	.	.						.	.	.
D070	**2**	**D**	M	.	.	.						.	.	.
A071	**2**	**D**	M	.	.	.						.	.	.
B072	**2**	**R**	F	81.52	29.48	36.26	218	96	101	106	97	128	89	52633.1
A073	**2**	**S**	M	112.72	36.28	.						.	.	.
D074	**2**	**R**	F	88.73	33.61	35.63	154	53	90	76	93	138	97	51703.8
D075	**2**	**R**	M	98.3	32.30	40.74						123	80	64822.7
B076	**2**	**D**	M	.	.	.						.	.	.
C077	**2**	**D**	M	.	.	.						.	.	.
D078	**2**	**R**	M	107.59	31.55	43.46	218	32	147	197	103	133	87	68449.5
A079	**2**	**R**	M	102.29	32.40	39.17	.	.	.	.	.	106	74	71915.7
C080	**2**	**S**	F	73.36	26.76	.	.	.	.	.	.	.	.	.
B081	**2**	**R**	M	103.66	31.88	40.24	.	.	.	.	.	137	91	75340.5
B082	**2**	**R**	M	110.64	34.96	43.7	267	45	172	276	98	147	97	70563.3
D083	**2**	**D**	F	.	.	.	.	.	.	.	.	.	.	.
A084	**2**	**D**	F	.	.	.	.	.	.	.	.	.	.	.
C085	**2**	**R**	F	66	27.72	32.28	.	.	.	.	.	110	78	43256.6
D086	**2**	**D**	M	.	.	.	.	.	.	.	.	.	.	.
D087	**2**	**R**	M	83.73	27.19	36.22	.	.	.	.	.	126	79	61394.6
C088	**2**	**L**	F	108.29	37.03	41.61	134	48	77	45	85	117	80	60634
A089	**2**	**R**	M	128.73	36.53	48	186	27	117	212	89	145	83	84715.3
D090	**2**	**D**	F	.	.	.						.	.	.
A091	**2**	**S**	M	125	36.20	44.5						.	.	.
A092	**2**	**R**	M	106.39	36.10	42.72	206	48	130	141	84	123	80	68482.3
B093	**2**	**R**	M	108.45	32.36	40.83	.	.	.	.	.	139	82	74474.6
D094	**2**	**D**	F	.	.	.						.	.	.
B095	**2**	**R**	M	96.38	34.12	38.58	236	37	169	150		130	94	57202.1

ID	Visit	Visit type	Gender	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM
C096	**2**	**R**	F	80.14	28.12	36.22	171	75	92	65		117	76	47106.8
A097	**2**	**D**	F	.	.	.						.	.	.
C098	**2**	**R**	F	85.14	29.42	34.5	257	67	170	98	93	123	89	47332
B099	**2**	**R**	F	90.73	37.80	46.69	.	.	.	.	.	143	93	46916.9
C100	**2**	**R**	M	100.11	32.78	39.72	152	53	84	89	94	119	65	60507.3
A101	**2**	**D**	F	.	.	.						.	.	.
C102	**2**	**R**	M	85.05	30.25	38	.	.	.	.	.	116	67	53848
A103	**2**	**R**	M	78.2	27.51	34	.	.	.	.	.	117	74	52262.9
A104	**2**	**R**	F	57.23	28.25	31.89	135	54	69	78	90	130	94	37799.5
D105	**2**	**D**	M	.	.									
D106	**2**	**R**	M	118.36	35.49	41.34	198	49	136	117	99	133	78	84225.3
D107	**2**	**R**	M	115.77	33.03	39.5	.	.	.	.	.	135	83	79245
B108	**2**	**D**	F	.	.									
C109	**2**	**D**	M	.	.									
A110	**2**	**R**	M	97.73	27.63	38.58	178	49	127	42	86	119	82	69395.3
B111	**2**	**R**	F	67.36	28.37	32	180	67	109	82	93	115	78	41307.3
D112	**2**	**R**	M	142.45	40.89	53.54	185	33	110	217	112	130	93	.
B113	**2**	**R**	M	107.95	30.06	41.54	231	39	169	169	92	123	68	75769.6
C114	**2**	**R**	F	90	30.69	40.25	179	66	100	108	82	116	93	51622.2
B115	**2**	**R**	M	88.41	30.17	39.25	.	.	.	.	.	128	69	59430.1
C116	**2**	**R**	M	79.5	26.56	35.43	166	41	111	105	98	122	80	61335.3
A117	**2**	**R**	F	72.36	30.71	35	168	55	112	58	100	123	83	41620.8
C118	**2**	**R**	F	69.77	29.05	38.43	.	.	.	.	.	109	74	37301.8
D119	**2**	**D**	F	.	.	.						.	.	.
D120	**2**	**R**	M	98.64	33.05	38.98	.	.	.	.	.	125	89	70413.7
B121	**2**	**R**	F	92	30.34	40	222	77	134	51	71	109	68	58938.4
D122	**2**	**R**	M	103.2	34.59	40.55	162	37	91	257	102	127	89	73110.9
C123	**2**	**R**	M	113.34	37.17	49.61	144	39	78	140	110	127	89	64392.8
A124	**2**	**R**	M	106.64	33.17	41.54	.	.	.	.	.	126	93	66552.2
B125	**2**	**R**	M	121.52	37.60	45.9	189	43	136	77	94	115	58	81646.6
A126	**2**	**L**	F	86.45	31.12	35.6						136	99	53502.9
A127	**2**	**R**	M	93.66	31.44	36.38	127	50	70	83	90	133	79	63436.9

ID	Visit	Visit type	Gender	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM
C128	**2**	**R**	F	94.34	34.80	39.53	119	40	68	47	82	130	85	54917.6
B129	**2**	**R**	F	89.295	33.79	40.75						.	.	52745.8
B130	**2**	**R**	F	73.32	28.03	30.71	220	51	167	59	94	96	58	44097.9
D131	**2**	**R**	F	92.11	32.30	37.79	.	.	.	.	.	119	77	57857.8
D132	**2**	**R**	M	93.48	32.05	36	.	.	.	.	.	140	99	73150.5
C133	**2**	**R**	F	74.91	27.55	.						.	.	.
B134	**2**	**D**	M	.	.	.						.	.	.
D135	**2**	**R**	F	83.52	28.98	35	.	.	.	.	.	109	71	54237.2
C136	**2**	**S**	M	95	35.08	.	.	.	.	.	.	.	.	.
A137	**2**	**R**	F	79.23	27.47	38.58	132	47	81	33	90	113	80	46010.6
A138	**2**	**R**	F	78.95	27.43	37.56	198	66	130	54	85	105	79	43622.6
B139	**2**	**R**	M	87.79	27.39	38.42	143	57	82	61	87	99	70	57573.8
C140	**2**	**R**	F	90.64	32.08	.	133	61	61	57	79	121	86	54094.6
D141	**2**	**R**	M	102.64	30.08	40.5	109	41	49	197	80	125	73	74628.4
B142	**2**	**R**	M	103.5	36.16	41.73	.	.	.	.	.	115	71	73447.4
B143	**2**		M	.	.									
A144	**2**		M	.	.									
C145	**2**	**R**	F	71.11	31.78	33.46					88	100	70	43199.5
D146	**2**	**D**	F	.	.	.						.	.	.
A147	**2**	**R**	F	87.82	29.75	41.25	174	56	98	98	93	116	76	49082.3
C148	**2**	**R**	M	104.27	35.48	40.94					83	124	86	68320.1
D149	**2**	**R**	F	76.89	30.96	34.00	185	73	95	83	87	119	74	46557.7
A150	**2**	**R**	M	103.32	31.15	39.17	160	55	93	62	94	122	93	65142.9
D151	**2**	**R**	M	89.84	31.29	40.55	.	.	.	.	.	131	92	59130.8
C152	**2**	**R**	M	112.27	32.90	42						141	97	74123.7
B153	**2**	**R**	M	111.89	33.05	41	.	.	.	.	.	109	69	71750.3
B154	**2**	**R**	M	89.77	29.64	38.86	206	48	145	62	99	121	75	61450.5
C155	**2**	**R**	M	109.91	34.34	39	123	42	67	57	89	121	76	71364.2
A156	**2**	**R**	M	87.27	29.10	40.15	208	52	146	59	90	118	79	56658.2
C157	**2**		M	.	.									
D158	**2**	**R**	M	93.7	28.02	39.76	219	43	155	70	100	106	66	64254.5
B159	**2**	**R**	M	124.86	37.80	45.27	165	48	105	137	100	129	87	82307.8

ID	Visit	Visit type	Gender	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD	LBM
A160	**2**	**D**	M	.	.	.	.	.	.	.	.	.	.	
B161	**2**	**D**	M	.	.	.	.	.	.	.	.	.	.	.
A162	**2**	**R**	M	111.73	31.99	43.5	227	56	149	89	93	152	94	74451.2
C163	**2**	**S**	M	102.27	30.63									
D164	**2**	**R**	F	69.36	27.05	34.45	166	77	88	76	90	123	91	45501.1
A165	**2**	**R**	M	102.41	30.65	41.14	170	44	108	96	89	120	81	70844.3
A166	**2**	**R**	F	79.77	29.98	34						110	81	43756.5
B167	**2**		M	.	.									
C168	**2**		M	.	.									
D169	**2**	**R**	M	110.18	35.85	40.67						121	82	68585.4
B170	**2**	**D**	M	.	.									
D171	**2**	**D**	F	.	.	.						.	.	.
C172	**2**	**R**	M	96.295	30.87	37	.	.	.	.	.	116	73	65182

ID	Visit	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	AINFO Use	kcal	Fat	CHO
D001	2	24629.9	9903	33.2	3	5	5	5	5	2	6	1418	38	157
D002	2	27996.2	11866.4	33.9	4	5	4	5	4	3	4	1102	45	130
D003	2	.	.	.	.	.	.	.	.	.	2			
B004	2	.	.	.	.	.	.	.	.	.	0			
A005	2	28592.6	13602	37.5	1	3	2	5	5	1		1183	48	96
C006	2	31234.7	16306.1	32	3	3	3	5	5	3		1314	43	171
D007	2	35230.6	17478.1	30.5	3	3	3	5	4	3	5	1441	69	120
D008	2	.	.	.	.	.	.	.	.	.	0			
D009	2	32724.5	13961.2	28.9	4	5	5	5	5	4	0			
D010	2	29229.4	14746.8	27.8	4	5	5	4	2	4	0	2705	98	287
B011	2	.	.	.	.	.	.	.	.	.	1			
A012	2	24322.9	12392.6	27.2	4	3	3	4	4	3				
A013	2	.	.	.	.	.	.	.	.	.				
B014	2	27504.4	10099.9	34.6	3	3	3	5	5	3	4	1265	50	163
A015	2	.	.	.	.	.	.	.	.	.				
C016	2	25779.3	14148.4	28.9	3	3	3	4	4	5				
B017	2	39677.8	17902.4	43.2	4	3	3	5	5	1	89			
C018	2	29035.1	17066.4	31.1	5	5	5	5	5	3				
C019	2	20566.3	10513	23.7	2	2	2	5	1	2				
C020	2	.	.	.	.	.	.	.	.	.				
D021	2	.	.	.	.	.	.	.	.	.	1			
C022	2	15623.1	6479.4	26.6	5	5	5	5	5	1				
B023	2	.	.	.	.	.	.	.	.	.	0			
B024	2	35413.7	17002.2	42.6	4	4	3	5	5	3	98			
B025	2	40626.9	19344.4	40.4	4	3	3	5	3	3	10			
D026	2	.	.	.	.	.	.	.	.	.	.			
D027	2	.	.	.	.	.	.	.	.	.	161			
C028	2	25167.8	12332.6	25.8	2	3	3	4	2	3				
C029	2	24584.1	12160.8	26.8	4	3	3	5	5	5		2441	97	306
B030	2	.	.	.	.	.	.	.	.	.	0			
A031	2	27320.6	16239.4	24.8	5	5	5	5	5	5		1926	63	273

ID	Visit	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	AINFO Use	kcal	Fat	CHO
C032	2	.	.	.	.	.	.	.	.	.				
A033	2	.	.	.	.	.	.	.	.	.				
C034	2	36872.6	18894.3	44.3	3	5	5	5	5	2				
A035	2	36176	16467.4	30.6	1	4	4	4	5	5				
B036	2	.	.	.	.	.	.	.	.	.	10			
A037	2	24203.1	14267.5	27.3	4	5	5	5	5	3		2405	92	240
A038	2	19810.6	11185.1	35	3	3	3	5	5	4				
B039	2	.	.	.	.	.	.	.	.	.	.			
A040	2	19605.3	7493	20.4	3	5	5	5	4	5				
D041	2	18698.3	7811.7	19.8	3	5	5	5	5	5	3			
B042	2	.	.	.	.	.	.	.	.	.	.			
A043	2	.	.	.	.	.	.	.	.	.				
C044	2	37805.6	16774.5	32.4	1	5	5	5	5	3		1723	44	217
C045	2	.	.	.	.	.	.	.	.	.				
D046	2	27537.3	14003.4	38.4	.	.	.	.	.	.	8			
A047	2	.	.	.	.	.	.	.	.	.				
C048	2	28746.9	12404.7	34.4	3	2	3	5	5	3				
B049	2										13			
A050	2	25409.4	15325.5	27.8	4	4	3	5	4	3		713	17	92
B051	2	32718.4	19019.3	30.1	4	4	3	5	5	3	8			
C052	2	.	.	.	.	.	.	.	.	.				
C053	2	.	.	.	.	.	.	.	.	.				
D054	2	25066.6	13718.5	25.3	4	4	2	5	5	2	59			
C055	2	27909.2	11569.2	33.4	3	3	3	4	4	2				
D056	2	32266.7	19137.6	31.1							32			
D057	2	19304.6	9823.7	19.1	4	3	3	5	2	2	65	1705	83	172
B058	2	.	.	.	.	.	.	.	.	.	.			
D059	2	.	.	.	.	.	.	.	.	.	8			
B060	2	29050.5	15728.9	28.7	3	5	3	5	4	1	7			
B061	2	31151.5	18313.5	24.6	5	5	5	4	3	4	0			
B062	2	36166.7	16744.2	45.4	3	3	3	5	5	5	3			

ID	Visit	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	AINFO Use	kcal	Fat	CHO
A063	2	34861	15916.9	35.1	3	3	3	3	5	3				
B064	2	39948.4	18244.6	41.6	.	.	.	.	.	.	19	1746	73	200
A065	2	.	.	.	.	.	.	.	.	.				
C066	2													
A067	2	32443.4	12437.6	40.2	2	3	4	5	5	3				
A068	2	.	.	.	.	.	.	.	.	.				
C069	2	.	.	.	.	.	.	.	.	.				
D070	2	.	.	.	.	.	.	.	.	.	.			
A071	2	.	.	.	.	.	.	.	.	.				
B072	2	25113.1	12088.6	31.3	3	3	3	5	5	3	35			
A073	2	.	.	.	.	.	.	.	.	.				
D074	2	33937.4	13960.7	38.5	4	3	3	5	4	2	0			
D075	2	28845.6	16593.6	29.8	3	3	3	5	5	2	45			
B076	2	.	.	.	.	.	.	.	.	.	.			
C077	2	.	.	.	.	.	.	.	.	.				
D078	2	34370	18769.6	32.4	1	3	3	5	5	1	1			
A079	2	25330.4	13371.1	25.2	4	3	5	5	2	2				
C080	2	.	.	.	.	.	.	.	.	.				
B081	2	23294.2	11290.9	22.8	4	5	5	5	5	4	0			
B082	2	35683.5	15127.7	32.6	3	4	4	5	5	3	7	3986	167	514
D083	2	.	.	.	.	.	.	.	.	.	42			
A084	2	.	.	.	.	.	.	.	.	.				
C085	2	19472.2	9872.2	29.9	5	2	2	5	5	1				
D086	2	.	.	.	.	.	.	.	.	.	5			
D087	2	18339.6	8605.1	22.2	3	2	2	4	5	3	1			
C088	2	43114	17286	40										
A089	2	36555	21450.8	29	3	4	3	5	5	5				
D090	2	.	.	.	.	.	.	.	.	.	43			
A091	2	.	.	.	.	.	.	.	.	.				
A092	2	33497.8	18523.1	31.8	4	5	3	4	4	4		1887	60	227
B093	2	28745.7	16362.1	26.9	4	5	4	5	4	1	0			
D094	2	.	.	.	.	.	.	.	.	.	0			

ID	Visit	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	AINFO Use	kcal	Fat	CHO
B095	2	35431	20474.1	37.3	4	3	5	5	5	3	173			
C096	2	29176.1	10315.3	37	4	3	3	5	4	4				
A097	2	.	.	.	.	.	.	.	.	.				
C098	2	34401	16086.7	40.8	5	3	3	5	5	2				
B099	2	40438.9	20981.1	45.1	.	.	.	.	.	.	0			
C100	2	34903.4	17130.9	35.5	4	5	5	5	4	4				
A101	2	.	.	.	.	.	.	.	.	.				
C102	2	26784.7	14462.5	31.9	3	3	3	5	5	3				
A103	2	21507.9	11475.3	28.2	4	4	4	5	4	4				
A104	2	16651.7	7812.6	29.5	3	3	3	5	4	4		1902	84	230
D105	2										0			
D106	2	28878.1	14526.7	24.6	5	5	5	5	5	3	24	2104	84	206
D107	2	30932.1	16974.3	27.2							0	1921	82	220
B108	2										0			
C109	2													
A110	2	23442.9	11860.7	24.3	4	4	4	4	4	4		2376	112	263
B111	2	22913	11427.7	34.5	3	5	5	5	5	3	0			
D112	2	.	.	.	3	4	3	5	5	5	19			
B113	2	26870.1	14643.7	25.3	3	5	5	5	5	4	46	1349	31	201
C114	2	34029.1	15474.4	38.3	5	3	3	5	5	3		2058	77	268
B115	2	22942.7	11794.9	27	3	3	3	5	5	5	96	1445	42	206
C116	2	15590.9	8574	19.5	4	5	5	4	5	5		1381	53	148
A117	2	27660.7	13707.5	38.8	4	3	3	5	3	5		1498	63	176
C118	2	29769.1	14018.7	43.1	4	4	3	4	4	3				
D119	2	.	.	.	.	.	.	.	.	.	.			
D120	2	23745.4	13006.1	24.4	1	4	3	4	5	3	29			
B121	2	28634.8	11978.5	31.5	4	4	4	5	4	4	0	1614	70	182
D122	2	25682.5	13585.4	25.2	.	.	.	.	.	.	0			
C123	2	43709.9	24987	39.2	4	4	4	4	5	5		2539	70	373
A124	2	35493.8	19519.2	33.7	4	3	3	4	3	4				
B125	2	35204	16592.4	29.4	4	4	3	5	4	5	14	1390	30	205

ID	Visit	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	AINFO Use	kcal	Fat	CHO
A126	2	28856.6	13397	33.8	1	2	2	5	5	3				
A127	2	25544.1	11309.6	27.7	4	4	4	5	3	4				
C128	2	34953.1	16817.5	37.6	4	2	2	4	2	4		2102	61	313
B129	2	32660.1	15354.9	37.1	5	3	3	5	1	5	7	2099	54	344
B130	2	25424.5	9156.1	35.1	5	3	3	5	5	5	1	1012	20	185
D131	2	30411.7	11366.6	33.4	4	5	5	5	5	3	12	1821	58	183
D132	2	17092.1	7892.6	18.3	4	4	5	5	4	3	5			
C133	2	.	.	.	.	.	.	.	.	.				
B134	2	.	.	.	.	.	.	.	.	.	.			
D135	2	25127.8	12005	30.4	3	3	3	5	3	3	21			
C136	2	.	.	.	.	.	.	.	.	.				
A137	2	29643.8	12697	37.8	4	3	3	5	5	5		1485	48	208
A138	2	31554.8	14140.5	40.4	4	3	3	5	1	5		1640	56	215
B139	2	26449.2	12453.8	30.4	4	3	3	5	5	3	1	1520	59	162
C140	2	33631.4	16319.9	37.1	3	3	3	4	5	5				
D141	2	23264.7	12198.7	23	4	5	5	5	5	3	0			
B142	2	24574.9	12893.2	24.3	4	5	5	5	5	5	0			
B143	2										0			
A144	2													
C145	2	24633.8	10079.6	35.2	4	4	3	4	4	3				
D146	2	.	.	.	.	.	.	.	.	.	0			
A147	2	35296.5	18690.4	40.7	3	5	5	5	5	5				
C148	2	31377.5	14144.8	30.5	4	4	3	5	4	5				
D149	2	27048.8	10654.8	35.6	4	4	4	5	5	3	2			
A150	2	34025.7	18186.5	33.3	3	4	3	5	5	3		2716	124	252
D151	2	26873.5	15030.9	30.4	4	3	3	5	5	4	0			
C152	2	32530.1	18135.9	29.4	4	3	3	5	1	5		1433	15	183
B153	2	35308.1	16875.1	32	4	4	3	5	4	3	0	853	45	91
B154	2	23971.4	11781.6	27.1	4	5	4	5	5	2	0	913	23	123
C155	2	33698.5	14316.7	30.9	5	5	3	5	5	3				
A156	2	26227.9	12836.5	30.5	4	4	3	4	3	5		1265	15	251

ID	Visit	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V	AINFO Use	kcal	Fat	CHO
C157	2													
D158	2	25340.5	12915.3	27.4	5	5	5	5	5	5	12			
B159	2	36424.6	18330	29.8	4	4	3	5	4	5	3			
A160	2	.	.	.	.	.	.	.	.	.				
B161	2	.	.	.	.	.	.	.	.	.	.			
A162	2	32065.7	17415.5	29.1	4	4	4	5	3	5				
C163	2													
D164	2	20485	6767.3	30	4	2	2	5	5	4	35	1338	29	219
A165	2	27096.8	13190.3	26.8	4	3	3	5	4	3		875	29	38
A166	2	32464.4	12570.3	41.2	5	5	5	5	4	2				
B167	2										0			
C168	2													
D169	2	36478.7	18220.3	33.7	4	3	3	5	4	4	2	1511	47	204
B170	2										0			
D171	2	.	.	.	.	.	.	.	.	.	.			
C172	2	27437.2	11809.7	28.8	5	4	3	5	5	4				

ID	Visit	Pro	Per Fat	Per CHO	Per Pro	Per ETOH	FRUIT	VEG	GRAIN	MEAT	DAIRY
D001	2	36	24	44	10	22	0.2	1.6	2.9	3.2	1.1
D002	2	49	36	47	17		4.5	1.6	0.8	5.9	0.1
D003	2										
B004	2										
A005	2	45	36	32	15	15	0.2	1.2	4.1	3.8	1.3
C006	2	63	29	52	19		1.4	2.6	6.7	4.7	1.0
D007	2	69	43	34	19	4	0.0	1.5	5.8	5.8	1.5
D008	2										
D009	2										
D010	2	102	32	42	15	10	4.2	1.9	9.3	9.1	1.3
B011	2										
A012	2										
A013	2										
B014	2	50	35	51	15		2.9	4.6	3.9	5.6	1.0
A015	2										
C016	2										
B017	2										
C018	2										
C019	2										
C020	2										
D021	2										
C022	2										
B023	2										
B024	2										
B025	2										
D026	2										
D027	2										
C028	2										
C029	2	86	36	50	14		1.6	4.0	7.6	5.7	2.8
B030	2										
A031	2	71	29	56	14	1	2.9	5.4	7.0	6.4	0.4

ID	Visit	Pro	Per Fat	Per CHO	Per Pro	Per ETOH	FRUIT	VEG	GRAIN	MEAT	DAIRY
C032	2										
A033	2										
C034	2										
A035	2										
B036	2										
A037	2	156	34	40	26		0.7	7.3	5.2	14.0	4.7
A038	2										
B039	2										
A040	2										
D041	2										
B042	2										
A043	2										
C044	2	97	23	50	22	4	1.1	2.1	5.6	5.8	4.3
C045	2										
D046	2										
A047	2										
C048	2										
B049	2										
A050	2	47	22	51	26		1.3	8.3	1.4	4.8	0.8
B051	2										
C052	2										
C053	2										
D054	2										
C055	2										
D056	2										
D057	2	69	44	40	16		0.3	2.5	6.9	5.5	1.2
B058	2										
D059	2										
B060	2										
B061	2										
B062	2										

ID	Visit	Pro	Per Fat	Per CHO	Per Pro	Per ETOH	FRUIT	VEG	GRAIN	MEAT	DAIRY
A063	2										
B064	2	75	37	45	17		0.1	3.5	6.0	5.8	1.7
A065	2										
C066	2										
A067	2										
A068	2										
C069	2										
D070	2										
A071	2										
B072	2										
A073	2										
D074	2										
D075	2										
B076	2										
C077	2										
D078	2										
A079	2										
C080	2										
B081	2										
B082	2	118	37	51	11		3.4	3.2	9.4	8.5	5.1
D083	2										
A084	2										
C085	2										
D086	2										
D087	2										
C088	2										
A089	2										
D090	2										
A091	2										
A092	2	94	30	49	20		0.2	1.9	5.6	4.4	1.3
B093	2										

ID	Visit	Pro	Per Fat	Per CHO	Per Pro	Per ETOH	FRUIT	VEG	GRAIN	MEAT	DAIRY
D094	2										
B095	2										
C096	2										
A097	2										
C098	2										
B099	2										
C100	2										
A101	2										
C102	2										
A103	2										
A104	2	64	39	48	13		2.0	2.2	3.4	6.7	10.6
D105	2										
D106	2	97	36	39	18	6	0.0	3.7	8.0	8.2	1.3
D107	2	77	38	45	16		0.0	3.8	6.8	6.7	1.0
B108	2										
C109	2										
A110	2	102	42	44	17		4.4	3.3	4.9	15.1	0.5
B111	2										
D112	2										
B113	2	75	20	59	22		0.3	5.8	6.3	3.0	3.3
C114	2	83	34	52	16		1.2	2.8	7.5	4.7	4.5
B115	2	75	26	57	20		2.2	4.5	5.1	5.4	3.1
C116	2	68	34	43	19	6	2.4	5.4	3.1	7.1	1.3
A117	2	60	37	47	16		0.6	1.1	5.2	5.7	1.8
C118	2										
D119	2										
D120	2										
B121	2	74	39	45	18		1.0	5.7	4.8	8.0	1.4
D122	2										
C123	2	118	25	58	18		4.4	3.0	7.7	4.3	2.0
A124	2										

ID	Visit	Pro	Per Fat	Per CHO	Per Pro	Per ETOH	FRUIT	VEG	GRAIN	MEAT	DAIRY
B125	2	81	19	59	23		1.7	0.2	4.4	5.5	2.6
A126	2										
A127	2										
C128	2	79	26	60	15		0.5	2.4	7.8	3.4	4.4
B129	2	61	23	65	11		4.0	0.9	4.7	6.2	0.3
B130	2	26	18	73	10		0.5	1.9	1.4	2.3	0.3
D131	2	145	28	40	32		0.0	3.0	2.9	8.7	4.5
D132	2										
C133	2										
B134	2										
D135	2										
C136	2										
A137	2	72	29	56	19		3.5	10.2	3.1	4.4	0.3
A138	2	71	31	52	17		0.8	2.8	5.1	5.3	1.9
B139	2	75	34	42	19	2	0.0	4.6	5.5	3.7	2.6
C140	2										
D141	2										
B142	2										
B143	2										
A144	2										
C145	2										
D146	2										
A147	2										
C148	2										
D149	2										
A150	2	101	41	37	14	7	0.3	3.3	10.4	9.3	2.8
D151	2										
C152	2	72	9	51	20	21	2.3	6.7	2.0	6.6	1.1
B153	2	28	48	43	13		0.0	0.0	4.0	5.0	0.0
B154	2	50	23	54	22		0.0	1.6	5.9	1.2	0.5
C155	2										

ID	Visit	Pro	Per Fat	Per CHO	Per Pro	Per ETOH	FRUIT	VEG	GRAIN	MEAT	DAIRY
A156	2	42	11	79	14		3.0	0.0	6.2	0.7	2.0
C157	2										
D158	2										
B159	2										
A160	2										
B161	2										
A162	2										
C163	2										
D164	2	44	19	65	13	4	3.7	4.8	2.6	2.5	0.7
A165	2	107	30	17	49		0.0	2.1	0.7	14.1	0.0
A166	2										
B167	2										
C168	2										
D169	2	71	28	54	19		0.0	1.1	10.6	4.4	2.6
B170	2										
D171	2										
C172	2										

ID	Visit	Visit type	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD
D001	**3**	**D**										
D002	**3**	**D**										
D003	**3**	**D**										
B004	**3**	**D**										
A005	**3**	**R**	78.66	29.06	37.40	203	61	122	77	93	111	69
C006	**3**	**R**	99.36	31.54	44.00	181	61	101	157	115	131	85
D007	**3**	**D**										
D008	**3**	**D**										
D009	**3**	**R**	107.38	30.94	40.60	172	49	109	76	84	133	80
D010	**3**	**R**	108.77	33.82	43.25						123	87
B011	**3**	**D**										
A012	**3**	**D**										
A013	**3**	**D**										
B014	**3**	**R**	80.16	27.29	34.45					88	103	64
A015	**3**	**D**										
C016	**3**	**R**	91.72	30.64	40.43						106	71
B017	**3**	**R**	94.41	31.72	36.81	178	82	81	75	105	104	78
C018	**3**	**D**										
C019	**3**	**D**										
C020	**3**	**D**										
D021	**3**	**D**										
C022	**3**	**R**	59.00	24.50	32.00						109	68
B023	**3**	**D**										
B024	**3**	**R**	88.36	31.87	35.00					91	114	88
B025	**3**	**R**	92.77	36.80	38.58	221	48	154	187	97	118	86
D026	**3**	**D**										
D027	**3**	**D**										
C028	**3**	**R**										68
C029	**3**	**R**	91.90	29.48	38.58						120	74
B030	**3**	**D**										
A031	**3**	**R**	109.77	32.69	42.52	152	31	97	150	86		

ID	Visit	Visit type	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD
C032	3	D										
A033	3	D										
C034	3	D										
A035	3	R	119.68	34.62	41.34						123	84
B036	3	D										
A037	3	S	86.36	28.95	38.00	173	33	95	227	82		
A038	3	R	56.89	25.62	35.43					88	83	60
B039	3	D										
A040	3	R	96.45	30.34	34.00	198	66	131	40	91	97	68
D041	3	S	99.09	34.25								
B042	3	D										
A043	3	D										
C044	3	R	116.40	33.65	42.16	146	52	83	111	96	130	85
C045	3	D										
D046	3	D				240	71	159	116	102		
A047	3	D										
C048	3	R	85.55	32.37	39.00	140	59	80	46	95	113	68
B049	3	D										
A050	3	R	93.36	30.05	39.45	204	51	140	131	99	130	76
B051	3	D										
C052	3	D										
C053	3	D										
D054	3	R	99.29	32.20	39.76					105	105	74
C055	3	R	83.50	29.79	35.25	161	56	90	76	88	109	71
D056	3	R	103.91	31.21	44.00	.	.	.	.	.	116	74
D057	3	L	106.68	29.89	38.35	191	53	117	108	94	130	90
B058	3	D										
D059	3	D										
B060	3											
B061	3	R	131.82	35.33	44.29					93	172	123
B062	3	D										

ID	Visit	Visit type	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD
A063	3	D										
B064	3	D										
A065	3	R	90.05	35.82	37.79	251	73	161	164	92	124	95
C066	3											
A067	3	D										
A068	3	D										
C069	3	D										
D070	3	D										
A071	3	R	82.82	29.95	35.74	208	67	112	143	92	151	97
B072	3	D										
A073	3	R	89.86	34.03	36.61	150	52	96	58	89	143	99
D074	3	R	99.84	32.81	39.17	.	.	.	.	.	123	87
D075	3	D										
B076	3	D										
C077	3	R	102.25	29.98	42.13					101	126	81
D078	3											
A079	3	D										
C080	3	D										
B081	3	R	111.23	35.15	41.73	325	61	247	84	96	148	96
B082	3	D										
D083	3	D										
A084	3	R	66.48	27.92	30.71	229	69	160	93	81	108	71
C085	3	D										
D086	3											
D087	3	D										
C088	3	D										
A089	3	D										
D090	3	D										
A091	3	R	107.57	36.50	44.69	188	46	118	118	93	121	84
A092	3											
B093	3	D										

ID	Visit	Visit type	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD
D094	**3**											
B095	**3**											
C096	**3**	**D**										
A097	**3**	**R**	85.91	29.68	34.30	214	62	121	155	86	123	74
C098	**3**											
B099	**3**	**R**	100.00	32.75	41.34	149	45	86	111	90	117	74
C100	**3**	**D**										
A101	**3**	**R**	87.61	31.16	40.00	198	44	132	216	91	141	90
C102	**3**											
A103	**3**	**R**	57.32	28.30	31.10	137	60	67	83	88	116	75
A104	**3**	**D**										
D105	**3**	**R**	121.14	36.32	40.75	199	51	135	106	109	140	98
D106	**3**	**R**	115.64	32.99	42.32	202	36	138	211	99	137	92
D107	**3**	**D**										
B108	**3**	**D**										
C109	**3**	**R**	93.84	26.53	37.44	175	50	112	59	82	118	79
A110	**3**											
B111	**3**											
D112	**3**	**R**	107.36	29.90	41.73	237	39	138	328	100	123	74
B113	**3**	**R**	85.54	29.17	39.76						132	91
C114	**3**	**R**	88.04	30.04	39.25	216	44	151	64	92	116	67
B115	**3**	**R**	80.00	26.73	34.25	181	46	121	125	95	112	77
C116	**3**	**R**	74.52	31.63	36.61	155	48	107	54	116	107	78
A117	**3**	**R**	71.59	29.81	38.50	.	.	.	.	.	104	79
C118	**3**	**D**										
D119	**3**											
D120	**3**	**R**	95.86	31.61	38.50						115	68
B121	**3**	**R**	106.91	35.84	41.00					101	109	72
D122	**3**											
C123	**3**	**R**	106.32	33.08	42.52	241	37	172	125	87	116	87
A124	**3**	**S**	116.98	36.19								

ID	Visit	Visit type	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD
B125	**3**	**D**										
A126	**3**	**R**	89.23	29.96	36.25	137	58	73	78	85	133	74
A127	**3**	**R**	94.18	34.74	39.61	93	33	55	35	86	113	86
C128	**3**											
B129	**3**	**R**	74.77	28.58	31.29	221	63	158	71	97	116	64
B130	**3**	**R**	91.27	32.00	36.61	182	72	99	113	90	118	77
D131	**3**	**R**	94.98	32.56	37.00						144	97
D132	**3**	**R**	71.91	26.45	35.16						113	73
C133	**3**	**D**										
B134	**3**	**R**	82.04	28.46	35.10						106	66
D135	**3**											
C136	**3**	**D**										
A137	**3**	**R**	82.18	28.55	37.50	237	76	148	64	94	96	70
A138	**3**	**R**	91.07	28.41	41.73					95	108	78
B139	**3**											
C140	**3**											
D141	**3**	**R**	101.20	35.35	40.55	185	52	117	141	92	121	84
B142	**3**											
B143	**3**											
A144	**3**											
C145	**3**	**D**										
D146	**3**											
A147	**3**											
C148	**3**											
D149	**3**											
A150	**3**	**D**										
D151	**3**											
C152	**3**		109.40	32.32	41.20						116	72
B153	**3**		88.77	29.31	37.25						123	85
B154	**3**											
C155	**3**											

ID	Visit	Visit type	Weight	BMI	WC	TCHL	HDL	LDL	TG	FBG	BPS	BPD
A156	**3**											
C157	**3**											
D158	**3**		124.10	37.57	45.60						127	93
B159	**3**	**D**										
A160	**3**	**D**										
B161	**3**		113.10	32.38	43.50						101	64
A162	**3**											
C163	**3**											
D164	**3**	**D**										
A165	**3**											
A166	**3**											
B167	**3**											
C168	**3**											
D169	**3**	**D**										
B170	**3**	**D**										
D171	**3**											
C172	**3**											

ID	Visit	LBM	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V
D001	**3**										
D002	**3**										
D003	**3**										
B004	**3**										
A005	**3**	47808.8	27427.5	12731.0	35.4	1	5	5	5	5	1
C006	**3**	63184.2	31646.2	16997.5	32.4	2	3	3	5	5	2
D007	**3**										
D008	**3**										
D009	**3**	77112.8	25344.2	10536.3	23.9	4	5	5	5	5	4
D010	**3**	72800	30723.4	16565.2	28.7	1	5	5	5	1	2
B011	**3**										
A012	**3**										
A013	**3**										
B014	**3**	48723.5	28189.6	11147.4	35.5						
A015	**3**	.	.	.							
C016	**3**	61203.3	26461.0	14024.8	29.3	3	3	3	4	3	5
B017	**3**	49080.8	41600.5	20125.0	44.6						
C018	**3**	.	.	.							
C019	**3**										
C020	**3**	.	.	.							
D021	**3**	.	.	.							
C022	**3**	41730.6	14545.7	6064.9	24.8	5	5	5	5	5	1
B023	**3**	.	.	.							
B024	**3**	45562.6	39540.2	20072.0	45.3						
B025	**3**	54311.4	34992.2	16967.5	38.1	4	3	3	5	5	5
D026	**3**	.	.	.							
D027	**3**	.	.								.
C028	**3**	24436.5	11219.3	24.5	4	3	3	5	3	4	24436.5
C029	**3**	26276.7	13901.6	28.9	4	3	3	5	5	3	26276.7
B030	**3**	.	.								.

ID	Visit	LBM	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V
A031	**3**	76120.7	28922.8	17051.4	26.6	4	5	5	5	5	76120.7
C032	**3**	.	.	.							.
A033	**3**	.	.	.							.
C034	**3**	.	.	.							.
A035	**3**	76548.6	37237.2	17736.3	31.5	1	3	2	5	5	76548.6
B036	**3**	.	.	.							.
A037	**3**	.	.	.							.
A038	**3**	34140.7	20129.2	11150.9	36.0	3	3	3	4	4	34140.7
B039	**3**	.	.	.							.
A040	**3**	70463.5	21131.0	8271.0	22.2	4	5	2	4	5	70463.5
D041	**3**										
B042	**3**	.	.	.							.
A043	**3**	.	.	.							.
C044	**3**	71616.7	39716.4	17566.1	34.5	5	5	5	5	5	71616.7
C045	**3**	.	.	.							.
D046	**3**	.	.	.							.
A047	**3**	.	.	.							.
C048	**3**	51858.2	30339.7	12410.2	35.7	3	3	3	5	5	51858.2
B049	**3**	.	.	.							.
A050	**3**	65010.6	24315.4	14261.7	26.4	5	5	3	5	5	65010.6
B051	**3**	.	.	.							.
C052	**3**	.	.	.							.
C053	**3**	.	.	.							.
D054	**3**	68970.6	25733.0	14591.8	26.2	3	3	2	5	5	68970.6
C055	**3**	51046.5	28240.1	12976.2	34.1						51046.5
D056	**3**	67411.7	31816.0	18590.7	31.1						67411.7
D057	**3**	79236	21881.5	11142.8	20.8	2	3	3	5	5	79236
B058	**3**	.	.	.							.
D059	**3**	.	.	.							.
B060	**3**										

ID	Visit	LBM	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V
B061	**3**	89438.9	35627.6	20306.9	27.6						
B062	**3**	.	.	.							
A063	**3**	65014.4	35499.9	15681.4	34.3	3	3	3	5	5	3
B064	**3**	.	.	.							
A065	**3**	.	.	.							
C066	**3**	44383.9	41926.9	19014.9	47.3	3	3	3	5	4	4
A067	**3**										
A068	**3**	.	.	.							
C069	**3**	.	.	.							
D070	**3**	.	.	.							
A071	**3**	.	.	.							
B072	**3**	51611.9	27723.6	13655.9	33.9	3	3	3	5	5	3
A073	**3**	.	.	.							
D074	**3**	52308.3	33926.5	13628.4	38.3	4	3	3	5	5	5
D075	**3**	65456.1	29759.9	16658.6	30.3	3	3	3	5	5	2
B076	**3**	.	.	.							
C077	**3**	.	.	.							
D078	**3**	66449.6	31125.1	16343.2	30.8	4	3	3	5	5	3
A079	**3**										
C080	**3**										
B081	**3**	.	.	.							
B082	**3**	71833.7	34876.0	15009.7	31.8	3	4	4	5	5	3
D083	**3**	.	.	.							
A084	**3**	.	.	.							
C085	**3**	44367.5	19008.0	8092.5	28.9	5	2	2	5	5	2
D086	**3**										
D087	**3**										
C088	**3**										
A089	**3**										
D090	**3**	.	.	.							

ID	Visit	LBM	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V
A091	**3**										
A092	**3**	69048.6	33765.8	18520.6	31.9	3	5	5	5	5	4
B093	**3**										
D094	**3**	.	.	.							
B095	**3**										
C096	**3**										
A097	**3**	.	.	.							
C098	**3**	47447	35160.8	16843.9	41.2	4	3	3	5	5	3
B099	**3**										
C100	**3**	60905.5	34192.5	16513.8	35.0	5	5	5	5	5	5
A101	**3**	.	.	.							
C102	**3**	56718.8	26602.3	14508.9	30.7	3	3	3	5	5	5
A103	**3**										
A104	**3**	36836.1	17701.1	7754.3	31.3	3	3	3	5	5	3
D105	**3**										
D106	**3**	85990.8	29425.3	15397.5	24.6	5	5	5	5	5	3
D107	**3**	78388.4	32270.0	17926.0	28.3	3	3	3	5	3	3
B108	**3**										
C109	**3**										
A110	**3**	67540.2	21637.8	10970.3	23.4	4	5	5	4	5	4
B111	**3**										
D112	**3**										
B113	**3**	73690.3	28386.5	15410.0	26.9	4	5	5	5	5	3
C114	**3**	50865	34333.8	16162.2	38.9	4	3	3	5	5	3
B115	**3**	62410	22015.1	10460.7	25.3	3	4	4	4	4	3
C116	**3**	60974.4	15154.1	8052.2	19.2	4	5	5	5	5	5
A117	**3**	43467	27816.0	12968.5	37.9	5	3	3	5	5	5
C118	**3**	38332.2	30465.1	14257.0	43.1	5	5	3	5	4	5
D119	**3**	.	.	.							
D120	**3**										

ID	Visit	LBM	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V
B121	**3**	64021.6	27091.0	11175.4	28.7	3	3	3	5	5	5
D122	**3**	75593.4	26810.5	14134.9	25.4	3	5	1	3	3	3
C123	**3**										
A124	**3**	65292.5	35997.0	19387.0	34.5	5	3	3	5	2	5
B125	**3**										
A126	**3**	.	.	.							
A127	**3**	65148.2	19463.3	7402.8	22.1	4	4	4	5	3	2
C128	**3**	55881.6	34003.0	16207.0	36.7	4	4	4	5	3	3
B129	**3**										
B130	**3**	45112.9	26196.2	9176.7	35.3	5	3	3	5	5	5
D131	**3**	56143.7	31520.1	11374.6	34.9	4	5	5	5	5	3
D132	**3**	73813.4	16587.0	7702.8	17.7	4	5	5	4	4	3
C133	**3**	42300.5	25843.0	11438.2	36.5	4	4	4	5	5	2
B134	**3**										
D135	**3**	55593.4	22518.2	9761.5	27.7	4	3	3	5	4	5
C136	**3**										
A137	**3**										
A138	**3**	45392.9	32459.6	14391.6	40.3	4	3	3	5	5	5
B139	**3**	57990.8	28827.0	14503.7	32.1	3	3	3	5	5	3
C140	**3**										
D141	**3**										
B142	**3**	72052.6	24616.6	13142.1	24.7	5	5	5	5	5	5
B143	**3**										
A144	**3**										
C145	**3**										
D146	**3**	.	.	.							
A147	**3**										
C148	**3**										
D149	**3**										
A150	**3**										

ID	Visit	LBM	WBF	TrFM	BF	SOC Port	SOCC Exer	SOCP Exer	SOC Fat	SOC Bev	SOC F_V
D151	**3**										
C152	**3**										
B153	**3**	70867.8	33385.4	15517.0	31.0	4	4	3	5	4	3
B154	**3**	61941.5	23020.0	10639.6	26.2	4	4	3	5	5	2
C155	**3**										
A156	**3**										
C157	**3**										
D158	**3**										
B159	**3**	81907	34775.5	17661.0	29.0	5	5	5	5	5	4
A160	**3**	.	.	.							
B161	**3**	.	.	.							
A162	**3**	76614.2	31657.8	17686.3	28.3	3	5	3	5	3	3
C163	**3**										
D164	**3**										
A165	**3**										
A166	**3**										
B167	**3**										
C168	**3**										
D169	**3**										
B170	**3**	.	.	.							
D171	**3**										
C172	**3**										

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