

ABSTRACT

Title of Document: ELECTRONIC INTERVENTIONS TO
IMPROVE HEALTH BEHAVIORS IN
COLLEGE STUDENTS

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Introduction: In transitioning from adolescence to adulthood, college students are faced with significant challenges to their health habits. Time, independence and stress have been known to result in poor eating and exercise habits which can lead to increased disease risk. **Objective:** To assess whether an electronic health intervention can improve health habits in college students. **Methods:** A 24-week diet and physical activity program was delivered by e-mail to 148 college students. The intervention involved weekly tailored, interactive diet and physical activity goals. The control group received non-diet-non-exercise-related health fact sheets. Baseline, 12-week, and 24-week diet and physical activity surveys were completed online.

BMI, neck circumference, waist circumference, and percent fat mass (FM%) by bioelectrical impedance analysis were measured at baseline, week 12 and week 24.

Results: Students were 18-20 years old 70% female from a diverse college campus (46% Caucasian, 23% Asian, 20% African American, 5% Hispanic, and 6% other).

At baseline, 23% were overweight/obese by BMI, 88% reported consuming <5 fruits and vegetables daily, 59% consumed >10% of kcalories from saturated fat, although 91% met or exceeded 150 minutes/week of moderate-vigorous exercise. Seventy-one percent of students completed all study visits. Repeated measures ANOVA showed a significant treatment by linear time interaction for saturated fat. A significant change from baseline saturated fat intake was detected between the treatment groups at week 24 (mean change \pm standard error $0.7 \pm 0.42\%$ of kcal for control and $-0.3 \pm 0.30\%$ of kcal for intervention). Differences in saturated fat intake between the two treatment groups were more evident in those whose intake exceeded recommendations. BMI, neck circumference, waist circumference, FM%, weekly minutes of moderate and vigorous physical activity as well as intake of fruit, vegetables, and added sugar were not significantly different between treatment groups. **Conclusion:** College students enrolled in an interactive electronic health intervention decreased saturated fat intake compared to control. Furthermore, the decrease observed in the intervention group was mainly due to those whose intake of saturated fat intake was above the recommended 10% of total kcalories. Further development of the electronic intervention program is needed to maximize health benefits in college students.

ELECTRONIC INTERVENTIONS TO IMPROVE HEALTH BEHAVIORS IN
COLLEGE STUDENTS.

By

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Dedication

I dedicate this work to my loving family. My husband Bob Luking always provides love and encouragement. His moral, editorial, graphic, and computer technology support with this project was critical to my success. He also cheerfully managed the family when I was deep into classes, papers and research. My children Katrina, Emily, and Calvin were great “practice subjects” who I occasionally consulted about college life. They also provided technical support with social media and other information technology. Thank you for understanding when I could not be two places at once. We make a great team.

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Chapter 1: Introduction

Objective and Rationale

The objective of the “Electronic Intervention to Improve Health Behaviors in College Students” project is to determine the efficacy of an email health intervention in preventing obesity and improving health outcomes of college-aged youths. Health outcome factors such as body composition, reported dietary intake, and reported physical activity were analyzed to determine the potential for the electronic intervention to influence health.

College is a time of increasing independence and growth. During this period students are known to make poor diet and physical activity choices such as skipping breakfast, consuming salty and sugary snacks, increasing alcohol consumption, and failing to meet diet and physical activity guidelines ¹⁻⁶. According to 2013 data from the National College Health Assessment only 6% of college students report eating at least 5 fruits and vegetables daily and less than half meet exercise recommendations ⁷. Such health behaviors result in a generation entering adulthood either at risk for obesity, or already obese.

Health risks have implications for healthcare systems. Demographic data show the US population graying over the next 35 years. By 2050 there could be more US adults over the age of 60 requiring health care than there will be working healthcare providers ⁸.

The time to plan and test healthcare that can be widely disseminated with minimal

staffing is now. Technology must be used to develop feasible and efficacious health interventions before the healthcare worker crisis erupts. Contemporary college students are the most technologically wired generation, having been born in the age of home computers and grown up with portable electronic devices. Based on 2012 Pew Research data, 78% of teens have cell phones, 93% have computer access at home, and 74% have internet access on portable devices⁹. The use of an electronic health intervention to improve diet and physical activity habits in college students is a cutting edge solution to an impending health crisis.

Study Aims and Hypotheses

Specific Aim 1: Characterize the manner in which college students utilize a 24-week Email health intervention by tracking goal selection and time spent using the intervention.

Specific Aim 2: Test the effect of electronic health intervention on changes in fitness, physical activity, dietary intake, anthropometric measures, and blood pressure in a randomized controlled trial among 100 college students.

Hypothesis 1: More than 75% of the Intervention group will interact with the program for 12 or more weeks out of 24;

Hypothesis 2a: After 24 weeks of EI the Intervention Group will: a) eat more fruits and vegetables; b) consume less added sugar; c.) consume less saturated fat; and d) report more regular physical activity than the Control group.

Hypothesis 2b: After 24 weeks of EI, the Intervention Group will have attenuated weight gain, less excess body fat, healthier body mass index (BMI), lower waist circumference, improved fitness measures, improved fat and sugar intake and have healthier levels of blood pressure than the Control group.

Chapter 2: Literature Review

Obesity

The phrase “freshman fifteen” was coined to describe the resulting weight gain associated with poor health habits in US college students. Studies of this phenomenon have identified 1-4 kg gain in body weight during the first year of college^{1, 3, 4, 10-17}. In the United States, this can result in increased proportions of students classified as overweight from 21% at the beginning of freshman year to 32% at the end of the first school year¹. Furthermore, the number of US students who are assessed as overweight/obese increase from 15% as freshman to 23% as Seniors⁴. Obesity in late adolescence can lead to obesity in adulthood^{18, 19}. The risk of being obese as an adult is four times as high for an overweight or obese adolescent compared to a normal weight adolescent²⁰. Clearly there is a need for obesity prevention in the college-aged population.

Obesity in adolescence, as in the general population, increases disease risk, particularly the risk of cardiovascular disease²¹⁻²⁷. More than half of US college students have at least one risk factor for coronary heart disease²⁸. Low cardiorespiratory fitness, obesity, elevated blood pressure and tobacco use are identified as the most prevalent risk factors associated with accelerated cardiovascular disease²⁹. From childhood to adulthood, obesity tracks more strongly than any other cardiovascular risk factor. Increasing blood pressure levels in children along with increasing prevalence of prehypertension and hypertension may be partially explained by the rise in obesity rates²⁹⁻³¹. Arterial dysfunction has also been associated with obesity in children^{32, 33}. Evidence of current

cardiovascular disease exists in adolescents. Bogalusa heart studies have demonstrated a positive relationship between childhood obesity and adult cardiovascular disease as measured by carotid artery intima-media thickness ³². A retrospective study of 70 children (average age 13 years) found that 75% of the sample had the vascular age of 45 year old adults ³⁴. These children were either diagnosed with familial dyslipidemia or were obese with cardiovascular risk factors including hyperlipidemia, high blood pressure, and high insulin levels. Fifty-seven percent were obese. When compared to those with familial dyslipidemia, obese children had significantly higher blood pressure. The vascular age was more advanced in obese children with high triglycerides. An intervention program to address obesity and physical activity in college students could be very useful in the prevention of cardiovascular disease.

Obesity in adolescence also increases risk of metabolic syndrome. Metabolic syndrome can be described as a combination of multiple metabolic disorders such as hyperglycemia, hypertension, dyslipidemia, and central adiposity. In children, metabolic syndrome presents almost exclusively in those that are obese ^{35,36}. An evaluation of adolescent data from the National Health and Nutrition Examination Survey (NHANES) reveals that the odds of metabolic syndrome were almost 20 times greater for obese girls and over 45 times greater in obese boys than their normal weight counterparts ³⁷. Not only is childhood obesity a risk factor for metabolic syndrome in adolescents but it is also a risk factor for metabolic disease in adults.

Obesity is a matter of energy balance. Prevention strategies should therefore focus on decreasing energy intake and increasing energy output. Calorically dense food and beverages provide calories without significant vitamins, minerals or other beneficial nutrients. These include such items as alcohol, soft drinks, fats, candy, and added sugar. Decreasing calorically dense food and beverage consumption is the most prudent way to control energy intake, especially in developing children. Increasing physical activity is the most beneficial way to increase energy output. In addition to increased energy output, physical activity provides added benefits to bone, heart and lungs. Good nutrition and adequate physical activity not only help with weight control but they offer an abundance of health benefits.

Diet and Health/Disease Risk

Diet plays a major role in heart disease and cancer prevention. Central obesity is excessive body fat located primarily in the abdominal region. Central obesity is one of the risk factors for coronary disease that responds to diet. Hypertension is another risk factor that diet can help to control. Research using Dietary Approaches to Stop Hypertension (DASH) has shown that high blood pressure can be controlled without medications by reducing fat and salt while increasing fiber, fruit, and vegetable intake³⁸. Unfortunately, college students readily admit to poor diets due to ready access to foods high in fat and sodium and to overall lack of time³⁹. They also report binge eating in response to stress. Low intake of fruits and vegetables and high fat and sugar intake are also typical of this age group^{4, 6, 7}.

Increasing fruits and vegetables has been inversely correlated with diabetes and stroke as well as cardiovascular disease and hypertension ⁴⁰. A recent study reported that those who consume no fruits and vegetables have a 53% higher mortality rate than those who consume five or more fruits and vegetables ⁴¹. Consuming at least five servings of fruits and vegetables daily could cut cancer rates by as much as 20%. Cancer incidence would be reduced by 30-40% if healthy diet were combined with staying physically active and maintaining healthy weight ⁴². Unfortunately less than 50% of college students are consuming five servings of fruits and vegetables per day ⁴³⁻⁴⁶.

Dietary fat is the most calorically dense macronutrient, providing nine kcalories per gram compared to four calories per gram from carbohydrate and protein. Sugar is the simplest form of carbohydrate and provides little nutritive value. Therefore, decreasing sugar and dietary fat are the focus of most weight loss programs. Diets high in fat are contributors to cardiovascular disease, obesity, and cancer. Sugar is known to contribute to dental caries and obesity. Recently, sugar sweetened beverages have been implicated in metabolic dysfunction. The Dietary Guidelines for Americans recognize the importance of decreasing fat and sugar intake. These national guidelines recommend decreasing total fat to less than 30% of kcalories with no more than 10% as saturated fat, minimal trans fat, and no more than 15% of kcalories from sugar and saturated fat ⁴⁷. The World Health Organization currently recommends cutting sugar intake to less than 10% of kcalories to prevent obesity ⁴⁸. College students typically consume 31-32% of kcalories as fat, at least 10% of kcalories as saturated fat, and 20-22% of kcalories from added sugar ⁴⁹⁻⁵¹.

For college-aged females and males, the Dietary Reference Intake for fiber is 25-26gm/day and 38 gm/day respectively⁵². In those with diabetes, dietary fiber may help control blood sugar by moderating glycemic index. In addition, foods high in soluble fiber are typically less calorically dense than low fiber foods. Including high fiber foods is therefore often recommended in weight control plans. Fiber is important for gastrointestinal motility and health of the large intestine. Those who consume an adequate amount of fiber are at reduced risk for colon cancer. Soluble fiber may also help reduce cholesterol levels and therefore reduce risk for cardiovascular disease. However, less than 20% of college students consume adequate amounts of fiber⁴³. Specifically, fiber consumption for this age group ranges from 13-22 grams per day^{50, 53}.

Physical Activity and Health Risk

Physical activity not only has health benefits for adolescents but exercise habits established in teen years influence exercise habits as adults and therefore effect adult health⁵⁴. Physical activity is recommended for prevention of cardiovascular disease, cancer, diabetes, and obesity. Regular physical activity improves adolescent body composition, bone health, mental health, lipid profile, cardiorespiratory and muscular fitness, and is associated with decreased insulin resistance^{29, 54-57}.

Physical activity is included in most weight control programs in an attempt to modify energy balance. Increasing physical activity, or energy output, can be an alternative to or in addition to reducing energy intake in weight control interventions. There is some thought that reducing intake by itself can lead to decreased metabolism. Adding physical

activity to a program can counteract the decreased metabolism associated with very low calorie diets. As with any behavior, social and psychological theories play an important part of any health intervention. Social support is vital to physical activity interventions. With the invention of social media, new electronic social support mechanisms have become available, such as electronic bulletin boards, chat rooms, email, blogs, Twitter™, and Facebook™. Including one of these forms of social support should be a part of any physical activity promotion program.

In adolescents and college-aged students, physical activity can affect mental health as well as physical health. Mental health benefits associated with physical activity include increased feelings of well-being, enhanced work performance, as well as decreased anxiety and depression. Physical activity and depression symptoms were evaluated regularly over five years in more than 800 Canadian adolescents⁵⁸. Those whose depressive symptoms increased over time participated in less moderate physical activity than those whose depression symptoms declined over time. When those adolescents were evaluated 10 years after baseline, current moderate and vigorous activity for the young adults was negatively related to symptom of depression⁵⁹. Past physical activity was not associated with depression. Physical activity, behavioral and emotional questionnaires completed by Finish adolescents linked physical inactivity to anxiety, depression, social problems and attention deficits in boys⁶⁰. In girls, inactivity was associated with depression, social problems and attention deficits. Additionally for both girls and boys, those who were inactive had significantly higher mean scores for anxiety, depression, social problem, attention deficits and rule-breaking behavior compared to

those who were more physically active. This suggests that adolescents who are not physically active are more emotional and have more social problems than those who are physically active. In randomized trials, children who engaged in exercise programs were less likely to be depressed and had better self-esteem, decreased anxiety, and decreased panic disorders compared to controls ⁵⁴.

Bone health is important for growth in children and for prevention of osteoporosis. Physical activity, especially weight bearing exercise, can promote bone health. Peripheral quantitative computed tomography was used to measure bone size, bone mineral content, and bone strength in young Canadian adults (mean age 29 ± 2.3 years) who had completed physical activity questionnaires as adolescents ⁶¹. Tibia bone size, strength and mineral content were improved in those adults who were more active as teenagers compared to those who were inactive as teens. This demonstrates that physical activity in youth can affect bone health later in life. Dance, sports practice and regular participation in jump rope clubs have been shown to improve bone density and protect against poor bone density in school-aged girls ⁵⁴.

Endothelial dysfunction, an initial step of atherosclerosis, is associated with childhood obesity and has shown improvement with regular exercise ⁶². Physical inactivity is an independent risk factor for coronary heart disease. Reduced physical activity and increased sedentary habits in children today have been associated with the rise in cardiovascular risk factors including poor lipid levels and high blood pressure seen in the young ²⁹. Most of the research involving effects of physical activity on cardiovascular

disease in children indicate that it is moderate-to-vigorous activity that shows positive effects on HDL cholesterol, LDL cholesterol, triglycerides level, blood pressure and cardiorespiratory fitness²⁹. Moderate and vigorous activity refers to the intensity of effort required to perform the activity. Moderate activity is described as any activity that requires a moderate amount of effort resulting in an increase in heart rate. Moderate activities include brisk walking, household chores and dancing. Vigorous activity is characterized by a significant increase in respiratory rate and heart rate and includes activities such as running, cycling, aerobics, and competitive sports⁶³.

Physical activity also plays a role in cancer prevention. Case-control studies have indicated that physical activity in adolescence reduces risk of breast cancer⁵⁴.

Additionally, adults who increase physical activity reduce their risk of colon cancer by 30-50%^{64,65}. At least 60 minutes of daily moderate to vigorous physical activity has been recommended for children and youth and at least 150 minutes per week for adults⁵⁷.

Only about 50% of college students report getting the recommended 150 minutes of week exercise⁷.

Electronic Interventions in Adults

The advancement in computer technology has led to a recent increase in use of electronic health interventions to affect behaviors related to skin cancer prevention, smoking cessation, depression, eating disorders, diabetes management, promoting exercise, diet, and weight control⁶⁶⁻⁷⁶. In adults, electronic interventions have been successful in promoting increased physical activity⁷⁷⁻⁸⁴, as well as weight loss and weight maintenance^{75,85}. Electronic interventions to improve fruit and vegetable intake, on the other hand,

have seen varying success^{68, 75, 82, 84-88}. Electronic health interventions in adults have included mobile phone applications, CD ROM education,⁶⁸ computer generated paper materials, health related web sites, email delivered health programs, as well as various recruitment procedures that include electronic tools^{75, 83, 84}. Most adult studies of electronic health interventions include primarily Caucasian females and therefore may not be generalizable.

Electronic interventions to affect physical activity in adults have used virtual coaches, interactive web-sites, and web-site programs plus mobile phone support^{77-80, 89, 90}. Again, adults in these studies were mostly female (64-100% female) and Caucasian (65-100%). All were on average overweight or obese. Both self-reported and objectively measured data have been used to document improvements in physical activity after electronic interventions. The extent of success in these interventions is related to the study design. The least effective design provided one tailored feedback session every three months after physical activity surveys, followed by access to a website for six months⁸⁹. Only seven reminders to use the website were sent to the 47 adult participants. This may have been the reason for 35% retention and questionable clinical relevance of reported increases in physical activity. Weekly email contact to encourage use of websites is more successful in increasing physical activity than less frequent contact. After using a tailored, physical activity website intervention weekly for three months, adults report walking 30 more minutes/week compared to the wait list control group⁷⁸. Additionally the intervention group reported increasing moderate and vigorous activity by more than 23 minutes/week while the control group reported decreased activity by 25 minutes/week.

When studying electronic interventions, one way to examine the efficacy of an electronic version is to compare it to a traditional in-person program. Tailored, interactive physical activity interventions can be added to website programs for maximal efficacy. Using a traditional program and electronic programs with added features, one study reported increased moderate and vigorous physical activity by 90-120 minutes/week after six months of intervention ⁸⁰. Sedentary adults were divided into three groups. One group was given a printed version of a standard physical activity intervention that was offered as a website version to a second group. The third group had access to the website program plus tailored physical activity feedback. Although there was no significant difference between the three groups, after 12 weeks of intervention, weekly physical activity was still 90 minutes higher than baseline for all groups.

There has been some debate on whether reported physical activity is valid. Using technology to document changes in physical activity eliminates the bias of self-reported data. Pedometers provide a count of steps taken by the wearer. In adults, pedometers have been used to document an almost 1400 step/day increase after a 16-week on-line physical activity intervention ⁷⁷. The study design compared an on-line physical activity intervention to a delayed treatment control. These 32 adults were sedentary and overweight. Unfortunately, eight months after completing the program, all study participants reverted back to their baseline sedentary activity.

Not all electronic physical activity interventions show evidence of effectiveness. A recent study using virtual technology in an attempt to increase physical activity showed no change for the intervention group and a decrease in pedometer step count in the control group⁹⁰. These adults were asked to “meet” with the virtual coach at least three times per week for 12 weeks. The investigators did notice a trend in improved step count for the intervention group compared to control. If recruitment had included enough adults to account for an 11% drop out rate, their findings might have been statistically significant. Additionally, personalizing the virtual coach by asking study participants to create an avatar, a graphical representation of the user, might have engaged the user more.

Accelerometers are an electronic device that measure multi-directional activity. This provides intensity indices of physical activity in addition to activity counts.

Accelerometers have become an important research tool to measure physical activity.

For example, one program, involving both internet and mobile phone support used activity counts from accelerometers to objectively measure moderate physical activity.

The program offered tailored weekly physical activity support for four months or a no support control. Compared to control, the intervention group engaged in over two hours more moderate activity⁷⁹. This suggests that use of a website along with email reminders

to deliver a tailored, interactive physical activity program can be successful in adults.

New virtual technology is on the rise and warrants further development to improve outcomes. Careful attention to program design, length and follow-up are crucial to success. More research is needed to maximize long-term efficacy for physical activity.

Electronic diet and exercise interventions have been employed in adults to improve general health, cardiovascular health and diabetes. However, internet interventions for fruit, vegetables and fat have been largely ineffective in improving intake. This is likely a result of low exposure to treatment where subjects either had a one-time exposure or were sent the intervention only monthly ^{86, 88, 91, 92}. Programs that focused on multiple health interventions in adults, including exercise and multi-faceted diet interventions were more successful. One multi-faceted health program encouraging physical activity, fruit and vegetable intake and weight gain prevention in adults, showed an increase in fruit and vegetable intake (1.5 servings/day), 1400 additional steps/day as measured by pedometer, and a 3% decrease in body weight ⁸⁴. Additionally, the authors discovered that those with the highest BMI and those with the worst dietary habits made the greatest improvements. Dietary Approaches to Stop Hypertension was adapted as a website intervention in an attempt to reach more adults. As mentioned previously, this approach involves a multi-faceted diet to improve blood pressure. When this program was introduced by internet to a cohort of overweight adults, a 4.2 pound weight loss, significantly higher fruit and vegetable intake, decreased carbonated beverages and decreased blood pressure in pre-hypertensive subjects were observed ⁸⁷. Additionally, those who visited the website more frequently had greater changes in blood pressure. Unfortunately, this program had only a 26% retention rate. Diabetic care also involves multiple interventions including diet, exercise and medication management. In an attempt to reach large numbers of diabetics, internet programs have been developed to focus on diabetic care. In one such intervention, percentage of those meeting physical

activity recommendations doubled compared to the control group⁸¹. Significantly more intervention participants than control participants lost six or more pounds.

“A Lifestyle Intervention Via Email” (ALIVE) © created and managed by NutritionQuest (Berkeley, CA) is a multi-faceted diet and exercise program. ALIVE © was the behavior modification program used in the current study. The ALIVE © program applies behavioral change principles in ways that are individualized and practical. Derived from social cognitive and social learning theories, the transtheoretical model and social marketing principles were incorporated into the program to guide users towards healthy choices.

The transtheoretical model of behavior change is based on the theory that change occurs in a series of five stages: Precontemplative, Contemplative, Preparation, Action, and Maintenance. Those in the precontemplative stage may not be aware that their behavior is problematic and therefore do not intend to change in the next six months. In the contemplative stage, awareness of problematic behaviors exists. In this stage the intention is to change within the next six months. Those in the preparation stage are ready to make changes in the next 30 days. In the action stage, behavioral changes have been made in the last six months. Those in this stage are progressing and strengthening their commitment to change. The maintenance stage includes those who have made behavioral changes more than six months ago. In this stage the issue is preventing relapse. Progression from precontemplative to maintenance stages ensures success in sustained behavior change. The transtheoretical model has been used in health

interventions and has shown to be effective ⁷². The ALIVE © program evaluates the stages of change for each user and personalizes goals according to the stage identified. In the ALIVE © program, social and cognitive principles included goal setting, a focus on individual choice, direct information and goal relevance for each learner, addressing barriers, specific action-based advice, salience of cues, building on prior learning, repetition of core messages, and repeated practice with new behaviors to transform them into sustained habits. There is an emphasis on small, achievable, cumulative goals, where accomplishment builds the participant's self-efficacy in the ability to make changes, and can enhance long-term maintenance. ALIVE © incorporates sociological principles, including suggestions to seek out and form communities of action, e.g., walking groups. Efficacy of the ALIVE © program has been demonstrated in adults using a randomized control trial ⁸². The sample of 784 adults was racially and ethnically diverse but primarily (73%) female. Fruit and vegetable intake, moderate and vigorous activity, and minutes of walking increased significantly in the intervention group compared to control. The intervention group also significantly decreased sugar and fat intake compared to control. The ALIVE © program is unique in that it delivers the intervention directly to the participant's email inbox. Compared to programs that are created on websites, there are no additional logins or passwords, and no need to remember to go to the webpage in order to receive the program.

Weight loss programs available on the internet have become as prevalent as diet self-help books. Three recent reviews identified over 6800 articles related to adult electronic weight loss interventions from 2009-2011 ^{75, 85, 93}. Participant retention in electronic

weight loss programs is generally 70-83% but varies from 21-94% depending on study design. Programs with lowest retention rates (20-30%) were designed with infrequent personal contact^{94,95} or a very long program period⁹⁶. Retention was highest (88-94%) for programs that enrolled participants from clinics where follow-up contact was done at usual care physician visits^{81,97}. Programs with high retention rates but poor study designs do not result in significant and clinically relevant weight loss. A variety of study designs have been attempted, including focusing on weight maintenance instead of weight loss⁹⁸⁻¹⁰¹, cohort studies with no control^{94,96,102}, comparing different internet programs¹⁰³⁻¹⁰⁶, internet programs compared to a variety of control conditions such as usual care^{73,107} no care^{108,109}, and paper information only^{81,97,110}. Tailored electronic interventions, with active weight loss goals and self-reporting features, achieve greater weight loss than control, but not greater than interventions with personal contact^{75,85,93}. In adults, the most effective weight loss program should focus on tailoring diet and exercise behavioral interventions. Additionally some human contact by qualified professionals should be included but with an internet-delivered maintenance follow-up program.

Electronic Interventions in College Age

College students are in transition from adolescence to adulthood. It is important to design interventions with this in mind in order for success of the program. Electronic interventions have been used successfully in college students all over the world to improve a variety of health behaviors including substance abuse, smoking cessation, stress management, diet and physical activity^{72,111-115}. Commonalities between adult and

college-aged interventions included volunteer biases. Most diet and physical activity interventions involved a majority of female students (>55% female) which is also true for adult studies. Retention rates for nutrition and physical activity based electronic interventions range from 64% to 96% ^{114, 116}. This represents a tighter range compared to adult studies. There are comparatively fewer electronic intervention studies in college students than adults.

Studies of physical activity programs using electronic technology have shown efficacy in college students. In female Taiwanese college students, physical activity increased after a three month intervention by website ⁷². This highly interactive website was developed to include high level graphics and virtual technology. Physical activity *more than doubled* for the students using the interactive website program. The control group, who received physical activity information via lecture only, *decreased* physical activity significantly, cutting activity by half post-intervention compared to baseline and by a third at five months post-intervention. The virtual technology portion of the intervention was designed to be specifically appealing to female college students. This program also used virtual rewards which has great appeal to this age group in on-line gaming and may have contributed to the success of the program. Hispanic college students have also shown increased physical activity with electronic interventions. A 12 week intervention compared a physical activity web-site program to a treatment of web-site plus Facebook support ¹¹⁷. Although there was no difference between the two interventions, a significant increase in moderate and heavy physical activity for all students was seen after the intervention. Another six week long study involving primarily Hispanic college

students, reported increased days of moderate and physical activity after a web based intervention compared to control ¹¹⁸. The control group was exposed to physical education information only and encouraged to use activity logs. For students, enrolling students in a required health class is one way to ensure high retention in a health program. One study revealed a 12% increase in moderate physical activity, and an 8% increased intake of high-fiber foods after a required college health class ¹¹⁵. Health behavior assignments, such as recording results of pedometer use and completing an exercise program, were required for grading by the course instructor. The on-line version did not produce significantly improved results compared to the traditional class. In a large study that included students from eight universities across the United States, an on-line curriculum was used to improve diet and physical activity habits ¹¹⁹. After a 10-week intervention versus delayed treatment, fruit and vegetable as well as physical activity was significantly higher in the intervention group compared to control. This difference remained at the 15 month follow-up visit. This study was the first to show a long-term effect on fruit and vegetable intake for college students. Not all studies show efficacy however. Physical activity was not improved after two, 90-minute computer sessions compared to equal exposure to an anatomy web-site ¹²⁰. College students in the intervention group did however increase fruit and vegetable intake significantly compared to control. However, the increase was not clinically meaningful and was not sustained 3 and 6 months post-intervention. This was likely due to infrequent exposure to the program.

On-line weight loss programs have been used with varying success in college students. A cohort study demonstrated a three percent body weight loss in overweight/obese students after a 12-week, 1-credit, online weight loss course ¹²¹. Another weight loss program combined printed material, text messages, and emails to deliver the program. This multi-media program was compared to a printed weight loss program for changes in weight, diet and physical activity ¹¹⁴. Body weight and sugar-sweetened beverage intake decreased, while fruit and vegetable intake and light physical activity increased after the 12 week program. However, there was no difference between electronically delivered and paper format interventions. Successful weight loss was also demonstrated in college students after an 8-week program that included use of Facebook, texting, and podcasts ¹¹⁶. Use of these multiple electronic tools resulted in a significant and relevant weight loss versus essentially no weight loss in the wait list control. A shorter, six-week program using the internet to deliver weekly weight loss topics plus feedback on self-reported weekly body weight was not successful compared to control ¹²². There is definitely potential for success in changing health habits of college students using computer technology and social media. The key, as with any study, is design and implementation.

Clearly there is a need to improve diet and exercise habits of college students. Electronic interventions have the advantage of reaching larger numbers with less staff and more convenience for the participant. Retention rates in reported studies are higher for college students than adults. This may be the result of generational differences in familiarity with computers and personal electronics. Electronic interventions are a new and growing

field. Additional work is needed to produce more clinically meaningful results that produce lasting changes in diet and exercise behaviors. Improvements in recruitment, retention, and study design and program methods are needed to increase acceptability and efficacy of electronic health interventions.

Chapter 3: Materials and Methods

This prospective, randomized, controlled clinical trial of 24-week duration was employed to assess the efficacy of the ALIVE © program, (Nutrition Quest, Berkeley, CA) after modification for use in a college-aged sample at the University of Maryland, College Park. Sample size was calculated based on the estimate of difference in minutes of moderate activity post intervention in 797 employees of Northern California Kaiser Permanente^{82, 103}. Mean (standard deviation) minutes of moderate activity post intervention were 244.53 (177.98) for the ALIVE © group and 184.54 (163.92) for the control group. Using 80% power and alpha=0.05% sample size was calculated as 105 to show a significant difference in moderate activity.

Recruitment

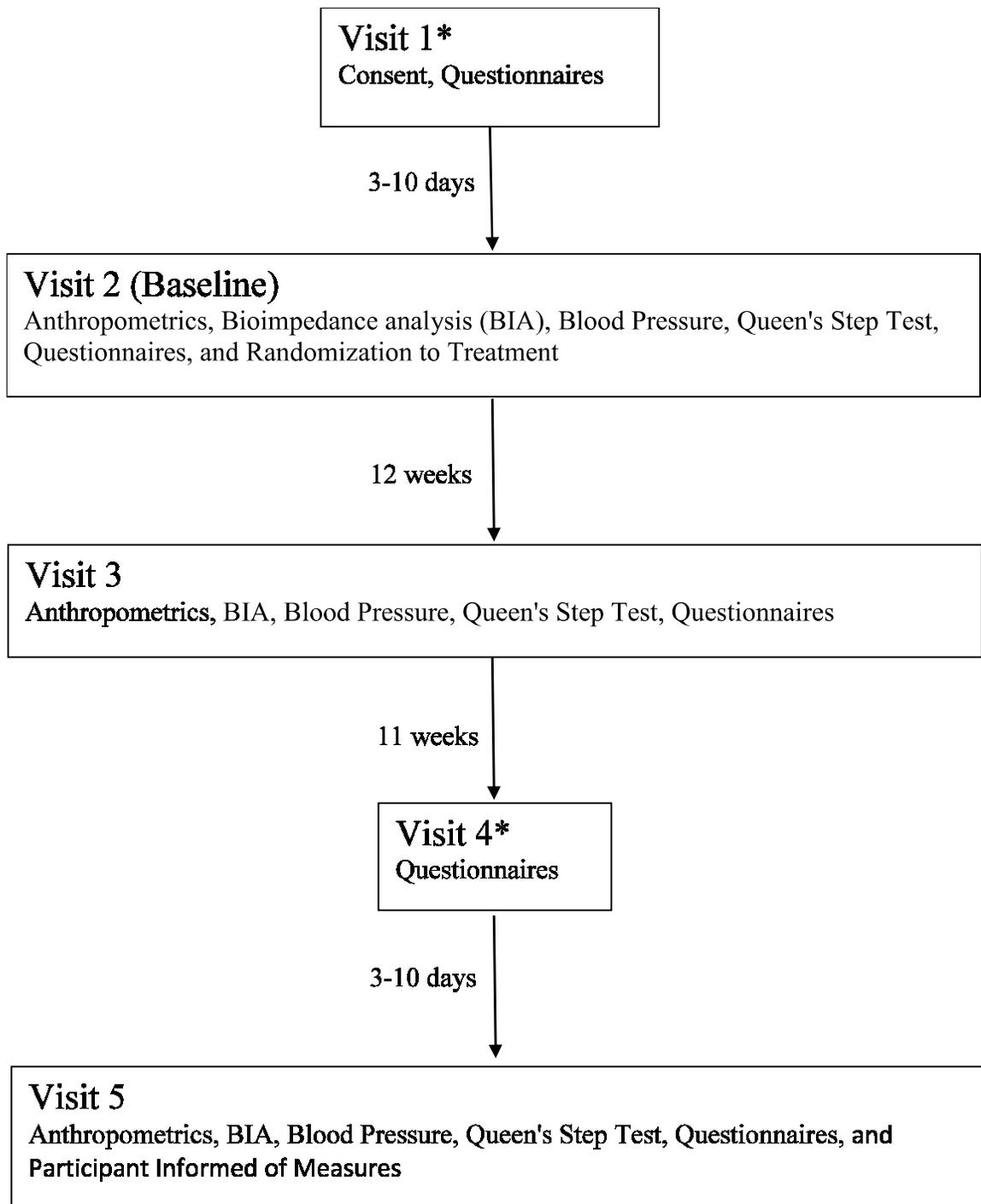
Participants were recruited from the University of Maryland campus utilizing Institutional Review Board (IRB) approved flyers (Appendix A) and IRB approved mass emails. Office of Information Technology was contacted to set up a list serve of students who were 18-20 years old at time of consent (August 8, 2012-September 28, 2012). The IRB approved email was sent to 10,370 students. Interested students (n=693) contacted the study Co-investigator and research assistants by telephone or email. Research assistants emailed interested students (Appendix B) to ask for phone contact information. Students who expressed interest in the study were then called by telephone to screen for eligibility (Appendix C), and schedule the consent process (Appendix D).

Study Methods

The sequence of study procedures, including 5 face-to-face visits, is outlined in Figure 1 and Figure 2. Participants were given a \$25 gift card to a local department store for completing each of visits 2, 3, and 5. All students who completed all visits and all surveys were entered into a raffle for a \$250 gift certificate. University of Maryland students were measured in a laboratory at the UMCP campus. Graduate and undergraduate research assistants were trained by Amy Schweitzer, M.S., R.D., who has been trained and is experienced in NHANES anthropometric procedures, Queen's Step test, bioelectrical impedance analysis, blood pressure measurements and in conducting informed consent. All research assistants were trained in conducting informed consent, anthropometric measures, bioelectrical impedance analysis, Queen's Step test, and in measuring blood pressure. The primary investigator and all research assistants passed the Collaborative Institutional Training Initiative Social and Behavioral Research Basic course, an IRB required ethics course. A Chemical Hygiene course, conducted by the University of Maryland's Department of Environmental Safety, was also completed on-line by all research assistants.

Weight Measurement

A digital weight scale, (Scale-Tronix, Wheaton IL), serial number 5002-27460 was calibrated with two 20 kg weights daily, prior to obtaining subject's weight. Participants were weighed in under clothes or bathing suit to the nearest 0.1 kg. The foot pad of the scale was sanitized with a germicidal disposable wipe prior to weighing each subject.



*Food records and accelerometers were distributed to participants at visits 1 and 4. Data from these tools are peripheral to this project.

Figure 1. Study Design



Figure 2. Electronic communications to participants after randomization

Height Measurement

A wooden portable stadiometer (Shorr Productions, Olney, MD) was used to measure subject's height. The stadiometer was calibrated with a 160 cm rod daily and sanitized with a germicidal disposable wipe prior to each subject. The subject, in bare feet, was instructed to touch posterior heel, buttocks, shoulder blades and head to the vertical board of the stadiometer. Frankfurt plane positioning of head was ensured. Height was measured three times at exhalation to the nearest centimeter. Subject was asked to step away from the stadiometer between measures.

BMI was calculated by dividing weight in kg by height in meters squared. BMI greater than 25kg/m^2 indicated a participant was overweight or obese according to guidelines established by the National Institute of Health ¹²³.

Body Circumferences

A Gulick II® fiberglass tape measure, (Country Technology, Gays Mills, WI) model # 67020, was used to measure mid-neck circumference, waist circumference and hip circumference. Neck circumference was measured to the nearest mm between mid-cervical spine and mid-anterior neck just below the laryngeal prominence with the head in the Frankfurt plane position according to the Ben-Noun procedure ¹²⁴. Neck circumference was compared to those established by Ben-Noun et al ¹²⁵ to determine overweight/obesity. Waist was measured at the right superior iliac crest according to the NHANES procedure¹²⁶ and compared to guidelines established by the National Institute of Health ¹²³. Hip circumference was measured at the widest area across the buttocks according to the Lohman procedure ¹²⁷. Waist-to-hip ratio (WHR) was calculated by dividing waist in cm by hip in cm. WHR results were compared to National Academy of Science values to assign risk for diabetes and cardiovascular disease ¹²⁸. The measuring tape was sanitized with a germicidal disposable wipe after each subject. All subjects were measured in triplicate starting with the neck, then waist, then hip, before repeating all circumferences. All measurements were taken on the subject's right side and reported to one decimal.

Blood Pressure Measurement

Seated blood pressure was measured in triplicate by trained research staff under resting conditions using a 10 series automated blood pressure monitor (Omeron Healthcare, Bannockburn, IL) per manufacturer's instructions. Measurements were taken on the right arm and reported to the nearest mmHg. Results were compared to NHLBI categories for

blood pressure in adults 18 years and older indicating abnormal ≥ 120 mmHg for systolic and ≥ 80 for diastolic blood pressure ¹²⁹.

Bioelectrical Impedance Analysis

Bioelectrical impedance analysis (BIA) was conducted in triplicate after verbal confirmation of fasting status. Participants rested supine with arms and legs not touching any part of the body, for 10 minutes prior to and during the entire procedure. In preparation for the BIA, participants were questioned about metal and medical device implants, seizure history, history of arrhythmia and fasting status. All external metal from the right side of the body or neck and any personal electronic devices were removed to avoid interference in the flow of the electrical charge from the BIA. Pregnancy, history of seizures and heart arrhythmias are all exclusion criteria for BIA. Two subjects were deferred, one for history of arrhythmias and a second for history of seizure. Participants were asked to empty their bladder immediately prior to testing. In preparation for electrode placement, skin of the right hand, wrist, foot and ankle were scrubbed with alcohol wipes. The DF50® (Impedimed, Carlsbad, CA) analyzer calibration was tested according to manufacturer's instructions using the test cell. Accuracy was verified manually by comparing impedance, phase angle, resistance and reactance values of the test cell to ranges required by the manufacturer. After confirmation of calibration, BIA was conducted by placing four electrodes 1) at the midpoint between the distal ulna and the dorsal radius of the right wrist, 2) five cm from the wrist electrode towards the metacarpal head of the dorsum, 3) at the midpoint between the distal tibia and dorsal fibula (right foot), and 4) five centimeters from the

right ankle electrode toward the toes. Leads were then clipped to the electrodes. Participant's height, weight, sex, and age were entered into the DF50 ® using the algorithm mode. The DF50 ® then sent 200 microamps of current through the leads on the right hand and recorded resistance, reactance, impedance and phase angle from the right foot leads. Algorithmic equations embedded into the DF50 ® calculated FM% which were displayed on the DF50 ® screen. Research assistants recorded the results to 0.1 decimal. Results were compared to receiver operator curves established by Laurson et al who identified excessive fat mass as ≥ 32 for females and ≥ 22 for males^{130, 131}

Queen's Step Test

Queen's step test was conducted to estimate maximum oxygen utilization (VO_{2max}). This involved participants stepping up and down on a 41.3 cm wooden step (Children's National Bioengineering, Washington, D.C, USA) for three minutes at 24 steps/minute for males and 22 steps/minute for females while wearing a sanitized Omron® HR-100C heart rate monitor transmitter (Bannockburn, USA). Trained study staff monitored and encouraged participants during the test. A Survivor III stopwatch model S3MAGXLBK (Accusplit, Pleasanton, CA) was used to time the test. A metronome model MA-30 (Korg, Tokyo, Japan) was used to set the step pace for the students. Heart rate as measured by the monitor was noted and recorded immediately following the step exercise. VO_{2max} was estimated based on the following equations:

$$\text{men: } VO_{2max} \text{ (ml/kg/min)} = 111.33 - 0.42 \times \text{heart rate (bpm)}$$

$$\text{women: } VO_{2max} \text{ (ml/kg/min)} = 65.81 - 0.1847 \times \text{heart rate (bpm)}^{132}.$$

Results were compared to those established by the Cooper Institute to determine physical fitness¹³³. All questionnaires were completed electronically. As indicated in Figure 2, the electronic intervention was delivered electronically via email with supplemental text messaging, phone calls, and web-based support for 24-weeks. The control group was offered the intervention program after completion of the study.

Study Visits

The study consists of five face-to-face visits (Visits 1-5). The first two visits occurred at the beginning of the college semester. The third visit followed 12 weeks after the second visit. The fourth visit occurred one week prior to the fifth visit which was scheduled 24 weeks after the second visit. Reminder emails were sent to participants prior to each visit (Appendices E, F).

Numbering of study weeks (i.e., Baseline/day 1, 12 weeks, 24 weeks) was linked to the date when the individual participant was randomized and began the electronic intervention, not based on the academic calendar. Randomization occurred at the end of visit 2. For every two intervention participants, one control subject was stratified by BMI and sex to treatment groups by computer algorithm. Study enrollment was staggered over the UMCP fall semester. The schedule for subsequent study visits was staggered similarly. Study visits at the designated 12-week and 24-week time points occurred within 10 working days from the exact date, calculated from baseline.

Visit 1: Three to ten days prior to Baseline

After trained study staff conducted informed consent, participants were asked to answer demographic, health history, a partial Paffenberger physical activity questionnaire and Physical Activity Readiness Questionnaire (PAR-Q) (Appendices H-K). Surveys were completed online using Research Electronic Data Capture (Redcap) <https://cri-datacap.org/surveys/?s=KWej3B>. After completing surveys, participants were instructed to keep food records (Appendix G) and wear accelerometers for two weekdays and one weekend day.

In order to provide valid blood pressure, heart rate, and bioelectrical impedance measures, participants were instructed to fast for 4 hours and to avoid consuming alcohol or caffeine for 12 hours prior to arriving for Visit 2.

Visit 2: Baseline

The sequence of procedures within each visit varied depending on whether females could give urine samples, how well participants complied with fasting procedures, and availability of equipment and study staff. Queen's step test was always performed after BIA, blood pressure measures and body measures.

Females were given sterile specimen cups labeled with subject ID and asked to provide a urine sample. Study staff followed manufacturer instructions for E.P.T.® Digital Pregnancy test.

Height, weight, blood pressure, and circumferences of neck, waist, and hip, were measured as previously described in triplicate by trained study staff. BIA and Queen's step test were also conducted at this visit as previously described.

Participants completed questionnaires not completed in Visit 1 (Appendices H-K) using Research Electronic Data Capture (Redcap) <https://cri-datacap.org/surveys/?s=KWej3B>. During completion of surveys and prior to the Queen's step test, participants were offered water and a variety of snacks. The electronic intervention administered baseline questionnaires related to diet, physical activity, behavior and lifestyle <https://college.nutritionquest.com/baseline1?cookie=UMD>. After completing baseline questionnaires, the ALIVE © program gave feedback related to the three health behavior tracks: 1) fat and sugar intake, 2) fruit and vegetable intake, and 3) physical activity. Participants then chose one of the tracks as the focus for intervention and goals. Using the electronic program, participants were then stratified 2:1 by BMI and gender to intervention and control treatment groups. This ratio ensured that drop outs did not affect the ability to demonstrate feasibility and satisfaction with this pilot program.

Visit 3: Week 12

After a four hour fast (and 12-h without ingesting alcohol), body measures, blood pressure, BIA, Queen's step test, and questionnaires conducted at baseline were repeated (<https://cri-datacap.org/surveys/?s=CZDTVf>). Demographic questionnaires were not repeated.

Visit 4: Three days prior to Visit 5

Participants were instructed to keep food records and wear an accelerometer for two weekdays and one weekend day. Prior to visit five, participants were instructed to fast for four hours and avoid consuming caffeine and alcohol for 12 hours for more accurate BIA, blood pressure and heart rate measurements (Appendix F).

Visit 5: Week 24

Diet records and accelerometers were returned at this visit. After a 4 hour fast (and 12-h without consuming caffeine or alcohol), all measures and questionnaires, except demographic questionnaires, conducted at baseline were repeated (<https://cri-datacap.org/surveys/?s=2w19GM>). Individual baseline results of final body measures, blood pressure, VO₂max, (Appendix M) along with a chart of recommended cut off values were shared with each participant after completing visit five (Appendix N). At the conclusion of this visit and all related assessments, subjects were unblinded by a study coordinator and offered the opportunity to receive the other treatment. No body measurement data were collected beyond visit five.

Data produced by food records and accelerometers are ancillary and will not be analyzed as a part of this project.

Data Analysis:

Power: Sample size estimate is based on preliminary studies^{82, 103} in 797 employees of Northern California Kaiser Permanente where mean (standard deviation) minutes of

moderate activity post intervention was 244.53 (177.98) for the ALIVE © group and 184.54 (163.92) for the control group. Power analysis with a Beta 80% alpha=0.05% indicated n=105 to show a 60 minute change in moderate activity.

Dependent variables: time spent exercising, maximum oxygen utilization, blood pressure, body fat percent, BMI, neck circumference, waist circumference, waist to hip ratio, energy intake, saturated fat intake, sugar intake, fruit and vegetable intake.

Independent variables: age, sex, ethnicity, group (intervention or control).

Covariates: sex and baseline BMI.

SPSS version 21 was used for descriptive statistics of baseline data. SAS version 9.3 was used for the repeated measures ANOVA with BMI and age as covariates.

Demographic and baseline characteristics of students in the intervention group were compared to those in the control group using t-test for continuous variables or Chi-square for categorical variables (Table 1 and Table 2).

The assumption of normality was examined for ANOVA. Because the assumption of normality is for the group means, when data appeared non-normal, a repeated random sampling of the residuals from the actual data was used to obtain samples of size 50. Group means were calculated and examined for normality. The sample size of 50 was

selected because this is approximately equal to the smallest sample sizes in the study. Given the effect of the central limit theorem these simulation results indicate that the normality assumption was adequately met for all analyses. Changes over time were analyzed by repeated measures ANOVA using a two [treatment (intervention, control)] x three [time (baseline, week 12, week 24)] factorial treatment design to determine differences between intervention and control over time and controlled for covariates sex and baseline BMI. This was done using a mixed model procedure (PROC MIXED SAS 9.3). Goodness of fit statistics were used to select the repeated measures structure that best fit the data.

The primary analysis was intent-to-treat approach. This approach allows for unbiased comparisons of the treatment group where all participants who are randomized are included in the analysis irregardless of compliance and missing data. Last observation carried forward technique was used to fill in for missing data. In this technique, data from the previous visit was used to fill in for missing visit data, creating a zero change for individuals who did not complete study visits. Imputed data does make assumptions about the outcome for drop outs and can dilute the treatment effect. However, ITT analysis does mimic non-compliance that occurs in clinical practice and therefore can be more generalizable¹³⁴. ITT also preserves the sample size by including drop outs which if excluded could decrease statistical power. Intent-to-treat analysis in the current study included 10 participants who were not compliant with inclusion criteria after randomization.

Secondary analyses were performed on a sub-group of completers. These participants were compliant with inclusion/exclusion criteria throughout the study period and completed questionnaires for the week 24 study visit. Repeated measures ANOVA was used to determine differences over time in outcome between intervention and control groups.

Food records and accelerometer results are part of another project and will not be reported here.

Chapter 4: Results

Participants

Of the 149 students who consented to enroll, 99 were stratified into the intervention group and 50 into the control group (Figure 3). Among the students in the intervention group 32% chose the fat and sugar path, 33% chose the fruit and vegetable path, and 34% chose the physical activity path. One control subject, who completed the modified ALIVE © survey but did not return for baseline body measures, did not complete the surveys and did not complete any more visits, was not included in the final analysis. Among the 149 enrolled, 83 intervention and 42 control participants completed the week 12 visit; 68 intervention and 38 control participants completed the week 24 visit, resulting in retention rates of 84% and 71% at weeks 12 and week 24 respectively. At least half of the study emails were read by 84% of the participants (81% of controls and 88% of intervention). Students who dropped out of the study had significantly higher (mean±SE) BMI ($24.2\pm 0.62\text{kg/m}^2$), waist circumference ($85.3\pm 1.55\text{cm}$), waist to hip ratio (0.86 ± 0.0067), neck circumference (34.6 ± 0.50), and reported lower kcalorie intake (19.8 ± 1.31) than those who completed all visits (BMI: $22.4\pm 0.32\text{ kg/m}^2$, waist circumference: $79.7\pm 0.79\text{ cm}$, waist to hip ratio: 0.84 ± 0.0043 , neck circumference: $33.0\pm 0.29\text{ cm}$, and reported kcalorie intake: $24.0\pm 1.04\text{ kcal/day}$). All other variables were not significantly different ($P>0.05$).

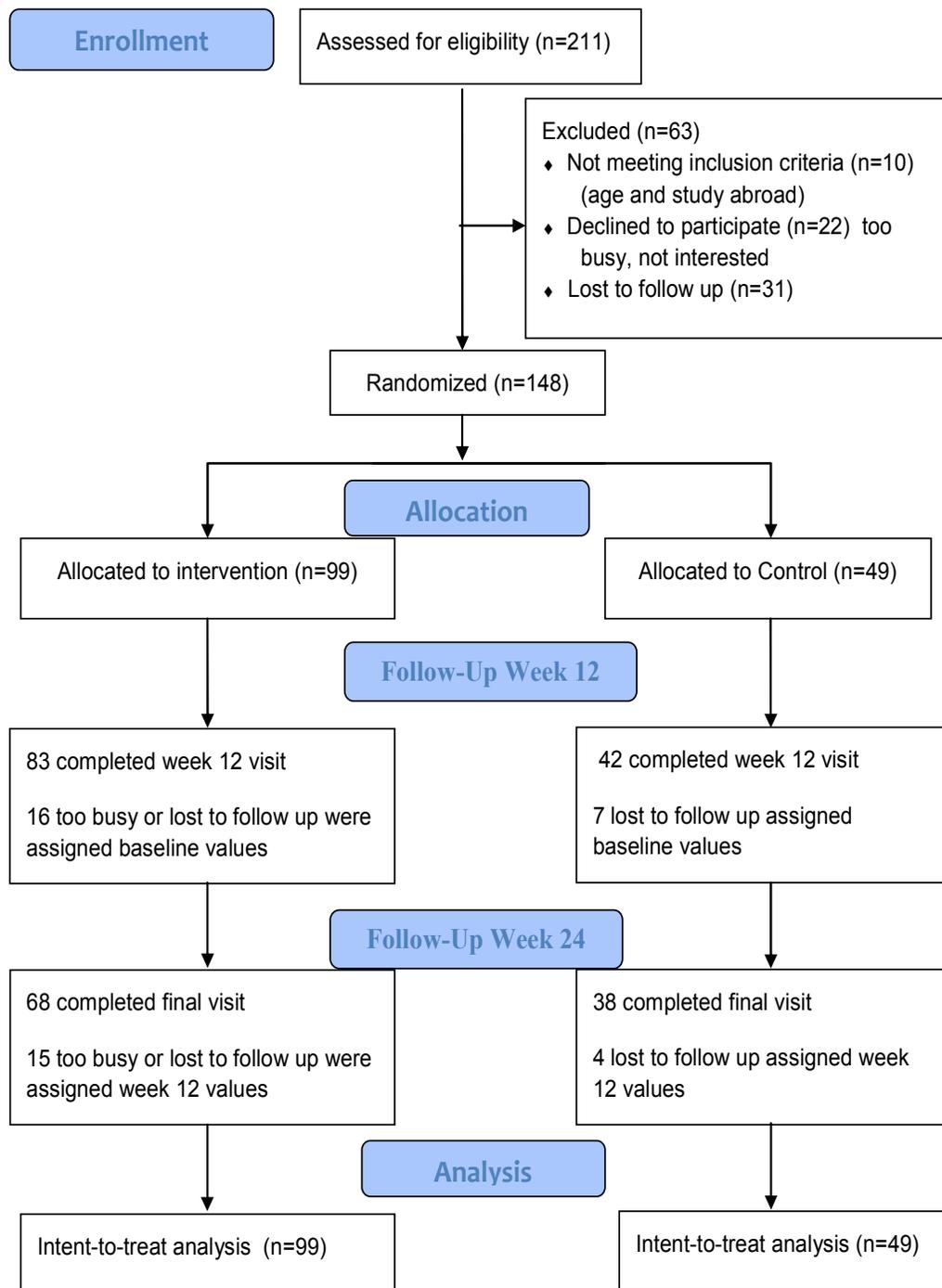


Figure 3. Consort Flow Diagram for College Students Recruited and Retained

Demographically, intervention and control subjects did not differ significantly at baseline (Table 1). The intervention group did have a significantly higher percentage of students who had previous experience participating in research studies (50%) compared to control (20%) $p=0.001$. Mean age \pm standard error of the mean was 19.7 ± 0.06 years. The profile of the study participants was 68.5% female, 46% Caucasian, 23% Asian, 20% African-American, 5% Hispanic, and 6% other race or ethnicity. This was not significantly different from the University of Maryland demographics at the time of the study. The participants in general were healthy, reporting low rates of hypertension (0.7%), hypercholesterolemia (2.7%), heart murmur (2.7%), gastrointestinal disease (3.4%), and anemia (5.4%). The highest prevalence of disease was asthma (17%). Twenty-two percent of students were taking medications, 7% took medications for allergies/asthma, 6% for psychiatric diagnosis, 3% took acne medication, and 6% for other reasons including gastrointestinal issues, blood pressure, epilepsy, migraine, and inflammation. Twenty-eight percent of females were taking birth control medication.

Family history of diabetes was reported by 43% of students, hypertension by 42%, hypercholesterolemia by 34%, obesity by 16%, heart disease by 14%, and stroke by 13% of students. Dietary supplement use was reported by 31% of this sample. The most common reason for using dietary supplements was for improved health (40%) and low dietary intake (25%). Seven students reported using supplements for the following five reasons: physician recommendation, to improve sleep, prevent colds, for more energy, and to help with exercise. Less than five percent of the students were smokers. There was no difference between the intervention and control group for any of these health

Table 1. Baseline characteristics of college students by treatment group

Characteristic	Intervention n(%) ^a	Control n(%) ^a	p value
Age (years): mean±SE	19.8 ±0.07	19.6±0.1	ns
Sex (%female)	68(46)	34(23)	ns
School Year			ns
Freshman	3(3)	5(10)	
Sophomore	38(39)	23(48)	
Junior	53(55)	19(40)	
Senior	3(3)	1(2)	
Race/ethnicity			ns
African-American	16(16)	13(26)	
White non hispanic	46(47)	21(43)	
Hispanic	7(7)	1(2)	
Asian	23(24)	11(22)	
Mixed	4(4)	2(4)	
Other	2(2)	1(2)	
Smoke	5(5)	2(4)	ns
Take Vitamins	33(34)	14(29)	ns
Transportation to campus:			ns
live on campus	45(46)	28(57)	
walk/run	28(29)	11(22)	
bike	8(8)	2(4)	
drive	17(17)	8(16)	
Past research participant	48(50)	10(20)	0.001

^a data are presented as count and % unless otherwise noted.

^b Student's t-test for age, else chi-square analysis of differences between groups
SE: standard error of the mean, ns not significant (p>0.05).

issues/health habits at baseline. Mode of transportation to campus was walking for 26%, driving for 17%, and biking for 7% of college students. Fifty percent lived on campus, not requiring transportation to campus. There was no significant difference between treatment groups for mode of transportation.

Outcomes

Number and percentage of students meeting health recommendations at baseline by treatment group are presented in Table 2. No significant differences between treatment groups were detected for students meeting health guidelines at baseline. However, prevalence of high blood pressure by objective measurement (18%) was higher than that reported (0.7%) in the baseline survey.

Outcome data by treatment group for baseline, week 12, and week 24 are presented in Table 3. Baseline outcome data did not differ significantly between groups except for waist circumference. The students in the intervention group had a significantly higher waist circumference at baseline than the control group ($p < 0.01$). This difference was also detected at week 24 (< 0.05) but the difference was not significant at week 12 ($p = 0.09$).

Table 2. College students meeting health recommendations at baseline

Recommendation	Intervention n (%) ^a	Control n (%) ^a	p value ^b
Body fat percent	54(55)	33(66)	ns
BMI (18.8-25g/m ²)	75(76)	40(80)	ns
Waist Circumference	79(81)	46(92)	ns
Waist- to-Hip ratio (WHR)	43(44)	21(43)	ns
Neck circumference	75(76)	37(74)	ns
Blood pressure (<120/80 mmHg)	83(84)	39(78)	ns
Fiber	10(10)	5(10)	ns
Sugar intake (<10% daily calories)	56(57)	25(50)	ns
Saturated fat intake (<10% daily kcal)	38(38)	23(46)	ns
Fruit and Vegetable (>5/day)	13(13)	5(10)	ns
Total fat intake (<30% daily kcal)	97(98)	49(98)	ns
Maximum oxygen utilization	56(58)	34(69)	ns
Exercise (150 min/week)	88(89)	47(94)	ns

^a Data are presented as count and %.

^b Chi-square analysis of differences between groups.

Body fat%: met <32 female (F), <22 male (M) ^{130, 131}; waist circumference met ≤88cm F, ≤102cm M ¹³⁵; WHR: met <0.8 F, <1.0 M ¹²⁸; neck circumference met <34cm F, <37cm M ¹²⁵; fiber met ≥25 F, ≥38 M ⁵²; VO₂max: maximum oxygen utilization met >35ml/kg/min for 19 year old (yo) F, >33 ml/kg/min for 20 yo F, >45 ml/kg/min for 19 yo M, >42 ml/kg/min for 20 yo M ¹³³, Exercise: min/week moderate to vigorous physical activity ⁵⁷

Table 3. Body measures physical activity, dietary intake of college students over time by treatment

Variable	Baseline		Week 12		Week 24	
	intervention (n=98)	control (n=50)	intervention (n=98)	control (n=50)	intervention (n=98)	control (n=50)
SBP (mmHg)	111 ±0.72	111±1.2	111±0.89	111±1.2	110 ±0.89	110±1.2
DBP (mm Hg)	71.9±0.72	70.8±1.0	71.8±0.72	70.7±1.0	71.0±0.72	70.2±1.0
FM%	24.3±0.50	25.0±0.68	24.9±0.50	25.2±0.68	24.6±0.50	24.9±0.68
BMI kg/m ²	23.1 ±0.38	22.8±0.54	23.1±0.38	22.8±0.54	23.2 ±0.38	22.8±0.54
NC (cm)	34.4±0.14	34.4±0.19	34.4±0.14	34.4±0.19	34.5±0.14	34.6±0.19
WCsi (cm)	82.2±0.49 ^a	79.9±0.68 ^b	81.7±0.49 ^{ac}	80.4±0.68 ^{bc}	81.9 ±0.54 ^a	80.1±0.75 ^{bc}
WHR	0.85±0.004	0.84±0.006	0.85±0.004	0.84±0.005	0.85±0.004	0.84±0.006
Exercise (min/week)	795 ±58	844 ±80	736 ±58	705 ±80	788 ±58	801±80
VO ₂ max (ml/kg/min)	41.4±0.59	42.6±0.81	41.1±0.44	42.1±0.59	40.8±0.47	42.4±0.63
Sitting hrs/day						
Weekday	7.9±0.30	7.6 ±0.42	7.9±0.30	7.3 ±0.41	7.5±0.30	7.0±0.41
Weekend	6.9±0.27 ^a	7.9±0.38 ^b	6.5±0.27 ^a	6.8 ±0.37 ^a	6.6±0.27 ^a	6.4±0.37 ^a
Dietary Intake						
Fruit/Veg (cups/day)	2.6 ±0.17	2.7±0.23	2.4±0.14	2.3 ±0.20	2.4±0.14	2.4±0.20
Sugar (% total kcal)	10.6±0.84	12.1±1.2	10.2±0.84	12.0±1.1	10.1±0.84	10.6±1.2
Saturated fat (% total kcal)	8.2±0.29	7.2±0.41	8.0±0.32	7.5±0.42	7.8±0.34	8.1±0.45
Energy (kcal/kg/day)	22.5±0.97	23.1±1.4	19.6±0.88	19.5±1.2	18.0±0.79	19.4±1.1
Fiber (gm/day)	16.7±0.86	17.1±1.2	14.6±0.72	13.8±0.99	14.4±0.75	14.8±1.0

^{abc} Within each row values with different letters are significantly different p<0.05.

Means±standard error derived by ANOVA repeated measures adjusted for sex and BMI at baseline.

SBP: systolic blood pressure, DBP: diastolic blood pressure, FM%: Fat Mass% , BMI: body mass

Index, NC: neck circumference, WCsi: waist circumference, WHR: waist-to-hip ratio, Exercise: minutes

per week reported moderate-vigorous activity, VO₂max: maximum oxygen utilization

Intent to treat analysis included all randomized participants regardless of whether they completed all study visits. For ITT analysis, data from the last completed visit was used for a missing visit. Completers included only those who continued to meet all exclusion criteria throughout the study and completed all study visits.

Repeated measures ANOVA with BMI and sex as covariates revealed a significant treatment by time effect for time spent in sedentary sitting activities on the weekend. However, only the control group showed a significant decrease in sitting activities on weekend days (1.45 ± 0.39 hours/weekend day, $p < 0.01$). Change in sitting activities on the weekend by the intervention group (0.28 ± 0.27 hours/weekend day) was not significant over time ($p > 0.05$). No significant difference was detected for weekday sitting activities over time for either treatment group ($p = 0.7$). A significant linear time by treatment interaction was seen for percent of calories from saturated fat (Figure 4) and for time spent in sedentary sitting activities on weekend days (Figure 5). This was true for ITT and completers. The linear interaction for saturated fat intake indicates that the increase in saturated fat intake by the control group ($0.3 \pm 0.30\%$ of kcal) was significantly different from the decrease in saturated fat intake by the intervention group ($0.7 \pm 0.42\%$ of kcal) $p < 0.05$. No significant effect of BMI or sex was detected for these variables. There was no significant treatment by time interactions for blood pressure, percent body fat, BMI, neck circumference, waist-to-hip ratio, exercise, maximum oxygen utilization, or for dietary intake of fruit and vegetables, sugar, energy, or fiber whether using the ITT analysis or for completers.

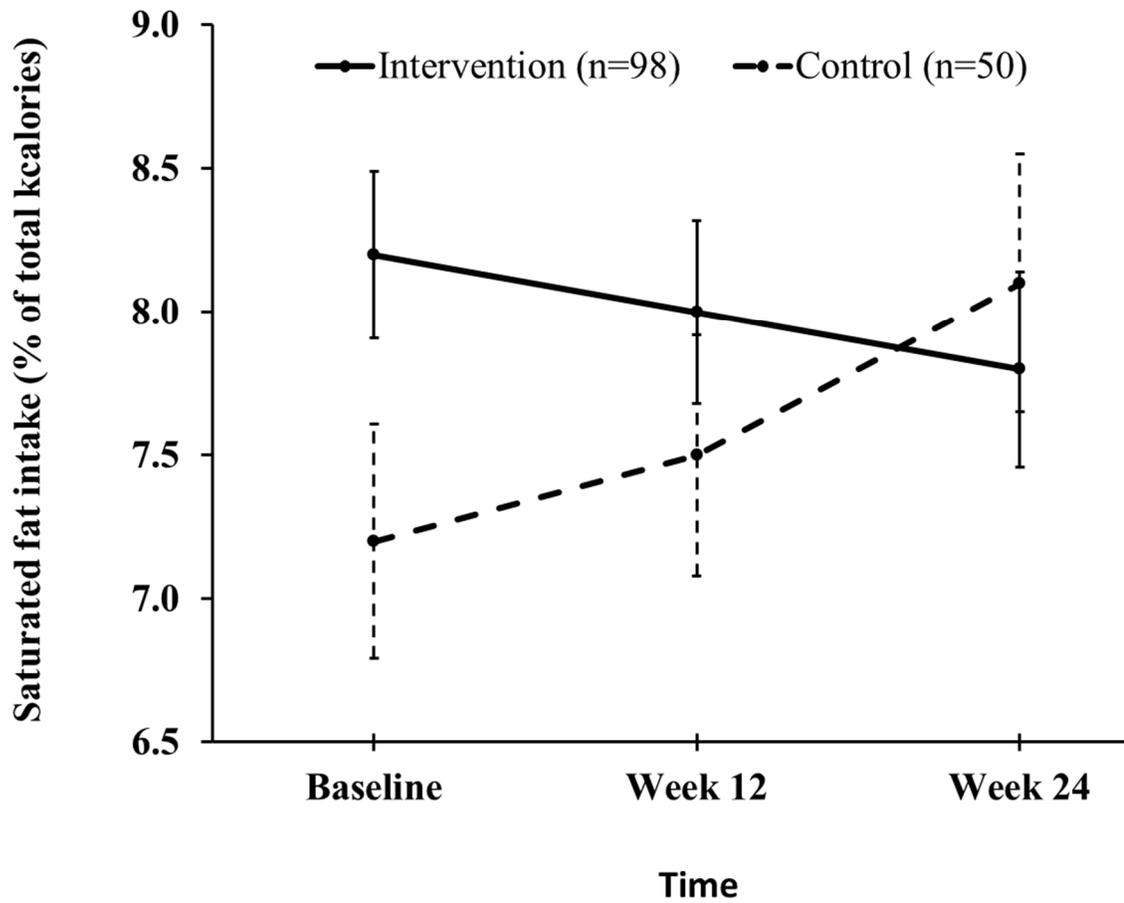


Figure 4. Saturated fat intake of college students over time by treatment. Data were analyzed by ANOVA repeated measures, adjusted for sex and BMI at baseline, presented as mean and standard error bars. No significant difference between groups at any time period. Slopes are significantly different $p < 0.05$.

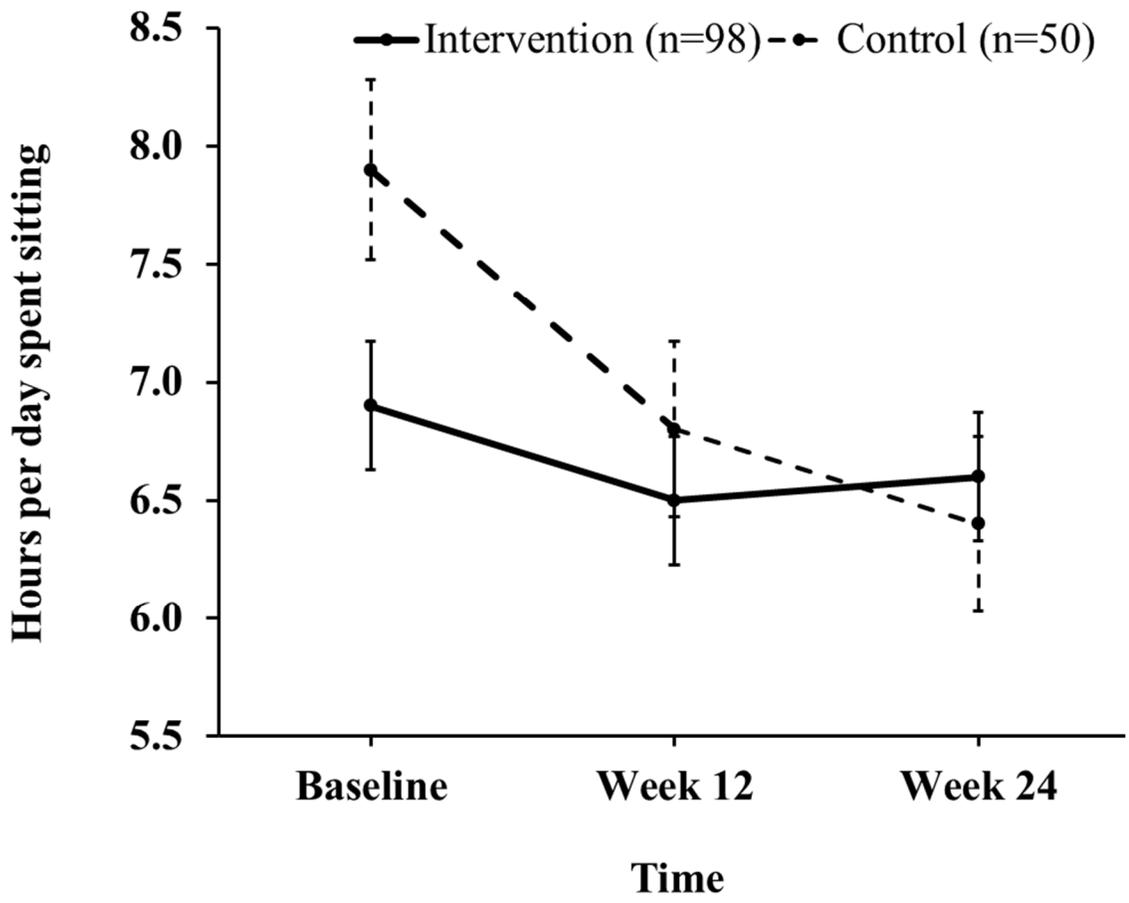


Figure 5. Hours college students spent in sedentary sitting activity on weekend days.

Data were analyzed by ANOVA repeated measures, adjusted for sex and BMI at baseline, presented as mean and standard error bars. Control group significantly different at week 12 and week 24 from baseline $p < 0.05$.

Further analysis of the change in saturated fat intake according to whether students met the saturated fat intake recommendation (<10% of kcalories) revealed a significant linear interaction of time and met/not met recommendation ($p < 0.0005$), indicating that decrease in saturated fat intake in the intervention group was largely due to those whose fat intake was higher than recommended (Figure 6). Additionally, the mean saturated fat intake for completers in the intervention group who did not meet the recommendation at baseline, was within the recommended range by study completion. Whereas the three completers in the control group who consumed saturated fat in excess of recommendations did not meet recommendations after the intervention (Figure 7).

A significant time effect was detected when combining all students regardless of treatment group for reported fiber intake, fruit and vegetable intake, kcalories/kg consumed, and minutes of weekly moderate to vigorous physical activity. Fiber intake was higher at baseline (16.8 ± 0.73 gm) than week 12 (14.1 ± 0.59 gm) and 24 (14.5 ± 0.62 gm), $p < 0.0001$ by at least 2 grams/day indicating that all students significantly decreased fiber intake from baseline despite the intervention. Students also significantly decreased fruit and vegetable intake from baseline (2.6 ± 0.16 servings) compared to week 12 (2.4 ± 0.14 servings) and week 24 (2.4 ± 0.14 servings) $p < 0.05$, although this was not a clinically important decrease. The time effect for moderate to vigorous activity was significant only for difference between baseline (831 ± 48 minutes/week) and week 12 (731 ± 48 minutes/week), $p < 0.05$. Energy intake was higher for all students at baseline (22.7 ± 0.86 kcal/kg/day) compared to week 12 (19.5 ± 0.76 kcal/kg/day) and week 24 (18.7 ± 0.68 kcal/kg/day) $p < 0.0001$.

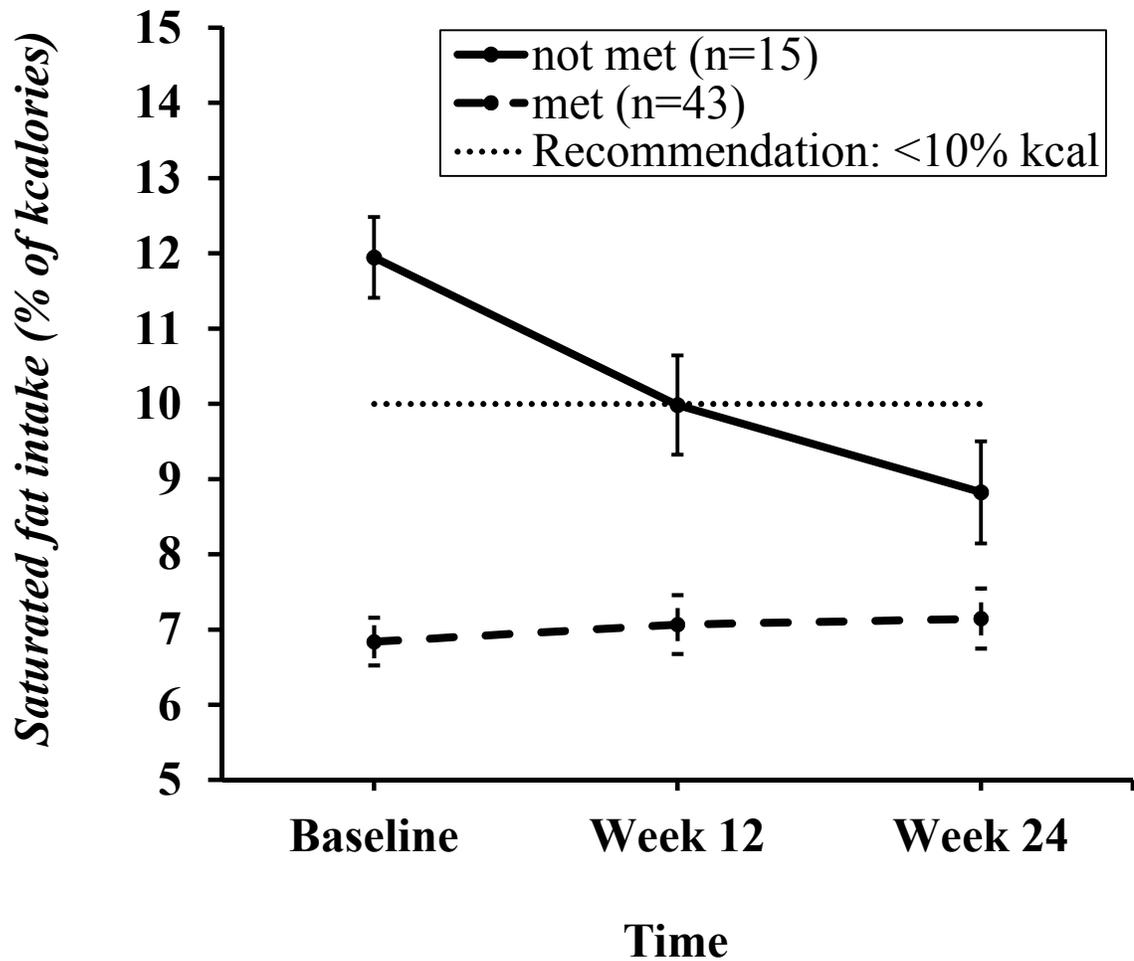


Figure 6. Change in saturated fat intake by college students in the intervention group who completed all study visits, categorized by whether recommendation was met, presented as mean and standard error bars. Slope of not met significantly different than slope of met ($p < 0.001$).

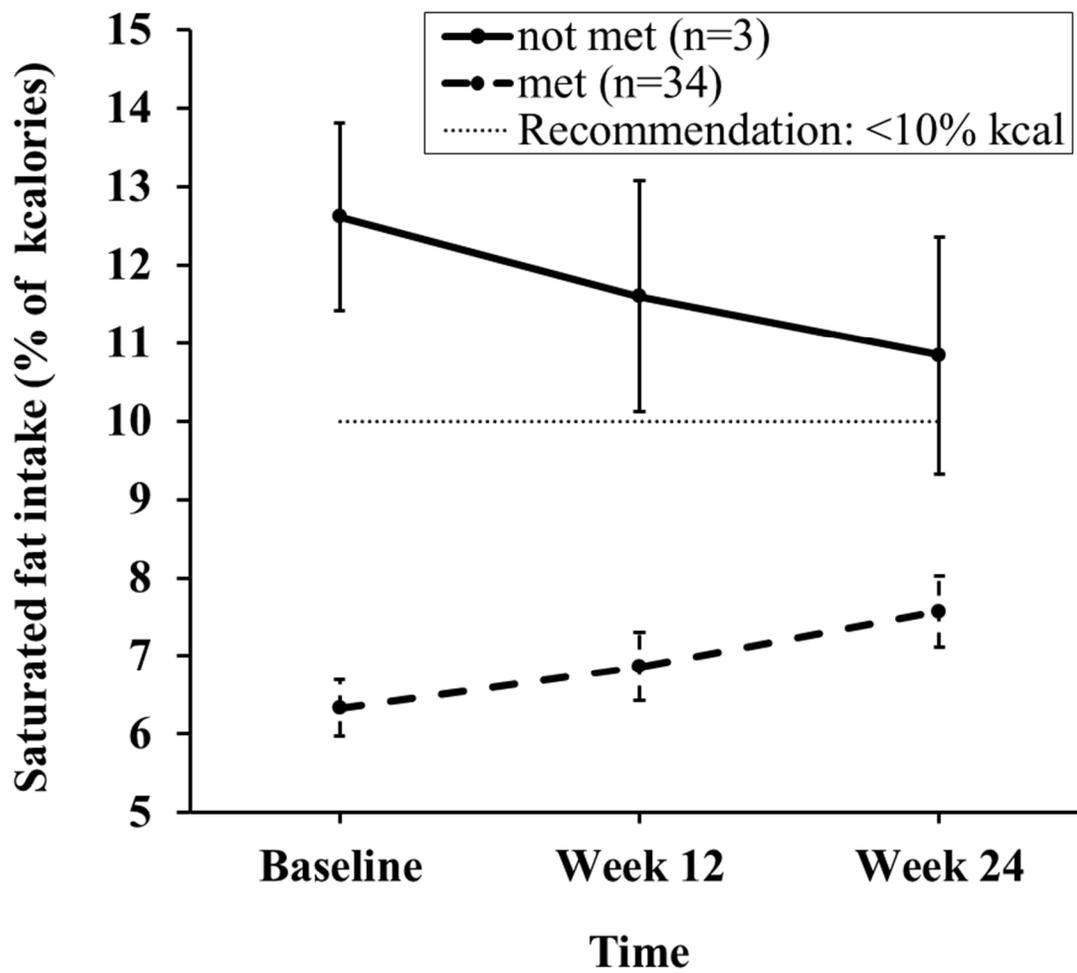


Figure 7. Change in saturated fat intake by college students in the control group who completed all study requirements, categorized by whether recommendation was met, presented as mean and standard error bars.

Chapter 5: Discussion

Participants

The current study demonstrates the feasibility of a 24-week electronic health intervention in college students as indicated by high retention rates, and a high percentage of students who interacted with the program. This program delivered the intervention and control directly to email inboxes. This more passive delivery, with no extra logins and no passwords, likely contributed to the ease of use. This may be one of the reasons for the high use and retention rates. Gift card incentives to complete study visits that required body measures and surveys may have also contributed to the high retention rate.

Our study sample is unique in that it represents a diverse sample of college-aged students. Whereas the female to male ratio is consistent with other college-aged electronic health intervention studies, the current study sample includes larger percentages of more racial and ethnic minorities than other predominantly Caucasian or predominantly Hispanic studies of electronic health interventions in the US.

The health of this sample is similar to that reported in the 2013 National College Health Assessment ⁷. The current sample did however report higher prevalence of asthma and allergy than that reported in the National Survey while the rate of current smoking was less than half that of college students around the nation. It is also interesting to note that although more than 90% of students reported exercising the required 150 minutes per week, only 60% demonstrated good physical fitness by Queen's step test. Students may have over reported moderate and vigorous physical activity. Another important finding

of this study was discovering high blood pressure in students who were unaware of this health issue. The baseline health survey indicated that 0.7% of students reported high blood pressure. When we measured their blood pressure, 18% of students had high blood pressure. This indicates the need for health screening in college students in order to detect potential health problems. The prevalence for high blood pressure in our sample is consistent with the 12-20% prevalence in US college students reported by some ^{10, 46, 136} but higher than the 5% reported by Fernandes et al., ⁴⁹ and lower than the 62% reported by Morell et al., ⁵¹.

Neck circumference can be used as a measure of obesity and cardiovascular disease risk ^{124, 125, 137}. In adults, neck circumference cut offs of >34 cm for females and >37 cm for males are indicative of body composition that is overweight or obese ¹²⁵. In the current sample neck circumference identified approximately 25% of students as obese which is comparable to that identified by BMI. This study is the first to report neck circumference in a diverse college sample. Previous reports of neck circumference in college students included only African Americans or white males. Mean neck circumference at baseline for the current sample was 32 cm for women and 37 cm for men which is slightly lower than the 34 and 39 cm reported in women and men respectively, attending a local historically black campus ¹³⁶ and slightly lower than 39 cm reported in Canadian university male athletes ¹³⁸. These three samples of college students are quite unique and therefore generalizability is limited to the profile of each study. More research is needed to identify appropriate neck circumference values in college students.

Waist circumference is often used to assess central obesity. Waist measurements are also predictive of insulin resistance¹³⁹ and cardiovascular disease^{136, 140-143}. In the current sample, mean waist circumference at baseline was 81 cm for women and 83 cm for men which is slightly higher than that reported in studies of US college students with primarily Caucasian students^{12, 49, 119, 144} but very close to that reported in a local historically black university sample¹³⁶. These differences could represent differences and similarities in methods, or race of the sample, or both. In our sample of college students, 16% had a waist circumference that was higher than recommended levels by adult standards¹³⁵ which is almost half that seen in a local historically black college¹³⁶ but more than twice the prevalence reported in a primarily Caucasian college sample⁴⁹. Additionally, Jung et al., reported 48% of Caucasian college males had excessive waist circumferences¹⁴². Prevalence data indicates that the differences in waist circumference between the current sample and previously reported samples of college students may be primarily due to sex, race and ethnic differences. Since waist circumference is associated with disease risk, standard measures and additional data are needed to assess the potential for health risk in this young adult/adolescent population.

Waist to hip ratio (WHR) is another measure of central obesity that has been associated with cardiovascular disease and metabolic syndrome^{140, 145}. In our sample 43% of students had a WHR indicative of disease risk at baseline. This is higher than that seen in a sample of active US college student (30%)⁴⁶, much higher than the 14% reported in German adolescents¹⁴⁵ and higher than the percent of students with elevated central adiposity as measured by waist circumference in the current study. Our sample is more

diverse than the German sample and therefore comparisons between these samples are not practical. In our sample, all of those with elevated WHR were female. Additionally, 25 of the 83 females with elevated WHR had waist circumference measures that were below the recommendation indicating the WHR may not be a good indicator of central adiposity in this sample.

BMI is also a measure of obesity and is associated with cardiovascular disease risk and metabolic syndrome in adolescents¹⁴². In our sample, 23% of students were overweight or obese with a BMI of ≥ 25 mg/kg². Other studies of college students have reported 13-45% of students with BMIs in the overweight and obese range^{1, 44-46, 120, 143, 144, 146}. The students in these studies were primarily ($\geq 57\%$) Caucasian. Racette et al., reported 23% of Seniors as overweight or obese but only 15% of Freshmen⁴⁵. Anderson et al., reported 21% of Freshman as overweight obese by BMI¹. Arnold et al., reported 46% of students from a historically black campus as overweight/obese by BMI¹³⁶. Although our study sample is diverse, prevalence of overweight/obesity is within the range reported by previous studies.

Body fat mass as determined by bioelectrical impedance analysis is a more specific measure of body composition than BMI. There are no standardized categories of body fat. The body fat categories used in this study are based on work by Laurson et al., which included African American youths^{130, 131}. According to this data, percent body fat $>32\%$ for females, and $>22\%$ for males is excessive. In our sample 40% of students presented at baseline with excessive body fat. Because standard recommendations for FM% have

not been established, previous studies have used a variety of recommendations and a variety of methods to measure FM%. High FM% has been reported in only 6% of a primarily Caucasian college sample ¹⁴⁴, and in 35% of an African American college sample ¹³⁶. Mean FM% by sex in our sample was 29 FM% in females and 20 FM% in males. This is similar to that reported by Arnold et al., using BIA (32 FM% females, 21 FM% males) ¹³⁶ and by Morrow et al., who used DEXA (29 FM% Caucasian females) ¹². However, Butler et al., who used skinfold measurements ², Gropper et al. ¹⁴⁴, and Hoffman et al. ¹⁰, who used BIA, all reported much lower FM% in US college students. In the current sample, prevalence of high FM% was consistent with prevalence of obesity as measured by WHR but was much higher than prevalence of obesity as measured by WC, BMI, and NC. In general, body measures of students in this sample were not inconsistent with those reported by others.

The data in Table 2 indicate that approximately 25% of students were overweight or obese and 40% had excessive body fat. A further look at the dietary and physical activity data reveal that the diet may be a more important factor than physical activity in explaining excessive weight and body fat. Almost half of the students reported exceeding the recommended sugar intake. The majority of students did not meet saturated fat, fiber, fruit, and vegetable intake whereas the majority of students reported meeting physical activity recommendations and were physically fit according to maximum oxygen utilization (VO₂max).

Sugar intake reported by the students in the current study was almost half that reported in other US college students⁵¹. This corresponds to twice as many students meeting sugar intake guidelines compared to that reported by Graham and Laska⁴³. Mean saturated fat intake reported by our students at baseline was within the guidelines of <10% of kcalories. However, 59% of our students exceeded recommendations at baseline. Previous studies of college students have reported mean saturated fat intake of 10-13% which is in excess of that recommended in the US^{51, 147}. Fiber intake in our students was low with only 10% of students consuming recommended levels. This is consistent with that reported previously^{43, 50, 51, 53, 148}. Low fiber intake is likely a reflection of the low fruit and vegetable intake. Recommendations for consuming ≥ 5 fruit and vegetables daily were not met by 88% of our students. Previous studies reported similar consumption^{2, 4, 44-46, 146}. One US campus reported that almost all of the students (95-98%) in the diverse student body consumed inadequate amounts of fruit and vegetables. The students in the current study have poor dietary habits and body composition measures. This is consistent with that reported in the literature. These measures of health indicate a need for intervention to prevent metabolic disorders^{12, 43, 49, 51, 119, 149}.

In the current study, physical fitness was assessed by Queen's step test which estimates maximum oxygen utilization (VO₂max). Categories of physical fitness as determined by VO₂max have been established by sex and age¹³³. Higher numbers for VO₂max indicate better physical fitness. In our students, mean VO₂max was 36 ml/kg/min for females and 48 ml/kg/min for males which places them in the "Good" category for physical fitness level. This is comparable to that reported by Greene et al.,¹¹⁹ but not as high as that

reported by Hager et al.¹¹⁵. Mean VO₂max for all students in our study was 41 ml/kg/min which is comparable to 39 ml/kg/min reported by Butler et al.². Using the VO₂max categories, physical fitness was at least “Good” for 63% of our students which is similar to that reported by Greene and colleagues⁴⁴. Engaging in moderate and vigorous physical activity contributes to physical fitness. The U.S. Department of Health and Human Services recommends 150 minutes per week of moderate to vigorous physical activity⁵⁷. Students in our study easily exceeded the recommendation, reporting a mean of more than 800 minutes per week of moderate to vigorous physical activity per week. Compared to other college students, this reported intake seems unrealistically high and therefore of questionable reliability. Morrow et al., reported a mean of 140 minutes/week of moderate to vigorous activity in female Caucasian freshman. In our study 74% of students reported >150 minutes/week of moderate to vigorous activity. Racette et al., reported 70% of mostly Caucasian students engaged in regular exercise⁴. Kasparek et al., reported that 50% of primarily Caucasian female students from a US university engaged in 150 minutes of moderate to vigorous physical activity per week³. Some of the students in the current study reported excessive and unrealistic minutes of exercise per week. Therefore, asking a student whether they met the 150 minutes/week recommendation may be a more reliable indicator of physical activity than actual reported minutes.

Intervention

The ALIVE © intervention was only significantly better compared to control at decreasing saturated fat intake over time. This is due to both the increase in saturated fat intake by the control group, and a decrease in the intervention group. That saturated fat was the

only significant dietary change may be partly related to what is available on campus. It may be more feasible for college students who rely heavily on campus dining for meals and snacks to decrease saturated fat than to increase fruit and vegetables or whole grains.

At baseline the control group spent significantly more time sitting on weekends than the intervention group. This could account for the significant decrease over time seen in control group compared to the intervention group. In this case the change may be more related to the baseline measure than the treatment group. Additionally, this measure was part of the Paffenberger physical activity questionnaire. The Paffenberger includes five activities for both weekdays and weekend days: vigorous, moderate, light, sitting, and sleeping/reclining. No significant treatment by time differences was detected in any of the other activities; therefore the relevance of the sitting on weekend finding is questionable.

Although the lack of increase in BMI, WC, NC, WHR, body fat, blood pressure, sugar intake, and lack of decrease in physical fitness indicated that student health habits had not worsened, there was no difference between control and intervention. This indicates that the intervention was not significantly different than control in attenuating poor health habits and outcomes. That the intervention group was not more successful in improving health habits may arise from the bias of repeated diet and physical activity surveys and body measurements. Additionally, the control group received feedback at baseline regarding diet and activity surveys. According to previous studies, college students who are measured but receive no feedback, education, or intervention, show an increase in

BMI, FM%, waist circumference, dietary fat intake and decrease vegetable and fruit intake over time^{2, 3, 12}. In the present study control participants were also encouraged to select a goal at baseline after being presented with feedback. Students who are interested in participating in a health study may be more interested in improving their health and thus when presented with feedback may actually proceed to work towards improving their health even without the support of the intervention program.

Improved health habits and health outcomes may be better documented in students with poor measures. Although this study was designed to prevent obesity, perhaps including only subjects who do not meet recommendations for diet and exercise would best show changes due to the intervention. A further look at saturated fat intake supports this idea. We found that those in the intervention group who had higher than recommended saturated fat intake decreased their intake over time significantly more than those who had optimal intake. Future studies should focus on students at risk for metabolic disorders.

Significant decreases in fiber, fruit and vegetable intake and exercise over time for all students combined may represent the typical pattern of college students. In the current study the students were able to switch tracks at any time. This could have minimized any potential benefit if students did not complete the full 12 weeks of coaching before switching to another track. Because the program was sent by email, website logins could not be monitored. The decline in exercise seen only at week 12 may represent such declines seen during final exams. Most of the week 12 visits were shortly before or during fall term finals week.

Summary

The current study shows that the ALIVE © program is both feasible, as demonstrated by high participation and high retention rate, as well as efficacious in decreasing saturated fat intake in this diverse college population. Furthermore, just providing feedback after measuring and surveying students may be enough to prevent weight gain, as well as prevent increases in total body fat, and central adiposity. The ALIVE © program should be modified to avoid sharing survey results with the control group and to include more social networking perhaps by including more social media. Those college students who may best benefit from an electronic intervention may be those who are not following current health guidelines or whose body composition suggests that they are at risk for metabolic dysfunction.

Strengths and Limitations

This study is a randomized control study in a diverse student population. This study design is the gold standard of research design. Including a diverse sample increases the generalizability of the results. We used standardized objective measures of body composition and fitness using calibrated equipment and trained staff to eliminate data collection bias. The length of the study closely reflects the length of the college school year. Included in this time is the early part of the school year when students are adjusting to college campus life, as well as fall exams, winter break and spring break. These college calendar issues can all interfere with or cause changes in diet and exercise

patterns. By including them in our treatment time, we have increased the generalizability of the program.

Major limitations include self-selection bias of the convenience sample. This may have resulted in a sample of students who were interested in health and therefore more motivated to participate and improve health habits and therefore limits the generalizability to all college students. In fact, those that dropped did show significantly higher measures of obesity, such as BMI, WC, NC, and WHR. The other major limitation is exposure to the feedback and goal selection by the control group. This can be corrected in a future study by including a waitlist control or manipulating the initial survey to end before providing feedback and goal choice. Using objective measures of physical activity, fruit and vegetable intake would remove biases due to self-report. With optimal funds, technology could be employed to measure skin carotenoids with Raman spectroscopy to evaluate fruit and vegetable intake.

Appendices

Appendix A: UMCP Recruitment Flyer



COLLEGE OF AGRICULTURE AND NATURAL RESOURCES
DEPARTMENT OF NUTRITION AND FOOD SCIENCE

David Lei, PhD
0121 Skinner Bldg.
University of Maryland
College Park, MD 20742
(301) 405-2143

UMCP Protocol 12-0052

**Do you want to improve your health habits?
Help us find out how college students use interactive communications and e-learning
to improve health behavior.**

**University of Maryland College Park Department of Nutrition and Food Science is
recruiting volunteers between 18-20 years old to participate in a research study that
uses a weekly e-mail program developed to improve lifestyle risk factors for chronic
disease.**

No drugs will be tested. No blood will be drawn.

**Participants will receive personal study results on their food choices, physical
activity levels, body composition, and blood pressure.**

Want to learn more?

Email: ehealthstudy@umd.edu

or Call: 301-405-8773

Receive compensation (\$25 each visit)

Enter a raffle to win \$250 after completion of the study

Appendix B: Recruitment email

Dear < Student>,

Thank you for your interest in the ehealth study. It is a 24 week study and requires 5 visits to Skinner Building. Two of the visits will be short visits. There will also be a monthly text message. If you would like to hear more about the study, send me your phone number so I can ask you the qualifying questions and answer any questions you may have.

Thanks,

<Name of study staff>

Appendix C: Phone Screen

a. “Hello, my name is <your name>. I am calling regarding your interest in the Email Study that University of Maryland Department of Nutrition and Food Science is conducting. Let me tell you a little bit about the study. This is a research study that will assess how students interact with an Email program designed to improve health behavior. Participants in the study will be randomized to receive one of two different types of Emails once a week for 24 weeks. We will also send you 1 brief text message each month. We will measure you 3 times, once at the beginning of the semester, once at the end of the semester and once in the following semester. Measurements include height, weight, blood pressure, heart rate, and body composition. We will also ask you to participate in a 3-minute step test and fill out some questionnaires about your health and health behaviors.”

“In order to participate, I need to ask you a few questions that will take just a minute or so to answer. Do you have a couple of minutes that I can ask these questions now?”

If NO, schedule a better time to call.

If YES, complete information below.

PROTECTED HEALTH INFORMATION

Participant Name _____ PS# (XXX) _____

Sex M F

Phone (____) _____ - _____ E-mail _____

Phone Screening Questionnaire

Interviewer _____ Date ____/____/____

1. Are you enrolled in college this semester?

- Yes. If yes, “What school do you attend?”
 No

2. Do you have access to Email at least once per week?

- Yes
 No

3. Do you have a phone that permits you to text message?

- Yes
 No

4. Are you between 18 and 20 years of age?

- Yes

- No. If no, “Are you turning 18 in the next 6 weeks?” If yes,
- “When will you turn 18?”—Month____; Day_____.

5. Are you currently participating in another research study that may affect behaviors associated with your health?

- Yes
- No

If yes, what?

6. Are you currently following a plan or treatment for weight loss?

- Yes
- No

7. Have you had bariatric surgery?

- Yes
- No

8. Have you ever been diagnosed with an eating disorder?

- Yes
- No

For females only

9. Are you pregnant or do you think you may be pregnant?

- Yes
- No

10. Are you nursing or lactating?

- Yes
- No

If ANY questions are “Yes” or the individual declines to complete one or more questions: Check box for ineligible.

- Ineligible. “Thank you for your interest in the study, but unfortunately you do not qualify for this study.”

- Eligibility pending. Turning 18 in the next 6 weeks. “Thank you for your interest in the study, but unfortunately you do not qualify for this study at this time. I will contact you after: Month____; Day_____.”

If NO FLAGS for exclusion: “You seem to be a good candidate for this study. Let me tell you more about it.”

“As I mentioned, participants in the study will be measured 3 times at the University of Maryland campus. We will also meet with you 3 days before the first and last visits to

give you instructions on wearing an accelerometer, which is about the size of a watch, and you will wear this for 3 days.”

“The first time we meet, we go over informed consent documents. I will E-mail you these forms so you can review them before the visit. You also have the option of being consented by phone.”

“Three days later, you will come in for the first measures. You will not be able to eat or drink anything (except for water) for 4 hours prior to the visit. We will repeat these measures at the end of the semester, and again 12 weeks after that, when we will ask you to wear the accelerometer a second time. Before you leave on the day of the first measures, you will be randomized to receive one of two Email health interventions for 24 weeks. If, at the end of the 24 weeks you would also like to complete the other health intervention program, you can opt to do the other one after all assessments are completed.”

“You will receive compensation of \$25 on the 3 days you come in for measurements, and a chance to win a \$250 at the completion of this study.”

Let’s schedule a 1-hour block for Visit 1. (Enter visit information in the box below.)

Best way(s) to be reached • Phone • E-mail • Text message

General availability

Mon Tue Wed Thu Fri Sat Sun

Inform the candidate

I will send you an e-mail with your appointment information and the consent document to look over.

Do you have any questions?

I look forward to seeing you at < Visit 1 appointment time and date>. End of call

Appendix D: Consent Form

Project Title	Electronic Health Interventions to Improve Health Behaviors in College Students
Purpose of the Study	<p>This research is being conducted by David Lei, PhD at the University of Maryland, College Park. We are inviting you to participate in this research project because you are between the ages of 18-20 years, and you meet the inclusion and exclusion criteria discussed below.</p> <p>Eligibility criteria: Participants will be included in the study if: (1) they are enrolled in college for the semester the study is conducted; (2) are between the ages of 18-20 years; (3) have regular (at least once per week) access to email; and (4) have a phone that enables text messaging.</p> <p>Exclusion criteria: Participants will be excluded from participating in this study if they indicated any of the following: (1) pregnancy or lactation; (2) an eating disorder; (3) currently in treatment for weight loss; (4) bariatric surgery for weight loss; or (5) currently participating in a clinical trial that may affect behaviors associated with their health.</p> <p>The purpose of this research project is to see how University of Maryland college students make use of a twenty-four week email-based health promotion program. We are interested in seeing if this program helps students make healthy behavior choices and if they find it useful to receive this information by email.</p>
Procedures	<p>The procedures involve five face-to-face visits (Visits 1-5). Each visit will take approximately 1-2 hours. These visits will be at the University of Maryland College Park campus. You will have the first two visits around the beginning of the college semester, one visit near the end of the semester, and two more visits 12 weeks after the end of the semester.</p> <p>During the entire duration of the study, which is 24 weeks, you will receive weekly emails and reminders with health information. You will also receive text messages, one weekly and one monthly with a brief survey. After week 24 you will have the option to continue with the program for up to week 72; again, your participation is voluntary and you can stop at any point.</p> <p>Visit 1: Three days prior to Baseline After you have read and signed this consent and agreed to</p>

participate, a study team member will instruct you on wearing a watch-sized accelerometer on your waist and/or your ankle. This is a device to detect/measure movement during your everyday activities. We will not ask you to make any changes in your daily routine, just to keep a record of your activities for three days. After three days, we will meet again to collect the accelerometers (visit 2).

Visit 2: Baseline

After a 4 hour fast, (and 12-h without ingesting alcohol) we will take measures of your body designed to assess your body composition. Water is encouraged for up to an hour before the visit. Accelerometers will be returned at this visit. Female participants will be asked to provide a urine sample for a pregnancy test. Those who are pregnant will be excluded from the study.

Questionnaires: During this visit you will also be asked to complete a set of questionnaires that will ask you about yourself, your medical history and immediate family medical history, your level of physical activity and your ability to undergo strenuous exercise, and a variety of health behaviors and attitudes.

Physical Measures: Your blood pressure will be measured twice and your height, weight, and circumferences of neck, waist (2 sites), and hip will be taken three times. Height and weight will be used to calculate BMI (body mass index). Your body composition will be measured using the Bioelectrical Impedance Assessment (BIA). This test is painless and estimates percent body fatness by how fast a small (imperceptible) electric charge travels from your wrist to your ankle using electrodes similar to an electrocardiogram. We will give you a snack during this visit.

Queen's Step Test: This is a simple 3-minute fitness test designed to estimate your body's capacity to use oxygen efficiently. During this test you will be asked to step onto and off a stair step designed for this test.

Randomization: After you complete the study measures in this visit you will be randomized to one of two weekly email health promotion programs. Randomization is like drawing straws, one out of every two enrolled will take part in each program. You will have the opportunity to

	<p>participate in the other program once you finish the 24-week study. Only the study staff administering the email programs will know which program you are receiving. Please do not tell the researchers who are measuring you about the email program you are receiving or discuss it where they may overhear you. You will be given contact information for other research staff in charge of the email program to discuss any problems you may encounter or questions you have specific to the transmission of the study emails.</p> <p>Visit 3: Week 12 The same measures and surveys similar to those collected at baseline are repeated after a 4 hour fast (and 12-h without ingesting alcohol). We will give you a snack during this visit.</p> <p>Visit 4: Three days prior to Visit 5 Accelerometer instruction and placement: A study team member will place an Accelerometer on your waist and/or your ankle, repeating the site of the previous time for consistency. You will receive the instructions on how to wear it and how to keep an activity record for three days. After three days, we will meet again to collect the monitor and the record. (visit 5).</p> <p>Visit 5: Week 24 After a 4 hour fast (and 12-h without ingesting alcohol), all measures conducted at baseline will be repeated along with similar surveys. We will give you a snack during this visit. In addition, you will be informed of your study measures.</p> <p>Long-term Follow Up: Week 24 to Week 72 After the 24-wk visit, you will have the option of continuing with the email program.</p>
<p>Potential Risks and Discomforts</p>	<p>There may be some risks from participating in this research study. Females may experience the identification of unknown health concerns if the pregnancy test results are positive. You will be referred to the University Health Center for care.</p> <p>There are minimal risks involved with assessment of body composition. Participants may feel uncomfortable having their bodies measured and can elect not to participate in this portion of the assessment if they experience discomfort. If a</p>

	<p>member of the research team conducting the assessment is of the opposite sex from the participant, there will be two researchers present to minimize risk of discomfort. There are also no known risks to the general population for the use of the BIA. However, it is contraindicated for those with seizure disorders, arrhythmias, or a pacemaker or who are pregnant. Therefore, a screening will be conducted prior to the BIA assessment and anyone who meets any of these criteria will not be assessed using the BIA.</p> <p>The Queen’s Step Test is a standardized 3-minute procedure of very low risk in a college-age population. The risk of developing a cardiac event or sudden cardiac death in the Queen’s Step Test is 1 death per 133,000 men and 769,000 women tested respectively (¹⁵⁰). The Physical Activity Readiness Questionnaire (PAR-Q) will be used to screen for cardiac event risk. If the PAR-Q indicates cardiac risk, participants will be excluded from the study and will be referred to the University Health Center. The Queen’s Step test at the University of Maryland will be supervised by study personnel trained and certified by the American Red Cross in Basic Life Support</p> <p>Finally, making any changes to your behaviors may affect your health. We recommend that, if you have any pre-existing health conditions, you check with your doctor to ensure that any changes to your behaviors you might make during this study are approved by a physician. We ask that you stop participating in the study if:</p> <ul style="list-style-type: none"> • There are any unexpected side effects • Your doctor thinks it is best for you • You become pregnant.
Potential Benefits	The benefits to you include you will learn about healthy lifestyle recommendations and at the end of the final visit, you will be informed of study measures and blood pressure.
Confidentiality	<p>Any potential loss of confidentiality will be minimized by storing data in a locked cabinet in a locked office and in a password protected computer.</p> <p>If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in</p>

	<p>danger or if we are required to do so by law.</p>
Medical Treatment	<p>The University of Maryland does not provide any medical, hospitalization or other insurance for participants in this research study, nor will the University of Maryland provide any medical treatment or compensation for any injury sustained as a result of participation in this research study, except as required by law.</p>
Right to Withdraw and Questions	<p>Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.</p> <p>If you decide to stop taking part in the study, if you have questions, concerns, or complaints, or if you need to report an injury related to the research, please contact the investigator, David Lei, PhD at: 0121 Skinner Bldg. University of Maryland, College Park, MD 20742 301-405-2143 dlei@mail.umd.edu, or Co-Investigator Amy Schweitzer 3107B Skinner Bldg., University of Maryland, College Park, MD 20742 301-405-8773, aluking@verizon.net.</p>
Participant Rights	<p>If you have questions about your rights as a research participant or wish to report a research-related injury, please contact:</p> <p>University of Maryland College Park Institutional Review Board Office 1204 Marie Mount College Park, Maryland, 20742 E-mail: irb@umd.edu Telephone: 301-405-0678</p> <p>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</p>

Statement of Consent	<p>Your signature indicates that you are at least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction and you voluntarily agree to participate in this research study. You will receive a copy of this signed consent form.</p> <p>If you agree to participate, please sign your name below.</p>	
Signature and Date	PARTICIPANT NAME [Please Print]	
	PARTICIPANT SIGNATURE	
	DATE	

Appendix E: Email Visit 1

Hello <participant name>,

Thank you for your time and interest in the email study. Attached is the consent document that we will go over during your first visit. Please read through the document, write down any questions you may have, and bring them to the first visit. I will be happy to answer any questions you have when I review the consent document with you during your appointment.

Your Visit 1 appointment is scheduled for <day> <date> from <start time> to <end time>.

I will send you a reminder e-mail and call to remind you before your appointment.

If you have any questions or concerns, please feel free to contact me by e-mail or by phone at 301-405-8773.

We look forward to seeing you.

Appendix F:
Email Visit 2

Hello <participant name>,

Thanks for coming in to complete Visit 1.

Your Visit 2 appointment is scheduled for <day> <date> from <start time> to <end time>. You receive a reminder e-mail or call before your appointment.

Things to remember for Visit 2:

- We will be measuring your body composition, so you won't be able to drink or eat for 4-5 hours (water is ok) , and do not drink alcohol for 12 hours before your appointment.
- Also, no water or strenuous exercise for 1 hour before your appointment.
- Some measurements will be done with only your underclothes on, so please wear underclothes you will be comfortable being measured in.
- You may need to bring a state ID (e.g., driver's license) to receive compensation.

If you have any questions or concerns, please feel free to contact us at any time by e-mail or by phone at 301-405-8773

Have a great day!

Thanks!

<Name of Study Staff>

Email Visit 3 & 5 Reminder

Hello <participant name>,

Thanks for continuing to participate in the email study.

Your Visit <3 or 5> appointment is scheduled for <day> <date> from <start time> to <end time>. You will receive a call, text or e-mail you to remind you before your appointment.

Things to remember for Visit <3 or 4>:

- We will be measuring your body composition, so you won't be able to drink or eat for 4-5 hours (water is ok) fast for 4-5 hours, and not to drink alcohol for 12 hours before your appointment.
- Also, no water or strenuous exercise for 1 hour before your appointment.
- Some measurements will be done with only your underclothes on, so please wear underclothes you will be comfortable being measured in.
- You may need to bring a state ID (e.g., driver's license) to receive compensation.

If you have any questions or concerns, please feel free to contact us at any time by email or by phone at 301-405-8773

Have a great day!

Thanks!

<Name of Study Staff>

Email Visit 4

Hello <participant name>,

Thanks for continuing to participate in the email study.

Your Visit 4 appointment is scheduled for <day> <date> from <start time> to <end time>. You will receive a call, text or e-mail you to remind you before your appointment. At this appointment you will be asked to wear the accelerometers for 3 days and you will complete surveys.

Thanks for coming in,

Appendix H: Demographics Questionnaire

Please select or describe the appropriate answer to each question.

Please select your marital status

a. Married/cohabitating b. Single c. Divorced/widowed

How many children have you had? _____

How many children have you adopted? _____

If female, are you currently pregnant? YES NO

If female, are you currently nursing? YES NO

Where were you born? (include country/state/town)

Country

State

Town

Have you participated in any research studies before? YES NO I don't know

Highest Education Level (circle one, and specify degree where applicable):

a. Grade School (K-8) b. High School (9-12)/GED c. Undergraduate coursework

d. Undergraduate degree _____ e. Graduate/Professional

Current grade/education level (if in school)

_____.

Do you smoke cigarettes? YES NO

If yes, approximately how many _____ packs/day for _____ years?

Appendix I: Health History Questionnaire

Ethnicity _____

Race: please specify _____)

What country(ies) did your parents originate from? _____

1. Have you ever been diagnosed with any of the following? Please check .

Diabetes	High Blood Pressure	Pre-diabetes (high blood sugar)
Asthma	High Cholesterol	Other respiratory conditions
Heart Murmur	Anemia	Other medical conditions (eg. Thyroid disease, genetic disorders, ect.)
Kidney Disease	Bleeding disorder	
Liver Disease	Cancer	
Heart Disease		
Gastrointestinal conditions:		

2. Are you taking any medications? No Yes:

Name: _____ Frequency (how often take):

Dose (how much take): _____ Duration (how long been taking):

3. Are you taking any vitamins or dietary supplements? No Yes:

Name: _____ Frequency (how often take):

Dose (how much take): _____ Duration (how long been taking):

Purpose (why take): _____

4. Are you following any special diet for medical purposes? No Yes:

5. Any orthopedic/muscular/joint/medical conditions (eg. chest pain, dizziness, episodes of fainting, shortness of breath that would interfere with exercise training) No Yes:

6. Any family history of the following? Please check \checkmark .

Diabetes	High Cholesterol	Stroke	Obesity
Heart Disease	High Blood Pressure/Hypertension		

7. For females only, what is the age of the first menstrual cycle? _____

8. What is your height and weight? _____

Appendix J: Physical Activity Readiness Questionnaire (PAR-Q)

For most people physical activity should not pose any problem or hazard. PAR-Q has been designed to identify the small number of adults for whom physical activity might be inappropriate or those who should have medical advice concerning the type of activity most suitable for them.

Common sense is your best guide in answering these few questions. Please read them carefully and check the yes or no opposite the question if it applies to you.

- | | YES | NO | |
|----|--------------------------|--------------------------|---|
| 1. | <input type="checkbox"/> | <input type="checkbox"/> | Has your doctor ever said you have heart trouble? |
| 2. | <input type="checkbox"/> | <input type="checkbox"/> | Do you frequently have pains in your heart and chest? |
| 3. | <input type="checkbox"/> | <input type="checkbox"/> | Do you often feel faint or have spells of severe dizziness? |
| 4. | <input type="checkbox"/> | <input type="checkbox"/> | Has a doctor ever said your blood pressure was too high? |
| 5. | <input type="checkbox"/> | <input type="checkbox"/> | Has your doctor ever told you that you have a bone or joint problem such as arthritis that has been aggravated by exercise, or might be made worse with exercise? |
| 6. | <input type="checkbox"/> | <input type="checkbox"/> | Is there a good physical reason not mentioned here why you should not follow an activity program even if you wanted to? |
| 7. | <input type="checkbox"/> | <input type="checkbox"/> | Are you over age 65 and not accustomed to vigorous exercise? |

If you answered YES to one or more questions...

If you have not recently done so, consult with your personal physician by telephone or in person before increasing your physical activity and/or taking a fitness test.

If you answered NO to all questions...

If you answered PAR-Q accurately, you have reasonable assurance of your present suitability for an exercise test.

Appendix K: Partial Paffenburger

On a usual weekday and a weekend day, how much time do you spend on the following activities? (Total for each day should add to 24 hrs)

	Usual Weekday (hours/day)	Usual Weekend Day (hours/day)
Vigorous Activity: (digging in the garden, strenuous sports, jogging, aerobic dancing, sustained swimming, brisk walk, heavy carpentry, bicycling on hills, etc)		
Moderate Activity: (housework, light sports, regular walking, golf, yard work, lawn mowing, painting, repairing, light carpentry, ballroom dancing, bicycling on level ground, etc)		
Light Activity: (office work, driving car, strolling, personal care, standing with little motion, etc)		
Sitting Activity: (eating, reading, desk work, watching TV, listening to radio, etc)		
Sleeping or Reclining		
TOTAL	24	24

Appendix L: Control Material Topics and Source URLs

Week	Topic	Source	Date accessed
1	Sun	http://www.healthmatters.idaho.gov/pdf/AAD_Protect_Yourself_Tips.pdf	4/20/2011
2	Sleep	http://www.nps.org.au/publications/consumer/medicines-talk/2010/medicines-talk-no-34-winter-2010/sleep-right-sleep-tight	6/13/11
3	Stress	http://www.mentalhealthamerica.net/mental-health-information	6/9/2011
4	anxiety	http://www.communityreachcenter.org/index.php?s=18957&item=15953	6/9/2011
5	Food safety	http://www.befoodsafe.org/sites/befoodsafe.org/files/BFS_BROCHURE_Color.pdf	4/26/2011
6	Binge drinking	http://www.cdc.gov/alcohol/fact-sheets/binge-drinking.htm	6/13/2011
7	Sport/Exercise safety	http://kidshealth.org/teen/safety/safebasics/sport_safety.html	6/13/2011
8	Caffeine	http://kidshealth.org/teen/drug_alcohol/drugs/caffeine.html	6/13/2011
9	flu	http://www.cdc.gov/flu/pdf/freeresources/general/take3.pdf	4/20/2011
10	preventing infection	http://www.oakgov.com/health/Documents/Facts%20Sheets/fs_cleaning-disinfecting-flu20(3).pdf	6/9/2011
11	mental illness	http://www.nami.org/Content/NavigationMenu/Find_Support/NAMI_on_Campus1/Mental_Illness_Fact_Sheets/MentalIllnessonCampus.pdf	6/9/2011
12	Sexual Health	http://www.youngmenshealthsite.org/collegehealth09.html	6/13/2011
13	HIV	http://www.cdc.gov/std/hiv/stds-and-hiv-fact-sheet-press.pdf	4/20/2011
14	distracted driving	http://www.cdc.gov/motorvehiclesafety/distracted_driving/	6/13/2011
15	dietary supplements	http://www.acefitness.org/acefit/fitness-fact-article/2664/test-your-supplement-savvy/	6/8/2011
16	Viral illness	http://www.cdc.gov/getsmart/campaign-materials/print-materials/virusBacteriaChart.html	6/13/2011
17	Smoking cessation	Children's National Medical Center	5/19/2011
18	mens health	https://www.opm.gov/healthcare-insurance/special-initiatives/managing-my-own-health/healthymen.pdf	6/13/2011
	womens health	http://www.ahrq.gov/patients-consumers/prevention/lifestyle/healthy-women.pdf	6/13/2011

19	depression	http://www.mhawisconsin.org/Data/Sites/1/media/fact-sheets/depression in college[1].pdf	6/13/2011
20	suicide prevention	http://www.nimh.nih.gov/health/publications/suicide-a-major-preventable-mental-health-problem-fact-sheet/teen-suicide.pdf	6/13/2011
21	high blood pressure	http://www.cdc.gov/dhdsp/data_statistics/fact_sheets/docs/fs_bloodpressure.pdf	6/13/2011
22	anger management	http://www.docstoc.com/docs/84117134/Anger-Management-Fact-Sheet	6/13/2011
23	pedestrian safety	http://www.mwcog.org/pedestrian_safety/othercontent/Pedestrian_Safety_Fact_Sheet.pdf	6/13/2011
24	noise-induced hearing loss	http://familydoctor.org/familydoctor/en/prevention-wellness/staying-healthy/occupational-health/hearing-noise-induced-hearing-loss.html	6/13/2011

Be Sun SmartSM: Protect Yourself from the Sun

Sun exposure is the most preventable risk factor for all skin cancers, including melanoma. You can have fun in the sun and decrease your risk of skin cancer. Here's how to **Be Sun SmartSM**:

- **Generously apply a water-resistant sunscreen** with a Sun Protection Factor (SPF) of at least 15 that provides broad-spectrum protection from both ultraviolet A (UVA) and ultraviolet B (UVB) rays to all exposed skin. Re-apply every two hours, even on cloudy days, and after swimming or sweating. Look for the AAD SEAL OF RECOGNITIONTM on products that meet these criteria.
- **Wear protective clothing**, such as a long-sleeved shirt, pants, a wide-brimmed hat and sunglasses, where possible.
- **Seek shade** when appropriate, remembering that the sun's rays are strongest between 10 a.m. and 4 p.m. If your shadow is shorter than you are, seek shade.
- **Protect children** from sun exposure by playing in the shade, using protective clothing and applying sunscreen.
- **Use extra caution near water, snow and sand** as they reflect the damaging rays of the sun, which can increase your chance of sunburn.
- **Get vitamin D safely** through a healthy diet that may include vitamin supplements. Don't seek the sun.
- **Avoid tanning beds.** Ultraviolet light from the sun and tanning beds can cause skin cancer and wrinkling. If you want to look like you've been in the sun, consider using a sunless self-tanning product, but continue to use sunscreen with it.
- **Check your birthday suit on your birthday.** If you notice anything changing, growing or bleeding on your skin, see a dermatologist. Skin cancer is very treatable when caught early.

SKIN CANCER

**Treatable
Beatable**

with early detection



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Sleep right Sleep tight

Natural sleep before medicines

Sleep patterns often change as we get older. Sleep may be lighter and you may wake up more often.

But it's the *quality* of your sleep, not just the quantity that is important. Some people who sleep for a short time (4 to 5 hours) may not complain of sleep problems, while others who sleep for a long time (9 hours or more) may still feel tired if they haven't slept well.

Sleeping problems are common. Insomnia is the medical term for having trouble getting to sleep, staying asleep or having sleep that doesn't leave you feeling rested. If you have trouble falling or staying asleep three times or more per week, talk to your doctor.

Effects of sleep problems

Being tired can make basic activities more difficult and affect the way you think and feel. You may become more anxious, irritable and get angry more easily. Poor sleep can also lead to depression and an increased risk of falls.

Causes of sleep problems

There are many causes of sleep problems and stress is a common factor. If you think stress may be affecting your sleep discuss your concerns with your doctor, family or friends and try relaxation techniques. Other things that can affect your sleep are substances that keep your body active (e.g. food or drinks that contain caffeine or alcohol), your lifestyle (e.g. exercising or eating too close to bedtime), and some medical conditions or medicines.

Managing sleep problems

If you are having trouble sleeping, keep a sleep diary for 1–2 weeks. Use it to record your sleep and waking patterns, and then discuss this with your doctor.

Your doctor may also suggest other ways to manage your sleep problems. Cognitive therapy can help change the way you think about sleep. Stimulus control involves only going to bed when you're sleepy, and sleep restriction focuses on limiting the time you spend in bed to the actual amount of time you sleep. Learning relaxation techniques may help you unwind before going to bed. Some people may also be referred to another health professional (e.g. psychologist) or sleep disorders clinic.

How well do you sleep?

www.nps.org.au/sleep

Tips to get a good night's sleep

- Wake up at the same time each day, even after a poor night's sleep.
- Be as active as possible during the day and spend time outdoors.
- Reduce the amount of caffeine you have each day. Avoid caffeine-containing drinks after lunchtime (e.g. cola, tea, coffee, cocoa, energy drinks).
- Avoid naps during the day. If you do nap, keep it to 20 minutes and before 3 pm.
- Avoid smoking and drinking alcohol in the evening.
- Avoid heavy meals, exercise or working on the computer late in the evening.
- Relax for 30 minutes before going to bed. Try a warm bath.
- Don't eat, work, watch television, read or discuss problems in bed.
- Ensure you're comfortable and that your bed is in a quiet, dark environment.
- If you're too hot or cold in bed it will be harder to sleep — try and keep cool or warm.
- Don't stay in bed if you are awake for more than 20 minutes, go to another room and do something relaxing.

Good sleep habits may take some time to develop. Keep practising these tips to get the most from your sleep.

Sleeping pills

Sleeping pills, like **all medicines, have risks and benefits**. Medicines may help you fall asleep but you won't sleep as deeply.

Medicines — including herbs and other natural remedies — should only be used for a short time. If you use medicines for a long time your sleep problems may become worse or you may become dependent on pills to sleep. Long-term use can also increase the risk of accidents and falls.

The sleep cycle

Stage 5 is a period of 'deep sleep'. If you don't reach this stage, or stay in it for long enough, you won't feel rested in the morning.

Sleep dos and don'ts

Do: Always talk to your doctor or pharmacist before starting any new medicine, including vitamins, herbs and other remedies. Some medicines can actually cause sleep problems.

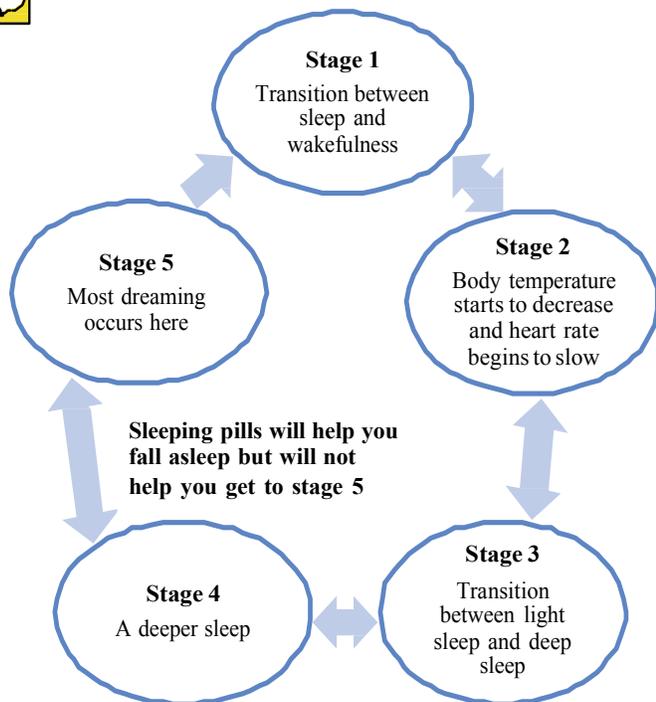
Do: Check with your doctor or pharmacist before you stop taking sleeping pills. Stopping them quickly can make sleeping problems worse.

Do: Check if any of your medicines need to be taken with or without food. Remember some interact with alcohol.

Do: Always read and follow the medicines information on the packet. Your doctor or pharmacist can give you a consumer medicine information leaflet which lists any side effects and interactions.

Do: If you're having trouble sleeping, keep a sleep diary for 1–2 weeks. This will help you keep track of your sleep patterns and any activities that may be causing problems. Take the diary with you when you see your doctor. **Order a sleep diary from www.nps.org.au/sleep.**

Don't: Don't share sleeping pills. The right medicine for you may not be the best one for someone else and could cause harm.



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Managing Life's Challenges

Mental health is an essential part of each person's overall health and wellness. At times, we all face challenges that test us and put our mental health at risk. When our mental health is poor, it can affect our entire body and play a role in the development of other health issues. For example, when stress doesn't let up and isn't managed, it can harm your health and well-being.

About Stress

Everyone feels stress. In small doses, stress may be good for you when it gives you a burst of energy. But too much stress or stress that lasts for a long time can take its toll on your body. Stress can make you feel run down, sad, nervous, angry or irritable. It can cause headaches, muscle tension, upset stomach, nausea, dizziness or feelings of despair, and may cause you to eat more or eat less than normal.

In the long-term, stress can raise your risk of high cholesterol, heart disease, diabetes and reproductive problems and weaken your body's ability to fight disease. It can also raise your risk of depression, which may in turn contribute to heart disease and diabetes. In addition, stress can make it harder for you to recover from a heart attack or keep your diabetes in check. So managing your stress is very important. Take a look at the ideas below for healthy suggestions on reducing your stress.

Healthy Ideas to Manage Life's Challenges

When we're trying to manage life's stressors, how we deal with these challenges can positively or negatively impact our mental health and our overall health and well-being. Finding healthy ways to manage life's challenges can lower the risk of mental health and other health problems and help you feel better overall. Here are some ideas to think about.

- **Relax your mind.** Each person has his or her own ways to relax. You can relax by listening to soothing music, reading a book or doing a quiet activity. Also think about deep breathing, yoga, meditation or massage therapy.

- **Exercise.** Exercising relieves your tense muscles, improves your mood and sleep, and increases your energy and strength. In fact, researchers say that exercise eases symptoms of anxiety and depression. You may not even need to exercise intensely to get the benefits of activity. Try taking a brisk walk or use a stationary bike. See what it takes for you to feel better.
- **Connect with others.** You don't have to cope with stress or other issues on your own. Talking to a trusted friend, family member, support group or counselor can make you feel better. Spending time with positive, loving people you care about and trust can ease stress and improve your mood.
- **Get enough rest.** Getting enough sleep helps you recover from the stresses of the day. Try to get seven to nine hours of sleep every night. Visit the Sleep Foundation at www.sleepfoundation.org for tips on getting a better night's sleep.
- **Help others.** Helping others builds social networks, improves self-esteem and can give you a sense of purpose and achievement.
- **Know your limits.** Let others know them, too. If you're overwhelmed at home or work, or with friends,



learn how to say “no.” It may feel uncomfortable at first, so practice saying “no” with the people you trust most.



- **Keep a journal.**

Writing down your thoughts can be a great way to work through issues. Some researchers have reported that writing about painful events can reduce stress and improve health. You can also track your sleep to help you identify any triggers that make you feel more anxious.

- **Watch your negative self-talk.** Try not to put yourself down. For example, if you don't make it to the gym this week, don't call yourself lazy. Instead think about the specific factor that may have kept you from going to the gym. “I wasn't able to work out because I had to work late hours this week, but next week, I'll make it a priority to go.” The problem is temporary and can be overcome.
- **Get involved in spiritual activities.** Studies have shown that religious involvement and spirituality are associated with better health outcomes, such as greater coping skills, less anxiety and a lower risk of depression. Spirituality may provide a sense of hope, meaning and purpose in life, a way to understand suffering and illness, and a connection with others. Religious and spiritual practices, such as prayer and meditation, can evoke positive emotions that can lead to better health.
- **Write down three good things that happen to you each day for a week.** Also write down why each good thing happened. Thinking about the good things in your life and expressing gratitude may actually help you feel happier.

Remember, it's OK to ask for help. If you feel overwhelmed or unable to cope, consider contacting a mental health professional.

For a referral to local services, contact your local Mental Health America affiliate or the Mental Health America national office at 1-800-969-6642. You can also visit www.mentalhealthamerica.net. If you're in a crisis, call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255).

De-Stress Through Deep Breathing

Deep breathing is a great way to de-stress. It actually changes your brain's chemical balance to calm you down. Here's how to do it:

1. Lie down or sit on the floor or in a chair.
2. Rest your hands on your stomach.
3. Slowly count to four and inhale through your nose. Feel your stomach rise. Hold it for a second.
4. Slowly count to four while you exhale through your mouth. To control how fast you exhale, purse your lips like you're going to whistle. Your stomach will slowly fall.
5. Do this a few times.

Anxiety Disorders

It is normal to feel stressed and anxious in college. Between exams, roommates, and your social life, it is hard to find time to relax. However, sometimes students experience more extreme forms of fear, worrying, and even panic that may be signs of an anxiety disorder. Anxiety disorders are more common than you probably think. According to the National Institute of Mental Health, more than 40 million American adults are affected by anxiety disorders each year.¹

So how do you know when it's more than just stress? People with anxiety disorders may experience a variety of symptoms, including:

- Excessive (and often irrational) worry
- Tension and irritability
- Fear surrounding certain situations
- Physical symptoms, including headaches, digestive problems and muscle tension
- Difficulty concentrating or making decisions
- Increase in avoidant behaviors, like drinking or drug use, or social withdrawal

These disorders can arise suddenly, and the feelings of anxiety can happen over and over again. The good news is that treatment is available. The earlier you get help, the sooner you can get some relief.

While there are a number of anxiety disorders, some of the more common disorders are described below, along with personal testimonials.

Generalized Anxiety Disorder is continual, extreme worry and tension. Usually this intense worry is accompanied by other symptoms, like fatigue, headaches and muscle tension. Sometimes the source of the worry is hard to identify specifically and instead takes the form of a constant feeling of dread.

"I'd have terrible sleeping problems. There were times I'd wake up wired in the middle of the night. I had trouble concentrating, even reading the newspaper or a novel. Sometimes I'd feel a little lightheaded. My heart would race or pound. And that would make me worry more. I was always imagining things were worse than they really were: when I got a stomachache, I'd think it was an ulcer."²

Panic Disorder is when someone experiences repeated panic attacks. These attacks include feelings of terror combined with physical symptoms such as a pounding heart, chest pain, sweating, trembling, shortness of breath, numbness and fear of dying. Panic attacks happen fast and appear out of the blue. There is usually no logical or visible cause for these attacks, although they can have certain triggers.



back to campus

"For me, a panic attack is almost a violent experience. I feel disconnected from reality. I feel like I'm losing control in a very extreme way. My heart pounds really hard, I feel like I can't get my breath, and there's an overwhelming feeling that things are crashing in on me." ²

Obsessive-Compulsive Disorder (OCD) is marked by obsessions – repeated, upsetting thoughts and images – that a person cannot control. To combat these images and thoughts and ease anxiety, a person with OCD spends time in repetitive rituals, called compulsions, such as hand washing or checking and re-checking door locks. This complex disorder can take many forms.

"Getting dressed in the morning was tough, because I had a routine, and if I didn't follow the routine, I'd get anxious and would have to get dressed again. I always worried that if I didn't do something, my parents were going to die. I'd have these terrible thoughts of harming my parents. That was completely irrational, but the thoughts triggered more anxiety and more senseless behavior. Because of the time I spent on rituals, I was unable to do a lot of things that were important to me." ²

Phobias occur when someone feels intense fear about a certain situation or event that is out of proportion to the actual harm possible. For example, claustrophobia, the fear of confined spaces, and acrophobia, the fear of heights, are common phobias. These disorders are serious and interfere with everyday life, as the person may avoid the situations or objects that cause the fear. It is important to differentiate a phobia from general nervousness about public speaking, riding in elevators, or being in large crowds, for example. Here is one woman's experience with social phobia, a common form of this disorder:

"In any social situation, I felt fear. I would be anxious before I even left the house, and it would escalate as I got closer to a college class, a party, or whatever. I would feel sick in my stomach-it almost felt like I had the flu. My heart would pound, my palms would get sweaty, and I would get this feeling of being removed from myself and from everybody else." ²

Post-Traumatic Stress Disorder (PTSD) can happen after a person experiences or witnesses a traumatic event, such as military combat, a serious accident or sexual assault. Symptoms include repeatedly thinking about the trauma, being constantly alert or on guard, and avoiding reminders of the trauma.

"Then I started having flashbacks. They kind of came over me like a splash of water. I would be terrified. Suddenly I was reliving the rape. Every instant was startling. I wasn't aware of anything around me, I was in a bubble, just kind of floating. And it was scary. Having a flashback can wring you out." ²



back to campus

Getting Help

If left untreated, an anxiety disorder can interfere with your schoolwork, social life and everyday activities. It can also lead to depression, and the disorders often happen at the same time. You should know that anxiety disorders are treatable and with help, you can feel better. To find help or get more information about anxiety disorders, start with your student health center or counseling service on campus. Most colleges provide limited free mental health services and can refer you to local providers for longer-term treatment. You can also contact your local Mental Health America affiliate or Mental Health America at 800-969-6642. If you ever feel so overwhelmed with your anxiety that you think about hurting yourself, call 1-800-273-TALK to speak with someone who can help you.

Additional Resources

Anxiety Disorders Association of America (ADAA)

Phone: (240) 485-1001

www.adaa.org

Freedom From Fear

Phone: (718) 351-1717

www.freedomfromfear.org

National Institute of Mental Health (NIMH)

Phone: (866) 615-6464

www.nimh.nih.gov

Obsessive-Compulsive Foundation

Phone: (203) 401-2070

www.ocfoundation.org

Substance Abuse and Mental Health Services Administration (SAMHSA)

Center for Mental Health Services (CMHS)

Phone: (800)-789-2647

<http://mentalhealth.samhsa.gov/>

¹ Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of twelve-month DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry*, 2005 Jun;62(6):617-27.

² National Institute of Mental Health (NIMH). Anxiety Disorder. Revised 2006. <http://www.nimh.nih.gov/publicat/anxiety.cf m#1>

Control Material Week 5

Food handling safety risks at home are more common than most people think. The four easy lessons of

**CLEAN, SEPARATE,
COOK, and CHILL**

can help prevent harmful bacteria from making your family sick.

To find out more about food safety, visit **befoodsafef.org**.



For more information on food safety, visit

Harmful bacteria can make people sick.

befoodsafef.org



4 Easy Lessons in
Safe Food Handling.

The U.S. Partnership for Food Safety Education is a non-profit organization.
Be Food Safe is a joint program of the USDA & PFSE.

Clean. Bacteria can spread throughout the kitchen and get on hands, cutting boards, knives, and countertops. Frequent cleaning can keep that from happening.



- 1 Wash your hands with warm water and soap for 20 seconds before and after handling food.
- 1 Wash cutting boards, dishes, utensils and counter tops with hot soapy water after preparing each food item and before you go on to the next food.
- 1 Consider using paper towels to clean up kitchen surfaces. If you use cloth towels wash them often in the hot cycle of your washing machine.
- 1 Rinse fresh fruits and vegetables under running tap water, including those with skins and rinds that are not eaten.
- 1 Rub firm-skin fruits and vegetables under running tap water or scrub with a clean vegetable brush while rinsing with running tap water.

Separate. Cross-contamination is how bacteria spreads. Keep raw meat, poultry, and seafood and their juices away from ready-to-eat foods.



- 1 Use one cutting board for fresh produce and a separate one for raw meat, poultry and seafood.
- 1 Separate raw meat, poultry, seafood and eggs from other foods in your grocery shopping cart, grocery bags and in your refrigerator.
- 1 Never place cooked food on a plate that previously held raw meat, poultry, seafood or eggs.

Cook. Even for experienced cooks, the improper heating and preparation of food means bacteria can survive.



- 1 Use a food thermometer to measure the internal temperature of cooked foods. Make sure that meat, poultry, egg dishes, casseroles and other foods are cooked to the internal temperature shown in the chart.
- 1 Cook ground meat or ground poultry until it reaches a safe internal temperature. Color is not a reliable indicator of doneness.
- 1 Cook eggs until the yolk and white are firm. Only use recipes in which eggs are cooked or heated thoroughly.
- 1 Bring sauces, soups and gravy to a boil when reheating.

Chill. Bacteria spreads fastest at temperatures between 40 °F and 140 °F, so chilling food properly is one of the most effective ways to reduce the risk of foodborne illness.



- 1 Chill leftovers and takeout foods within 2 hours. Keep the fridge at 40 °F or below and use an appliance thermometer to check the temperature.
- 1 Refrigerate or freeze meat, poultry, eggs and other perishables as soon as you get them home from the store.
- 1 Never defrost food at room temperature. Food must be kept at a safe temperature during thawing. There are three safe ways to defrost food: in the refrigerator, in cold water, and in the microwave. Food thawed in cold water or in the microwave should be cooked immediately.

The Partnership for Food Safety Education

SAFE COOKING TEMPERATURES *as measured with a food thermometer*

	Internal temperature
Ground Meat & Meat Mixtures	
Beef, Pork, Veal, Lamb	160 °F
Turkey, Chicken	165 °F
Fresh Beef, Veal, Lamb	
Medium Rare	145 °F
Medium	160 °F
Well Done	170 °F
Poultry	
Chicken & Turkey, whole	165 °F
Poultry parts	165 °F
Duck & Goose	165 °F
Stuffing (cooked alone or in bird)	165 °F
Fresh Pork	
Medium	160 °F
Well Done	170 °F
Ham	
Fresh (raw)	160 °F
Pre-cooked (to reheat)	140 °F
Eggs & Egg Dishes	
Eggs	Cook until yolk & white are firm
Egg dishes	160 °F
Seafood	
Fin Fish	145 °F
	flesh is opaque
Shrimp, Lobster & Crabs	flesh pearly & opaque
Clams, Oysters & Mussels	Shells open
	during cooking
Scallops	milky white or opaque & firm
Leftovers & Casseroles	165 °F

Binge Drinking

Binge drinking is a common pattern of [excessive alcohol use](#) in the United States. The [National Institute on Alcohol Abuse and Alcoholism](#) defines binge drinking as a pattern of drinking that brings a person's blood alcohol concentration (BAC) to 0.08 grams percent or above. This typically happens when men consume 5 or more drinks, and when women consume 4 or more drinks, in about 2 hours.¹

Most people who binge drink are not [alcohol dependent](#).

According to national surveys

- Approximately 92% of U.S. adults who drink excessively report binge drinking in the past 30 days.²
- Although college students commonly binge drink, 70% of binge drinking episodes involve adults age 26 years and older.³
- The prevalence of binge drinking among men is higher than the prevalence among women.⁴
- Binge drinkers are 14 times more likely to report alcohol-impaired driving than non-binge drinkers.³
- About 90% of the alcohol consumed by youth under the age of 21 in the United States is in the form of binge drinks.⁵
- About 75% of the alcohol consumed by adults in the United States is in the form of binge drinks.⁵
- The proportion of current drinkers that binge is highest in the 18- to 20-year-old group (51%).³

Binge drinking is associated with many health problems, including—

- Unintentional injuries (e.g., car crashes, falls, burns, drowning).
- Intentional injuries (e.g., firearm injuries, sexual assault, domestic violence).
- Alcohol poisoning.
- Sexually transmitted diseases.
- Unintended pregnancy.
- Children born with [Fetal Alcohol Spectrum Disorders](#).
- High blood pressure, stroke, and other cardiovascular diseases.
- Liver disease.
- Neurological damage.
- Sexual dysfunction.
- Poor control of diabetes.

Evidence-based interventions to prevent binge drinking and related harms^{6, 7, 8, 9, 10} include

- Increasing alcoholic beverage costs and excise taxes.
- Limiting the number of retail alcohol outlets that sell alcoholic beverages in a given area.
- Consistent enforcement of laws against underage drinking and alcohol-impaired driving.
- Screening and counseling for alcohol misuse

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov

References:

1. National Institute of Alcohol Abuse and Alcoholism. NIAAA council approves definition of binge drinking. *NIAAA Newsletter* 2004; No. 3, p. 3. Available at http://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number3.pdf [PDF-1.62MB]. Accessed March 31, 2008.
2. Town M, Naimi TS, Mokdad AH, Brewer RD. [Health care access among U.S. adults who drink alcohol excessively: missed opportunities for prevention](#). *Prev Chronic Dis* [serial online] April 2006. Accessed March 31, 2008.
3. Naimi TS, Brewer RD, Mokdad A, Clark D, Serdula MK, Marks JS. [Binge drinking among US adults](#). *JAMA* 2003;289(1):70–75.
4. Centers for Disease Control and Prevention. *Behavioral Risk Factor Surveillance System prevalence data*. Atlanta, GA: CDC. Available at www.cdc.gov/brfss. Accessed April 1, 2010.
5. Office of Juvenile Justice and Delinquency Prevention. *Drinking in America: Myths, Realities, and Prevention Policy*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention, 2005. Available at http://www.udetc.org/documents/Drinking_in_America.pdf [PDF-1.08MB]. Accessed March 28, 2008.
6. Babor TF, Caetano, R., Casswell S, et al. *Alcohol and Public Policy: No Ordinary Commodity*. New York: Oxford University Press, 2003.
7. The Community Guide. *Alcohol Abuse and Misuse Prevention. Interventions Directed to the General Population*. Atlanta, GA: Centers for Disease Control and Prevention, 2008. Available at <http://www.thecommunityguide.org/alcohol/default.htm>. Accessed April 1, 2010.
8. National Research Council and Institute of Medicine. *Reducing Underage Drinking: A Collective Responsibility*. Washington, DC: National Academies Press, 2004.
9. U.S. Department of Health and Human Services. *The Surgeon General's Call to Action to Prevent and Reduce Underage Drinking*. U.S. Department of Health and Human Services, Office of the Surgeon General, 2007. Available at <http://www.surgeongeneral.gov/topics/underagedrinking/>. Accessed May 9, 2008.
10. U.S. Preventive Services Task Force. Screening and behavioral counseling interventions in primary care to reduce alcohol misuse: recommendation statement. *Ann Intern Med* 2004;140:554–556.

Control Material Week 7



Essential Equipment

Did you know that playing tennis with a badly strung racquet while wearing worn-out shoes can be just as dangerous as playing football without shoulder pads? Using the wrong — or improperly fitted — equipment is a major cause of injuries.

The equipment you wear while participating in sports and other activities is key to preventing injuries. Start with **helmets**: They're important for sports such as football, hockey, baseball, softball, biking, skateboarding, inline skating, skiing, and snowboarding — to name just a few.

Always wear a helmet made for the sport you're playing.

When choosing a bike helmet, look for a sticker that says the helmet meets the safety standard set by the Consumer Product Safety Commission (CPSC), a federal regulatory agency that creates safety standards for bike helmets and other safety equipment.

If you use a multisport helmet for inline skating and skateboarding, it is not considered safe for bicycle riding unless it has the CPSC sticker.

Any helmet should fit snugly but comfortably on your head and shouldn't tilt backward or forward.

Eye protection also is a must for many sports:

The most protective eye gear is made from a plastic called polycarbonate and has been tested especially for sports use.

If you wear glasses, you'll probably need prescription polycarbonate goggles — don't just wear your regular glasses when you're on the court or field.

Staying Off the Court When You're Hurt

If you've been injured and you try to come back too soon, you run the great risk of reinjuring yourself — maybe even more seriously than before. Don't let anyone — including yourself, your parents, your

friends, or even your coach — pressure you into playing before your body is fully healed. Your doctor, coach, or trainer will give you specific advice on when you should return to your sport or activity.

http://kidshealth.org/teen/safety/safebasics/sport_safety.html#

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TeensHealth.org

A safe, private place to get
doctor-approved information
on health, emotions, and life.



Caffeine

It's 11 PM and Aaron has already had a full day of school, work, and after-school activities. He's tired and knows he could use some sleep. But he still hasn't finished his homework. So he reaches for his headphones — and some caffeine.

What Is Caffeine?

Caffeine is a drug that is naturally produced in the leaves and seeds of many plants. It's also produced artificially and added to certain foods. Caffeine is defined as a drug because it stimulates the central nervous system, causing increased alertness. Caffeine gives most people a temporary energy boost and elevates mood.

Caffeine is in tea, coffee, chocolate, many soft drinks, and pain relievers and other over-the-counter medications. In its natural form, caffeine tastes very bitter. But most caffeinated drinks have gone through enough processing to camouflage the bitter taste.

Teens usually get most of their caffeine from soft drinks and energy drinks. (In addition to caffeine, these also can have added sugar and artificial flavors.) Caffeine is not stored in the body, but you may feel its effects for up to 6 hours.



Got the Jitters?

Many people feel that caffeine increases their mental alertness. Higher doses of caffeine can cause anxiety, dizziness, headaches, and the jitters. Caffeine can also interfere with normal sleep.

Caffeine sensitivity (the amount of caffeine that will produce an effect in someone) varies from person to person. On average, the smaller the person, the less caffeine needed to produce side effects. Caffeine sensitivity is most affected by the amount of caffeine a person has daily. People who regularly take in a lot of caffeine soon develop less sensitivity to it. This means they may need more caffeine to achieve the same effects.

Caffeine is a diuretic, meaning it causes a person to urinate (pee) more. It's not clear whether this causes dehydration or not. To be safe, it's probably a good idea to stay away from too much caffeine in hot weather, during long workouts, or in other situations where you might sweat a lot.

Caffeine may also cause the body to lose calcium, and that can lead to bone loss over time. Drinking caffeine-containing soft drinks and coffee instead of milk can have an even greater impact on bone density and the risk of developing osteoporosis.

Caffeine can aggravate certain heart problems. It may also interact with some medications or supplements. If you are stressed or anxious, caffeine can make these feelings worse. Although caffeine is sometimes used to treat migraine headaches, it can make headaches worse for some people.

Moderation Is the Key

day to be a moderate amount for adults. But consuming as little as 100 mg of caffeine a day can lead a person to become "dependent" on caffeine. This means that someone may develop withdrawal symptoms (like tiredness, irritability, and headaches) if he or she quits caffeine suddenly.

Teens should try to limit caffeine consumption to no more than 100 mg of caffeine daily, and kids should get even less. The following chart includes common caffeinated products and the amounts of caffeine they contain:

Drink/Food/Supplement	Amt. of Drink/Food	Amt. of Caffeine
SoBe No Fear	8 ounces	83 mg
Monster energy drink	16 ounces	160 mg
Rockstar energy drink	8 ounces	80 mg
Red Bull energy drink	8.3 ounces	80 mg
Jolt cola	12 ounces	72 mg
Mountain Dew	12 ounces	55 mg
Coca-Cola	12 ounces	54 mg

Diet Coke	12 ounces	45 mg
Pepsi	12 ounces	38 mg
7-Up	12 ounces	0 mg
Brewed coffee (drip method)	5 ounces	115 mg*
Iced tea	12 ounces	70 mg*
Cocoa beverage	5 ounces	4 mg*
Chocolate milk beverage	8 ounces	5 mg*
Dark chocolate	1 ounce	20 mg*
Milk chocolate	1 ounce	6 mg*
Jolt gum	1 stick	33 mg
Cold relief medication	1 tablet	30 mg*

Vivarin	1 tablet	200 mg
Excedrin extra strength	2 tablets	130 mg
*denotes average amount of caffeine		

Source: U.S. Food and Drug Administration, National Soft Drink Association, Center for Science in the Public Interest.

Cutting Back

If you're taking in too much caffeine, you may want to cut back. The best way is to cut back slowly. Otherwise you could get headaches and feel tired, irritable, or just plain lousy.

Try cutting your intake by replacing caffeinated sodas and coffee with noncaffeinated drinks. Options include water, decaffeinated coffee, caffeine-free sodas, and caffeine-free teas. Start by keeping track of how many caffeinated drinks you have each day, then substitute one of these daily drinks with a caffeine-free alternative. Continue this for a week. Then, if you are still drinking too much caffeine, substitute another of your daily drinks, again, keeping it up for a week. Do this for as many weeks as it takes to bring your daily caffeine intake below the 100-milligram mark. Taking a gradual approach like this can help you wean yourself from caffeine without unwanted side effects like headaches.

As you cut back on the amount of caffeine you consume, you may find yourself feeling tired. Your best bet is to hit the sack, not the sodas: It's just your body's way of telling you it needs more rest. Your energy levels will return to normal in a few days.

Reviewed by: Mary L. Gavin, MD

Date reviewed: January 2008

Originally reviewed by: Jessica Donze Black, RD, CDE, MPH



Note: All information on TeensHealth® is for educational purposes only. For specific medical advice, diagnoses, and treatment, consult your doctor.

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Flu is a **serious contagious** disease that can lead to **hospitalization** and even **death**.

Flu-like symptoms include:

- fever
- cough
- sore throat
- runny or stuffy nose
- body aches
- headache
- chills
- fatigue

Some people may also have vomiting and diarrhea. People may be infected with the flu, and have respiratory symptoms without a fever.

CDC Says
“Take 3”
Actions
To Fight The Flu

For more information, visit
<http://www.flu.gov>
or call
800-CDC-INFO.



U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

August 2010
CS214209-A

CDC urges you to take the following actions to protect yourself and others from influenza (the flu):

#1 Take time to get a flu vaccine.

- CDC recommends a yearly flu vaccine as the first and most important step in protecting against flu viruses.
- While there are many different flu viruses, the flu vaccine protects against the three viruses that research suggests will be most common.
- The 2010–2011 flu vaccine will protect against an influenza A H3N2 virus, an influenza B virus and the 2009 H1N1 virus that caused so much illness last season.
- Everyone 6 months of age and older should get vaccinated against the flu as soon as the 2010–2011 season’s vaccine is available.
- People at high risk of serious flu complications include young children, pregnant women, people with chronic health conditions like asthma, diabetes or heart and lung disease and people 65 years and older.
- Vaccination of high risk persons is especially important to decrease their risk of severe flu illness.
- Vaccination also is important for health care workers, and other people who live with or care for high risk people to keep from spreading flu to high risk people.
- Children younger than 6 months are at high risk of serious flu illness, but are too young to be vaccinated. People who care for them should be vaccinated instead.



#2 Take everyday preventive actions to stop the spread of germs.

- Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in the trash after you use it.
- Wash your hands often with soap and water. If soap and water are not available, use an alcohol-based hand rub.
- Avoid touching your eyes, nose or mouth. Germs spread this way.
- Try to avoid close contact with sick people.
- If you are sick with flu-like illness, CDC recommends that you stay home for at least 24 hours after your fever is gone except to get medical care or for other necessities. (Your fever should be gone without the use of a fever-reducing medicine.)
- While sick, limit contact with others as much as possible to keep from infecting them.



#3 Take flu antiviral drugs if your doctor prescribes them.

- If you get the flu, antiviral drugs can treat your illness.
- Antiviral drugs are different from antibiotics. They are prescription medicines (pills, liquid or an inhaled powder) and are not available over-the-counter.
- Antiviral drugs can make illness milder and shorten the time you are sick. They may also prevent serious flu complications.
- It’s very important that antiviral drugs be used early (within the first 2 days of symptoms) to treat people who are very sick (such as those who are hospitalized) or people who are sick with flu symptoms and who are at increased risk of severe flu illness, such as pregnant women, young children, people 65 and older and people with certain chronic health conditions.
- Flu-like symptoms include fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills and fatigue. Some people may also have vomiting and diarrhea. People may be infected with the flu, and have respiratory symptoms without a fever.



PUBLIC HEALTH FACT SHEET



CLEANING AND DISINFECTING HARD SURFACES

What should be used to clean and disinfect hard surfaces?

When a surface is visibly dirty, wash with a general household cleaner (soap or detergent). Rinse with water and follow with a disinfectant. When a surface is not visibly dirty, clean with a commercial product that is both a detergent (cleans) and a disinfectant (kills germs). Wear disposable gloves. Make sure the disinfectant product you choose is registered with the United States Environmental Protection Agency (EPA) and includes an EPA registration number on it. For a list of EPA-registered disinfectants visit:

www.epa.gov/oppad001/chemregindex/html.

What surfaces should be cleaned and disinfected?

Hard surfaces that are touched often or by more than one person need to be cleaned and disinfected as explained above. Examples of hard surfaces include:

- Countertops
- Tabletops
- Doorknobs/door handles
- Microwaves
- Bathroom surfaces
- Desktops

Use sanitizer cloths on electronic items that are touched often. These items include computers, keyboards, computer mice, telephones, remote controls, light switches, door knobs and hand-held video games. Also use sanitizer cloths on car door handles, steering wheels, and gear shifts in vehicles.

What if disinfectants are not available?

If disinfectants are not available, use a chlorine bleach solution made by adding one ounce of fresh bleach to nine ounces of water. Spray or use a cloth to apply to surfaces and let stand for 10 minutes if possible. Rinse with clear water.

NOTE:

Minimum disinfectant concentrations are needed for different infectious agents and surfaces. In general, a bleach concentration of 10% is effective against most infectious agents for most surfaces. For more detailed information visit the EPA disinfectant web page at: www.epa.gov/oppad001/chemregindex.html.

When using chlorine bleach to disinfect surfaces, use an unopened bottle. Chlorine bleach loses its effectiveness 30 days after opening. A fresh bleach/water solution should be made daily.

REMEMBER:

Always follow label instructions carefully when using cleaners and disinfectants. Pay attention to any hazard warnings and instructions on labels for using personal protective items such as household gloves.

DO NOT MIX DISINFECTANTS AND CLEANERS

OVER
➡

HAND WASHING INSTRUCTIONS:

- Use soap and running water
- Rub your hands vigorously for 20 seconds
- Wash all surfaces, including:
 - Backs of hands
 - Wrists
 - Between fingers
 - Under fingernails
- Rinse well
- Dry hands with a paper towel
- Turn off the water using a paper towel instead of bare hands

For more information on cleaning and disinfecting hard surfaces, call (248) 858-1406 or toll free 1 (800) 848-5533.

For additional copies, visit our website at www.oakgov.com/health.

The Oakland County Health Division will not deny participation in its programs based on race, sex, religion, national origin, age or disability. State and federal eligibility requirements apply for certain programs.



Mental Illness on Campus ~ What You Can Do to Help

Times of anxiety and feeling down are common experiences in college, but did you know that they may be part of a treatable mental health condition? The latest research reports that feeling depressed to the point where students have trouble functioning impacts about 40% of students—while 15% have a serious clinical depression. Suicide is a serious problem in college---about 1,100 lives a year are lost to this largely preventable outcome.

The 2005 National College Health Assessment (NCHA), a survey of nearly 17,000 college students conducted by the American College Health Association, revealed that 25% reported they “felt so depressed it was difficult to function” three to eight times during the past year and 21% reported they “seriously considered suicide” one or more times during the past year. In the NCHA survey, students also ranked depression as one of the top ten impediments to academic performance.

While colleges and universities have a role in ensuring the health and safety of people on campus, students themselves are often the first to recognize when a problem might exist and are likely the first to be able to engage before the condition becomes a more serious issue.

How can you tell if a Person is in Trouble?

- Take conversations about suicide or homicide very seriously. A person who jokes about suicide or homicide may be struggling with a deeper sense of hopelessness. Most people who commit suicide have told someone, often in the days preceding the event.
- Sleep problems are often a symptom of more serious health problems. Roommates who have big changes in sleep patterns may be at risk for psychiatric illnesses. For example, if a person who usually sleeps ten hours, midnight to 10 am, suddenly begins waking up at 5 am and acts agitated or begins pacing, this could be a sign that they may be experiencing a deeper problem that should be addressed.
- Bulimia and Anorexia are eating disorders that often co-occur with anxiety and depression. Behaviors such as patterns of binge-eating, recurrent inappropriate behavior to control one's weight, self-induced vomiting,

excessive exercise, expressions of an intense fear of gaining weight, or an ongoing preoccupation with weight and food despite being may be signs of a more serious psychiatric illness that needs medical attention.

- Alcohol and drug use compound all risk. Alcohol risk is higher in sororities and fraternities, but the risk remains for most college students as alcohol is often a part of acceptable campus social life. Guns are very high risk in combination with alcohol and other drugs; these two in combination are very dangerous.
- Be aware of expectable life stresses. Relationship breakups, future career stress, exam pressure, peer pressure and judgment, loneliness, financial stress, and even graduation can compound all other risks.
- Be mindful of other possible, less expectable but very real stresses—for instance the realization that one may be gay, that one is being bullied or discriminated against, the death of a parent or grandparent, or divorce can compound self harm risk.

What to do if you suspect a person is in trouble or at risk.

- Follow your instincts. People have been wired for Millennia to detect unusual or risky social situations, and your instincts can be a key to helping someone get the help they need. If you feel sad around the person, remember feelings can be contagious, and you may be sensing their own internal despair. If you want to avoid the person, note that, too. Do not hesitate to tell someone in authority on campus about your concerns.
- Don't worry alone. If you live in on-campus housing, start with your Residential Assistant/Advisor who can offer more information and resources or will often know the best approach and services available to you. You can also go to the Campus Counseling Center for information and assistance about what is available on your campus community.
- If you feel you can, approach the person with concern, not judgment. Easy comments such as “I sense you are (sad, troubled) etc.” can begin a discussion and possibly invite the person to talk about what they are experiencing. Gently suggest they get help, offer to go with them if you feel comfortable with that. However, safety should always come first—yours.
- Offer information on college mental health services. Don't be afraid to use them as they help people every day deal with the stresses of college life.

- Offer information on web sites that might be helpful. Students rely on networking and the Internet as primary information sources. NAMI has a “NAMI on Campus” section at www.nami.org/namioncampus that also features discussion group networking options that may offer the person support and information to help them manage their own situations. Additionally, there are over 1,100 local NAMI affiliates in communities across the country. Visit www.nami.org to Find Support that is the most convenient.

- Meetings and groups can offer hope and support to students. There are often dozens of campus student groups operating all days of the week, including support and networking groups for mental illness and stress management. Find out what may be available and encourage the person to attend. If you feel comfortable, offer to go to a first meeting with the person, or find another person who might offer to make the meeting more inviting.

- Be gentle with yourself. Even the best doctor cannot predict all bad outcomes. People sometimes hide their feelings and behavior to avoid consequences. Remember that you are ultimately only responsible for your own behavior.

Reviewed by Ken Duckworth, M.D., 2007

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Email: namioncampus@nami.org,

Website: www.nami.org/oncampus



College Health: Sexual Health

What do I need to know if I'm sexually active or if I'm thinking about becoming sexually active?

During college, you may make lots of decisions about your sexuality and sexual activity. Some sexuality issues that teens make decisions about are the gender of partners, the type of contraception, and the intensity of the relationships. It is important to know your personal views on having sex before becoming sexually active.

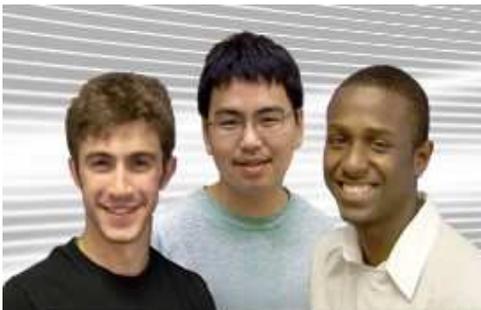
Before you decide to have a sexual relationship, talk to your partner about whether this is the right decision for both of you. Ask about his or her sexual history, including if he or she has been exposed to [sexually transmitted diseases \(STD's\)](#). Discuss whether you or your partner will be sexually involved with other people. Remember, the risk of getting a sexually transmitted disease or a virus that can cause cancer or **AIDS** is increased if either of you is having sexual intercourse with other people. The more partners, the greater the risk. Some young men and women both get tested for STD's before having a sexual relationship. If you do decide to have sex, the best way to avoid getting any sexually transmitted diseases is to have sex with only one person that has never been exposed to a sexually transmitted disease. You should use a latex condom every time you have sex, from start to finish.

Many young men and women do not feel ready for a sexual relationship. Also, the only way to absolutely prevent getting a sexually transmitted disease is to not have sex. You may decide that it is not the right time for you to have a sexual relationship, and this is a legitimate decision.

College is a time when many young people are trying to figure out their **sexual orientation**. You may feel comfortable sorting this out on your own, but if you wish to talk with someone, there are counselors available at your Student Health Service. Many colleges also have support groups for gay, lesbian, bisexual, and transgender students.

Written by the CYWH and YMH Staff at Children's Hospital Boston
Updated 2/5/2008

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CDC Fact Sheet



The Role of STD Prevention and Treatment in HIV Prevention



Testing and treatment of sexually transmitted diseases (STDs) can be an effective tool in preventing the spread of HIV, the virus that causes AIDS. An understanding of the relationship between STDs and HIV infection can help in the development of effective HIV prevention programs for persons with high-risk sexual behaviors.

g What is the link between STDs and HIV Infection?

Individuals who are infected with STDs are at least two to five times more likely than uninfected individuals to acquire HIV infection if they are exposed to the virus through sexual contact. In addition, if an HIV-infected individual is also infected with another STD, that person is more likely to transmit HIV through sexual contact than other HIV-infected persons (Wasserheit, 1992).

There is substantial biological evidence demonstrating that the presence of other STDs increases the likelihood of both transmitting and acquiring HIV.

- Increased susceptibility. STDs appear to increase susceptibility to HIV infection by two mechanisms. Genital ulcers (e.g., syphilis, herpes, or chancroid) result in breaks in the genital tract lining or skin. These breaks create a portal of entry for HIV. Additionally, inflammation resulting from genital ulcers or non-ulcerative STDs (e.g., chlamydia, gonorrhea, and trichomoniasis) increase the concentration of cells in genital secretions that can serve as targets for HIV (e.g., CD4+ cells).
- Increased infectiousness. STDs also appear to increase the risk of an HIV-infected person transmitting the virus to his or her sex partners. Studies have shown that HIV-infected individuals who are also infected with other STDs are particularly likely to shed HIV in their genital secretions. For example, men who are infected with both

gonorrhea and HIV are more than twice as likely to have HIV in their genital secretions than are those who are infected only with HIV. Moreover, the median concentration of HIV in semen is as much as 10 times higher in men who are infected with both gonorrhea and HIV than in men infected only with HIV. The higher the concentration of HIV in semen or genital fluids, the more likely it is that HIV will be transmitted to a sex partner.

g How can STD treatment slow the spread of HIV infection?

Evidence from intervention studies indicates that detecting and treating STDs may reduce HIV transmission.

- STD treatment reduces an individual's ability to transmit HIV. Studies have shown that treating STDs in HIV-infected individuals decreases both the amount of HIV in genital secretions and how frequently HIV is found in those secretions (Fleming, Wasserheit, 1999).
- Herpes can make people more susceptible to HIV infection, and it can make HIV-infected individuals more infectious. It is critical that all individuals, especially those with herpes, know whether they are infected with HIV and, if uninfected with HIV, take measures to protect themselves from infection with HIV.
- Among individuals with both herpes and HIV, trials are underway studying if treatment of the genital herpes helps prevent HIV transmission to partners.



g What are the implications for HIV prevention?

Strong STD prevention, testing, and treatment can play a vital role in comprehensive programs to prevent sexual transmission of HIV. Furthermore, STD trends can offer important insights into where the HIV epidemic may grow, making STD surveillance data helpful in forecasting where HIV rates are likely to increase. Better linkages are needed between HIV and STD prevention efforts nationwide in order to control both epidemics.

In the context of persistently high prevalence of STDs in many parts of the United States and with emerging evidence that the U.S. HIV epidemic increasingly is affecting populations with the highest rates of curable STDs, the CDC/HRSA Advisory Committee on HIV/AIDS and STD Prevention (CHAC) recommended the following:

- Early detection and treatment of curable STDs should become a major, explicit component of comprehensive HIV prevention programs at national, state, and local levels;
- In areas where STDs that facilitate HIV transmission are prevalent, screening and treatment programs should be expanded;

- HIV testing should always be recommended for individuals who are diagnosed with or suspected to have an STD.
- HIV and STD prevention programs in the United States, together with private and public sector partners, should take joint responsibility for implementing these strategies.

CHAC also notes that early detection and treatment of STDs should be only one component of a comprehensive HIV prevention program, which also must include a range of social, behavioral, and biomedical interventions.

REFERENCES:

Centers for Disease Control and Prevention. 1998. HIV prevention through early detection and treatment of other sexually transmitted diseases - United States. *MMWR* 47(RR-12):1-24.

Fleming DT, Wasserheit JN. 1999. From epidemiological synergy to public health policy and practice: The contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sexually Transmitted Infections* 75:3-17.

Wasserheit JN. 1992. Epidemiologic synergy: Interrelationships between human immunodeficiency virus infection and other sexually transmitted diseases. *Sexually Transmitted Diseases* 9:61-77.

g FOR MORE INFORMATION:

Centers for Disease Control and Prevention

Division of STD Prevention (DSTDP)

<http://www.cdc.gov/std/>

Division of HIV/AIDS Prevention

<http://www.cdc.gov/hiv/>

CDC-INFO Contact Center

1-800-CDC-INFO (1-800-232-4636)

Email: cdcinfo@cdc.gov

American Social Health Association (ASHA)

1-800-783-9877

www.ashastd.org

Distracted Driving

Each day, more than 16 people are killed and more than 1,300 people are injured in crashes involving a distracted driver.¹ Distracted driving is driving while doing another activity that takes your attention away from driving; these activities can increase the chance of a motor vehicle crash.

There are three main types of distraction:

- Visual—taking your eyes off the road;
- Manual—taking your hands off the wheel; and
- Cognitive—taking your mind off what you are doing.¹

Distracted driving activities include things like using a cell phone, texting, eating, drinking, and talking with passengers. Using in-vehicle technologies (such as navigation systems) and portable communication devices can also be sources of distraction. While any of these distractions can endanger the driver and others, texting while driving is especially dangerous because it combines all three types of distraction.¹

How big is the problem?

- In 2008, nearly 6,000 people died in crashes involving a distracted driver and more than 500,000 people were injured.¹
- The proportion of drivers reportedly distracted at the time of a fatal crash has increased from 8 percent in 2004 to 11 percent in 2008.¹
- When asked whether driving feels safer, less safe, or about the same as it did five years ago, more than 1 in 3 drivers say driving feels less safe today. Distracted driving—cited by 3 out of 10 of these drivers—was the single most common reason given for feeling less safe today.²

What are the risk factors?

- Some activities—such as texting—take the driver’s attention away from driving more frequently and for longer periods than other distractions.³
- Younger, inexperienced drivers under the age of 20 may be at highest risk because they have the highest proportion of distraction-related fatal crashes.³

How can distracted driving be prevented?

- Many states are enacting laws—such as banning texting while driving—or using graduated driver licensing systems for teen drivers to help raise awareness about the dangers of distracted driving and to keep it from occurring.³
- On October 1, 2009, President Obama issued an executive order prohibiting federal employees from texting while driving on government business or with government equipment.³

*Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348, 24 Hours/Every Day - cdcinfo@cdc.gov*

- In January 2010, the Federal Motor Carrier Safety Administration enacted an interim ban that prohibits commercial vehicle drivers from texting while behind the wheel. In March 2010, a proposed rule was announced that would make that ban stronger and more durable.³
- The Department of Transportation recently launched a national campaign to encourage the public to get involved in ending distracted driving. [Put It Down](#)¹ focuses on the key messages that drivers can't do two things at once, and everyone has a personal responsibility to pay attention while behind the wheel.³

Resources for More Information

- [U.S. Department of Transportation](#)¹
- [Official U.S. Government Website for Distracted Driving](#)¹
- [Put It Down Campaign](#)¹

References

1. National Highway Traffic Safety Administration. Statistics and Facts about Distracted Driving. Based on the 2008 National Occupant Protection Use Survey [online]. [Cited 2008 June 2–22]. Available from URL: <http://www.distraction.gov/stats-and-facts/#what>¹.
2. AAA Foundation for Traffic Safety. 2009 Traffic Safety Culture Index. [Cited 2009 July]. Available from URL: <http://www.aaafoundation.org/pdf/2009TSCIndexFinalReport.pdf>¹
3. National Highway Traffic Safety Administration. Policy Statement and Compiled Facts on Distracted Driving. [Online]. Available from URL: <http://nhtsa.gov/>¹

FTC FACTS for Consumers

FEDERAL TRADE COMMISSION
FOR THE CONSUMER

Test Your Supplement Savvy



A

advertised throughout the media, displayed in grocery stores and pharmacies, and promoted widely on the Internet, dietary supplements

look like just another consumer product on the shelf. But are they? Take this quiz to find out how much you know about using dietary supplements safely.

Questions



A supplement labeled “natural” means that it also is:

- A. mild
- B. without any risk of side effects
- C. safe to use with other medications
- D. none of the above



Since dietary supplements are so easily available – and don’t require a doctor’s prescription – they are much safer than drug products and can be used to self-treat illnesses without a health professional’s advice or supervision.

Facts for Consumers



Many supplements have proven health benefits.

True or False



Before you start taking a dietary supplement, talk it over with a knowledgeable person like:

- A. your doctor or health professional
- B. your pharmacist
- C. a supplement salesperson
- D. a friend who takes them

Answers



D.

The term “natural” may suggest to consumers that the supplement is safe, especially when compared with prescription drugs that are known to have side effects. But natural is not necessarily safe. Although many supplements can be used safely by most people, other supplements, including some herbal products, can be dangerous. Aristolochic acid, which has been found in some traditional Chinese herbal remedies, has been linked to severe kidney disease. And the herb comfrey contains certain alkaloids that, when ingested, have been linked to serious, even fatal, liver damage. Animal studies suggest that the herb may cause cancer, too. Even certain vitamins can be toxic at high doses. And certain supplements have been found to interact with other medications in ways that could cause injury.



False.

Studies have shown that some herbal products interact with drugs and can have a wide range of effects. For example, St. John’s Wort can lower the effects of indinavir, a protease inhibitor for treating HIV. St. John’s Wort also may interfere with drugs used by organ transplant patients and drugs used to treat depression, seizures, and certain cancers. In addition, there are concerns that it may reduce the effectiveness of oral contraceptives. Garlic, ginkgo, danshen, and dong quai can cause blood to thin, which could cause serious problems for people on drugs like warfarin or aspirin. Dietary supplements are not required to go through the same pre-market government review for quality, safety, and efficacy as drug products. But that doesn’t mean they should be taken lightly — or without consulting your health care professional, especially if you have a medical condition or are taking other drugs.



False.

It’s unwise to judge a product’s efficacy or safety based only on testimonials. First, it is very difficult to verify the accuracy of the account: Some marketers may embellish or even make up testimonials to sell their product. Second, you can’t generalize one person’s experience to others. Anecdotes are not a substitute for valid science.



True.

Studies suggest that several popular supplements, including herbal products, may provide health benefits. For example, calcium can reduce the risk of osteoporosis, folic acid during pregnancy can prevent birth defects, and there is some evidence suggesting that St. John's Wort may be helpful for some people with mild depression. Check out any health claims with a reliable source, such as the National Institutes of Health's Office of Dietary Supplements, a public health or scientific organization like the American Cancer Society or the Arthritis Foundation, and your health provider.



A or B.

Talk to your doctor, pharmacist, or other health provider about any medicines you take, as well as any dietary supplements you're using or thinking about using. Though some doctors have limited knowledge of herbal products and other supplements, they have access to the most current research and can help monitor your condition to ensure that no problems develop or serious interactions occur. Retailers or marketers can be good sources of information about their products and their ingredients, but bear in mind that they have a financial interest in their products. If your doctor or pharmacist has a financial interest in the product, get a second, independent opinion.

For more information about the safe use of dietary supplements, visit the FTC's Virtual Health Treatments page at ftc.gov/healthclaims.

The FTC works to prevent fraudulent, deceptive and unfair business practices in the marketplace and to provide information to help consumers spot, stop and avoid them. To file a complaint or get free information on consumer issues, visit ftc.gov or call toll-free, 1-877-FTC-HELP (1-877-382-4357); TTY: 1-866-653-4261.

Watch a new video, How to File a Complaint, at ftc.gov/video to learn more. The FTC enters consumer complaints into the Consumer Sentinel Network, a secure online database and investigative tool used by hundreds of civil and criminal law enforcement agencies in the U.S. and abroad.



Facts for Consumers

The Federal Trade Commission (FTC) is the nation's consumer protection agency. Here are some tips from the FTC to help you be a more savvy consumer.

1. Know who you're dealing with. Do business only with companies that clearly provide their name, street address, and phone number.
2. Protect your personal information. Share credit card or other personal information only when buying from a company you know and trust.
3. Take your time. Resist the urge to "act now." Most any offer that's good today will be good tomorrow, too.
4. Rate the risks. Every potentially high-profit investment is a high-risk investment. That means you could lose your investment — all of it.
5. Read the small print. Get all promises in writing and read all paperwork before making any payments or signing any contracts. Pay special attention to the small print.
6. "Free" means free. Throw out any offer that says you have to pay to get a gift or a "free" gift. If something is free or a gift, you don't have to pay for it. Period.
7. Report fraud. If you think you've been a victim of fraud, report it. It's one way to get even with a scam artist who cheated you. By reporting your complaint to 1-877-FTC-HELP or ftc.gov, you are providing important information to help law enforcement officials track down scam artists and stop them!



Federal Trade Commission
Bureau of Consumer Protection
Division of Consumer and Business Education

June 2001

Virus Bacteria Chart



Get Smart. Take a look at this chart to find out which upper respiratory infections are usually caused by viruses — germs that are not killed by antibiotics. Talk with your doctor about ways to feel better when you are sick. Ask what you should look for at home that might mean you are developing another infection for which antibiotics might be appropriate.

Illness	Usual Cause		Antibiotic Needed
	Virus	Bacteria	
Cold	Yes	No	No
Flu	Yes	No	No
Chest Cold (in otherwise healthy children and adults)	Yes	No	No
Sore Throats (except strep)	Yes	No	No
Bronchitis (in otherwise healthy children and adults)	Yes	No	No
Runny Nose (with green or yellow mucus)	Yes	No	No
Fluid in the Middle Ear	Yes	No	No

Department of Health and Human Services
Centers for Disease Control and Prevention Food and Drug Administration

2 Column Newspaper (4 5/8" X 7 1/4")

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- Page last reviewed: September 1, 2010
- Page last updated: June 30, 2009
- Content source: [National Center for Immunization and Respiratory Diseases, Division of Bacterial Diseases](#)



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Quitting Smoking

Your doctor has told you to quit smoking. You want to, but you aren't sure of the best way. Perhaps you've tried before. Or you're afraid you'll gain weight.

What's the best way to quit?

There are many ways to quit smoking, but first you need *the desire to quit*. You can quit "cold turkey," or you can set a quit date and decrease smoking gradually over a 2-week period. Some people find it helpful to have support from others who are quitting at the same time. Your local chapter of the American Lung Association, the American Cancer Society, or the American Heart Association, or a hospital in your community can help you find a smoking cessation class. Or, you can use the "buddy system"—make a pact with a friend who wants to quit and give each other support.

Many people find chewing nicotine gum or using nicotine patch helpful for the first few weeks. Talk to your doctor about prescribing one of these for you.

What about withdrawal symptoms?

Keep in mind that most smokers actually have a double addiction: physical and psychological. Physical withdrawal can be a problem for heavy smokers (more than one pack a day). The symptoms vary from one person to another, but common complaints:

- Headaches
- Constipation
- Irritability
- Nervousness
- trouble concentrating
- insomnia (trouble sleeping)

You may even cough more for the first week after quitting. This is actually a sign that your body is healing itself.

You can do several things to ease the withdrawal symptoms. Although you may fear that you'll be craving a cigarette all the time, each urge actually lasts only 2 or 3 minutes. When it hits, do a minute or two of deep-breathing exercises to calm the urge; close your eyes, take a deep breath, and slowly let it out.

If you still feel a craving, change your activity, walk around or do something using both hands, or do something that you especially enjoy.

Drink lots of water to help flush the toxins from your body. Eat a healthy, well-balanced diet. Many authorities say that eating less meat and more fresh vegetables and fruits helps reduce withdrawal symptoms. To fight after meal cravings, leave the table right away and brush your teeth. Sugar-less gum or hard candy, a toothpick, or unsalted, shelled sunflower seeds satisfy the oral craving without adding calories.

Daily exercise (unless your doctor advises you not to) will help relax you and slow down the effects of nicotine.

Try to avoid situations that you associate with smoking, such as a morning cup of coffee or a before-dinner drink. You may need to change your habits for a while until the withdrawal period is over. Avoid spending time around other smokers.

Write down all your reasons for quitting smoking to remind yourself whenever you're discouraged or tempted to smoke. Keep the list handy, and look at it often. And feel proud of yourself for quitting.

Won't I gain weight?

According to recent studies, only about one-third of ex-smokers gain some weight; one-third lose weight, and one-third stay the same. The key to not gaining weight is to not eat every time you crave a smoke.

As long as you maintain a well-balanced diet, don't snack between meals, and exercise, you shouldn't experience any weight problems.

What if I fail?

Many people who have successfully quit smoking failed the first time they tried. Often they describe these "failures" as valuable learning experiences that helped them succeed the next time. Whatever you do, don't give up!

**PLEASE TALK WITH YOUR NURSE
OR DOCTOR FOR MORE INFORMATION.**

Reference: Mosby's Patient Teaching Guides
Reviewed by CA/PNP Adolescent Health Center
Revised by WN/APS 4-04

Control Material Week 18



Women: Stay Healthy at Any Age

Use the information in this pamphlet to help you stay healthy. Learn about which screening tests to get, whether you need medicines to prevent diseases, and steps you can take for good health.



Get More Information on Good Health

Check out these Federal Government Web sites:

Healthfinder.gov. Guides and tools for healthy living, an encyclopedia of health-related topics, health news, and more. Go to: www.healthfinder.gov.

MedlinePlus. Health information from government agencies and health organizations, including a medical encyclopedia and health tools. Go to: www.medlineplus.gov.

Questions Are the Answer. Information on how to get involved in your health care by asking questions, understanding your condition, and learning about your options. Go to: www.ahrq.gov/questionsaretheanswer.

If you don't have access to a computer, talk to your local librarian about health information in the library.

Sources. The information in this pamphlet is based on research from the U.S. Department of Health and Human Services and the U.S. Preventive Services Task Force (USPSTF). The USPSTF, supported by AHRQ, is a national independent panel of medical experts that makes recommendations based on scientific evidence about which clinical preventive services should be included in primary medical care and for which populations.

For information about the USPSTF and its recommendations, go to: www.uspreventiveservicestaskforce.org.



Get the Screenings You Need

Screenings are tests that look for diseases before you have symptoms. Blood pressure checks and mammograms are examples of screenings.

You can get some screenings, such as blood pressure readings, in your doctor's office. Others, such as mammograms, need special equipment, so you may need to go to a different office.

After a screening test, ask when you will see the results and who to talk to about them.

Breast Cancer. Ask your health care team whether a mammogram is right for you based on your age, family history, overall health, and personal concerns.

Cervical Cancer. Have a Pap smear every 1 to 3 years if you are 21 to 65 years old and have been sexually active. If you are older than 65 and recent Pap smears were normal, you do not need a Pap smear. If you have had a hysterectomy for a reason other than cancer, you do not need a Pap smear.

Chlamydia and Other Sexually Transmitted Diseases. Sexually transmitted diseases can make it hard to get pregnant, may affect your baby, and can cause other health problems.

- Have a screening test for Chlamydia if you are 24 or younger and sexually active. If you are older than 24, talk to your health care team about being screened for Chlamydia.
- Ask your doctor or nurse whether you should be screened for other sexually transmitted diseases.

Colorectal Cancer. Have a screening test for colorectal cancer starting at age 50. If you have a family history of colorectal cancer, you may need to be screened earlier. Several different tests can detect this cancer. Your health care team can help you decide which is best for you.

Depression. Your emotional health is as important as your physical health. Talk to your health care team about being screened for depression, especially if during the last 2 weeks:

- You have felt down, sad, or hopeless.
- You have felt little interest or pleasure in doing things.

Diabetes. Get screened for diabetes if your blood pressure is higher than 135/80 or if you take medication for high blood pressure.

Diabetes (high blood sugar) can cause problems with your heart, brain, eyes, feet, kidneys, nerves, and other body parts.

High Blood Pressure. Starting at age 18, have your blood pressure checked at least every 2 years. High blood pressure is 140/90 or higher. High blood pressure can cause stroke, heart attack, kidney and eye problems, and heart failure.

AHRQ
U.S. Department of Health and Human Services
Agency for Healthcare Research and Quality
www.ahrq.gov

AHRQ Pub. No. 104F002-A
Replaces AHRQ Pub. No. 074F005A
August 2010



It's *Your* Body!

You know your body better than anyone. Always tell your doctor or nurse about any changes in your health, including your vision and hearing. Ask them about being checked for any condition you are concerned about, not just the ones here. If you are wondering about diseases such as glaucoma or skin cancer, for example, ask about them.

High Cholesterol. Starting at age 20, have your cholesterol checked regularly if:

- You use tobacco.
- You are obese.
- You have diabetes or high blood pressure.
- You have a personal history of heart disease or blocked arteries.
- A man in your family had a heart attack before age 50 or a woman, before age 60.

HIV. Talk with your health care team about HIV screening if any of these apply to you:

- You have had unprotected sex with multiple partners.
- You have injected drugs.
- You exchange sex for money or drugs or have sex partners who do.
- You have or had a sex partner who is HIV-infected, bisexual, or injects drugs.
- You are being treated for a sexually transmitted disease.
- You had a blood transfusion between 1978 and 1985.
- You have any other concerns.

Osteoporosis (Bone Thinning). Have a screening test at age 65 to make sure your bones are strong. If you are younger than 65, talk to your health care team about whether you should be tested.

Overweight and Obesity. The best way to learn if you are overweight or obese is to find your body mass index (BMI). You can find your BMI by entering your height and weight into a BMI calculator, such as the one available at: <http://www.nhlbiupport.com/bmi/>. A BMI between 18.5 and 25 indicates a normal weight. Persons with a BMI of 30 or higher may be obese. If you are obese, talk to your doctor or nurse about seeking intensive counseling and help with changing your behaviors to lose weight. Overweight and obesity can lead to diabetes and cardiovascular disease.



Take Preventive Medicines If You Need Them

Aspirin. If you are 55 or older, ask your health care team if you should take aspirin to prevent strokes.

Breast Cancer Drugs. If your mother, sister, or daughter has had breast cancer, talk to your doctor about whether you should take medicines to prevent breast cancer.

Estrogen for Menopause (Hormone Replacement Therapy). Do not use estrogen to prevent heart disease or other diseases. If you need relief from symptoms of menopause, talk with your health care team.

Immunizations.

- Get a flu shot every year.
- If you are 65 or older, get a pneumonia shot.
- Depending on health problems, you may need a pneumonia shot at a younger age or need shots to prevent diseases like whooping cough or shingles.
- Talk with your health care team about whether you need vaccinations. You can also find which ones you need by going to: www2.cdc.gov/nip/adultimmsched/.



Take Steps to Good Health

Be physically active and make healthy food choices. Learn how at www.healthfinder.gov/prevention.

Get to a healthy weight and stay there. Balance the calories you take in from food and drink with the calories you burn off by your activities.

Be tobacco free. For tips on how to quit, go to www.smokefree.gov. To talk to someone about how to quit, call the National Quitline: 1-800-QUITNOW (784-8669).

If you drink alcohol, have no more than one drink per day. A standard drink is one 12-ounce bottle of beer or wine cooler, one 5-ounce glass of wine, or 1.5 ounces of 80-proof distilled spirits.



Men: Stay Healthy at Any Age

Use the information in this pamphlet to help you stay healthy. Learn about which screening tests to get, whether you need medicines to prevent diseases, and steps you can take for good health.



Get More Information on Good Health

Check out these Federal Government Web sites:

Healthfinder.gov. Guides and tools for healthy living, an encyclopedia of health-related topics, health news, and more. Go to: <http://www.healthfinder.gov>.

MedlinePlus. Health information from government agencies and health organizations, including a medical encyclopedia and health tools. Go to: www.medlineplus.gov/.

Questions Are the Answer. Information on how to get involved in your health care by asking questions, understanding your condition, and learning about your options. Go to: www.ahrq.gov/questionsaretheanswer/.

Healthy Men. An AHRQ Web site for men on staying healthy. Go to: www.ahrq.gov/healthymen/.

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For information about the USPSTF and its recommendations, go to www.uspreventiveservicestaskforce.org.



Get the Screenings You Need

Screenings are tests that look for diseases before you have symptoms. Blood pressure checks and tests for high cholesterol are examples of screenings.

You can get some screenings, such as blood pressure readings, in your doctor's office. Others such as colonoscopy, a test for colorectal cancer, need special equipment, so you may need to go to a different office.

After a screening test, ask when you will see the results and who you should talk to about them.

Abdominal Aortic Aneurysm. If you are between the ages of 65 and 75 and have ever been a smoker, talk to your doctor or nurse about being screened for abdominal aortic aneurysm (AAA). AAA is a bulging in your abdominal aorta, the largest artery in your body. An AAA may burst, which can cause dangerous bleeding and death.

Colorectal Cancer. Have a screening test for colorectal cancer starting at age 50. If you have a family history of colorectal cancer, you may need to be screened earlier. Several different tests can detect this cancer. Your doctor can help you decide which is best for you.

Depression. Your emotional health is as important as your physical health. Talk to your doctor or nurse about being screened for depression especially if during the last 2 weeks:

- You have felt down, sad, or hopeless.
- You have felt little interest or pleasure in doing things.

Diabetes. Get screened for diabetes if your blood pressure is higher than 135/80 or if you take medication for high blood pressure.

Diabetes (high blood sugar) can cause problems with your heart, brain, eyes, feet, kidneys, nerves, and other body parts.

High Blood Pressure. Starting at age 18, have your blood pressure checked at least every 2 years. High blood pressure is 140/90 or higher. High blood pressure can cause strokes, heart attacks, kidney and eye problems, and heart failure.

High Cholesterol. If you are 35 or older, have your cholesterol checked. Have your cholesterol checked starting at age 20 if:

- You use tobacco.
- You are obese.
- You have diabetes or high blood pressure.
- You have a personal history of heart disease or blocked arteries.
- A man in your family had a heart attack before age 50 or a woman, before age 60.

AHRQ
U.S. Department of Health and Human Services
Agency for Healthcare Research and Quality
www.ahrq.gov

AHRQ Pub. No. 104F004-A
Replaces AHRQ Pub. No. 074F006-A
August 2010



It's Your Body!

You know your body better than anyone else. Always tell your doctor or nurse about any changes in your health, including your vision and hearing. Ask them about being checked for any condition you are concerned about, not just the ones here. If you are wondering about diseases such as prostate cancer or skin cancer, for example, ask about them.

HIV. Talk with your health care team about HIV screening if any of these apply to you:

- You have had unprotected sex with multiple partners.
- You have sex with men.
- You use or have used injection drugs.
- You exchange sex for money or drugs or have sex partners who do.
- You have or had a sex partner who is HIV-infected or injects drugs.
- You are being treated for a sexually transmitted disease.
- You had a blood transfusion between 1978 and 1985.
- You have any other concerns.

Syphilis. Ask your doctor or nurse whether you should be screened for syphilis.

Overweight and Obesity. The best way to learn if you are overweight or obese is to find your body mass index (BMI). You can find your BMI by entering your height and weight into a BMI calculator, such as the one available at: <http://www.nhlbisupport.com/bmi/>.

A BMI between 18.5 and 25 indicates a normal weight. Persons with a BMI of 30 or higher may be obese. If you are obese, talk to your doctor or nurse about seeking intensive counseling and getting help with changing your behaviors to lose weight. Overweight and obesity can lead to diabetes and cardiovascular disease.



Take Preventive Medicines If You Need Them

Aspirin. If you are 45 or older, ask your doctor if you should take aspirin to prevent heart disease.

Immunizations.

- Get a flu shot every year.
- If you are 65 or older, get a pneumonia shot.
- Depending on health problems, you may need a pneumonia shot at a younger age or need shots to prevent diseases like whooping cough or shingles.
- Talk with your doctor or nurse about whether you need vaccinations. You can also find which ones you need by going to: www2.cdc.gov/nip/adultimmsched/.



Take Steps to Good Health

Be physically active and make healthy food choices. Learn how at www.healthfinder.gov/prevention.

Get to a healthy weight and stay there. Balance the calories you take in from food and drink with the calories you burn off by your activities.

Be tobacco free. For tips on how to quit, go to www.smokefree.gov. Total talk to someone about how to quit, call the National Quitline: 1-800-QUITNOW (784-8669).

If you drink alcohol, have no more than two drinks per day if you are 65 or younger. If you are older than 65, have no more than one drink a day.

A standard drink is one 12-ounce bottle of beer or wine cooler, one 5-ounce glass of wine, or 1.5 ounces of 80-proof distilled spirits.

Factsheet: Depression in College

Sometimes the multitude of life's changes that occur during your college years can trigger serious depression. At this vulnerable time, the smartest thing you can do for yourself is to seek help. If your feelings of constant stress and sadness go on for weeks or months, you may be experiencing more than just difficulty adjusting to life's changes. Seek assistance from a doctor or mental health professional, the university counseling service, or the student health center. While in treatment, there are a number of steps you can take to help you cope on your way to recovery.

- **Carefully plan your day.** Make time every day to prioritize your work. Prioritizing can give you a sense of control over what you must do and a sense that you can do it.
- **Plan your work and sleep schedules.** Too many students defer doing important class work until nighttime, work through much of the night, and start every day feeling exhausted. Constant fatigue can be a critical trigger for depression. Seven or eight hours of sleep a night is important to your well-being.
- **Participate in an extracurricular activity.** Sports, theater, fraternities and sororities, the student newspaper – whatever interests you – can bring opportunities to meet people interested in the same things you are, and these activities provide welcome change from class work.
- **Seek support from other people.** This may be a roommate or a friend from class. Friendships can help make a strange place feel more friendly and comfortable. Sharing your emotions reduces isolation and helps you realize that you are not alone.
- **Try relaxation methods.** These include meditation, deep breathing, warm baths, long walks, exercise – whatever you enjoy that lessens your feelings of stress and discomfort.
- **Take time for yourself every day.** Make special time for yourself – even if it's only for 15 minutes a day. Focusing on yourself can be energizing and gives you a feeling of purpose and control over your life.
- **Work towards recovery.** The most important step in combating depression and reclaiming your college experience is to seek treatment. Your physician should communicate to you that remission of symptoms should be your goal and work with you to determine whether psychological counseling, medication or a combination of both treatments is needed.

For More Information:

For help finding treatment, support groups, medication information, help paying for your medications, your local Mental Health America affiliate, and other mental health-related services in your community, please click here to access our [Frequently Asked Questions](#) and Answers. **If you or someone you know is in crisis now**, seek help immediately. Call 1-800-273-TALK (8255) to reach a 24 hour crisis center or dial 911 for immediate assistance.

SUICIDE

A major, preventable mental health problem

Facts about suicide and suicide prevention among teens and young adults.

Some common questions and answers about suicide:

Q: *How common is suicide in children and teens?*

A: In 2007, suicide was the third leading cause of death for young people ages 15–24. Suicide accounted for 4,140 deaths (12 percent) of the total 34,598 suicide deaths in 2007.

While these numbers may make suicide seem common, it is important to realize that suicide and suicidal behavior are not healthy or typical responses to stress.

Q: *What are some of the risk factors for suicide?*

A: Risk factors occur in combination or change over time. Some important risk factors vary with age, gender, or ethnic group. They may occur in combination or change over time. Some important risk factors are:

- Depression and other mental disorders
- Substance abuse disorder (often in combination with other mental disorders)
- Prior suicide attempt
- Family history of suicide
- Family violence including physical or sexual abuse
- Firearms in the home
- Incarceration
- Exposure to suicidal behavior of others, such as family members or peers.

However, it is important to note that many people who have these risk factors are not suicidal.

Q: *What are signs to look for?*

A: The following are some of the signs you might notice in yourself or a friend that may be reason for concern.

- Feelings of hopelessness or worthlessness, depressed mood, poor self-esteem or guilt
- Not wanting to participate in family or social activities
- Changes in sleeping and eating patterns: too much or too little
- Feelings of anger, rage, need for revenge
- Feeling exhausted most of the time
- Trouble with concentration, problems academically or socially in school
- Feeling listless, irritable
- Regular and frequent crying
- Not taking care of yourself
- Reckless, impulsive behaviors
- Frequent physical symptoms such as headaches or stomach aches.

Seeking help is a sign of strength, if you are concerned, go with your instincts, get help!





Q: *What can I do for myself or someone else?*

A: If you are concerned, immediate action is very important. Suicide can be prevented and most people who feel suicidal demonstrate warning signs. Recognizing some of these warning signs is the first step in helping yourself or someone you care about.

If you are in crisis and need help: call this toll-free number, available 24 hours a day, every day **1-800-273-TALK (8255)** or go to: <http://www.suicidepreventionlifeline.org>. You will reach the National Suicide Prevention Lifeline, a service available to anyone. You may call for yourself or for someone you care about and all calls are confidential.

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For more information on suicide

Visit the National Library of Medicine’s MedlinePlus <http://medlineplus.gov>

En Español <http://medlineplus.gov/spanish>

For information on clinical trials

<http://www.nlm.nih.gov/health/trials/index.shtml>

National Library of Medicine clinical trials database

<http://www.clinicaltrials.gov>

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E-mail: nimhinfo@nih.gov

Website: <http://www.nlm.nih.gov>



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

National Institute of Mental Health

Control Material Week 21

Facts on High Blood Pressure

Having high blood pressure puts you at risk for heart disease and stroke, the first and third leading causes of death in the United States.

High blood pressure was a primary or contributing cause of death for 326,000 Americans in 2006.

High blood pressure usually has no warning signs or symptoms, so many people don't realize they have it.

About one out of three U.S. adults—31.3%—has high blood pressure.

About one in four American adults has prehypertension—blood pressure measurements that are higher than normal, but not yet in the high blood pressure range.² Having prehypertension raises your risk for high blood pressure.

In 2010, high blood pressure will cost the United States \$76.6 billion in health care services, medications, and missed days of work.²

Blood pressure is written as two numbers. The first (systolic) number represents the pressure in your blood vessels when your heart beats. The second (diastolic) number represents the pressure in your vessels when your heart rests between beats.

Blood Pressure Levels

Normal

systolic: less than 120 mmHg

diastolic: less than 80mmHg

At risk (prehypertension)

systolic: 120–139 mmHg

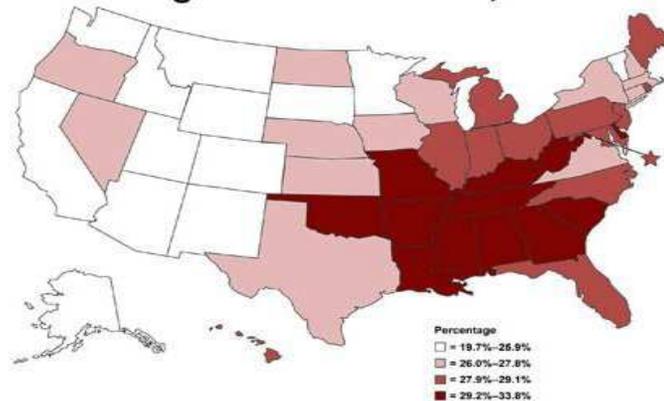
diastolic: 80–89 mmHg

High

systolic: 140 mmHg or higher

diastolic: 90 mmHg or higher

Percentage of Adults Aged 20 Years and Older Who Have Been Told They Have High Blood Pressure, 2007



Control Material Week 22

Anger Management Fact Sheet

"Speak Peace"

What is anger, and why should I keep it under control?

Do you know that keeping your anger in check is good for your health. Anger is a natural emotion, but sometimes anger can lead to behavior that is out of control. It may even feel like the anger is controlling you. Have you ever had this happen to you? If so, you're not alone. Many people have trouble managing their anger.

How can I tell if I am getting too angry?



Your body has a few ways of letting you know when you are getting too angry. Some common feelings may include:

- Your heart races - it beats very fast and may even feel like it's pounding in your chest
- You breathe faster - it may feel like you can't catch your breath
- Your muscles tighten - your body feels stiff
- Your body temperature increases - you feel hot and may sweat a lot

Are there some situations that make you feel particularly angry?



Try to look at how you react to things. Find out your triggers. Ask yourself: What situations make me feel anger? What words make me angry? By answering these questions you can plan what you will do when these situations happen.

What are some ways I can learn to control my temper?



- Improve your problem solving skills.
- Take responsibility for your actions.
- Think about the consequence of your behavior
- Pay attention to what upsets you..
- Pay attention to how your body feels when you are angry.

Is there anything I can do to relax when I'm feeling so angry?



- **Take slow deep breaths.** Breathe in and slowly breathe out - This works especially well when you feel like your breathing is speeding up.
- **Repeat a calming word or sentence** to yourself such as "I am in control of my feelings."
- **Tighten your muscles then relax them.** Notice the difference.
- **Close your eyes and think about a person, place or thing, that makes you feel calm.**

What if my anger feels out of control?

911

- **Leave the scene** - Take yourself away from the person and/or place where you became angry. A change of scenery can help you "cool off" your angry feelings.
- **Walk away instead of driving away** - Walking is a great way to get your anger out. Avoid driving to prevent yourself from putting yourself and others in danger.
- **Choose safe ways to deal with anger** - Take deep breaths, repeat a calming word, relax your muscles, imagine a calm place to decrease your anger. Do not engage in self-destructive behaviors or behaviors that can hurt others.
- **If you feel you are a danger to yourself or others, call 911 or go to the closest emergency room.** If you are having thoughts of wanting to hurt yourself or hurt other people, it is important to get help immediately!

What do I do with all the anger inside?



- **Talk to someone you trust** Call or meet with a person you feel comfortable with and is a good listener.
- **See your school counselor**
- **Exercise** - Get that anger out by taking a long walk (in a safe part of town), work out at the gym or play a sport. Exercise stimulates the release of a chemical in the brain called "endorphins" that make us feel happy.
- **Write in a journal** - Let your feelings out by writing about them in a journal or create poetry or song lyrics. You can use your journal to write a letter to someone you are really mad at.
- **Listen to or play music** - Music has a way of calming the soul whether it is listening to your iPod, singing along with the car radio (even if you sing off key), or playing an instrument.
- **Draw, paint or do other creative art projects** - For some people, being creative is an outlet for their anger and helps them manage their feelings.
- **Rest** - Anger often takes our energy away and makes us feel exhausted. It's fine to take a break, nap, or go to bed early. Sleep helps us focus so we can deal with our feelings better.

True strength comes from the ability to do the "right" thing when it is the hardest thing to do.



Information adapted from : <http://www.youngwomenshealth.org/anger.html>

Mental Health and Crisis Management Services

M-DCPS Crisis Line: 305-995-CARE

<http://mhcms.dadeschools.net/>



Pedestrian Safety Fact Sheet

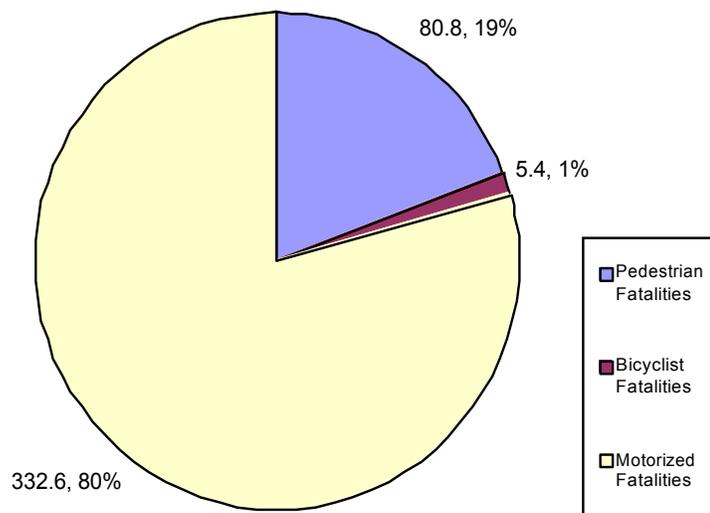
The Pedestrian Safety Problem

In 2006 4,784 pedestrians were killed in the United States, up from 4,675 in 2004. The National Highway Traffic Safety Administration estimates that a pedestrian is killed almost every 2 hours and injured every 9 minutes on our nation's roadways. Nationally, pedestrians account for 11% of motor vehicle deaths with urban areas having higher fatality rates than rural areas.

Pedestrian fatality and injury rates in the greater Washington, DC region are typical for a major urbanized area, but still high in proportion to the number of pedestrian trips. A pedestrian is killed in the Washington region every 4.4 day, and an average of 5.6 pedestrians are injured every day.

Approximately 2300 pedestrians are injured every year in the Washington region, and eighty-four are killed. Pedestrian fatalities accounted for one fifth of the total traffic fatalities in the District of Columbia, suburban Maryland and northern Virginia from 2002-2006.

Average Annual Pedestrian, Bicyclist, and Motorized Traffic Fatalities in the Washington Region, 2002-2006



Trends in Pedestrian Fatalities and Injuries

Pedestrian injury rates as a proportion of population were flat from 1994 through 2006 at about 45 injuries per 100,000 population.

The absolute number of pedestrian fatalities has remained more or less flat, but the rate per population has decreased. The fatality rate per 100,000 population fell from 1.94 in 1994-1999 to 1.66 in 2000-2005.

Pedestrian Profile

- **Age and Gender**

Persons aged 25 to 44 have the highest percentage of pedestrian crashes. Around 60% of victims are male. The median age of pedestrians who are killed is somewhat older, with pedestrians aged 65 and older accounting for about 15% of fatalities. The frail condition of many elderly makes them more vulnerable to death and serious injury.

- **Race/Ethnicity**

Hispanics have the highest rate of pedestrian hospitalizations, Blacks the second-highest, Whites the third-highest, and Asians the lowest rate. In Northern Virginia Hispanics are hospitalized at a rate of eight per 100,000 population, compared to six per 100,000 for Blacks, three per 100,000 for Whites, and two per 100,000 for Asians. Proportions are roughly comparable in DC and Maryland.

- **Alcohol**

The majority of pedestrians struck (about 90%) had no evidence of alcohol or drug abuse, nor did most drivers. Of the intoxicated 90% had been using alcohol.

Driver Profile

- **Age and Gender**

Young male drivers account for the most pedestrian crashes. In Northern Virginia drivers aged 25 to 34 account for most pedestrian crashes, with drivers aged 35 to 44 and 15 to 24 each accounting for nearly as many. In Northern Virginia 54% of the drivers are male, 33% female, and another 13% were unknown.

- **Alcohol**

90% of drivers who were identified had not abused alcohol or drugs. However, it is likely that a significant proportion of the hit and run drivers were intoxicated.

- **Physical Condition**

Data from Northern Virginia show that 75% of drivers involved in pedestrian collisions had no physical impairment. However, 20% had defective eyesight, and another 4% were ill, fatigued, or asleep.

Circumstances of Pedestrian Crashes

- **Vehicle Type**

Passenger cars and light trucks account for an overwhelming majority of pedestrian crashes in the Washington region. Less than 5% of pedestrian crashes can be attributed to trucks and buses.

Truck and bus crashes are much more likely to be lethal for the pedestrian, however, with a lethality rate of 11% versus 4% for passenger cars.

- **Driver Action**

More than half of drivers who hit a pedestrian were going straight, about one quarter were turning, and between 5 to 9% were backing up.

Trucks that hit a pedestrian are less likely to be going straight ahead, and more likely to be turning or backing. Approximately 40% of trucks that hit a pedestrian are going straight, compared to about 25% making turns, and about 15% that are backing up.

14% of pedestrians hit by trucks in Northern Virginia were outside the roadway, versus 4% of those hit by passenger cars.

Buses that hit pedestrians are more likely to be turning (nearly half of all collisions) than going straight ahead (less than half). Collisions while backing up are less of a problem with buses than with trucks.

- **Driver Violation**

In about half the collisions there was no driver violation. In Northern Virginia driver inattention (13%), hit-and-run (11%), and failure to yield the right-of-way (8%) are some of the most common driver violations.

While only 1% of drivers are shown as having exceeded the speed limit, the reliance on motorist accounts of the crash may create a bias in the data. Speed also affects injury severity and likelihood of a fatal collision, regardless of whether the driver exceeded the speed limit.

- **Pedestrian Action**

The most common pedestrian action in Virginia and Maryland was crossing not at an intersection, the second most common crossing at an intersection. In Maryland 40% of pedestrians were hit while crossing not at an intersection.

- **Lighting and road conditions**

Data from Maryland indicates that the vast majority of pedestrian crashes occur either in daylight (58%) or where street lighting was present (30%). 13% of crashes occurred in rain, fog, or snow. Specific road defects were present in only 3% of crashes.

In the District of Columbia 65% of pedestrian crashes occurred during daylight hours.

- **Traffic conditions**

Data from the District of Columbia shows that only 21% of pedestrian crashes occurred when traffic was heavy, versus 46% in medium and 34% in light traffic.

- **Timing**

Most pedestrian crashes occur during the afternoon weekday rush hour. The peak day and hour is Friday at 5 p.m.

- **Location**

The highest pedestrian crash rates are found in the urban core and inner suburban areas, especially areas with low incomes and/or high Hispanic immigrant populations. The pedestrian injury rate is highest in the District of Columbia.

However, the fatality rate per population is not a good measure of the danger of walking since it does not take into account pedestrian exposure, or the number of miles walked.

Deaths and injuries, including those of nonresidents, are calculated against *resident* population. Jurisdictions with large numbers of nonresident workers and visitors, such as the District of Columbia, will have a higher pedestrian injury rate per population.

The relative danger of walking is probably highest in the inner suburbs since people there walk much less, according to census walk to work numbers, than in the urban core jurisdictions of the District of Columbia, Arlington, and Alexandria.

Summary

The people who are being injured and killed walking in the Washington region tend to be new immigrants, often transit users, often people of low socioeconomic status, hit while crossing the street between intersections on busy commercial/residential corridors,

usually during the weekday evening rush hour. Pedestrians are often struck at locations other than an intersection, which may indicate a lack of safe crossing facilities. Fault for pedestrian crashes is about evenly divided between motorists and pedestrians.

Collisions tend to occur in good lighting and weather conditions. However, a significant number of drivers involved in pedestrian collisions have defective eyesight.

Data on pedestrian crashes and injuries is not always strictly comparable across State lines, since each State defines, collects, and maintains data differently. Data in this fact sheet is from the 2005 and 2007 Inova Fairfax studies of pedestrian injury in the Washington region, as well as jurisdictional pedestrian death and injury numbers provided by the District Department of Transportation, the Virginia Department of Motor Vehicles, and the Maryland Office of Highway Safety.

To help the environment, we have kept handouts to a minimum and printed on two sides. To see additional materials, or to share materials with others, visit the workshop website at

www.mwcog.org/pedestrian_safety





Hearing: Noise-Induced Hearing Loss

What are the effects of noise?

Aging, some drugs, head injuries and too much noise can all cause lasting damage to hearing. This handout discusses the most common type of permanent hearing loss -- the loss that results from too much noise.

Frequent exposure to loud or moderately loud noise over a long period of time can damage the soft tissue of the inner ear. Cells and nerves in the inner ear are destroyed by continuous or repeated exposure to loud sounds. If enough cells and nerves are destroyed, hearing is permanently damaged.

Whether noise harms your hearing depends on the loudness, the pitch and the length of time you are exposed to the noise. The loudness of a sound (measured in decibels, or dB) and the length of exposure are related. The louder the sound, the shorter the exposure can be before damage occurs. For example, 8 hours of exposure to 85-dB noise on a daily basis can begin to damage a person's ears over time. Using power tools (at about 100 dB), listening to loud stereo headsets (at about 110 dB), attending a rock concert (at about 120 dB) or hearing a gunshot (at 140 to 170 dB) may damage the hearing of some people after only a few times.

What are the symptoms of noise-induced hearing loss?

One reason people fail to notice the danger of noise is that too much exposure to noise causes few symptoms. Hearing loss is rarely painful. The symptoms are usually vague feelings of pressure or fullness in the ears, speech that seems to be muffled or far away, and a ringing sound in the ears that you notice when you are in quiet places. These symptoms may go away minutes, hours or days after the exposure to noise ends.

People assume that if the symptoms go away, their ears have "bounced back" to normal. This is not really true. Even if there are no more symptoms, some of the cells in the inner ear may have been destroyed by the noise. Your hearing returns to normal if enough healthy cells are left in your inner ear. But you will develop a lasting hearing loss if the noise exposure is repeated and more cells are destroyed.

The first sign of a noise-induced hearing loss is not hearing high-pitched sounds, like the singing of birds, or not understanding speech when in a crowd or an area with a lot of background noise. If the damage goes on, hearing declines further, and lower pitched sounds become hard to understand.

How can you decide which noises are too loud?

- If you have to shout to be heard above the noise.
- If you can't understand someone who is speaking to you from less than 2 feet away.
- If a person standing near you can hear sounds from your stereo headset while it is on your head.

How can I prevent noise-induced hearing loss?

- **Reduce your exposure to noise.** This step is especially important for people who work in noisy places and who go to and from work in noisy city traffic. Special earmuffs that protect your ears are available for people who work in noisy environments (such as around heavy machinery). You can also reduce your exposure to noise by choosing quiet leisure activities rather than noisy ones.
- **Develop the habit of wearing earplugs when you know you will be exposed to noise for a long time.** Disposable foam earplugs cost about \$2 a pair and are available in drugstores. These

earplugs, which can quiet up to 25 dB of sound, can mean the difference between a dangerous and a safe level of noise. You should always wear ear plugs when riding snowmobiles or motorcycles, attending concerts, when using power tools, lawn mowers or leaf blowers, or when traveling in loud motorized vehicles.

- **Use sound-absorbing materials to reduce noise at home and at work.** Rubber mats can be put under noisy kitchen appliances, computer printers and typewriters to cut down on noise. Curtains and carpeting also help reduce indoor noise. Storm windows or double-pane windows can reduce the amount of outside noise that enters the home or workplace.
- **Don't use several noisy machines at the same time.** Try to keep television sets, stereos and headsets low in volume. Loudness is a habit that can be broken.
- **Don't try to drown out unwanted noise with other sounds.** For example, don't turn up the volume on your car radio or headset to drown out traffic noise or turn up the television volume while vacuuming.
- **Have your hearing checked.** Persons at risk for hearing loss should have their hearing tested every year. You are at risk if you are regularly exposed to loud noise at work or play.

Source

[Written by familydoctor.org editorial staff.](#)

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Appendix M: Pre and Post Intervention Health Measures Questionnaire

Name: _____ Date: _____

Height 1: _____ feet, _____ inches 2.: _____ feet, _____ inches

Weight: 1. _____ pounds 2. _____ pounds

BMI 1: _____ BMI 2: _____

%Body fat: 1. _____ 2. _____

Superior iliac waist circumference: 1. _____ 2. _____

Waist-to-Hip Ratio: 1. _____ 2. _____

Neck Circumference: 1. _____ 2. _____

Blood Pressure: 1. _____ 2. _____

VO₂max: 1. _____ 2. _____

Appendix N: Standard References for Health Measures

Presented to Participants at Visit 5

Classification by BMI, Waist Circumference, and Associated Risk for Type 2 Diabetes, Hypertension, and CVD			
http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/bmi_dis.htm			
Disease Risk* Relative to Normal Weight and Waist Circumference			
BMI (kg/m ²)		Men 102 cm (40 in) or less Women 88 cm (35 in) or less	Men > 102 cm (40 in) Women > 88 cm (35 in)
Underweight	< 18.5	-	-
Normal	18.5 - 24.9	-	-
Overweight	25.0 - 29.9	Increased	High
Obesity	30.0 - 34.9	High	Very High
	35.0 - 39.9	Very High	Very High
Extreme Obesity	40.0 +	Extremely High	Extremely High

* Disease risk for type 2 diabetes, hypertension, and CVD.

+ Increased waist circumference can also be a marker for increased risk even in persons of normal weight.

Body Fat Percent Health Standards		
Body Fat Range	Male	Female
Risky (high body fat)	>30%	>40%
Excess Fat	21-30%	31-40%
Normal range	9-20%	19-30%
Elite athlete	5-8%	15-18%
Risky (low body fat)	<5%	<15%

Applies to adults ages 18 and older. Based on information from the American College of Sports Medicine, the American Council on Exercise, Exercise Physiology (4th Ed.) by McArdle, Katch, and Katch, and various scientific and epidemiological studies.

Waist-to-Hip Ratio (WHR) DM and CVD Risk Cut-offs

Reference	WHR Cut-off		Waist site
	female	male	
Institute of Medicine	≥0.8	≥1.0	suprailiac

Summary: weighing the options--criteria for evaluating weight-management programs. Committee to Develop Criteria for Evaluating the Outcomes of Approaches to Prevent and Treat Obesity Food and Nutrition Board, Institute of Medicine, National Academy of Sciences. J Am Diet Assoc, 1995. 95(1): p 96-105.

Neck Circumference Reference Values

Sex	Category	Neck Circumference (cm)
Female	Normal	<34
	Overweight	34- 36.4
	Obese	≥36.5
Male	Normal	<37
	Overweight	37-39.4
	Obese	≥39.5

Ben-Noun, L., E. Sohar, and A. Laor, Neck circumference as a simple screening measure for identifying overweight and obese patients. *Obes Res*, 2001. 9(8): p. 470-7.

Categories for Blood Pressure in Adults (Ages 18 Years and Older)

	Blood Pressure Level (mmHg)		
Category	Systolic		Diastolic
Normal	< 120	and	< 80
Prehypertension	120-139	or	80-89
High Blood Pressure			
Stage 1 Hypertension	140–159	or	90–99
Stage 2 Hypertension	≥ 160	or	≥ 100

<http://www.nhlbi.nih.gov/hbp/detect/categ.htm> (Accessed 8)

Classification of Physical Fitness by Maximum Oxygen Utilization

Normative data (Heywood 2006) for Female (values in ml/kg/min)

Age	Very Poor	Poor	Fair	Good	Excellent	Superior
13-19	<25	25 - 30	31 - 34	35 - 38	39 - 41	>41
20-29	<24	24 - 28	29 - 32	33 - 36	37 - 41	>41
30-39	<23	23 - 27	28 - 31	32 - 36	37 - 40	>40
40-49	<21	21 - 24	25 - 28	29 - 32	33 - 36	>36
50-59	<20	20 - 22	23 - 26	27 - 31	32 - 35	>35
60+	<17	17 - 19	20 - 24	25 - 29	30 - 31	>31

Normative data (Heywood 2006) for Male (values in ml/kg/min)

Age	Very Poor	Poor	Fair	Good	Excellent	Superior
13-19	<35	35 - 37	38 - 44	45 - 50	51 - 55	>55
20-29	<33	33 - 35	36 - 41	42 - 45	46 - 52	>52
30-39	<31	31 - 34	35 - 40	41 - 44	45 - 49	>49
40-49	<30	30 - 32	33 - 38	39 - 42	43 - 47	>48
50-59	<26	26 - 30	31 - 35	36 - 40	41 - 45	>45
60+	<20	20 - 25	26 - 31	32 - 35	36 - 44	>44

Heywood, V., The Physical Fitness Specialist Manual, The Cooper Institute for Aerobics Research, Dallas TX, revised 2005. In: HEYWOOD, V (2006) Advanced Fitness Assessment and Exercise Prescription. Fifth Edition ed2006, Champaign, IL: Human Kinetics.

This is not a diagnosis. Please see your medical professional for any health concerns.

Bibliography

1. Anderson DA, Shapiro JR, Lundgren JD: **The freshman year of college as a critical period for weight gain: an initial evaluation.** *Eat Behav* 2003, **4**:363-367.
2. Butler SM, Black DR, Blue CL, Gretebeck RJ: **Change in diet, physical activity, and body weight in female college freshman.** *Am J Health Behav* 2004, **28**:24-32.
3. Kasparek DG, Corwin SJ, Valois RF, Sargent RG, Morris RL: **Selected health behaviors that influence college freshman weight change.** *J Am Coll Health* 2008, **56**:437-444.
4. Racette SB, Deusinger SS, Strube MJ, Highstein GR, Deusinger RH: **Weight changes, exercise, and dietary patterns during freshman and sophomore years of college.** *J Am Coll Health* 2005, **53**:245-251.
5. Nelson MC, Larson NI, Barr-Anderson D, Neumark-Sztainer D, Story M: **Disparities in dietary intake, meal patterning, and home food environments among young adult nonstudents and 2- and 4-year college students.** *Am J Public Health* 2009, **99**:1216-1219.
6. Nelson MC, Story M: **Food environments in university dorms: 20,000 calories per dorm room and counting.** *Am J Prev Med* 2009, **36**:523-526.
7. **American College Health Association-National College Health Assessment II: Reference Group Executive Summary Spring 2013.** Hanover, MD; 2013.
8. Grayson K. Vincent VAV: **The Next Four Decades. The Older Population in the United State: 2010 to 2015. Population Estimates and Projections.** Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau; 2010.
9. Mary Madden AL, Maeve Duggan, Sandra Cortesi and Urs Gasser: **Teens and Technology** [<http://www.pewinternet.org/2013/03/13/teens-and-technology-2013/>], Access date: 8/27/2014.
10. Hoffman DJ, Policastro P, Quick V, Lee SK: **Changes in body weight and fat mass of men and women in the first year of college: A study of the "freshman 15".** *J Am Coll Health* 2006, **55**:41-45.
11. Levitsky DA, Halbmaier CA, Mrdjenovic G: **The freshman weight gain: a model for the study of the epidemic of obesity.** *Int J Obes Relat Metab Disord* 2004, **28**:1435-1442.
12. Morrow ML, Heesch KC, Dinger MK, Hull HR, Kneehans AW, Fields DA: **Freshman 15: fact or fiction?** *Obesity (Silver Spring)* 2006, **14**:1438-1443.
13. **Center for Disease Control and Prevention. Youth Risk Behavior Surveillance: National College Health Risk Behavior Survey - United States, 1995.** pp. MMWR. 46(SS-46) 41-54, 1997.:MMWR. 46(SS-46) 41-54, 1997.

14. **Center for Disease Control and Prevention. Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia: US Dept Health and Human Services CDC. 2005.**
15. Economos CD, Hildebrandt ML, Hyatt RR: **College freshman stress and weight change: differences by gender.** *Am J Health Behav* 2008, **32**:16-25.
16. Gillen MM, Lefkowitz ES: **The 'freshman 15': trends and predictors in a sample of multiethnic men and women.** *Eat Behav* 2011, **12**:261-266.
17. Gropper SS, Newton A, Harrington P, Simmons KP, Connell LJ, Ulrich P: **Body composition changes during the first two years of university.** *Prev Med* 2011, **52**:20-22.
18. Power C, Lake JK, Cole TJ: **Measurement and long-term health risks of child and adolescent fatness.** *Int J Obes Relat Metab Disord* 1997, **21**:507-526.
19. Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH: **Predicting obesity in young adulthood from childhood and parental obesity.** *N Engl J Med* 1997, **337**:869-873.
20. Juonala M, Raitakari M, J SAV, Raitakari OT: **Obesity in youth is not an independent predictor of carotid IMT in adulthood. The Cardiovascular Risk in Young Finns Study.** *Atherosclerosis* 2006, **185**:388-393.
21. Budd GM, Hayman LL: **Addressing the childhood obesity crisis: a call to action.** *MCN Am J Matern Child Nurs* 2008, **33**:111-118, quiz 119-120.
22. Daniels SR, Arnett DK, Eckel RH, Gidding SS, Hayman LL, Kumanyika S, Robinson TN, Scott BJ, St Jeor S, Williams CL: **Overweight in children and adolescents: pathophysiology, consequences, prevention, and treatment.** *Circulation* 2005, **111**:1999-2012.
23. Fields DA, Hull HR, Cheline AJ, Yao M, Higgins PB: **Child-specific thoracic gas volume prediction equations for air-displacement plethysmography.** *Obes Res* 2004, **12**:1797-1804.
24. Freedman DS, Mei Z, Srinivasan SR, Berenson GS, Dietz WH: **Cardiovascular risk factors and excess adiposity among overweight children and adolescents: the Bogalusa Heart Study.** *J Pediatr* 2007, **150**:12-17 e12.
25. Gordon-Larsen P, The NS, Adair LS: **Longitudinal trends in obesity in the United States from adolescence to the third decade of life.** *Obesity (Silver Spring)* 2010, **18**:1801-1804.
26. Sun SS, Liang R, Huang TT, Daniels SR, Arslanian S, Liu K, Grave GD, Siervogel RM: **Childhood obesity predicts adult metabolic syndrome: the Fels Longitudinal Study.** *J Pediatr* 2008, **152**:191-200.
27. Williams DP, Going SB, Lohman TG, Harsha DW, Srinivasan SR, Webber LS, Berenson GS: **Body fatness and risk for elevated blood pressure, total cholesterol, and serum lipoprotein ratios in children and adolescents.** *Am J Public Health* 1992, **82**:358-363.
28. Arts J, Fernandez ML, Lofgren IE: **Coronary heart disease risk factors in college students.** *Adv Nutr* 2014, **5**:177-187.
29. Daniels SR, Benuck I., Christakis, D.A., Dennison, B.A., Gidding, S.S., Gilman, M.W., Gottesman, M.M., Kwiterovich, P.O., McBride, P.E.,

- McCrindle, B.W., Rocchini, A.P., Urbina, E.M., Van Horn, L.V., Washington, R.L.: **Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents: Summary Report.** In *Pediatrics*, vol. 128. pp. S213-S256; 2011:S213-S256.
30. Juhola J, Oikonen M, Magnussen CG, Mikkila V, Siitonen N, Jokinen E, Laitinen T, Wurtz P, Gidding SS, Taittonen L, Seppala I, Jula A, Kahonen M, Hutri-Kahonen N, Lehtimaki T, Viikari JS, Juonala M, Raitakari OT: **Childhood physical, environmental, and genetic predictors of adult hypertension: the cardiovascular risk in young Finns study.** *Circulation* 2012, **126**:402-409.
 31. Field AE, Cook NR, Gillman MW: **Weight status in childhood as a predictor of becoming overweight or hypertensive in early adulthood.** *Obes Res* 2005, **13**:163-169.
 32. Freedman DS, Patel DA, Srinivasan SR, Chen W, Tang R, Bond MG, Berenson GS: **The contribution of childhood obesity to adult carotid intima-media thickness: the Bogalusa Heart Study.** *Int J Obes (Lond)* 2008, **32**:749-756.
 33. Juonala M, Jarvisalo MJ, Maki-Torkko N, Kahonen M, Viikari JS, Raitakari OT: **Risk factors identified in childhood and decreased carotid artery elasticity in adulthood: the Cardiovascular Risk in Young Finns Study.** *Circulation* 2005, **112**:1486-1493.
 34. Le J, Zhang D, Menees S, Chen J, Raghuvver G: **"Vascular age" is advanced in children with atherosclerosis-promoting risk factors.** *Circ Cardiovasc Imaging* 2010, **3**:8-14.
 35. Ford ES, Ajani UA, Mokdad AH: **The metabolic syndrome and concentrations of C-reactive protein among U.S. youth.** *Diabetes Care* 2005, **28**:878-881.
 36. Weiss R, Dziura J, Burgert TS, Tamborlane WV, Taksali SE, Yeckel CW, Allen K, Lopes M, Savoye M, Morrison J, Sherwin RS, Caprio S: **Obesity and the metabolic syndrome in children and adolescents.** *N Engl J Med* 2004, **350**:2362-2374.
 37. Laurson KR, Welk GJ, Eisenmann JC: **Diagnostic performance of BMI percentiles to identify adolescents with metabolic syndrome.** *Pediatrics* 2014, **133**:e330-338.
 38. Craddick SR, Elmer PJ, Obarzanek E, Vollmer WM, Svetkey LP, Swain MC: **The DASH diet and blood pressure.** *Curr Atheroscler Rep* 2003, **5**:484-491.
 39. Greaney ML, Less FD, White AA, Dayton SF, Riebe D, Blissmer B, Shoff S, Walsh JR, Greene GW: **College students' barriers and enablers for healthful weight management: a qualitative study.** *J Nutr Educ Behav* 2009, **41**:281-286.
 40. Bazzano LA: **The high cost of not consuming fruits and vegetables.** *J Am Diet Assoc* 2006, **106**:1364-1368.
 41. Bellavia A, Larsson SC, Bottai M, Wolk A, Orsini N: **Fruit and vegetable consumption and all-cause mortality: a dose-response analysis.** *Am J Clin Nutr* 2013, **98**:454-459.

42. Research WCRFAIfC: **World Cancer Research Fund / American Institute for Cancer Research. Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective.** Washington, DC: AICR 2007 [<http://www.aicr.org/reduce-your-cancer-risk/>], Access date: 8/24/2011.
43. Graham DJ, Laska MN: **Nutrition label use partially mediates the relationship between attitude toward healthy eating and overall dietary quality among college students.** *J Acad Nutr Diet* 2012, **112**:414-418.
44. Greene GW, Schembre SM, White AA, Hoerr SL, Lohse B, Shoff S, Horacek T, Riebe D, Patterson J, Phillips BW, Kattelman KK, Blissmer B: **Identifying clusters of college students at elevated health risk based on eating and exercise behaviors and psychosocial determinants of body weight.** *J Am Diet Assoc* 2011, **111**:394-400.
45. Racette SB, Deusinger SS, Strube MJ, Highstein GR, Deusinger RH: **Changes in weight and health behaviors from freshman through senior year of college.** *J Nutr Educ Behav* 2008, **40**:39-42.
46. Sharma SV, Bush JA, Lorino AJ, Knoblauch M, Abuamer D, Blog G, Bertman D: **Diet and cardiovascular risk in university marching band, dance team and cheer squad members: a cross-sectional study.** *J Int Soc Sports Nutr* 2008, **5**:9.
47. **U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2010. 7th Edition.** U.S. Government Printing Office: Washington, DC; December 2010.
48. **Diet, nutrition and the prevention of chronic diseases. Report of the joint WHO/FAO expert consultation.** In *WHO Technical Report Series*; 2003.
49. Fernandes J, Arts J, Dimond E, Hirshberg S, Lofgren IE: **Dietary factors are associated with coronary heart disease risk factors in college students.** *Nutr Res* 2013, **33**:647-652.
50. Li KK, Concepcion RY, Lee H, Cardinal BJ, Ebbeck V, Woekel E, Readdy RT: **An examination of sex differences in relation to the eating habits and nutrient intakes of university students.** *J Nutr Educ Behav* 2012, **44**:246-250.
51. Morrell JS, Lofgren IE, Burke JD, Reilly RA: **Metabolic syndrome, obesity, and related risk factors among college men and women.** *J Am Coll Health* 2012, **60**:82-89.
52. Panel on Macronutrients PotDoDF, Subcommittee on Upper Reference Levels of Nutrients, Subcommittee on Interpretation and Uses of Dietary Reference Intakes, and the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board Institute of Medicine Food and Nutrition Board,: **Dietary Reference Intakes for Energy, Carbohydrates, Fiber, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients).** Washington DC: National Academy Press; 2005.
53. Pelletier JE, Laska MN: **Campus food and beverage purchases are associated with indicators of diet quality in college students living off campus.** *Am J Health Promot* 2013, **28**:80-87.
54. Hallal PC, Victora CG, Azevedo MR, Wells JC: **Adolescent physical activity and health: a systematic review.** *Sports Med* 2006, **36**:1019-1030.

55. Johnson KE, Taliaferro LA: **Relationships between physical activity and depressive symptoms among middle and older adolescents: a review of the research literature.** *J Spec Pediatr Nurs* 2011, **16**:235-251.
56. Kohrt WM, Bloomfield SA, Little KD, Nelson ME, Yingling VR: **American College of Sports Medicine Position Stand: physical activity and bone health.** *Med Sci Sports Exerc* 2004, **36**:1985-1996.
57. Committee PAGA: *Physical Activity Guidelines for Americans.* Washington, DC: U.S. Department of Health and Human Services; 2008.
58. Sabiston CM, O'Loughlin E, Brunet J, Chaiton M, Low NC, Barnett T, O'Loughlin J: **Linking depression symptom trajectories in adolescence to physical activity and team sports participation in young adults.** *Prev Med* 2013, **56**:95-98.
59. Brunet J, Sabiston CM, Chaiton M, Barnett TA, O'Loughlin E, Low NC, O'Loughlin JL: **The association between past and current physical activity and depressive symptoms in young adults: a 10-year prospective study.** *Ann Epidemiol* 2013, **23**:25-30.
60. Kantomaa MT, Tammelin TH, Ebeling HE, Taanila AM: **Emotional and behavioral problems in relation to physical activity in youth.** *Med Sci Sports Exerc* 2008, **40**:1749-1756.
61. Duckham RL, Baxter-Jones AD, Johnston JD, Vatanparast H, Cooper D, Kontulainen S: **Does physical activity in adolescence have site-specific and sex-specific benefits on young adult bone size, content, and estimated strength?** *J Bone Miner Res* 2014, **29**:479-486.
62. Bruyndonckx L, Hoymans VY, Van Craenenbroeck AH, Vissers DK, Vrints CJ, Ramet J, Conraads VM: **Assessment of endothelial dysfunction in childhood obesity and clinical use.** *Oxid Med Cell Longev* 2013, **2013**:174782.
63. (WHO) WHO: **Global Strategy on Diet, Physical Activity and Health** [http://www.who.int/dietphysicalactivity/physical_activity_intensity/en/], Access date: 10/23/2014.
64. Vainio H BF: **IARC Handbook of Cancer Prevention. Volume 6: Weight Control and physical activity.** Lyon, France.
65. Von Eschenbach A: **Energy Balance: The Complex Interaction of Diet, Physical Activity, and Genetics in Cancer Prevention and Control. Director's Update, 2004** [<http://www.cancer.gov/directorscorner/directorsupdate>], Access date: 8/27/2014.
66. Clarke G, Eubanks D, Reid E, Kelleher C, O'Connor E, DeBar LL, Lynch F, Nunley S, Gullion C: **Overcoming Depression on the Internet (ODIN) (2): a randomized trial of a self-help depression skills program with reminders.** *J Med Internet Res* 2005, **7**:e16.
67. DeBar LL, Dickerson J, Clarke G, Stevens VJ, Ritenbaugh C, Aickin M: **Using a website to build community and enhance outcomes in a group, multi-component intervention promoting healthy diet and exercise in adolescents.** *J Pediatr Psychol* 2009, **34**:539-550.

68. Di Noia J, Contento IR, Prochaska JO: **Computer-mediated intervention tailored on transtheoretical model stages and processes of change increases fruit and vegetable consumption among urban African-American adolescents.** *Am J Health Promot* 2008, **22**:336-341.
69. Ershow AG, Peterson CM, Riley WT, Rizzo AS, Wansink B: **Virtual reality technologies for research and education in obesity and diabetes: research needs and opportunities.** *J Diabetes Sci Technol* 2011, **5**:212-224.
70. Gay G, Pollak J, Adams P, Leonard JP: **Pilot study of Aurora, a social, mobile-phone-based emotion sharing and recording system.** *J Diabetes Sci Technol* 2011, **5**:325-332.
71. Hingle MD, Snyder AL, McKenzie NE, Thomson CA, Logan RA, Ellison EA, Koch SM, Harris RB: **Effects of a Short Messaging Service-Based Skin Cancer Prevention Campaign in Adolescents.** *Am J Prev Med* 2014.
72. Huang SJ, Hung WC, Chang M, Chang J: **The effect of an internet-based, stage-matched message intervention on young Taiwanese women's physical activity.** *J Health Commun* 2009, **14**:210-227.
73. Hunter CM, Peterson AL, Alvarez LM, Poston WC, Brundige AR, Haddock CK, Van Brunt DL, Foreyt JP: **Weight management using the internet a randomized controlled trial.** *Am J Prev Med* 2008, **34**:119-126.
74. Swartz LH, Noell JW, Schroeder SW, Ary DV: **A randomised control study of a fully automated internet based smoking cessation programme.** *Tob Control* 2006, **15**:7-12.
75. Wieland LS, Falzon L, Sciamanna CN, Trudeau KJ, Brodney S, Schwartz JE, Davidson KW: **Interactive computer-based interventions for weight loss or weight maintenance in overweight or obese people.** *Cochrane Database Syst Rev* 2012, **8**:CD007675.
76. ter Huurne ED, Postel MG, de Haan HA, Drossaert CH, DeJong CA: **Web-based treatment program using intensive therapeutic contact for patients with eating disorders: before-after study.** *J Med Internet Res* 2013, **15**:e12.
77. Carr LJ, Bartee RT, Dorozynski CM, Broomfield JF, Smith ML, Smith DT: **Eight-month follow-up of physical activity and central adiposity: results from an Internet-delivered randomized control trial intervention.** *J Phys Act Health* 2009, **6**:444-455.
78. Dunton GF, Robertson TP: **A tailored Internet-plus-email intervention for increasing physical activity among ethnically-diverse women.** *Prev Med* 2008, **47**:605-611.
79. Hurling R, Catt M, Boni MD, Fairley BW, Hurst T, Murray P, Richardson A, Sodhi JS: **Using internet and mobile phone technology to deliver an automated physical activity program: randomized controlled trial.** *J Med Internet Res* 2007, **9**:e7.
80. Marcus BH, Lewis BA, Williams DM, Dunsiger S, Jakicic JM, Whiteley JA, Albrecht AE, Napolitano MA, Bock BC, Tate DF, Sciamanna CN, Parisi AF: **A comparison of Internet and print-based physical activity interventions.** *Arch Intern Med* 2007, **167**:944-949.
81. Christian JG, Bessesen DH, Byers TE, Christian KK, Goldstein MG, Bock BC: **Clinic-based support to help overweight patients with type 2 diabetes**

- increase physical activity and lose weight. *Arch Intern Med* 2008, **168**:141-146.
82. Sternfeld B, Block C, Quesenberry CP, Jr., Block TJ, Husson G, Norris JC, Nelson M, Block G: **Improving diet and physical activity with ALIVE: a worksite randomized trial.** *Am J Prev Med* 2009, **36**:475-483.
83. Wantland DJ, Portillo CJ, Holzemer WL, Slaughter R, McGhee EM: **The effectiveness of Web-based vs. non-Web-based interventions: a meta-analysis of behavioral change outcomes.** *J Med Internet Res* 2004, **6**:e40.
84. Winett R, Anderson E, Wojcik J, Winett S, Moore S, Blake C: **Guide to health: a randomized controlled trial of the effects of a completely web-based intervention on physical activity, fruit and vegetable consumption, and body weight.** *TBM* 2011, **1**:165-174.
85. Arem H, Irwin M: **A review of web-based weight loss interventions in adults.** *Obes Rev* 2011, **12**:e236-243.
86. de Vet E, de Nooijer J, de Vries NK, Brug J: **Testing the transtheoretical model for fruit intake: comparing web-based tailored stage-matched and stage-mismatched feedback.** *Health Educ Res* 2008, **23**:218-227.
87. Moore TJ, Alsabeeh N, Apovian CM, Murphy MC, Coffman GA, Cullum-Dugan D, Jenkins M, Cabral H: **Weight, blood pressure, and dietary benefits after 12 months of a Web-based Nutrition Education Program (DASH for health): longitudinal observational study.** *J Med Internet Res* 2008, **10**:e52.
88. Oenema A, Tan F, Brug J: **Short-term efficacy of a web-based computer-tailored nutrition intervention: main effects and mediators.** *Ann Behav Med* 2005, **29**:54-63.
89. Spittaels H, De Bourdeaudhuij I, Vandelanotte C: **Evaluation of a website-delivered computer-tailored intervention for increasing physical activity in the general population.** *Prev Med* 2007, **44**:209-217.
90. Watson A, Bickmore T, Cange A, Kulshreshtha A, Kvedar J: **An internet-based virtual coach to promote physical activity adherence in overweight adults: randomized controlled trial.** *J Med Internet Res* 2012, **14**:e1.
91. Soureti A, Murray P, Cobain M, Chinapaw M, van Mechelen W, Hurling R: **Exploratory study of web-based planning and mobile text reminders in an overweight population.** *J Med Internet Res* 2011, **13**:e118.
92. Verheijden M, Bakx JC, Akkermans R, van den Hoogen H, Godwin NM, Rosser W, van Staveren W, van Weel C: **Web-based targeted nutrition counselling and social support for patients at increased cardiovascular risk in general practice: randomized controlled trial.** *J Med Internet Res* 2004, **6**:e44.
93. Kodama S, Saito K, Tanaka S, Horikawa C, Fujiwara K, Hirasawa R, Yachi Y, Iida KT, Shimano H, Ohashi Y, Yamada N, Sone H: **Effect of Web-based lifestyle modification on weight control: a meta-analysis.** *Int J Obes (Lond)* 2012, **36**:675-685.
94. Carter-Edwards L, Bastian LA, Schultz M, Amamoo MA, Ostbye T: **An internet-based weight loss intervention initiated by a newspaper.** *Prev Chronic Dis* 2009, **6**:A101.

95. Kaipainen K, Payne CR, Wansink B: **Mindless eating challenge: retention, weight outcomes, and barriers for changes in a public web-based healthy eating and weight loss program.** *J Med Internet Res* 2012, **14**:e168.
96. Neve MJ, Collins CE, Morgan PJ: **Dropout, nonusage attrition, and pretreatment predictors of nonusage attrition in a commercial Web-based weight loss program.** *J Med Internet Res* 2010, **12**:e69.
97. Christian JG, Byers TE, Christian KK, Goldstein MG, Bock BC, Prioreshi B, Bessesen DH: **A computer support program that helps clinicians provide patients with metabolic syndrome tailored counseling to promote weight loss.** *J Am Diet Assoc* 2011, **111**:75-83.
98. Cussler EC, Teixeira PJ, Going SB, Houtkooper LB, Metcalfe LL, Blew RM, Ricketts JR, Lohman J, Stanford VA, Lohman TG: **Maintenance of weight loss in overweight middle-aged women through the Internet.** *Obesity (Silver Spring)* 2008, **16**:1052-1060.
99. Rothert K, Strecher VJ, Doyle LA, Caplan WM, Joyce JS, Jimison HB, Karm LM, Mims AD, Roth MA: **Web-based weight management programs in an integrated health care setting: a randomized, controlled trial.** *Obesity (Silver Spring)* 2006, **14**:266-272.
100. Stevens VJ, Funk KL, Brantley PJ, Erlinger TP, Myers VH, Champagne CM, Bauck A, Samuel-Hodge CD, Hollis JF: **Design and implementation of an interactive website to support long-term maintenance of weight loss.** *J Med Internet Res* 2008, **10**:e1.
101. Thomas D, Vydelingum V, Lawrence J: **E-mail contact as an effective strategy in the maintenance of weight loss in adults.** *J Hum Nutr Diet* 2011, **24**:32-38.
102. Krukowski RA, Harvey-Berino J, Ashikaga T, Thomas CS, Micco N: **Internet-based weight control: the relationship between web features and weight loss.** *Telemed J E Health* 2008, **14**:775-782.
103. Booth AO, Nowson CA, Matters H: **Evaluation of an interactive, Internet-based weight loss program: a pilot study.** *Health Educ Res* 2008, **23**:371-381.
104. Gold BC, Burke S, Pintauro S, Buzzell P, Harvey-Berino J: **Weight loss on the web: A pilot study comparing a structured behavioral intervention to a commercial program.** *Obesity (Silver Spring)* 2007, **15**:155-164.
105. Tate DF, Wing RR, Winett RA: **Using Internet technology to deliver a behavioral weight loss program.** *JAMA* 2001, **285**:1172-1177.
106. Appel LJ, Clark JM, Yeh HC, Wang NY, Coughlin JW, Daumit G, Miller ER, 3rd, Dalcin A, Jerome GJ, Geller S, Noronha G, Pozefsky T, Charleston J, Reynolds JB, Durkin N, Rubin RR, Louis TA, Brancati FL: **Comparative effectiveness of weight-loss interventions in clinical practice.** *N Engl J Med* 2011, **365**:1959-1968.
107. McConnon A, Kirk SF, Cockroft JE, Harvey EL, Greenwood DC, Thomas JD, Ransley JK, Bojke L: **The Internet for weight control in an obese sample: results of a randomised controlled trial.** *BMC Health Serv Res* 2007, **7**:206.

108. Patrick K, Calfas KJ, Norman GJ, Rosenberg D, Zabinski MF, Sallis JF, Rock CL, Dillon LW: **Outcomes of a 12-month web-based intervention for overweight and obese men.** *Ann Behav Med* 2011, **42**:391-401.
109. Tate DF, Jackvony EH, Wing RR: **A randomized trial comparing human e-mail counseling, computer-automated tailored counseling, and no counseling in an Internet weight loss program.** *Arch Intern Med* 2006, **166**:1620-1625.
110. Lubans DR, Morgan PJ, Collins CE, Warren JM, Callister R: **Exploring the mechanisms of weight loss in the SHED-IT intervention for overweight men: a mediation analysis.** *Int J Behav Nutr Phys Act* 2009, **6**:76.
111. Brown J: **A review of the evidence on technology-based interventions for the treatment of tobacco dependence in college health.** *Worldviews Evid Based Nurs* 2013, **10**:150-162.
112. Carey KB, Scott-Sheldon LA, Elliott JC, Bolles JR, Carey MP: **Computer-delivered interventions to reduce college student drinking: a meta-analysis.** *Addiction* 2009, **104**:1807-1819.
113. Chiauzzi E, Brevard J, Thum C, Decembrele S, Lord S: **MyStudentBody-Stress: an online stress management intervention for college students.** *J Health Commun* 2008, **13**:555-572.
114. Hebden L, Cook A, van der Ploeg HP, King L, Bauman A, Allman-Farinelli M: **A mobile health intervention for weight management among young adults: a pilot randomised controlled trial.** *J Hum Nutr Diet* 2014, **27**:322-332.
115. Hager R, George JD, LeCheminant JD, Bailey BW, Vincent WJ: **Evaluation of a university general education health and wellness course delivered by lecture or online.** *Am J Health Promot* 2012, **26**:263-269.
116. Napolitano MA, Hayes S, Bennett GG, Ives AK, Foster GD: **Using Facebook and Text Messaging to Deliver a Weight Loss Program to College Students.** *Obesity* 2012.
117. Cavallo DN, Tate DF, Ries AV, Brown JD, DeVellis RF, Ammerman AS: **A social media-based physical activity intervention: a randomized controlled trial.** *Am J Prev Med* 2012, **43**:527-532.
118. Magoc D, Tomaka J, Bridges-Arzaga A: **Using the web to increase physical activity in college students.** *Am J Health Behav* 2011, **35**:142-154.
119. Greene GW, White AA, Hoerr SL, Lohse B, Schembre SM, Riebe D, Patterson J, Kattelman KK, Shoff S, Horacek T, Blissmer B, Phillips BW: **Impact of an online healthful eating and physical activity program for college students.** *Am J Health Promot* 2012, **27**:e47-58.
120. Franko DL, Cousineau TM, Trant M, Green TC, Rancourt D, Thompson D, Ainscough J, Mintz LB, Ciccazzo M: **Motivation, self-efficacy, physical activity and nutrition in college students: randomized controlled trial of an internet-based education program.** *Prev Med* 2008, **47**:369-377.
121. Harvey-Berino J, Pope L, Gold BC, Leonard H, Belliveau C: **Undergrad and overweight: an online behavioral weight management program for college students.** *J Nutr Educ Behav* 2012, **44**:604-608.

122. Gow RW, Trace SE, Mazzeo SE: **Preventing weight gain in first year college students: an online intervention to prevent the "freshman fifteen"**. *Eat Behav* 2010, **11**:33-39.
123. **Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults--The Evidence Report. National Institutes of Health.** In *National Heart, Lung, and Blood Institute in cooperation with The National Institute of Diabetes and Digestive and Kidney Diseases*. pp. 228: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health National Heart, Lung, and Blood Institute; 1998:228.
124. Ben-Noun LL, Laor A: **Relationship between changes in neck circumference and cardiovascular risk factors.** *Exp Clin Cardiol* 2006, **11**:14-20.
125. Ben-Noun L, Sohar E, Laor A: **Neck circumference as a simple screening measure for identifying overweight and obese patients.** *Obes Res* 2001, **9**:470-477.
126. CDC: **National Health and Nutrition Examination Survey Anthropometry Procedures Manual.** 2007.
127. Lohman P, Timothy: *Anthropometric Standardization Reference Manual.* Champaign, IL: Human Kinetics Books; 1988.
128. **Summary: weighing the options--criteria for evaluating weight-management programs. Committee to Develop Criteria for Evaluating the Outcomes of Approaches to Prevent and Treat Obesity Food and Nutrition Board, Institute of Medicine, National Academy of Sciences.** *J Am Diet Assoc* 1995, **95**:96-105.
129. In *The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.* Bethesda (MD); 2004
130. Laurson KR, Eisenmann JC, Welk GJ: **Development of youth percent body fat standards using receiver operating characteristic curves.** *Am J Prev Med*, **41**:S93-99.
131. Laurson KR, Eisenmann JC, Welk GJ: **Body fat percentile curves for U.S. children and adolescents.** *Am J Prev Med* 2011, **41**:S87-92.
132. McArdle WD, Katch FI, Katch VL: *Exercise physiology : energy, nutrition, and human performance.* 7th edn. Philadelphia, Pa.: Lippincott Williams & Wilkins; 2009.
133. Heywood V: *The Physical Fitness Specialist Manual, The Cooper Institute for Aerobics Research, Dallas TX, revised 2005.* In: HEYWOOD, V (2006) *Advanced Fitness Assessment and Exercise Prescription.* Fifth Edition edn. Champaign, IL: Human Kinetics; 2006.
134. Gupta SK: **Intention-to-treat concept: A review.** *Perspect Clin Res* 2011, **2**:109-112.
135. National Obesity Education Initiative of the National Heart L, and Blood Institute (NHLBI): **Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults The Evidence Report**

- In *Obesity Education Initiative*: National Institute of Health; 1998.
136. Arnold TJ, Schweitzer A, Hoffman HJ, Onyewu C, Hurtado ME, Hoffman EP, Klein CJ: **Neck and waist circumference biomarkers of cardiovascular risk in a cohort of predominantly African-American college students: a preliminary study.** *J Acad Nutr Diet* 2014, **114**:107-116.
 137. Ben-Noun LL, Laor A: **Relationship between changes in neck circumference and changes in blood pressure.** *Am J Hypertens* 2004, **17**:409-414.
 138. Almosnino S, Pelland L, Stevenson JM: **Retest reliability of force-time variables of neck muscles under isometric conditions.** *J Athl Train* 2010, **45**:453-458.
 139. Raman A, Fitch MD, Hudes ML, Lustig RH, Murray CB, Ikeda JP, Fleming SE: **Baseline correlates of insulin resistance in inner city high-BMI African-American children.** *Obesity (Silver Spring)* 2008, **16**:2039-2045.
 140. Fang J, Zhang JP, Luo CX, Yu XM, Lv LQ: **Carotid Intima-media thickness in childhood and adolescent obesity relations to abdominal obesity, high triglyceride level and insulin resistance.** *Int J Med Sci* 2010, **7**:278-283.
 141. Freedman DS, Kahn HS, Mei Z, Grummer-Strawn LM, Dietz WH, Srinivasan SR, Berenson GS: **Relation of body mass index and waist-to-height ratio to cardiovascular disease risk factors in children and adolescents: the Bogalusa Heart Study.** *Am J Clin Nutr* 2007, **86**:33-40.
 142. Jung C, Fischer N, Fritzenwanger M, Figulla HR: **Anthropometric indices as predictors of the metabolic syndrome and its components in adolescents.** *Pediatr Int* 2010, **52**:402-409.
 143. Musso C, Graffigna M, Soutelo J, Honfi M, Ledesma L, Miksztowicz V, Pazos M, Migliano M, Schreier LE, Berg GA: **Cardiometabolic risk factors as apolipoprotein B, triglyceride/HDL-cholesterol ratio and C-reactive protein, in adolescents with and without obesity: cross-sectional study in middle class suburban children.** *Pediatr Diabetes* 2011, **12**:229-234.
 144. Gropper SS, Simmons KP, Connell LJ, Ulrich PV: **Changes in body weight, composition, and shape: a 4-year study of college students.** *Appl Physiol Nutr Metab* 2012, **37**:1118-1123.
 145. Schwandt P, Bertsch T, Haas GM: **Anthropometric screening for silent cardiovascular risk factors in adolescents: The PEP Family Heart Study.** *Atherosclerosis* 2010, **211**:667-671.
 146. DiGioacchino RF, Sargent RG, Topping M: **Body dissatisfaction among White and African American male and female college students.** *Eat Behav* 2001, **2**:39-50.
 147. Irazusta A, Hoyos I, Irazusta J, Ruiz F, Díaz E, Gil J: **Increased cardiovascular risk associated with poor nutritional habits in first-year university students.** *Nutrition Research* 2007, **27**:387-394.
 148. Byrd-Williams CE, Strother ML, Kelly LA, Huang TT: **Dietary fiber and associations with adiposity and fasting insulin among college students with plausible dietary reports.** *Nutrition* 2009, **25**:896-904.

149. Satchek JM, Kuder JF, Economos CD: **Physical fitness, adiposity, and metabolic risk factors in young college students.** *Med Sci Sports Exerc* 2010, **42**:1039-1044.
150. Van Camp SP, Bloor CM, Mueller FO, Cantu RC, Olson HG: **Nontraumatic sports death in high school and college athletes.** *Med Sci Sports Exerc* 1995, **27**:641-647.