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A FEASIBILITY STUDY OF CARDIOVASCULAR RISK FACTORS IN UNDERGRADUATE FEMALE STUDENTS AT THE UNIVERSITY OF HAWAI'I AT MANOA

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By
Cindy Rote

Thesis Committee

Ronald K. Hetzler
Michele Labotz
Iris F. Kimura

We certify that we have read this thesis and that, in our opinion, it is satisfactory in scope and quality of a thesis for the degree of Master of Science in Kinesiology and Leisure Science.

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Thesis Committee

Chairperson

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Introduction

Every thirty-five seconds an American will die of cardiovascular disease (CVD), making it the leading cause of death in the United States since 1900 (American Heart Association [AHA], 2006). In 2003, the American Heart Association (AHA) reported that 483,842 women and 432,245 men died of CVD in the United States. For the past twenty-two years, the number of CVD deaths for women has exceeded those of males (AHA, 2004). With an aging US population, the number of women who will be affected by CVD will probably continue to exceed that of males. The primary means to decrease the incidence of CVD is to prevent the progression of the disease by modifying cardiovascular risk factors (CVRF). Modifiable CVRF include: high blood pressure, high blood cholesterol, cigarette smoking, obesity, physical inactivity, and diabetes mellitus. The AHA and federal programs such as the National Institute of Health are making efforts to increase research in CVD in women to decrease the current health disparity between men and women (Wenger, 2004).

In the past, most CVD research focused on white middle-aged males (Wenger, 2004). However, women and other minority groups have higher CVD mortality rates than Caucasians. African-Americans and Hispanics have been shown to have higher CVD rates than Caucasians (AHA, 2006). While Native Hawaiians have cardiovascular mortality rates that are almost five-times higher than combined national figures for all races (Contreras, 1999), and heart disease is the leading cause of death in Asian Americans and Pacific Islanders (AAPI) (Contreras, 1999). Native Hawaiian females have mortality rates above rates of all males in Hawai'i, except native Hawaiians and

Caucasians (Hawai'i State Health Planning & Development Agency, 2001). Yet, only 0.2 percent of Federal health related grants have gone towards research in AAPI (Gosh 2003); therefore, further research on AAPI seems warranted.

As of July 2004, the AAPI population was approximately 15 million and was estimated to grow to 41 million by the year 2050 (US Census, 2006 & 2001). Although Asian Americans and Pacific Islanders are the fastest growing race groups in the United States (US Census, 2001), cardiovascular disease data and research for AAPI are lacking (Ghosh, 2003). Accurate cardiovascular disease baselines for AAPI currently do not exist and are needed to further facilitate CVD research on AAPI women (Ghosh, 2003; Ro, 2002;Contreras, 1999). Asian Americans and Pacific Islanders make up 51% of Hawai'i's population, and Hawai'i has the largest concentration of AAPI in the United States (U.S. Census State & County Quick Facts, 2000).

There is growing recognition that certain CVRF for CVD can be identified in young people many years before the onset of symptoms of CVD (Ford, et al., 2004). Serum cholesterol levels measured in a group of young males, mean age 22, showed a strong graded relationship with CVD later in life (Klag et al., 1993). This raises the possibility that CVRFs can be identified, modified, and the disease either prevented or delayed for both males and females. Reports of increasing rates of CVRF in young Americans was of concern, but was mostly based upon large studies which have fundamentally different populations than the ethnic mixture in Hawai'i.

In most large epidemiological studies involving CVD, obesity and adiposity were commonly assessed with using body mass index (BMI) (kg/m^2) or waist to hip ratio (WHR). Although easily calculated, the use of BMI or WHR may be misleading, as they only provide gross estimates of body composition. The use of anthropometric equations developed to estimate body composition could potentially give a better picture of the relationship between obesity and CVRFs. However, these methods tend to be population specific and most of the equations were developed for populations that are ethnically very different than those found in Hawaii. Asians have been shown to have a lower BMI and higher percentage of body fat than whites of the same stature and weight (Deurenburg et al., 2002; Wang, 1994). Polynesians with a BMI of approximately 25 kg/m^2 have a lower percentage of body fat than Europeans at the same BMI levels (Swinburg,1999). Therefore, using the BMI or WHR to study the relationship between obesity and CVRFs may not be suitable for the AAPI population. By comparing various body composition techniques with CVRFs it may be possible to obtain a clearer picture of the relationship between adiposity and CVRFs.

There is a lack of data concerning the CVRFs in young women and specifically AAPI women. The University of Hawai'i at Manoa (UHM) was an optimal location to study CVRF in young AAPI women. There were 14,251 undergraduates enrolled at UHM, of which approximately 32 % were AAPI females (UHM, 2005). The purpose of this pilot study was three-fold: 1) to create a CVRF profile for young AAPI women at the UHM; 2) to describe differences in CVRF among different ethnic groups within the undergraduate female population at the UHM; and 3) to evaluate body mass index (BMI),

waist circumference (WC), waist to hip ratio (WHR), dual-energy x-ray absorptiometry (DEXA), skinfold (SKF), bioelectrical impedance (BIA) and an estimate of aerobic physical fitness as a means to better predict CVRF among the different ethic groups sampled. It was hypothesized that: 1) ethnic difference would exist for CVRF, and 2) body composition measurements would account for a greater portion of the variance for selected CVRF than BMI.

Methodology

Subjects

One hundred undergraduate females from the University of Hawai'i at Manoa participated in this study: 22 Caucasians, 35 Asian Americans, 23 Mixed Asians (Asian and Caucasian parents), 20 Native Hawaiian and Pacific Islanders. All subjects completed an informed consent approved by the University of Hawai'i at Manoa, Committee on Human Studies prior to participation in this study. Each subject participated in two separate visits for data collection.

Visit one

Visit one was conducted at the University Health Center (UHC). Subjects were informed of the purpose and objectives of the study and their rights as human subjects. If subjects agreed to participate they were given an informed consent form that was verbally reviewed with them by the principal investigator. Subjects were assigned a study identification number after they signed the informed consent. Each subject completed a survey that asked for the following; emergency contact information; demographic and

medical history and a non-exercise activity questionnaire to estimate their maximal oxygen uptake ($VO_{2\,max}$) (George et al., 1997). Instructions for visit two were given to each subject informing them that they had to fast for twelve hours prior to visit two.

Non-Exercise VO_2 max Physical Activity Questionnaire

Subjects completed a non-exercise VO_2 max estimation questionnaire (R^2= 0.85, SEE = 3.60 ml^{-1} min) consisting of three questions (George et al. 1997). Questions one and two were perceived functional abilities (PFA) and question three was perceived activity rating (PA-R). Each question had a number coded activity level from one to thirteen. Maximum oxygen uptake was calculated by the following equation:

VO_2 max = 43.513+(6.564 * gender) – (0.749 * BMI) + (0.724 * PFA) + (0.788*PA-R).

Perceived functional ability was calculated by adding the given answers for questions one and two; P-AR equaled the given answer for question number three and the gender variable for females was 0.

Visit Two

Subjects arrived at the CRC and were questioned on their medical health and if they fasted for twelve hours. Once the CRC staff determined eligibility, visit two began. The CRC staff informed students of the procedures and answered any questions asked. Subjects signed a check-in slip and reviewed screening contact information recorded on the CRC Subject Information Sheet for emergency purposes. The CRC study staff insured that a study identification number had been assigned and reviewed the signed

informed consent forms in the subject's file. Subjects completed a pregnancy test prior to any testing. None of the subjects tested positive for pregnancy.

Laboratory and Blood Analysis

Subjects were escorted to the Clinical Laboratories of Hawai'i, (CLOH) located in the basement of the KMCWC hospital for a glucose-screening exam. Lab technicians drew 2ml of blood for the pre-2 hour glucose measurement. Immediately following the blood draw, subjects consumed 200ml of a glucose solution at the laboratory. Subjects returned to the laboratory for a post glucose tolerance test after two hours. A lab technician drew an additional 2ml blood sample to complete the glucose tolerance test.

Anthropometric Measurements

A registered nurse measured blood pressure, weight to the nearest 0.1 kg on a SECA 767 Electronic Personal Scale (Seca Corp.,1352 Charwood Rd. Suite E, Hanover MD, 21076), height to the nearest 0.5 centimeter with a wall-mounted stadiometer and waist and hip circumferences in centimeters as described by Behnke & Wilmore (Behnke & Wilmore 1974, chap.3). Body mass index was calculated by dividing body weight in kilograms by height in meters squared, according to guidelines set by the United States Department of Health, Center for Disease Control and Prevention (CDC). The same skilled technician collected skinfold measurements with Lange skinfold calipers at seven sites: chest, triceps, subscapluar, mid-axillary line, abdomen, suprailiac and thigh; each site was measured three times in a rotational order as described by Jackson et al. (1980).

Body density was calculated and converted to percentage of body fat (%BF) using both the Brozek and Siri equation.

Bioelectrical impedance measurements were taken with a RJL Quantum II analyzer (RJL Systems, 33955 Harper Ave, Clinton Twp MI 48035), (BIA) following manufacturer's testing protocol recommendations. Subjects were instructed to remove all metal items and to lay supine with their arms extended at a 45-degree angle on a non-metal testing table. The designated electrodes sites on the hand and foot were cleaned with alcohol swabs. Four electrodes were attached at the 1) imaginary line bisecting the ulnar head, 2) at the third metacarpal phalangeal joint, 3) at the imaginary line bisecting the malleoli, and 4) at the third metatarsal phalangeal joint. BIA red lead cords were attached to the hand, red clip on the wrist, black clip on the hand. BIA black lead cords were attached to the foot, red clip on the ankle and black clip on the foot. BIA resistance and reactance were taken twice. Body fat calculations using BIA data were derived from five different BIA equations: Wang et al. (1995) developed specifically for Asian adult females (97% of their subjects were of Chinese ancestry), Lukaski et al. (1990), RJL Systems (1992), Houtkooper et al. (1992), and Fornetti et al. (1999) developed for use on colligate female athletes.

A certified radiologist performed a ten-minute dual-energy X-ray absorptiometry scan (DEXA), (GE Lunar Corporation Prodigy, model12484, 726 Heartland Trail, Madison WI 53717-1915) on each subject. The DEXA scanner was calibrated according to the manufacture's recommendation each day prior to testing. Subjects were positioned on

the DEXA platform and secured by Velcro straps at the arms and feet. Subjects were instructed not to move or speak during the DEXA scan.

Anthropometric Analysis

Anthropometric body composition equations presented in tables 1 and 2 were used to compute body fat percentages of subjects.

Table 1. Skinfold and Body Density equations used to determine Body Fat Percentages

Jackson Pollock	$BD(F1) = 1.0970 - 0.00046971(X_1) + 0.00000056(X_1)^2 - 0.00012828$ (age yrs)
Siri	$\%BF = (4.95/Db - 4.50) \times 100$
Brozek	$\%BF = (4.57/Db - 4.142) \times 100$

BD = body density, F1 = female, equation no. 1, X_1 = Sum of seven skin folds
%BF = percentage of body fat, Db = total body density

Table 2. BIA equations used to determine Body Fat percentage

Lukaski et al.	$FFM = 0.734 \times [ht^2/resistance] + [0.116 \times wt] + [0.96 \times reactance] + [0.878 \times gender \{females = 0\}] - 4.03$
RJL	$FFM = 0.5[ht^{1.48}/ impedance^{0.55} \times 1.0/1.12]+[0.42 \times wt] + 0.49$
Houtkooper et al.	$FFM = 0.61 \times [ht^2/resistance] + [0.25 \times wt] + 1.31$
Fornetti et al.	$FFM = [0.282 \times ht] + [0.415 \times wt] - [0.037 \times resistance] + [0.096 \times reactance] - 9.734$
Wang et al.	$FFM = 0.146[ht^2/resistance] + 0.271 [wt] + 0.246[ht] - 22.98$

FFM = Fat free mass in kg, ht=height in cm, wt = weight in kg

Statistical Analysis

Data were analyzed using SAS version 9.1 (SAS Institute Inc., SAS Campus Drive, Cary, North Carolina 27513, USA). The GLM, stepwise procedure, was used to test for the amount of variance in the CVRF variables accounted for by the anthropometric variables. The alpha level was set at $p < 0.05$. An ANOVA using the GLM procedure was used to test for differences between ethnic groups for the CVRF variables. This study was designed as a pilot study. By their nature, pilot studies are exploratory and useful for identifying possible relationships for further analysis in subsequent protocols. These subsequent protocols will be modified and redesigned based on the findings of the pilot study. Therefore, the alpha level adopted to test for significant differences using the ANOVA was not as conservative as a Bonferroni adjustment. However, due to the large number of ANOVAs the alpha level was set at 0.01 rather than 0.05.

Results

Descriptive data of 100 subjects are presented in table 3. Descriptive data by ethnic groups are presented in table 4, with significant differences between ethnic groups resulting from the ANOVA noted by symbols.

Table: 3 Descriptive data of 100 subjects.

Variable	Mean ± Std
Age (years)	20.20 ± 2.18
Height (cm)	162.33 ± 7.05
Weight (kg)	61.28 ± 11.91
BMI	23.19 ± 4.05
Waist (cm)	69.88 ± 9.05
Hip (cm)	95.49 ± 8.07
WHR	0.73 ± 0.05
%Android Fat	36.65 ± 10.20
% Gynoid Fat	43.70 ± 6.11
A-G Ratio	0.81 ± 0.52
BMD	1.16 ± 0.07
BMC	2481.59 ± 366.75
SBP	106.70 ± 10.43
DBP	68.36 ± 8.81
Cholesterol	158.77 ± 25.98
Triglycerides	82.78 ± 38.29
HDL	65.28 ± 15.17
LDL	76.96 ± 21.30
Chol-HDL	2.53 ± 0.59
Glucose Fast	87.46 ± 7.98
Post Glucose	93.36 ± 24.73
Delta Glucose	5.90 ± 23.72
DEXA Body Fat %	33.61 ± 7.61
BIA RJL Body Fat %	32.12 ± 7.591
BIA Resistance	621.00 ± 66.58
BIA Reactance	68.12 ± 7.77
Wang Body Fat %	34.16 ± 5.49
Houtkooper Body Fat %	29.44 ± 5.07
Lukaski Body Fat %	31.90 ± 6.61
Fornetti Body Fat %	26.26 ± 3.96
Siri Body Fat %	27.30 ± 6.29
Brozek Body Fat %	26.46 ± 5.82
VO_2 maximum estimation	39.15 ± 6.27
PFA	13.18 ± 4.90
PA-R	4.11 ± 2.40

WHR = waist to hip ratio, A-G Ratio = android to gynoid ratio, BMD = bone mass density, BMC = bone mass content, SBP = systolic blood pressure, DBP = diastolic blood pressure, Chol-HDL = cholesterol to HDL ratio, PFA= perceived functional ability and PA- R=perceived activity rating.

Table: 4 CVRF data (means ± std).

	Caucasians	Asians	Mixed Asians	NHPI
Age (years)	18.47 ± 0.28 *	20.09 ± 2.11 *	20.79 ± 2.21 *	21.65 ± 2.23 *
Height (cm)	165.30 ± 6.19 ‡	158.81 ± 6.5 ‡	163.11 ± 6.55 ‡	164.32 ± 7.34 ‡
Weight (kg)	64.25 ± 11.9 ⅄	55.87 ± 8.81 ⅄	60.18 ± 10.57 ⅄	68.78 ± 13.80 ⅄
BMI	23.46 ± 3.79	22.06 ± 3.12	22.60 ± 4.10	25.55 ± 4.93
Waist (cm)	70.36 ± 8.76 †	66.69 ± 6.90 †	68.86 ± 7.47 †	76.10 ± 11.43†
Hip (cm)	96.25 ± 6.23 §	91.86 ± 6.83 §	95.28 ± 8.37 §	101.23 ± 8.52 §
WHR	0.73 ± 0.05	0.73 ± 0.04	0.72 ± 0.04	0.75 ± 0.07
%Android Fat	36.24 ± 9.10	36.45 ± 9.24	34.21 ± 11.80	40.29 ± 10.74
% Gynoid Fat	43.25 ± 4.21	43.40 ± 5.66	42.92 ± 8.47	45.60 ± 5.42
A/G Ratio	0.83 ± 5.94	0.83 ± 0.14	0.79 ± 0.15	0.87 ± 0.18
BMD	1.15 ± 0.09	1.14 ± 0.06	1.16 ± 0.06	1.17 ± 0.09
BMC	2528.40 ± 393.7	2344.62 ± 312.36	2502.27 ± 328.03	2646.10 ± 405.2
SBP	101.0 ± 9.10 **	106.86 ± 9.90 **	107.70 ± 8.88 **	111.55 ± 12.03 **
DBP	65.90 ± 8.72	69.65 ± 9.17	66.70 ± 8.17	70.70 ± 8.61
Cholesterol	160.59 ± 28.63	158.74 ± 20.65	161.04 ± 31.43	154.20 ± 25.90
Triglycerides	81.00 ± 30.65	78.80 ± 33.18	86.82 ± 54.77	87.05 ± 32.90
HDL	61.50 ± 14.24	69.49 ± 12.42	68.17 ± 18.75	58.75 ± 13.72
LDL	82.95 ± 23.93	73.54 ± 19.75	75.56 ± 18.88	77.95 ± 23.56
Chol/HDL	2.72 ± 0.64	2.34 ± 0.45	2.45 ± 0.53	2.75 ± 0.70
Glucose Fast	85.14 ± 5.66	88.86 ± 9.89	87.36 ± 8.75	87.70 ± 4.80
Post Glucose	92.14 ± 18.78	99.20 ± 30.26	88.81 ± 21.22	90.60 ± 22.82
Delta Glucose	7.00 ± 19.86	10.34 ± 26.18	0.45 ± 23.72	2.90 ± 23.18
DEXA BF	33.80 ± 5.75	32.96 ± 6.71	32.34 ± 10.03	36.00 ± 7.7
BIA RJL BF	32.78 ± 6.74	30.39 ± 6.83	30.95 ± 8.00	35.76 ± 8.40
BIA Resist.	616.64 ± 70.3	639.11 ± 65.95	626.80 ± 62.25	587.40 ± 59.32
BIA React.	68.39 ± 9.83	67.10 ± 7.63	69.91 ± 7.00	67.53 ± 6.36
RJL Phase Angle	6.34 ± 0.56	6.00 ± 0.57	6.39 ± 0.67	6.59 ± 0.66
Wang BF %	34.40 ± 5.09	33.07 ± 4.79	33.19 ± 5.79	36.94 ± 5.68
Hout. BF %	29.78 ± 4.02	28.60 ± 4.89	28.71 ± 5.39	31.39 ± 5.80
Lukaski BF %	32.33 ± 5.49	30.87 ± 6.31	30.70 ± 7.24	34.62 ± 7.14
Frnt BF %	25.99 ± 3.05	26.33 ± 3.85	25.15 ± 4.59	27.20 ± 4.23
Siri BF %	28.30 ± 5.54	26.50 ± 5.98	26.26 ± 7.85	28.80 ± 5.56
Brozek BF %	27.38 ± 5.18	25.72 ± 5.52	25.50 ± 7.24	27.83 ± 5.15
VO_2 max est	40.97 ± 4.15	38.95 ± 6.22	39.40 ± 7.54	37.17 ± 6.52
PFA	14.65 ± 3.54	12.33 ± 5.56	13.74 ± 5.50	12.40 ± 2.26
PA-R	5.27 ± 2.14	3.64 ± 2.38	3.57 ± 2.38	4.50 ± 2.26

* = Caucasians were significantly younger than the Asians, Mixed Asians and NHPI and NHPI was significantly older than the Mixed Asians, $p = < 0.0001$.

‡ = Asians were significantly shorter than the other ethnic groups, $p = < 0.01$.

** = Caucasians had significantly lower SBP than the other ethnic groups, $p = < 0.01$.

† = NHPI had a significantly larger waist circumference than the other ethnic groups, $p = < 0.01$.

§ = NHPI had a significantly larger hip circumference than the other ethnic groups, $p = < 0.001$.

⅄ = Asians weighed significantly less than Caucasians and NHPI and NHPI weighed significantly more than the Mixed Asians, $p = < 0.001$.

WHR = waist to hip ratio, A-G Ratio = android to gynoid ratio, BMD = bone mass density, BMC = bone mass content, SBP = Systolic blood pressure, DBP = diastolic blood pressure, Chol-HDL = cholesterol to HDL ratio, Dexa BF %= Dual-energy x-ray absorptiometry body fat percentage, BIA RJL BF % = RJL bioelectrical impedance body fat percentage, BIA Resist = bioelectrical impedance resistance, BIA React = bioelectrical impedance reactance, Hout.BF % = Houtkooper body fat percentage, Lukaski BF% = Lukaski body fat percentageFrnt. BF % = Fornetti body fat percentage, Siri BF % = Siri body fat percentage, Brozek BF % = Brozek body fat percentage VO_2 max = maximum oxygen uptake estimate, PFA=Perceived functional ability, PA-R =Perceived Activity Rating.

Ethnic group differences for the following variables approached significance for a main effect between groups: body mass index, $p = 0.0160$; RJL body fat percentage, $p = <0.0663$; Wang body fat percentage, $p = 0.0559$; bone mineral content, $p = 0.028$; and HDL, $p = 0.0267$. Differences for the following variables were also not found to have significant differences between ethnic groups: WHR, $p = 0.2989$; android fat percentage, $p = 0.2751$; gynoid fat percentage, $p = 0.4794$, android to gynoid fat ratio, $p = 0.3878$; bone mass density (BMD), $p = 0.4533$; diastolic blood pressure (DBP), $p = 0.1970$; cholesterol, $p = 0.8292$; Triglycerides, $p = 0.8226$; LDL, $p = 0.43315$; 12-hour glucose fasting, $p = 0.4035$; post glucose tolerance test, $p = 0.2269$; delta glucose, $p = 0.5779$; SIRI body fat percentage, $p = 0.4165$; Brozek body fat percentage, $p = 0.4192$; DEXA body fat percentage, $p = 0.4150$; Houtkooper et al. body fat percentage, $p = 0.2107$; Lukaski et al. body fat percentage, $p = 0.1679$; Fornetti et al. body fat percentage, $p = 0.3980$; non-exercise VO2max estimation, $p = 0.2691$ and PFA, $p = 0.2802$. Thus, there were significant differences in a number of anthropometric measurements, but the only CVRF that was found to be significantly different between groups was SPB.

A stepwise regression analysis was used to identify the variables which accounted for significant portions of the variance for the CVRFs. Results of the regression analysis for all subjects are reported in table 5; and tables 6, 7, 8 and 9 give the regression analysis results for the Asian, Mixed Asian and NHPI ethnic groups.

Table 5. Variables that accounted for a significant portion of the variance of CVRFs for all subjects combined.

Dependant Variable	Significant Explanatory Variable	Partial R^2	Model R^2	*p* Value of Explanatory Variables
SBP	Waist Age	0.0638 0.0396	0.0638 0.1034	0.0116 0.0423
DBP	Waist to Hip Ratio	0.0423	0.0423	0.0411
Triglyerides	Waist	0.1170	0.1170	0.0005
HDL	Brozek PFA	0.0776 0.0479	0.0776 0.1256	0.0052 0.0239
LDL	Brozek	0.0503	0.0503	0.0256
Chol-HDL Ratio	Waist	0.1182	0.1182	0.0005
Fasting Glucose	Age	0.0521	0.0521	0.0231
Post Glucose	Brozek	0.1096	0.1096	0.0008
Delta Glucose	Brozek	0.0894	0.0894	0.0026

Table 6. Variables that accounted for a significant portion of the variance of CVRFs for Caucasians.

Dependant Variable	Significant Explanatory Variable	Partial R^2	Model R^2	*p* Value of Explanatory Variables
SBP	PA-R	0.3262	0.3262	0.0055
Triglycerides	Houtkooper BIA Hip PA-R	0.2115 0.1348 0.1159	0.3985 0.5333 0.6472	0.0182 0.0350 0.0257
HDL	Waist to Hip Ratio	0.3134	0.3134	0.0067
Chol-HDL Ratio	Waist to Hip Ratio	0.3110	0.3110	0.0070
Glucose Fast	BMI Waist	0.2405 0.1285	0.5017 0.6302	0.0069 0.0223

Table 7. Variables that accounted for a significant portion of the variance of CVRFs for Asians.

Dependant Variable	Significant Explanatory Variable	Partial R^2	Model R^2	*p* Value of Explanatory Variables
DBP	Age Waist RJL BIA	0.1278 0.1256 0.0974	0.1278 0.2534 0.3507	0.0350 0.0269 0.0390
Triglycerides	Age	0.1254	0.1254	0.0369
HDL	Lukaski BIA DEXA	0.1252 0.1589	0.3251 0.4840	0.0206 0.0042
Chol-HDL Ratio	Wang BIA	0.1758	0.1758	0.0122
Glucose Fast	Hip	0.1852	0.1852	0.0099
Post Glucose	BMI Wang BIA Weight Houtkooper BIA	0.2440 0.2186 0.0782 0.0794	0.2440 0.4626 0.5408 0.6203	0.0026 0.0010 0.0285 0.0285
Delta Glucose	BMI Wang BIA Weight Height	0.1857 0.1728 0.1145 0.0927	0.1857 0.3585 0.4731 0.5658	0.0098 0.0061 0.0143 0.0169

Table 8. Variables that accounted for a significant portion of the variance of CVRFs for Mixed Asians.

Dependant Variable	Significant Explanatory Variable	Partial R^2	Model R^2	*p* Value of Explanatory Variables
Cholesterol	PFA	0.2042	0.2042	0.0347
Post Glucose	RJL BIA	0.3160	0.3160	0.0065
Delta Glucose	Siri	0.2518	0.2518	0.0173

Table 9. Variables that accounted for a significant portion of the variance of CVRFs for Native Hawaiians and Pacific Islanders.

Dependant Variable	Significant Explanatory Variable	Partial R^2	Model R^2	*p* Value of Explanatory Variables
SBP	Weight	0.3014	0.3014	0.0122
DBP	Waist to Hip Ratio	0.2931	0.2931	0.0137
Cholesterol	Weight PA-R	0.2275 0.2054	0.4330 0.2054	0.0182 0.0447
HDL	PA-R PFA	0.2997 0.1476	0.2997 0.4473	0.0125 0.0480
Glucose Fast	Hip Fornetti BIA	0.2251 0.2377	0.2251 0.4628	0.0345 0.0139

Discussion

The purpose of this study was three-fold. First, the study was conducted to create a CVRF profile for young AAPI women at the UHM. A CVRF profile was created with a limited number of subjects from a diverse AAPI student population at the UHM (table 4). It should be noted that the present study was a pilot study and thus the relatively small number of subjects may not be representative of the larger population of female AAPI subjects. Other potential problems with interpretation of the results is that the AAPI profile represents a diverse ethnic population at UHM and the term AAPI is broad and includes a number of diverse groups. Many of the subjects were multi-ethnic and belonged to one or more ethnic groups. The term, AAPI defines over 48 diverse ethnic groups. Ten different ethnic variations existed between the 20 NHPI subjects. Only five were classified as Native Hawaiian. Eleven different ethnic variations existed between

the 35 Asian subjects. Twelve ethnic variations existed between the 23 Mixed Asian subjects. Therefore, although the subjects in the present study were assigned to an ethnic code based on their responses on the health history form, it is doubtful that the groups were actually comprised a homogeneous sample representing a single given ethnic group. The use of race and ethnicity in 919 epidemiological studies was recently reviewed by Comstock et al. (2004). They state that there: "...is no consensus concerning the definition and categorization of race and ethnicity as scientific variables, the methods used to assess race and ethnicity, and the appropriate interpretation of the data obtained from using these variables". They state that at a minimum, researchers should clearly state the context, in which race and ethnicity are being used, describe the method being used to assess these variables and discuss all significant findings.

The CVRF profile by ethnic group (table 4) indicates that the subjects in this study were an average group of healthy young female adults. These data were compared to data from other large data sets. Population data for the USA are available from NHANES III and NHANES 1999-2002 which were surveys conducted by the National Center for Health Statistics. The NHANES 1999-2002 was the latest update to the NHANES III survey that was conducted between 1988 through 1994. The purpose of NHANES III was to establish national health and nutritional data of the US population. One limitation of NHANES III was the limited data on minority groups such as AAPI. The Coronary Artery Risk Development in Young Adults (Cardia Study) was another population based longitudinal study of young men and women 18 to 30 years in age. Descriptive data from NHANES and Cardia Study (Carnethon et al. 2003) can be compared with the subjects'

data from this study and are presented in table 10. Risk factor data from the present study were compared to the NHANES III and Cardia study data presented in table 11. The AAPI CVRF profile for this study is similar to the current data from National Health and Nutrition Examination Survey III (NHANES) and the Cardia Study (table 11).

Table 10. Comparison of the descriptive data of the female subjects from the NHANES, Carida study, with data from the present study.

	Age (yrs)	Height (cm)	Weight (kg)	BMI
NHANES III n = 1665	24.53 ± 2.85	161.56 ± 7.01	66.12 ± 15.86	24.31 ± 5.77
NHANES 1999-2002	19	162.9, n=262	67.9, n=225	25.5, n=225
NHANES 1999-2002	20-29	162.8 , n=1034	71.1, n=656	26.8, n=654
Cardia Study n=2478	24.9	na	na	24.5
All Ethnicities n=100	20.20 ± 2.18	162.33 ± 7.06	61.28 ± 11.91	23.21 ± 4.02
Caucasians n= 22	18.47 ± 0.28	165.30 ± 6.19	64.25 ± 11.9	23.46 ± 3.79
Asians n = 35	20.13 ± 2.12	158.88 ± 6.5	56.07 ± 8.87	22.18 ± 3.19
Mixed Asians n = 24	20.71 ± 2.20	162.83 ± 6.55	59.73 ± 10.58	22.56 ± 4.02
NHPI n = 20	21.65 ± 2.23	164.32 ± 7.34	68.78 ± 13.80	25.48 ± 4.85

Table 11. NHANES III, Cardia study, Milligan et al. baseline data compared to data from the present study.

variable	Present study N = 100	Asians N=58	Pacific Islanders N= 20	Milligan et al.study N = 282	Cardia Study N = 2458	NHANES III N=2647
BMI	23.21 ± 4.03	22.27 ± 3.52	25.55 ± 4.93	22.1 ± 3.3	24.5	24.31 ± 5.77
W/H ratio	0.73 ± 0.05	0.72 ± 0.04	0.75 ± 0.07	0.72 ±0.04	na	na
Total Cholesterol (mM)	4.12 ± 0.67	4.13 ± 0.65	3.99 ± 0.67	4.4 ± 0.8	4.6	4.7
HDL (mM)	1.69 ± 0.39	1.78 ± 0.39	1.52 ± 0.35	1.36 ± 0.29	1.44	1.42
Total Chol:HDL ratio	2.53 ± 0.59	2.38 ± 0.49	2.75 ± 0.70	3.1 ± 0.8	3.2	na
SBP	106.70 ± 10.43	107.19 ± 9.44	111.55 ± 12.03	112.9 ± 10.1	106.4	na
DBP	68.30 ± 8.81	68.48 ± 8.84	70.70 ± 8.61	63.7 ± 6.5	66.8	na

As can be seen from comparison of the data in table 11, subjects in the present study were similar to the larger population based studies. The lipid values and blood pressure values were well within the range of normal for young women. Therefore, these data do not suggest that the cohorts of subjects in the AAPI group were at greater risk for development of CVD than other ethnic groups at the time the data were collected.

The second purpose of this study was to describe any differences in the prevalence of CVRF among different ethnic groups within the undergraduate female population at the UHM. Similar means between groups existed for the CVRF variables. Only SBP was found to be statistically different between groups ($p < 0.01$), figure 1. Although significant differences between groups were not revealed by the ANOVA, fasting glucose and post glucose tolerance levels for Asians seemed slightly higher than for the other ethnic groups. Figure 2 shows the results of the pre and post glucose tolerance test. Four subjects had impaired fasting glucose levels over 100 mg/dL. Of those four subjects, one subject was diagnosed with diabetes with a post glucose level of 212 mg/dL and one subject who had a fasting glucose level under 100 mg/dL had an impaired glucose tolerance level of 175 mg/dL.

Figure 1

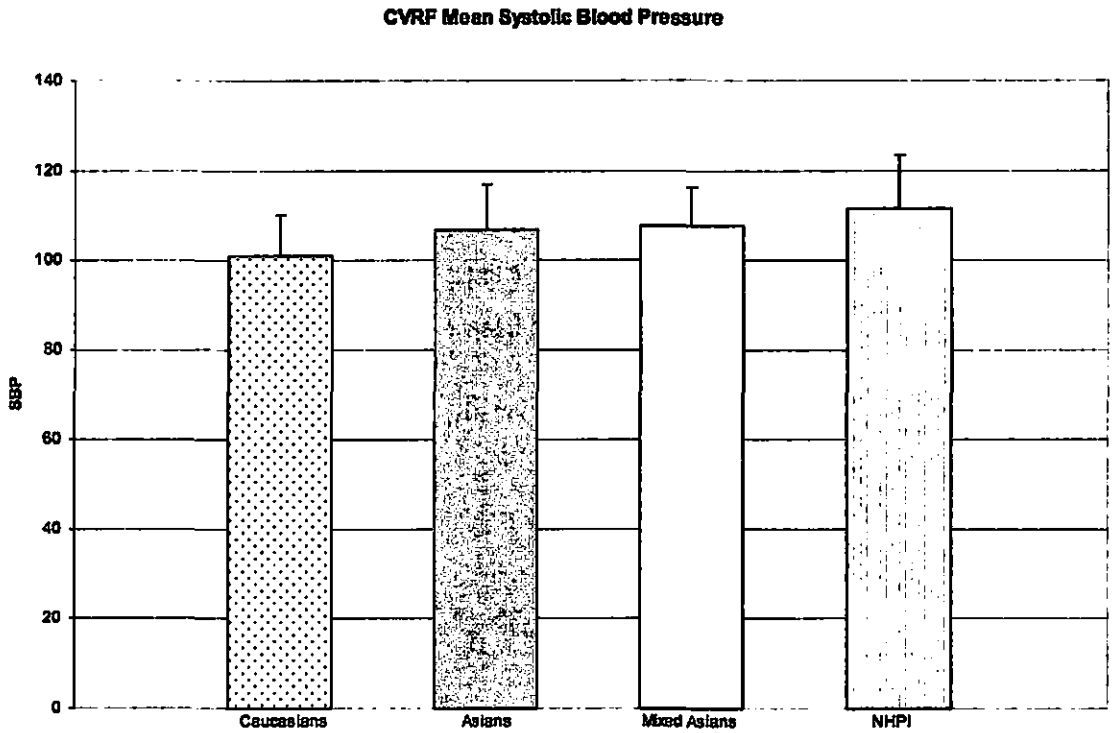
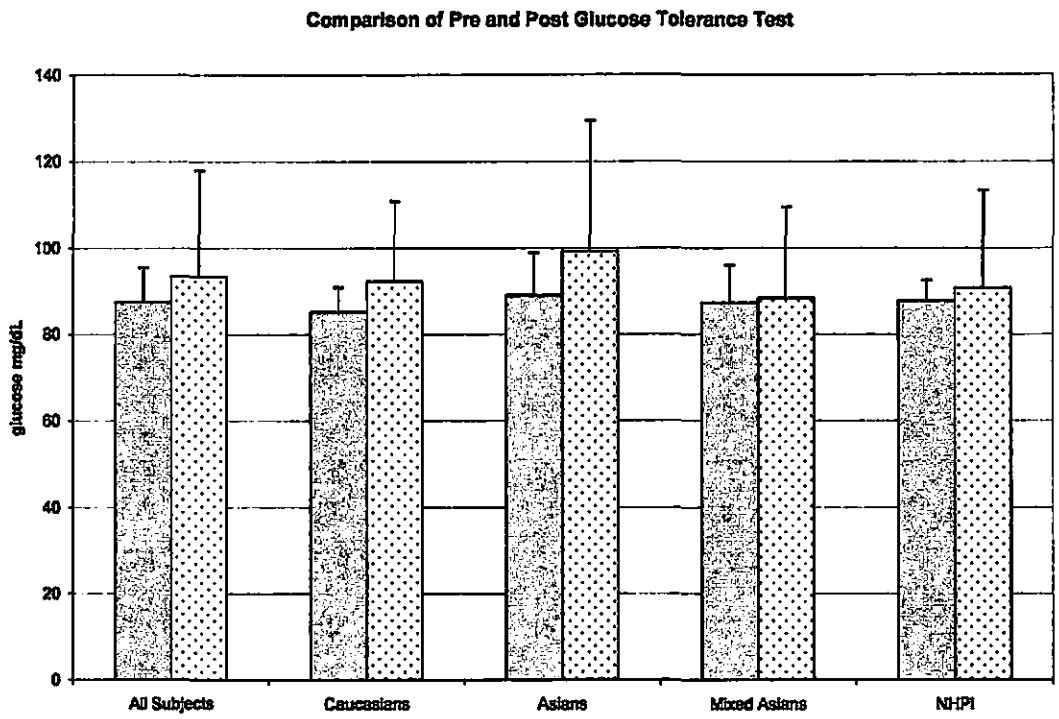


Figure 2



Native Hawaiians, Filipinos and Japanese have been reported to have higher rates of diabetes than Caucasians (Hawaii Diabetes Report (HDR), 2004). Eighteen of the 35 Asian subjects in this study were Japanese, Filipino or mixed Japanese and Filipino. McNeely & Boyko, 2004 conducted a study to compare the prevalence of type II diabetes in Asian Americans with other racial and ethnic groups. They reported that at any given BMI, Asian Americans are more likely than Non-Hispanic whites to develop diabetes and that Pacific Islanders have a greater prevalence of diabetes than whites. Four subjects in this study were found to have impaired fasting glucose levels (>100 mg/dl), of which all were of Asian descent; three were at least 50% Japanese, the other of Chinese descent. The one subject diagnosed with type II diabetes was 50% Japanese. One subject of Asian descent, had type-1 diabetes prior to participating in this study, no glucose data were

obtained from this subject. The data from this study may suggest that the glucose levels in Asians may show the initial signs of increased risks of developing diabetes.

The final purpose of this study was to conduct regression analysis to evaluate the amount of variance accounted for in the CVRFs by various anthropometric variables from the various ethnic groups. Variables included in the stepwise regression analysis were: body mass index (BMI), waist circumference (WC), waist to hip ratio (WHR), dual-energy x-ray absorptiometry (DEXA), skinfold (SKF), bioelectrical impedance (BIA) and an estimate of aerobic physical fitness as a means to best predict CVRF among the different ethic groups sampled. None of the explanatory anthropometric variables accounted for more than 32% of the variance of any given CVRF. It should be noted that it is possible that estimates of body composition may not truly reflect the body composition of the subjects, as the regression equations used were developed for other ethnic populations.

Based on the data from this study, none of the explanatory variables stood out as a best predictor of the development of CVRFs by accounting for a large portion of the variance. When the data were analyzed as a single group, only five explanatory variables significantly accounted for a portion of the variance in the nine different dependent variables. Caucasians had five explanatory variables account for significant amounts of variance of six of the CVRF variables. Asians had seven CVRF variables significantly related to eleven different explanatory variables. Mixed Asians had three explanatory variables significantly account for the variance of with three CVRF variables, and NHPI had five explanatory variables significantly account for the variance in the CVRF

variables. All the models generated by the regression analysis had relatively low R^2 values, with none of the models exceeding 65% of the variance accounted for. The significant prediction variables may not be useful clinically due to the lack of consistent results and the low partial R squares of the significant variables. Skinfold and BIA variables were entered into the regression models more frequently than were WHR or BMI for the CVRFs and therefore warrant further research.

Estimated maximal oxygen uptakes failed to significantly enter into any of the computer generated regression models. Maximum oxygen uptake ($VO_{2\ max}$) has been used to link fitness levels with CVRF using a treadmill test (Carnethon et al., 2003). Data from the CARDIA study (Carnethon et al. 2003) indicated that participants with the lowest fitness (<20th percentile, estimated VO_2max ~ 26.9 ml/kg/min) were 3- to 6- fold more likely to develop diabetes, hypertension, and metabolic syndrome than participants with high fitness (>60th percentile, estimated VO2max ~ 44.1 ml/kg/min). Fitness did not protect against the development of diabetes or metabolic syndrome in young adults who were already obese. They concluded that poor fitness in young adults is associated with the development of CVRFs and the associations involve obesity and may be modified by improving fitness (Carnethon et al., 2003). Milligan et al. (1997) studied a large group of Caucasian women (n = 282) with a mean age of 18 yrs and reported that cardiovascular risk factors were related to smoking, "unsafe" drinking, and physical inactivity, particularly in females. They suggested that these behaviors should be targeted in designing multimodal health promotion programs appropriate for these young adults.

Data from the present study were compared to Milligan et al. in table 11. Subjects in this study reported an activity level of 4.11 ±2.40 for their overall level of physical activity for the six months prior to the study. This corresponds to running less than one mile per week or less than 30 minutes per week in comparable activities such as running or jogging, lap swimming or other vigorous aerobic types of exercise. Subjects in the present study had a mean estimated VO2max of 39.1 ± 2.63 ml/kg/min. So they could be classified as a healthy fit group of young women at the time of testing. The relatively low level of physical activity reported by this group of subjects may explain the increases in CVRFs that occur over time in these populations. Decreased physical activity levels tend to occur with age. Fleg et al. (2005) estimated that peak VO_2 max levels decreased by 3 to 6% in the third decade of life and that the loss of aerobic fitness accelerates with age. Both weight and fitness levels were linked to increases in CVRF, which was of concern for young adults who barely meet the minimum recommendation of daily physical activity. A limitation of this study was that a dietary recall was not included, as exercise and diet can influence many of the modifiable risk factors. Hubert et al. (1983) found that relative weight in women was positively and independently linked to CVD. The combined effect of decreased fitness levels and potential weight gain with age was of concern for young females.

Physical activity levels during young adulthood have been linked to physical activity levels later in life. Conroy et al. showed a strong relationship between vigorous physical activity in young adults and achieving the recommended 30 minutes of physical activity when they are middle aged or older. Several studies have examined the physical activity

levels of college students and the data are alarming. Suminki et al. (2002) examined the physical activity levels of 2836 college students that consisted of 1698 women; 489 Asian women, 640 Caucasian women, 229 African women and 340 Hispanic women. Twenty-eight percent of Asian women reported no physical activity and the Asian women had the lowest physical activity levels of the study. Forty seven percent of the total sample did not engage in vigorous physical activity. Suminki et al. also reported that ethnicity and rates of inactivity were related.

Haase et al. (2004) analyzed physical activity level of college students from 23 countries and found women had lower physical activity levels than men. A significant trend in inactivity across the groups was found in both women and men. Japanese women reported the lowest physical activity levels of all the countries studied. Additionally, Haase et al. reported that only 40-60% of the students were aware of the associated benefits of physical activity and CVD. These finding were similar to finding of Green et al. (2003) who surveyed 470 undergraduate students from two major Universities. Green reported that minorities and women were less physically active and that 68% of the men and women in the study perceived their risk for CVD as lower than their peers, underestimating their perceived risk for heart attacks.

The AHA recommends thirty minutes of moderate-intensity physical activity to help lower and or prevent CVD. The American College of Sports Medicine (ACSM), the American Diabetes Association and the American Cancer Society endorse this 30 minute

standard. A total of 2 ½ hours per week is needed to meet the minimum suggested physical activity baseline. The U.S. Department of Health and Human Services reported that 73% of women failed to meet the minimum 30–minute guideline (PCFS, 2004). Based on the data from the present study, 31% of the subjects from this study failed to meet the minimum suggested AHA physical activity recommendations. These subjects reported 60 minutes or less per week of moderate activity. Forty three percent of the women in this study reported that they did not participate in vigorous exercise (running jogging lap swimming, etc.).

Physical fitness was assessed using a survey (non-exercise test) in the present study. Jurca et al. (2005) reported that cardiorespiratory fitness can be accurately estimated from a non-exercise test model including gender, age, body mass index, resting heart rate and self reported physical activity. These authors listed three reasons why cardio respiratory fitness should be estimated in clinical settings: 1) low CRF carries the same high risk for mortality when compared to other clinical risk factors, 2) increases in CRF result in positive changes in other risk factors, and 3) there is a growing urgency to identify the high risk asymptomatic individual who would benefit from an intervention.
Although fitness, as estimated in this study, was not included in the regression models, the lower level of reported activity was likely to result in increased CVRFs in decades to come.

In summary, young female AAPI at UHM are relatively average for lipid profiles and CVRFs when compared to larger population studies. Although not significant, Asians in this study had slightly higher glucose levels and may suggest the initial signs of diabetes. Attention to the relationship of fitness levels and CVRF in young women is one area that should be addressed. Decreasing rates and or lack of physical activity levels in young college women are of concern. Lack of physical activity may result in increases in CVRF and future development of CVD later in life. Further research on the development of new prediction equations to estimate body composition that include AAPI subjects and non-exercise VO_2 max tests to estimate physical activity levels for diverse ethnic groups is warranted. It was concluded that young AAPI women did not exhibit CVRFs that were different than the general US population.

Asian Americans, Native Hawaiians and Pacific Islanders

The state of Hawaii population was estimated at 1,257,608 for the year 2003. This was a 3.8% increase over the 2000 population of 1,211,537. For the same period the population increase in the United States was estimated at 3.3%, rising from 281,421,906 in 2000 to 290,809,777 in 2003. The predominant ethnic groups in Hawaii are as follows: Asians (41.6%), Native Hawaiians (9.4%) and Caucasians (24.3%). Twenty-one percent report belonging to more than two races, (US Census Bureau, 2005).

The United States Census 2000 report gave each citizen the opportunity to specifically classify his or her race by selecting more than one race category for the first time. The six race categories included; White, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, and some other race. The US Census 2000 also separated Pacific Islander and Hawaiians from the Asian category, allowing better identification of these populations. Data from US Census 2000 is not completely comparable to data from census 1990 or earlier due to the new changes.

The estimated population of Native Hawaiians and Pacific Islanders (NHPI), alone or mixed with another race in the United States is 281,000, accounting for 0.1 % of the total population responding "one race only". NHPI are considered the smallest race group in the Unites States. Fifty-eight percent of NHPI reside in the state of Hawaii and California. Honolulu, Hawaii has the largest NHPI population with 58,130 NHPIs. This

reflects NHPI alone or in combination with one or more races (US Census NHPI Brief [USCNHPI], 2001). The term Native Hawaiian and Other Pacific Islander refers to US citizens having origins of Hawaii, Guam, Samoa or other Pacific Islands. The US Census lists a detailed list of NHPI as follows; Polynesian: Native Hawaiian, Samoan, Tongan, Tahitian, and Tokelauan; Micronesians: Guamanian (Chamooro), Mariana Islander, Saipanes, Palauan, Carolinian, Kosraean, Chuukese, Yapese, Marshallese and I-Kirbati; Melanesian: Fijian, Papua New Guinean, Solomon Islander; Ni-Vanuatu and Other Pacific Islander. The NHPI categories consist of over 23 ethnic groups (USCNHPI, 2001).

The US Census 2000 estimated the Asian American (AA) population at 11,900,000. Hawaii had the third largest population of Asians at 700,000 (US Census Asian Brief [USCAB], 2002). The term "Asian" refers to US citizens who have origins of people from the Far East, Southeast Asia or the Indian subcontinent (USCAB, 2002). The "Asians" term is made of more than 24 different ethnic groups; Asian Indian, Bangladeshi, Bhutanese, Burmese, Cambodian, Chinese, Filipino, Hmong, Indochinese, Indonesian, Iwo Jiman, Japanese, Korean, Laotian, Malaysian, Maldivian, Nepalese, Okinawan, Pakistani, Singaporean, Sri Lankan, Tawanese, Thai, Vietnamese and Other Asian (USCAB, 2002).

Within the "Pacific Islander" and "Asian" groups, many diverse ethnic groups exist. This makes it difficult for research on ethnic populations. Recently, Comstock et al. (2004) reviewed the use of race and ethnicity in 919 epidemiological studies. They state that

there: "...is no consensus concerning the definition and categorization of race and ethnicity as scientific variables, the methods used to assess race and ethnicity, and the appropriate interpretation of the data obtained from using these variables". Caution must be used when addressing AA and PI due to the diverse nature of the ethnic groups.

Only a small number of research studies identifying AAs and NHPIs as separate groups. In 2003, only 0.2% of federal health related grants and 0.01 % of Medline articles mention AA and NHPI (Gosh 2003). Hawaii is home to more than 985,899 Asian, Pacific Islander and Native Hawaiians (US Census, 2000). The diverse population in Hawaii makes it an ideal location to conduct the much need research on health disparities among minorities in the United States. Among one of the greatest health disparities is cardiovascular disease (CVD).

Cardiovascular Disease

The development of CVD has been extensively studied in Caucasian, African American and Hispanic men. However, far less research has been done on women, young adults and smaller minority groups. In the past decade there has been significant growth in interest regarding CVD in the AA and NHPI population, however, most of these studies have focused on adults over 30 years old. In addition there has also been growing interest in predictors of cardiovascular risk in the pediatric population. However, most of these studies have been performed in U.S. mainland and Northern European populations fundamentally different than that found in the state of Hawaii. National studies to date

looking at these risk factors in young Americans (NHANES III) have specifically excluded AA and NHPI in their statistical analysis.

There are over 5.6 million ethnically diverse AA and NHPI women in the United States. Current research and data is lacking in women and in minorities. However, very little data on CVD exist for these groups. This is because these ethnic groups have been categorized as "other" on most studies (Ro, 2002). Thus, there are few true known health risks that have been studied within the AA and NHPI population. Known health risks that summarize populations tend to overlook the diverse nature of AA and NHPI and should be used with caution. Asian Americans and NHPI have a lower age-related death rate than non-Hispanic whites, 517.5 per 100,000 compared to 869.4 per 100,000. Samoan women have age related death rate of 907.7 per 100,000 (Ro, 2002).

CVD is the leading cause of mortality in women of all ethnic groups in the United States. Since 1984, there have been more deaths in women due to CVD than men (AHA, 2006). The CVD mortality rate for AAPI is 35.6% (AHA, 2006). This rate is misleading due to the diversity of the AA and NHPI group. Japanese women tend to have a very low mortality risk rate and Hawaiians have a high-risk rate. Data are for women aged 45 and over (AHA, 2006). There is a dire need for data on young adult populations of minority women such as AA and NHPI. There are many unanswered health questions concerning women and ways to improve their health, (Ro, 2002).

Several studies looking at select populations of undergraduate students suggest that college students have cholesterol levels significantly higher than age-group national norms. The NHANES III reports the mean total blood cholesterol level for girls aged 4-19 is 167 mg/dL. The NHANES III only includes data for Caucasians, African Americans and Hispanic girls. For data on 20 and older women, the NHANES IV reports that 53.6 % of Caucasians, 46.4 % of African Americans and 44.7% of Hispanics have total blood pressure cholesterol levels over 200. No data was presented for AAPI within the 4-19 and 20 and older age groups.

Current national screening recommendations, according to the National Cholesterol Education Program's Adult Treatment Panel III (ATP III), include an initial lipid panel at 20 years of age and every 5 years in the absence of other risk factors for hyperlipidemia. There are two particular points of interest made by the ATP III. First, a paucity of data on the AAPI population prevented ethnicity-specific recommendations on screening or treatment. The second point is that the ATP III recommended more aggressive treatment of elevated LDL in adolescents and young adults compared to those found in the ATP II. This last point reflects a growing realization that the risk to benefit ratio of current lipid-lowering regimens favors intervention at an earlier stage of disease, and therefore suggests greater benefit of early identification of hyperlipidemia.

Diabetes

Type II diabetes is a metabolic disorder where the human body is unable to use or make insulin properly. Diabetes is a chronic disease that has no cure. Hawaii Department of Health's Hawaii Diabetes Report 2004 (HDR) reports that there are an estimated 72,000 to 100,000 cases of diabetes in the state of Hawaii and that more than 900 people die every year of related complications. Type II diabetes is more common in ethnic groups such as Asian American, Native Hawaiians and Pacific Islanders. Data from the HDR 2004 showed Native Hawaiians (7.9%) and Filipinos (7.5%) had the highest rates of diabetes in Hawaii, followed by Japanese (6.6%). The prevalence of diabetes in Hawaii for Caucasians was 3.4 %. Cardiovascular disease is a major complication of diabetes and persons with diabetes are two to four times more likely to die of heart disease and stroke. Heart disease and stroke account for approximately 65% of diabetic's deaths (HDR, 2004).

Studies of the development of glucose intolerance in young populations are of increased interest due to current obesity rates and the increased rates of type II diabetes in children. The NHANES III showed impaired glucose tolerance in 1.76% of almost 2,900 adolescents tested but did not include data for the late adolescent AA and NHPI populations, as found at UHM. National studies like previous census counts, categorized Asians American, Native Hawaiians and Pacific Islanders as one group and were labeled, non-Hispanic white. Thus limited diabetes data exists on AA and NHPI.

Anthropometric Measurements

Body mass index (BMI) and waist to hip ratio (WHR) are two of the most readily accessible anthropometric measures commonly used in public health screenings and physicians' offices to aid in the assessment of obesity and cardiovascular risk. Body mass index, (BMI), is the ratio of body weight to height squared. BMI (kg/m^2) = weight in kg/height^2 in meters. BMI classification of weight and co-morbidity risk has been validated primarily in a Caucasian population (Deurenberg, 2002). Waist circumferences have no universal measurement site. For this study, waist measurements were taken in centimeters at the narrowest waist between the lowest lateral section of the rib cage and iliac crest. Hip measurements were taken in centimeters, anteriorly, at the level of the symphysis pubis, and posteriorly, at the maximum extension of the buttocks. Waist to hip ratio, (WHR), was calculated by dividing waist measurements by hip measurements.

Measurements of body fat better predict obesity than BMI. Body composition measurements may have the potential to be better predictors of CVRFs in diverse ethnic populations. Skinfold measurement are commonly used to calculate body density and body composition, particularly in high school, collegiate, and other athletic settings where they are used to determine body fat. Jackson et al. (1980) devised a seven site skinfold equation using a female population, n= 331, ages 18 to 55 years old. Jackson et al. determined that the equations were valid for adult females of various builds. Ethnicities of the subjects were not mentioned in the study. Both Siri and Brozek equations were used to determined body fat from the measured body density derived from the Jackson et al. equation. Equations used for these calculations are very

population specific, and have primarily been determined in Caucasian, African American, and Hispanic populations, and therefore may not be suitable for use in AA and NHPI populations.

Bioelectrical impedance is an evolving, inexpensive, and non-invasive technology for assessing body composition, and has been found reliable for body composition assessment (Fornetti, 1999). However, once again, equations used for BIA determinations have not been validated in the AAPI population. Bioelectrical impedance equations are population specific. Currently there are no known equations for NHPI. Wang et al. (1995) derived an equation for Asians using mostly Chinese subjects (97%) between the ages of 18 through 94 years old. This equation is one of the few reported for Asians. Other general BIA equations that have been used in studies to measure BIA are Lukaski et al. (1990), Fornetti et al. (1999), Houtkooper et al. (1992) and the manufacture's RJL equation. The Lukaski et al. equation was derived from 104 male and female college athletes. The study only mentioned Caucasians and African American subjects. Ethnicity of the subject was not listed. The Fornetti et al. (1999) equation was derived from college-aged female athletes, mean age 20.4 ± 1.5 and was shown to be a reliable and valid technique for estimating body composition in female athletes. The Houtkooper et al. (1992) equation was derived using Caucasian children ages 10-19 years old, n=131, and was shown to predict fat-free body mass with good accuracy in Caucasian children. Further research is warranted to devise BIA equations to be used in diverse ethnic populations.

Physical Activity Levels and Cardiovascular Disease.

The President's Council on Physical Fitness and Sports (PCPFS) (2004) reported that increasing physical activity in women is a protective factor to helping decrease the number of women affected by coronary heart disease. The PCPFS reported that 30-minutes of physical activity confers significant and measurable cardiovascular health benefits. Physical activity levels have been established as a CVRF. Carethon et al. (2003) reported that young adults with low levels of fitness had a greater risk of developing diabetes, hypertension and the metabolic syndrome than individuals with high fitness levels. The Carethon et al. study emphasizes the importance of low fitness levels as a CVRF in young adulthood.

Current research studies have shown that physical activity levels are important risk factors in CVD and that fitness levels tend to decrease with age when women are more likely to develop CVD. Fleg et al. (2005) studied 375 women and 435 men for 20 years to determine the longitudinal rate of change in aerobic and how age, gender and physical activity affect these changes. Treadmill tests were used to predict VO_2 max estimates and subjects included untrained women. Fleg et al. reported that at an age of 30 years, peak VO_2 maximum estimates decreased approximately 5% per decade and that changes in body weight and fat free mass due to age were important factors of longitudinal changes in peak VO_2 max

Current levels of fitness for college age students seem to be generally low for females. Haase et al. (2004) studied the physical activity levels of 19,298 students from 23 different countries. They reported that the majority of students are below the recommended level of physical activity. Japanese female students had the lowest reported physical activity levels for the study. Women in general reported lower activity levels than men.

College females may be at a greater risk of developing CVD if their current fitness levels are low. Conroy et al. (2005) examined the physical activity level data of 39,876 females under the age of 45 years old from the Women's Health Study. A strong relationship between vigorous activities in young adulthood was linked to meeting minimum recommendations of physical activity at middle age. Conroy et al. (2005) concluded that women who are more active when they are younger would more likely be active later in life when they are at a greater risk of developing CVD.

An easy means to estimate fitness levels of college students is through a non-exercise physical activity questionnaire. George et al. (1996) developed a non-exercise VO_2 max estimation questionnaire for active college students. George et al. reported that the questionnaire provided a valid and convenient way to predict VO_2 max estimates in physically active college students. Jurca et al. (2005) used a similar non-exercise questionnaire as George et al. to estimate VO_2 max. Jurca et al. reported that cardiorespiratory fitness might be accurately estimated from a non-exercise test that includes gender, age, BMI, resting heart rate and self-reported physical activity. The self

reported physical activity questionnaire was measured against VO_2 max results from a treadmill test that is considered the gold standard for VO_2 max testing.

Further research on female college students, fitness levels and CVRF are warranted based on the current literature. Milligan et al. (1997) examined the lifestyle and CVRF in 18 year old Australians. The study consisted of a large group of Caucasian women (n = 282) with a mean age of 18 yrs and reported that cardiovascular risk factors are related to smoking, "unsafe" drinking, and physical inactivity, particularly in females. They suggested that these behaviors should be targeted in designing multimodal health promotion programs appropriate for these young adults.

Women are currently at greater risk of dying of CVD. Research is warranted to study AA and NHPI to study their CVRF. Specifically young female AAs and NHPIs who may belong to both an ethnic and age group that lack CVRF data. The use of anthropometric measurements may be better predictors of CVRFs than BMI and WHR which are used currently.

Hawaii Pacific Health

55 Merchant Street • Honolulu, Hawaii 96813 • hawaiipacifichealth.org

27th Floor Phone: (808) 535-7500 Fax: (808) 547-5931

Institutional Review Board

June 3, 2004

Approval of Initial Documents

Michele LaBotz, MD, FAAP
John A. Burns School of Medicine
B207A Biomedical Science Building
1960 East-West Road
Honolulu, HI 96822

RE: RP#: 2004LABO001
"Cardiovascular Risk Factors of Incoming Female Students at the University of Hawaii at Manoa: A Feasibility Study"

Dear Dr. LaBotz:

The Hawaii Pacific Health Institutional Review Board (IRB) reviewed and approved your project on May 4, 2004, pending modifications to the informed consent. These modifications were received, approved and acknowledged in its letter to you dated 5/27/04.

The IRB also approved the following documents you submitted which were inadvertently omitted with the 5/27/04 letter:

- Non-exercise VO2 max Estimation
- Subject Contact Information
- Demographic and Medical History form
- Instructions for Your Next study Visit
- Two maps to the CRC

Enclosed are these IRB-approved documents stamped with the dates of the approval period.

If during the course of your project you intend to make changes that will affect the human subjects involved, you must obtain IRB approval prior to implementing these changes. Modifications to the informed consent form must be submitted for review and approval prior to implementation.

Any Serious Adverse Events (SAEs) or Unexpected Adverse Events (UAEs) must be reported immediately to either the IRB Chairperson or the IRB Administrative Office. A written report of the adverse reaction must follow within five days to the IRB. Events that may not be directly related to the study must also be reported.

If you have any questions, please contact Joyce Fojas at 822-4544.

Sincerely,

Curtis Kamida, MD, Chair
Institutional Review Board

CK:jf

Enclosures:
Non-exercise VO2 max Estimation
Subject Contact Information
Demographic and Medical History form
Instructions for Your Next study Visit
Two maps to the CRC

KAPIOLANI MEDICAL CENTER AT PALI MOMI KAPIOLANI MEDICAL CENTER FOR WOMEN & CHILDREN Straub CLINIC & HOSPITAL Wilcox Health

Hawaii Pacific Health

55 Merchant Street • Honolulu, Hawaii 96813 • hawaiipacifichealth.org
Institutional Review Board

July 14, 2004

Modification Approval

Michele LaBotz, MD, FAAP
Division of Sports Medicine
Dept. of Family Practice and Community Medicine
Biomedical Sciences Building
1960 East West Road, B207A
John A. Burns School of Medicine
Honolulu, HI 96821

RE: RP #2004LABO001
Project Title: Cardiovascular Risk Factors of Incoming Female Students at the University of Hawaii at Manoa: A Feasibility Study

Dear Dr. LaBotz:

The Hawaii Pacific Health Institutional Review Board (IRB) is in receipt of your letter dated 7/12/04 requesting revisions to the informed consent form, Demographic and Medical History form, and letter to participants reporting test results.

These modifications were reviewed and approved by the IRB via expedited review on 7/14/04. Your approval dates remain unchanged for the period 5/4/04 through 5/3/05. A Continuing Review report must be submitted on or about 3/3/05.

Enclosed are your IRB stamped approved Informed Consent dated 5/26/03, letter to participants, and Demographic and Medical History form. Please use these versions when enrolling subjects.

If you intend to make changes during the course of your project which will affect the human subjects involved, you must obtain IRB approval prior to implementing these changes.

Any Serious Adverse Event (SAE) or Unanticipated Adverse Event (UAE) must be reported immediately to either the IRB Chairperson or the IRB Administrative Office. A written report of the SAE or UAE must be submitted to the IRB within five calendar days. Any non-serious adverse events that may not be directly related to the study must also be reported within 45 days.

If you have any questions, please contact Joyce Fojas at 522-4544.

Sincerely,

Curtis Kamida, MD, Chair
Institutional Review Board

CK:jf

Enclosures: Informed Consent form dated 5/26/03, letter to participants reporting test results, Demographic and Medical History form

cc: Sharon Malehorn, Clinical Research Center

KAPIOLANI MEDICAL CENTER AT PALI MOMI KAPIOLANI MEDICAL CENTER FOR WOMEN & CHILDREN Straub CLINIC & HOSPITAL

Consent to Participate in a Research Study

CARDIOVASCULAR RISK FACTORS OF INCOMING FEMALE STUDENTS AT THE UNIVERSITY OF HAWAII AT MANOA

PRINCIPAL INVESTIGATOR: Michele LaBotz, MD, FAAP
John A. Burns School of Medicine
B207A Biomedical Sciences Building
1960 East-West Road
Honolulu, HI 96822
(808) 956-5530

INTRODUCTION:

Before you decide whether or not to participate in this study, you must understand the purpose, how it may help you, any risks to you, and your rights as a research participant. This process is called informed consent. The consent form gives you information about the study and it will be discussed with you. It also gives you information about what health information will be collected as part of the research study and how that information as well as existing health information about you will be used and disclosed. Once you understand the study, and if you agree to take part, you will be asked to sign this consent form. If you sign this form you are agreeing to take part in this study and to allow the research team to use and disclose your health information. A signed copy will be given to you to keep for your reference.

Before you learn about the study, it is important that you know the following:

- Taking part in this study is of your own free will.
- You may decide not to take part in the study or stop being in the study at any time. If you decide that you don't want to be part of this study, you will still receive medical care and will still receive any benefits that you are normally entitled to.

It is important that the following explanation of the proposed procedures be read. It describes the purpose, procedures, benefits, risks, discomforts and precautions of the study. It also describes alternative procedures available and the right to withdraw from the study at any time. You have been told that no guarantee or assurance can be made as to the results. You have also been told that refusal to participate in this study will not influence standard treatment available to you.

You will be one of approximately 100 subjects to participate in this study.

PURPOSE:

The purpose of this research study is to look at cardiovascular risk factors among female students at the University of Hawaii. Cardiovascular disease is the leading killer of adults in the United States, and there is increasing evidence that the disease process begins much earlier than previously thought. If these risk factors can be identified in young people before the onset of symptoms, these risk factors may be modified to prevent or delay disease.

The study will also track how weight, blood pressure and fitness change during college enrollment.

Your medical history and personal information are needed to accurately track changes that occur during the one year study period. Any irregular laboratory results will be shared with you and your designated primary care physician or the University Health Services at Manoa for appropriate follow-up care. Results of this study may be published and will be used to request funding for future research but you will be identified by a unique study code number, not by name.

DURATION:

One hundred incoming first-year female students, 18 to 24 years of age, will participate in this study. The first 2 visits will occur between September and November 2004, with a final visit one year later.

PROCEDURES:

The first screening visit will take place at University Health Services at Manoa (UHS). The visit will take about an hour and will involve:

- review of your medical history
- completion of a brief physical activity survey
- measurement of height, weight and blood pressure

The second study visit at the Clinical Research Center at Kapiolani Medical Center for Women and Children will involve laboratory tests and body composition assessments. It will last about three hours.

Laboratory tests will include:

- Cholesterol and triglyceride levels. You will be asked to fast for 12 hours prior to the study visit. Fasting involves not eating any food or drinking any liquids except water. The test will require 5 ml of blood (approximately 1 teaspoon).
- Oral glucose tolerance test. You will be asked to drink about 75 grams (1 ¼ cup) of a sugar solution. A blood sample will be taken before drinking the solution, and again after 2 hours. Each sample will need about 5 ml (approximately 1 teaspoon) of blood and be tested for glucose (blood sugar) levels. The first sample will be drawn at the same time as the needle stick for the cholesterol test. The total amount of blood needed for the study is about 15 ml or 3 teaspoons.
- Urine pregnancy test. You will be asked to provide a urine sample to check if you are pregnant. You will be informed of the pregnancy test results and advised to

seek appropriate medical care if needed. If the pregnancy test is positive, you will not be able to participate in the study.

Body composition and additional testing will include:

- Measurement of height, weight, blood pressure, waist and hip circumferences, and skin fold measures.
- Dual-energy x-ray absorptiometry (DEXA) scan. This is a full body scan to measure your bone density and body fat composition and involves lying flat and still on a table for about 5 minutes. You will be asked to change into a hospital gown and to remove all metal.
- Bioelectrical impedance analysis (BIA). This painless test uses a small, harmless low-level electrical current to calculate the percentage of fat tissues out of the whole body mass.

The third and final visit will be one year later at UHS and will involve:

- Measurement of height, weight, blood pressure, waist and hip circumference
- Completion of the medical history and physical activity survey forms.

FORESEEABLE RISKS OR DISCOMFORTS:

The study may involve the following risks and/or discomforts:

- Blood drawing can cause mild pain or a bruise at the place where the needle is inserted. Occasionally, a person may faint or feel faint when blood is drawn. The risk of infection is slight since only sterile one-time equipment will be used.
- Fasting overnight may cause hypoglycemia (low blood sugar), blurry vision, faintness, weakness, nausea, or shakiness. If this occurs on the morning after your fast and before your study visit, call the study nurse at 983-6242 prior to coming to the clinic. Immediately drink juice and eat. We will reschedule your visit.
- The glucose drink may cause nausea.
- Some of the questions asked are of a personal and sensitive nature. You may feel uncomfortable when answering these questions and can choose not to answer the questions. The physical activity survey questions may cause you to feel self conscious about your body and to feel a loss of privacy.
- A full body DEXA-scan involves exposure to some radiation. Radiation is energy in the form of waves that pass through the body and is measured in mRem. A chest x-ray is 5 mRem and 1 year of background radiation exposure is 300 mRem. The radiation for a DEXA scan is less than 1 mRem or less than the exposure received during a round-trip flight from Hawaii to the mainland which is about 6 mRem.
- You will have several different body measurements taken and they may cause you to feel embarrassed and self-conscious about your body.

There also may be risks and discomforts which are not yet known.

BENEFITS:

You may receive no direct benefit from participating in this study. You will receive information about your personal cardiovascular risk profile, including cholesterol and blood sugar levels, as well as body composition and bone density measures.

Your participation will contribute to information about cardiovascular risk factors among young women at UHM and help researchers to design future studies.

NEW FINDINGS:

You will receive any new information during the course of the study concerning significant findings that may affect your willingness to continue participating in the study.

CONFIDENTIALITY:

Every effort will be made to maintain the confidentiality of your study records. All information about you will remain strictly confidential to the extent allowable by the law. Results from this study may be published or shared with other interested parties such as other physicians, research institutions and/or federal authorities, but you will not be personally identified. In the process of evaluating the study, your records may be examined by the Hawaii Pacific Health Institutional Review Board (IRB), the staff of the University of Hawaii Committee on Human Studies, the Investigator and the research staff. Your identity will remain confidential unless disclosure is required by law.

USE AND DISCLOSURE OF YOUR HEALTH INFORMATION:

By signing this form you are authorizing the use and disclosure of your health information. Your information will only be used/disclosed as described in this consent form and as permitted by state and federal laws.

This consent covers all information about you that is used or collected for this study. It includes your name, birth date, past and present residences, medical history and information gathered about you during the study visits including the physical exams, measurements, laboratory tests, DEXA scan, BIA, and questionnaires that are described in the Procedures section of the consent form.

Your medical records may contain information about AIDS or HIV infection, venereal disease, treatment for alcohol and/or drug abuse, or mental health or psychiatric services and the research team may have access to that information.

There is no expiration date to this consent. However, if you decide to terminate your participation in this study or you are removed from this study by the principal investigator, you may revoke your consent by submitting written notification to the principal investigator Michele LaBotz, MD, FAAP at John A. Burns School of Medicine, B207A Biomedical Sciences Building, 1960 East-West Road, Honolulu, HI 96822. If you decide to revoke your consent, your health information created for this study shall not be used or disclosed by the principal investigator after the date of receipt of the written revocation except to the extent that the law allows us to continue using your information. The

investigators in this study are not required to destroy or retrieve any of your health information created for this study that has been used or disclosed prior to receiving your written revocation.

Your medical records and any health information related to this study may be used or disclosed in connection with this research study to the following parties:

- Michele LaBotz, MD, FAAP and her research staff for the purposes of conducting this research study
- Co-investigator Iris Kimura, PhD and her research staff at Dept of Kinesiology and Leisure Sciences, University of Hawaii
- Consultant Ron Hetzler, PhD, Dept of Kinesiology and Leisure Sciences, University of Hawaii
- Jeff Okamoto, MD, Kapiolani Medical Center
- Graduate Research Assistant, Department of Kinesiology and Leisure Sciences, University of Hawaii
- Research staff at the Clinical Research Center at Kapiolani Medical Center
- Clinical Laboratories of Hawaii
- Diagnostic Laboratory Services
- University Health Services at Manoa

The individuals named above may disclose your medical records, this consent form and the information about you created by this study to:

- Federal, state and local agencies having oversight over this research, such as the Office for Human Research Protections in the U.S. Department of Health and Human Services, Food and Drug Administration, the National Institutes of Health, etc.
- The Hawaii Pacific Health (HPH) Research Institute, HPH Officials, the Hawaii Pacific Health Institutional Review Board, and the HPH Office of Compliance for purposes of overseeing the research study and making sure that your ethical rights are being protected.
- the staff of the University of Hawaii Committee on Human Studies
- your primary care provider

Some of the persons or groups that receive your study information may not be required to comply with federal privacy regulations, and your information may lose its federal privacy protection if those persons or groups disclose it.

ACCESS TO YOUR INFORMATION

You may not be allowed to see or obtain copies of certain information in your medical or study records collected in connection with your participation in this research study while the research is in progress. Once the research is completed, you will be able to access or obtain copies of the information by submitting a written request to the Principal Investigator.

FINANCIAL COSTS TO THE SUBJECT:

You will not be charged for your participation in the study. All study procedures will be provided at no charge to you.

COMPENSATION IN CASE OF INJURY:

If you are injured as a result of this study, you or your insurance company will be responsible for any charges incurred. There will be no additional money paid to you for illness or injury related to participation in this study.

PAYMENTS TO PARTICIPANTS:

You will receive a $30 credit at the UH Bookstore at visit 2 as reimbursement for your time and travel expenses.

RIGHT TO REFUSE OR WITHDRAW:

It has been explained to you that your participation is voluntary and you may refuse to participate, or may discontinue your participation AT ANY TIME, without penalty or loss of benefits to which you are otherwise entitled. If you withdraw from the study we will continue to use information that has already been collected but no new information about you will be collected unless the information concerns an adverse event (a bad effect) related to the study. If such an adverse event occurs, your entire medical record may need to be reviewed.

You have also been told that the investigator has the right to withdraw you from the study AT ANY TIME. You have been told that your withdrawal from the study may be for reasons related solely to you (e.g. not following study-related directions from the Investigator; a serious adverse reaction) or because the entire study has been terminated.

You have also been told you have the right to refuse to sign this consent. This would prevent those listed above from having access to or using any of your health information for the purpose stated. You have been told that refusal to sign this consent means that you cannot participate in this study.

OFFER TO ANSWER QUESTIONS:

This study has been explained to your satisfaction by the study staff and your questions have been answered. If you have any other questions about this study, you may contact Principal Investigator. Michele LaBotz, MD as listed above.

If you have any questions about your rights as a research subject, you may call the Chairman of the Hawaii Pacific Health Institutional Review Board at 535-7500 or send written correspondence to
55 Merchant Street, 27th Floor, Honolulu, Hawaii 96813. You may also contact the Committee on Human Studies, University of Hawaii, 2540 Maile Way, Honolulu, HI 96822, phone: 956-5007.

VOLUNTARY CONSENT:

I READ THE INFORMATION PROVIDED ABOVE. I VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY AND MAY WITHDRAW MY CONSENT AT ANY TIME. MY DECISION TO WITHDRAW WILL NOT AFFECT THE MEDICAL CARE THAT I RECEIVE. I UNDERSTAND THAT MY CONSENT DOES NOT TAKE AWAY ANY OF MY LEGAL RIGHTS IN CASE OF NEGLIGENCE ON THE PART OF ANYONE WHO IS WORKING ON THIS PROJECT.

A SIGNED COPY OF THIS CONSENT FORM WILL BE GIVEN TO ME.

_____
Subject's Name (Print)

_____

_____
Subject's Signature Date

_____

_____
Legal Representative (If applicable) Date

If signed by someone other than the subject, describe your authority to act on behalf of the subject:

_____

_____
Signature and Title of Person Obtaining Consent and Identification of Role in the Study Date

UNIVERSITY OF HAWAI'I AT MANOA

KAPI'OLANI HEALTH

CLINICAL RESEARCH CENTER

Cardiovascular Risk Factors of incoming female students at the University of Hawaii

Visit 2 Data Collection Form

Subject # _____ Date of Visit: _____

Blood Pressure: _____

Initials of person measuring BP_____
Comments:_____

Anthropometric Measurements:

Height _____cm Weight _____kg

Area measured	First (cm)	Second (cm)	Third (cm)
Waist Circumference			
Hip Circumference			

Skin Fold	First (mm)	Second (mm)	Third (mm)	Median (mm)
Chest				
Triceps				
Abdomen				
Subscapular				
Axillary line				
Thigh				
Suprailiac				

Initials of person taking anthropometry measurements:_____
Comments: _____

_____

BIA testing:

BIA	First Reading	Second Reading
Resistance		
Reactance		

Initials of person conducting BIA test: _____
Comments: _____

_____

CRC - CARDIOVASCULAR RISK FACTORS-UH (16887) Clinical Laboratories of Hawaii
1319 POUNAHOU STREET,BINGHAM 101 .
ATTN: ' |
HONOLULU, HI 96826
983-6225
Ordering Phys: CRC-CARDIOVASCULAR RISK

Patient ID	Age	Sex	Report Date	Report Time
	18	F		11:37 AM

Patient Tel No: SSN: DD:

PAGE: 1

Collected: Accession:

	RESULTS	ABNORMAL	REFERENCE RANGE	UNITS	LOC
Collect time: 15:15 SQ Accn: H3588,H3676					
Glucose 2hr post 75g	111		(70-139)	mg/dL	C

Interpretive criteria:
Less than 140 mg/dL: patient probably belongs in normal glucose tolerance category.
140 -199: patient probably belongs in the impaired glucose tolerance category.
200 or higher: suggests either provisional diabetes mellitus diagnosis or confirms diabetes mellitus diagnosis if previous fasting or plasma glucose results have resulted in provisional diagnosis of diabetis mellitus.

Lipid Profile				
Cholesterol	123		(<200)	mg/dL
		Desirable level:	< 200	
		Borderline high:	200-239	
		High level:	>=240	
Triglyceride	65		(<150)	mg/dL
		Borderline-high:	150-199	
		High level:	200-499	
		Very high level:	>=500	
HDL Cholesterol	50		(>39)	mg/dL
		Low Level:	< 40	
		High Level:	>=60	
LDL	60		(<100)	mg/dL
		LDL Interpretation:		
		Optimal:	<100	
		Near/above optimal:	100-129	
		Borderline high:	130-159	
		High:	160-189	

CONTINUED....

CRC - CARDIOVASCULAR RISK FACTORS-UH (16887) Clinical Laboratories of Hawaii
1319 POUNAHOU STREET,BINGHAM 101 .
ATTN:
HONOLULU, HI 96826
983-6225
Ordering Phys: CRC-CARDIOVASCULAR RISK

Patient ID	Age	Sex	Report Date
	18	F	

Patient Tel No: 0 SSN: HD:

Collected: Accession:

	RESULTS	ABNORMAL	REFERENCE RANGE	UNITS	LOC
	Very high:		>=190		
CHOL/HDL Ratio	2.46		(<3.5)		
	Chol/HDL ratio interpretation:				
	Ideal:		<3.5		
	Average risk:		<4.5		
	2x average risk:		10.8		
	3x average risk:		20.8		
Comments	Fasting				
Glucose	90		(70-110)	mg/dL	C

FINAL REPORT

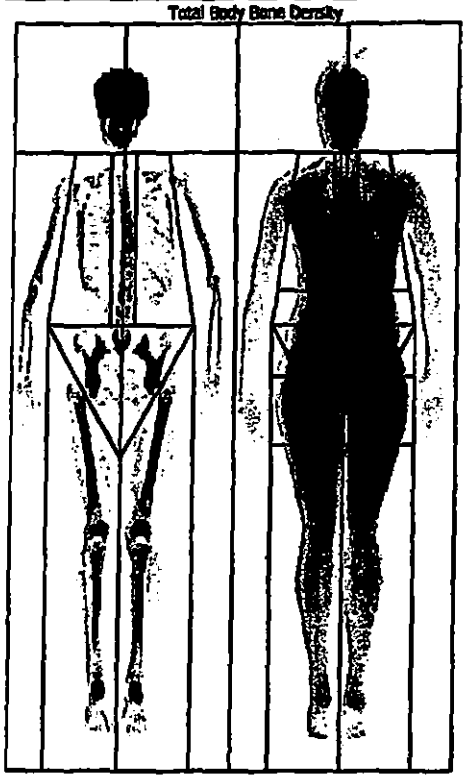
Testing Locations:
C: Kapiolani

GE Lunar Corporation

726 Heartland Trail
Madison, WI 53717-1915

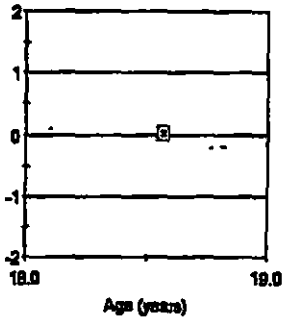
Patient:	CVRF,	**Facility ID:**	CRC
Birth Date:	18.5 years	**Physician:**	
Height / Weight:	67.0 in. 142.0 lbs.	**Measured:**	1:55:06 PM (8.70)
Sex / Ethnic:	Female White	**Analyzed:**	3:02:02 PM (8.70)

Total Body Bone Density



Reference Chart: No reference data for Total Body [Total] region.

Trend: Total
%Change vs Baseline



Region	BMD[1] (g/cm²)
Total	1.293

Measured Date	Age (years)	Trend: Total BMD[1] (g/cm²)	Change vs Baseline (%)	Change vs Baseline (%/yr)
	18.5	1.293	baseline	baseline

COMMENTS:

Image not for diagnosis

1 -Statistically 68% of repeat scans fall within 1SD (± 0.010 g/cm² for Total Body Total)

GE Medical Systems
LUNAR

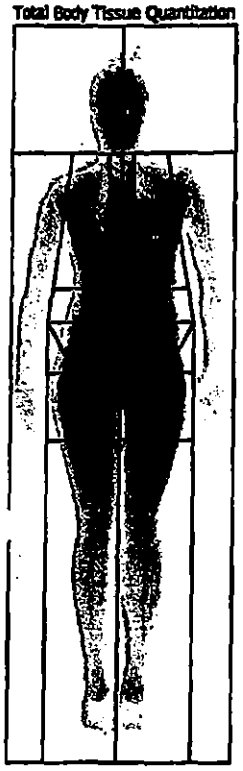
Prodigy
DP+12484

GE Lunar Corporation

726 Heartland Trail
Madison, WI 53717-1915

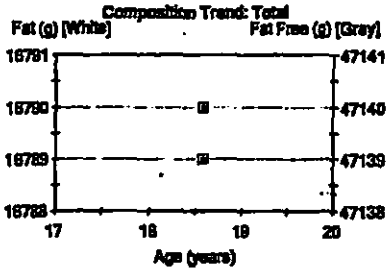
Patient:	CVRF,	**Facility ID:**	CRC
Birth Date:	: 18.5 years	**Physician:**	
Height / Weight:	67.0 in. 142.0 lbs.	**Measured:**	1:55:06 PM (8.70)
Sex / Ethnic:	Female White	**Analyzed:**	3:02:02 PM (8.70)

Total Body Tissue Quantization



Reference Chart: No reference data for Total Body [Total] region.

Composition Trend: Total



Trend: Total

Measured Date	Age (years)	Tissue (%Fat)	Centile	T.Mass (kg)	Region (%Fat)	Tissue (g)	Fat (g)	Lean (g)	BMC (g)	Fat Free (g)
	18.5	27.5	-	63.93	28.3	61,007	16,790	44,217	2,921.8	47,139

Trend: Fat Distribution

Measured Date	Age (years)	Android (%Fat)	Gynoid (%Fat)	A/G Ratio	Total Body (%Fat)
	18.5	33.3	37.1	0.90	27.5

COMMENTS:

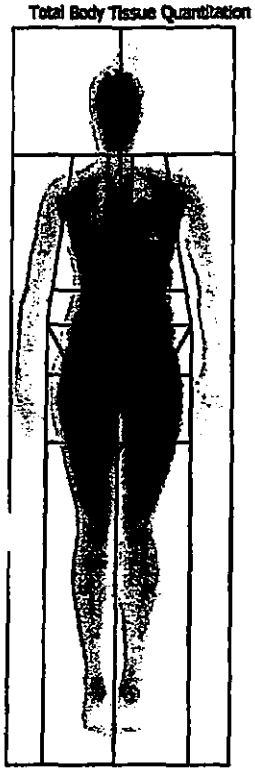
Image not for diagnosis

GE Lunar Corporation

726 Heartland Trail
Madison, WI 53717-1915

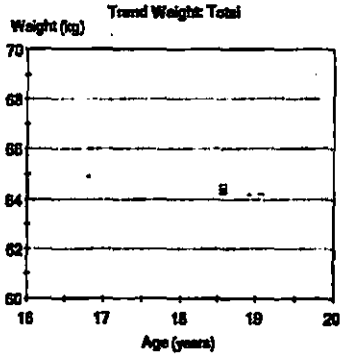
Patient:	CVRF,	Facility ID:	CRC
Birth Date:	18.5 years	Physician:	
Height / Weight:	67.0 in. 142.0 lbs.	Measured:	1:55:06 PM (8.70)
Sex / Ethnic:	Female White	Analyzed:	3:02:02 PM (8.70)

Total Body Tissue Quantitation



Reference Chart: No reference data for Total Body [Total] region.

Trend Weight: Total



Region	Tissue (%Fat)	Centile	T.Mass (kg)	Fat (g)	Lean (g)	BMC (g)
Total	27.5	-	63.93	16,790	44,217	2,921.8

Trend: Total

Measured Date	Age (years)	Tissue (%Fat)	Centile	T.Mass (kg)	Fat (g)	Lean (g)
	18.5	27.5	-	63.93	16,790	44,217

COMMENTS:

Image not for diagnosis

GE Lunar Corporation

726 Heartland Trail
Madison, WI 53717-1915

Patient:	CVRF.		**Facility ID:**	CRC	
Birth Date:		18.5 years	**Physician:**		
Height / Weight:	67.0 in.	142.0 lbs.	**Measured:**	1:55:06 PM	(8.70)
Sex / Ethnic:	Female	White	**Analyzed:**	3:02:02 PM	(8.70)

BODY COMPOSITION

Region	Tissue (%Fat)	Region (%Fat)	Tissue (g)	Fat (g)	Lean (g)	BMC (g)	Total Mass (kg)
Left Arm	23.8	22.6	3,242	772	2,470	176.1	-
Left Leg	30.1	28.6	10,733	3,227	7,506	549.4	-
Left Trunk	28.3	27.4	14,670	4,149	10,521	462.6	-
Left Total	27.6	26.4	30,388	8,397	21,991	1,433.9	-
Right Arm	23.8	22.4	2,802	667	2,135	170.5	-
Right Leg	30.1	28.6	10,647	3,201	7,446	540.4	-
Right Trunk	28.3	27.5	14,800	4,185	10,614	445.1	-
Right Total	27.4	26.1	30,619	8,392	22,226	1,487.9	-
Arms	23.8	22.5	6,044	1,439	4,605	346.6	-
Legs	30.1	28.6	21,380	6,427	14,952	1,089.8	-
Trunk	28.3	27.4	29,469	8,334	21,135	907.7	-
Android	33.3	32.8	4,052	1,349	2,704	53.9	-
Gynoid	37.1	36.1	10,510	3,903	6,607	305.3	-
Total	27.5	26.3	61,007	16,790	44,217	2,921.8	63.93

FAT MASS RATIOS

Trunk/ Total	Legs/ Total	(Arms+Legs)/ Trunk
0.50	0.38	0.94

CARDIOVASCULAR RISK FACTORS IN UHM STUDENTS: PILOT
DEMOGRAPHIC AND MEDICAL HISTORY FORM

1. Has anyone in your family ever had any of the following:

FAMILY HISTORY	YES	NO	DON'T KNOW	If yes, please state relationship of family member
Diabetes	✓			Grandma
Heart attack		✓		
High blood pressure	✓			Dad
High cholesterol/ high triglycerides		✓		
Stroke		✓		

2. Have you ever had any of the following:

	YES	NO	DATE		YES	NO	DATE
Cancer		✓		Heart problems		✓	
Diabetes		✓		Obesity/overweight		✓	
High blood pressure		✓		Stroke		✓	
High cholesterol/ high triglycerides		✓					

3. Do you currently have any significant medical problems? ___ Yes ✓ No
   If so, what?_____

4. Are you currently on any medication (including prescription and over the counter)?
   _____ Yes ✓ No If yes, what?_____
5. What was the first day of your last menstrual period?_____

6. Have you ever had any of the following tests done:

	YES	NO	If yes, were the results normal, high or low?
Glucose/blood sugar		✓	
Cholesterol/blood lipid		✓	
Exercise test		✓	

7.

HABITS	YES	NO	AMOUNT
Smoke tobacco		✓	___ packs per day for ___ years
Drink alcohol		✓	___ drinks per day
Exercise	✓		60 minutes per day 3 times per week

8. Where are you living this year while enrolled at the University of Hawaii?

___ Dormitory/On campus
___ Off campus with parents
_✓_ Off campus not with parents
___ Other:_____

9. Do you have a University meal plan this year?

___ Yes
_✓_ No

10. Where did you attend high school? (Please mark where you spent the MOST time)

___ Oahu
___ Neighbor islands (Maui, Kauai, Lanai, Molokai, Hawaii/Big Island)
_✓_ Mainland United States
___ Other:_____

11. Please mark the ONE category that most closely describes your ethnicity?

☐ African American
☐ American Indian/Alaska Native
☑ Caucasian
☐ Asian *(please specify)* ☐ Chinese ☐ Japanese ☐ Malaysian ☐ East Indian ☐ Korean ☐ Thai ☐ Filipino ☐ Laotian ☐ Vietnamese ☐ Other Asian_____
☐ Native Hawaiian
☐ Pacific Islander *(please specify)* ☐ Fijian ☐ Marshallese ☐ Micronesian ☐ Samoan ☐ Tahitian ☐ Tongan ☐ Other Pacific Islander_____
☐ Other ethnicity/race *(please specify)* _____
☐ Mixed (more than one of the 7 large categories listed) *(please specify)*

_____

12. Please mark the ONE category that most closely describes your MOTHER'S ethnicity:

- ☐ African American
- ☐ American Indian/Alaska Native
- ☑ Caucasian
- ☐ Asian *(please specify)* ☐ Chinese ☐ Japanese ☐ Malaysian ☐ East Indian ☐ Korean ☐ Thai ☐ Filipino ☐ Laotian ☐ Vietnamese ☐ Other Asian_____
- ☐ Native Hawaiian
- ☐ Pacific Islander *(please specify)* ☐ Fijian ☐ Marshallese ☐ Micronesian ☐ Samoan ☐ Tahitian ☐ Tongan ☐ Other Pacific Islander_____
- ☐ Other ethnicity/race *(please specify)* _____
- ☐ Mixed (more than one of the 7 large categories listed) *(please specify)* _____
- ☐ Do not know

13. Please mark the ONE category that most closely describes your FATHER'S ethnicity:

- ☐ African American
- ☐ American Indian/Alaska Native
- ☐ Caucasian
- ☐ Asian *(please specify)* ☐ Chinese ☐ Japanese ☐ Malaysian ☐ East Indian ☐ Korean ☐ Thai ☐ Filipino ☐ Laotian ☐ Vietnamese ☐ Other Asian_____
- ☐ Native Hawaiian
- ☐ Pacific Islander *(please specify)* ☐ Fijian ☐ Marshallese ☐ Micronesian ☐ Samoan ☐ Tahitian ☐ Tongan ☐ Other Pacific Islander_____
- ☐ Other ethnicity/race *(please specify)* _____
- ☑ Mixed (more than one of the 7 large categories listed) *(please specify)* Caucasian and Filipino
- ☐ Do not know

KLS 487 - Non-exercise VO_{2max} estimation for physically active college students

George et al., Med Sci. Sports Exerc. 29:3, 415-423, 1997.

R = 0.85, SEE = 3.60 $ml \cdot kg^{-1} \cdot min^{-1}$

VO_{2max} =	*43.513*	*43.513*
	*+ 6.564*gender*	+ _____
	*- 0.749*BMI*	- _____
	*+ 0.724*PFA*	+ _____
	*+ 0.788*PA-R*	+ _____
	VO_{2max} =	_____ $ml \cdot kg^{-1} \cdot min^{-1}$

Suppose you were going to exercise continuously on an indoor track for 1 mile. Which exercise pace is just right for you—not too easy and not too hard?

Circle the appropriate number (any number, 1 to 13).

1 Walking at a *slow* pace (18 minutes per mile or more)
2
3 Walking at a *medium* pace (16 minutes per mile)
4
5 Walking at a *fast* pace (14 minutes per mile)
6
7 Jogging at a *slow* pace (12 minutes per mile)
8
9 Jogging at a *medium* pace (10 minutes per mile)
10
11 Jogging at a *fast* pace (8 minutes per mile)
12
13 Running at a *fast* pace (7 minutes per mile or less)

Sum of both = PFA

How fast could you cover a distance of 3-miles and NOT become breathless or overly fatigued? Be realistic.

Circle the appropriate number (any number, 1 to 13).

1 I could walk the entire distance at a *slow* pace (18 minutes per mile or more)
2
3 I could walk the entire distance at a *medium* pace (16 minutes per mile)
4
5 I could walk the entire distance at a *fast* pace (14 minutes per mile)
6
7 I could jog the entire distance at a *slow* pace (12 minutes per mile)
8
9 I could jog the entire distance at a *medium* pace (10 minutes per mile)
10
11 I could jog the entire distance at a *fast* pace (8 minutes per mile)
12
13 I could run the entire distance at a *fast* pace (7 minutes per mile or less)

Figure 1—Perceived Functional Ability (PFA) Questions.

Physical Activity Rating (PA-R) Question

Select the number that best describes your overall level of physical activity for the previous 6 MONTHS:

0 = avoid walking or exertion; e.g., always use elevator, drive when possible instead of walking

1 = **light activity:** walk for pleasure, routinely use stairs, occasionally exercise sufficiently to cause heavy breathing or perspiration

2 = **moderate activity:** 10 to 60 minutes per week of moderate activity; such as golf, horseback riding, calisthenics, table tennis, bowling, weight lifting, yard work, cleaning house, walking for exercise

3 = **moderate activity:** over 1 hour per week of moderate activity as described above

4 = **vigorous activity:** run less than 1 mile per week or spend less than 30 minutes per week in comparable activity such as *running* or jogging, lap swimming, cycling, rowing, aerobics, skipping rope, *running* in place, or engaging in vigorous aerobic-type activity such as soccer, basketball, tennis, racquetball, or handball

5 = **vigorous activity:** run 1 mile to less than 5 miles per week or spend 30 minutes to less than 60 minutes per week in comparable physical activity as described above

6 = **vigorous activity:** run 5 miles to less than 10 miles per week or spend 1 hour to less than 3 hours per week in comparable physical activity as described above

7 = **vigorous activity:** run 10 miles to less than 15 miles per week or spend 3 hours to less than 6 hours per week in comparable physical activity as described above

8 = **vigorous activity:** run 15 miles to less than 20 miles per week or spend 6 hours to less than 7 hours per week in comparable physical activity as described above

9 = **vigorous activity:** run 20 to 25 miles per week or spend 7 to 8 hours per week in comparable physical activity as described above

10 = **vigorous activity:** run over 25 miles per week or spend over 8 hours per week in comparable physical activity as described above

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Figure 2—Physical Activity Rating (PA-R) Question. Modified from reference 18 Jackson, A. S., S. N. Blair, M. T. Mahar, L. T. Weir, R. M. Ross, and J. E. Stuteville. Prediction of functional aerobic capacity without exercise testing. *Med. Sci. Sports Exerc.* 22:863–870, 1990.

Apendix B	Defintion of Codes for CVRF Raw Data
I.D.	Identification number
Ethnicity	Ethnicity
Code	1=Caucasian, 2=Asian, 3= Mixed Asian 4=Native Hawaiian and Pacific Islander
Age/yrs.	Age in years
Ht/cm	Height in cm
Wt/kg	Weight in kg
BMI	Body Mass Index
Waist/cm	Waist in cm
Hip/cm	Hip in cm
W/H ratio	Waist to Hip Ratio
Android	Percent of android Fat
Gynoid	Percent of gynoid fat
A/G Ratio	Android to gynoid fat ratio
BMD	Bone mass density
BMC	Bone mass content
sbp	Systolic Blood Pressure
dpb	Diastolic Blood Pressure
Cholesl	Cholesterol
Tri	Triglyerides
HDL	HDL
LDL	LDL
chol/HDL Ratio	cholesterol to HDL ratio
Glu/Fasting	12 hour Glucose fasting measurements
Glu/post 75 g	Post two-hour glucose tolerance test
delta glucose	delta glucose
Tri	Tricep
Thigh	Thigh
Suprailiac	Suprailiac
Chest	Chest
Abd.	Abdomen
Subscap	Subscapula
Axillary L.	Axillary Line
Jackson:X1=Sum of 7skf	Sum of seven skinfold measurements
Jackson BD	body density
Siri 4.95/Db-4.50	Siri body density equation
Siri SKF-BF%	Siri raw body fat percentage
SIRI BF%	Siri body fat percentage
Brozek 4.57/Db-4.142	Brozek body density equation
Brozek SKF-BF%	Brozek raw body fat percentage
Brozek BF%	Brozek body fat percentage

Apendix B	Defintion of Codes for CVRF Raw Data
DEXA%BF	Dexa bodt fat percentage
BIA RJL %BF	Manufactor RJL body fat percentage
RJL Phase Angel	Phase angel
BIA-Resist	Resistance
BIA-Reac	Reactance
Wang:FFM	Wang fat free mass
Wang:FM	Wang fat mass
Wang BF=FM/BM	Wang body fat equals fat mass / body mass
Wang BF%	Wang body fat percentage
Hout:FFM	Houtkooper fat free mass
Hout:FM	Houtkooper fat mass
Hout:BF=FM/BM	Houtkooper body fat equals fat mass / body mass
BIA Hout %BF	Houtkooper body fat percentage
Luk:FFM	Lukaski fat free mass
Luk:FM	Lukaski r fat mass
Luk:FM/BM	Lukaski body fat equals fat mass / body mass
BIA%BF Lukaski	Lukaski body fat percentage
Frnt:FFM	Fornetti fat free mass
Frnt:FM	Fornetti fat mass
Frnt:FM/BM	Fornetti body fat equals fat mass / body mass
BIA Frnt %BF	Fornetti body fat percentage
VO2 - 1	Question one from non-exercise questionnaire
VO2 - 2	Question two from non-exercise questionnaire
VO2 - 3	Question three from non-exercise questionnaire
est VO2max	Estimated VO2max
Campus	1 = lives on campus, 2 = lives off campus with parents
	3 = lives off campus without parents
On/Off Camp	1 = on campus, 2 = off campus
Meals	1 = meal plan, 2 = no meal plan
HighSch	1 = went to high school on Oahu
	2 = went to high school on neighbor island
	3 = other
HS.A	1 = high school in Hawaii,
	2 = mainland or other high school
SM	1 = yes, smokes, 2 = no, smokes
BirthCont	1 = on birth control, 2= not on birth control

Appendix B

I.D.	Ethnicity	Code	Age/yrs.	Ht/cm	Wt/kg	BMI	BMI	Waist/cm	Hip/cm	W/H ratio	Android	Gynoid	A/G Ratio	BMD	BMC	sbp	dpb
1	C	1	18.5	169.7	64.4	22.4	22.0	70.5	92.0	0.77	33.3	37.1	0.90	1.29	2,921.80	102	58
2	C	1	18.5	173.6	66.3	22.0	22.0	69.5	96.0	0.72	36.7	42.4	0.86	1.208	2931.5	110	62
3	C	1	18.4	166.6	48.9	17.6	18.0	57.0	88.0	0.65	28	43.2	0.65	0.999	1959.3	110	78
4	C	1	18.1	160.1	64.5	25.1	25.0	70.0	99.0	0.71	37.2	45.2	0.82	1.07	2337.4	106	60
5	C	1	18.9	161.6	60.0	23.0	23.0	68.0	96.5	0.70	40.4	47	0.86	1.06	2,314.30	94	62
6	C	1	18.4	162.0	87.9	33.5	33.0	92.0	109.0	0.84	59	52.6	1.12	1.249	2553	106	70
7	C	1	18.8	155.3	55.2	22.9	23.0	65.0	94.0	0.69	37.7	46.7	0.81	1.169	2370	110	76
8	C	1	18.4	161.3	63.0	24.2	24.0	69.0	96.0	0.72	36	44.9	0.80	1.08	2176.00	80	50
10	As/F	2	18.3	156.9	54.6	22.2	22.0	62.2	92.0	0.68	30.3	44.7	0.68	1.12	2172.00	120	78
11	As/Ch/J	2	18.2	160.3	48.6	18.9	19.0	56.0	87.0	0.64	21.6	35.9	0.6	1.185	2470.1	90	70
12	C	1	18.3	175.0	85.7	28.0	28.0	80.5	105.0	0.77	42.3	41.6	1.02	1.278	3259.9	90	68
13	M/As/AA/F	3	18.2	163.6	58.8	22.0	22.0	65.8	96.0	0.69	34.3	41.4	0.83	1.152	2481.6	120	76
14	As/J	2	18.4	155.2	49.5	20.5	21.0	63.0	85.5	0.74	27.2	34.8	0.78	1.147	2074.4	98	70
15	As/J	2	18.6	157.8	51.7	20.8	21.0	68.0	89.0	0.76	32.1	39.3	0.82	1.076	2042.6	102	80
16	C	1	18.7	167.5	51.5	18.4	18.0	59.0	90.0	0.66	26.6	40.3	0.66	1.059	2142.1	80	50
17	C	1	18.3	160.6	55.5	21.5	22.0	68.5	90.0	0.76	38.8	42.5	0.91	1.087	2038.3	94	64
18	As/J	2	20.8	165.5	50.6	18.5	18.0	60.5	82.5	0.73	18.6	31.8	0.58	1.234	2558	88	58
19	PI/S	4	19	166.1	68.0	24.6	25.0	73.0	97.0	0.75	33.4	37.7	0.89	1.295	3122.6	110	70
20	C	1	18.9	175.5	72.7	23.6	24.0	72.5	100.0	0.73	34.9	42.6	0.82	1.229	3103.7	110	70
21	C	1	18.1	176.4	78.4	25.2	25.0	79.0	102.0	0.77	50.3	48.5	1.04	1.21	3257.7	110	82
22	C	1	18.7	168.7	62.4	21.9	22.0	67.0	94.0	0.71	32.9	37.0	28.7	1.161	2757.8	108	80
23	C	1	18.8	162.6	65.2	24.7	25.0	70.0	97.0	0.72	36.5	44.3	0.82	1.159	2491.7	106	60
24	C	1	18	171.7	85.3	28.9	29.0	88.0	110.0	0.80	51.3	48.1	1.07	1.076	2476.8	104	70
25	NH	4	18.4	169.6	56.9	19.8	20.0	63.0	92.0	0.68	21.7	40.1	0.54	1.135	2524.2	94	72
26	C	1	18.5	161.9	72.6	27.7	28.0	79.0	100.0	0.79	36.3	43.3	0.84	1.27	2989.7	108	60
27	C	1	18.3	162.0	62.9	24.0	24.0	70.5	94.0	0.75	27.4	38.7	0.71	1.09	2321.9	100	70
28	As/F	2	18.3	156.7	57.0	23.2	23.0	67.0	92.0	0.73	42.5	49.1	0.87	1.074	2032.4	108	58
29	M/As/C/J	3	18.7	153.0	67.1	28.7	29.0	75.0	105.0	0.71	49.6	51.7	0.96	1.151	2335.3	120	68
30	PI/Palauan/C	4	18.3	156.8	65.5	26.6	27.0	74.0	100.0	0.74	40.8	43.2	0.94	1.124	2493.5	110	78
32	C	1	18.3	156.9	51.5	20.9	21.0	60.0	89.0	0.67	22.2	37.9	0.59	1.204	2359	100	60
33	M/C/Mex	3	18.2	166.3	74.3	26.9	27.0	72.0	105.0	0.69	28.7	52.4	0.93	1.135	2748.4	106	60
34	M/C/Mex	3	18.6	157.2	52.0	21.0	21.0	65.0	93.0	0.70	35.2	44.4	0.79	1.117	2220.8	90	62
35	C	1	18.9	159.0	58.3	23.1	23.0	64.5	96.0	0.67	22.8	40.1	0.57	1.222	2500.2	100	72

I.D.	Ethnicity	Code	Age/yrs.	Ht/cm	Wt/kg	BMI	BMI	Waist/cm	Hip/cm	W/H ratio	Android	Gynoid	A/G Ratio	BMD	BMC	sbp	dpb
36	C	1	18.4	162.9	53.3	20.1	20.0	65.0	92.0	0.71	39.6	48.8	0.81	1.111	2259.3	100	60
37	C	1	18.1	165.8	48.0	17.5	17.0	63.5	88.0	0.72	27	38.7	0.7	1.049	2103	94	68
39	M/As/C/K	3	18.2	161.9	53.2	20.3	20.0	70.0	83.0	0.84	20.4	31.3	0.65	1.218	2558.8	108	62
40	As/J	2	18.1	157.2	65.0	26.3	26.0	78.0	98.0	0.80	47.7	49.4	0.97	1.031	2040.6	104	84
41	M/As/Ch/J	2	18.3	152.5	53.9	23.2	23.0	62.0	90.0	0.69	42	45.8	0.92	1.116	2205.7	92	64
42	As/J	2	18.5	167.3	66.4	23.7	24.0	71.5	96.0	0.74	25	35	0.72	1.194	2892.7	90	66
43	M/As/C/Ch	3	18.5	153.6	57.5	24.4	24.0	68.5	96.0	0.71	46.7	50.6	0.92	1.145	2359.9	94	70
44	M/As/J/F	2	18.7	157.6	59.7	24.0	24.0	63.0	97.0	0.65	39.8	46.4	0.86	1.225	2840.2	124	60
45	M/As/J/F	2	18.1	161.9	57.8	22.1	22.0	63.0	95.0	0.66	27.7	42.3	0.66	1.145	2447.7	118	80
46	M/As/J/K	2	24.1	156.6	74.5	30.4	30.0	82.0	108.0	0.76	47.7	49	0.97	1.185	2455	110	68
47	M/As/C/J	3	19.8	161.6	46.8	17.9	18.0	63.0	84.5	0.75	26	34.2	0.76	1.109	2029.6	108	72
48	M/As/J/F	2	18.4	153.6	57.7	24.4	24.0	74.0	93.0	0.80	40.8	43.4	0.94	1.126	2254.3	122	82
49	As/J	2	18.9	166.1	61.0	22.1	22.0	70.0	96.5	0.73	40	41.2	0.97	1.196	2700.8	112	80
50	As/F	2	18.1	149.1	39.4	17.7	18.0	52.5	80.0	0.66	22.8	36	0.63	1.089	1858.7	102	70
51	As/Ch	2	20.8	161.34	51.45	19.8	20.0	65	87	0.75	26	35.8	0.72	1.216	2449	118	70
53	PI/Chamorro	4	21.2	162.9	56.5	21.3	21.0	69.0	97.0	0.71	30.6	46.2	0.66	1.119	2384	100	54
55	As/F	2	18.3	164.5	56.3	20.8	21.0	66.0	90.0	0.73	33.2	39.3	0.85	1.206	2740.8	110	64
56	As/J	2	23.7	160.6	64.5	25.0	25.0	74.0	96.5	0.77	48.1	52.1	0.92	1.103	2384	104	66
57	As/K	2	23.3	164.4	68.3	25.3	25.0	72.5	101.0	0.72	39.7	46.4	0.86	1.146	2713	110	70
58	M/As/C/F	3	23.1	157.1	75.7	30.7	31.0	81.0	112.0	0.72	49.6	54	0.92	1.177	2407	110	64
59	M/As/C/J	3	23.1	163.8	52.7	19.6	20.0	67.0	87.0	0.77	27	36.9	0.73	1.148	2349	102	50
60	M/As/C/Ch/NH	3	18.1	159.4	51.7	20.3	20.0	60.5	86.0	0.70	42	47.4	0.89	1.226	2371.5	118	68
61	As/J	2	19.3	157.0	60.8	24.7	25.0	71.5	99.0	0.72	45.6	50.2	0.9	1.166	2588.0	100	60
62	M/As/C/Ch/NH	3	23.8	164.7	51.6	19.0	19.0	59.0	89.0	0.66	21.6	37.5	0.58	1.043	1964	108	74
63	M/As/C/J/NH	3	25	160.6	80.2	31.1	31.0	84.0	110.0	0.76	56.1	60.1	0.93	1.182	2906	100	60
64	As/Ch	2	20.7	143.5	37.9	18.4	18.0	56.0	80.0	0.70	33.1	43.6	0.76	1.108	1822	100	52
65	M/As/J/F/K	2	23.3	158.6	69.1	27.5	27.0	79.0	100.5	0.79	53	50.1	1.06	1.236	2736	100	70
66	NH	4	22.9	165.4	63.3	23.1	23.0	74.0	101.0	0.73	41.5	47.3	0.88	1.21	2718	110	70
67	As/J	2	21.2	157.4	43.2	17.4	17.0	60.0	84.0	0.71	29.6	37.9	0.78	1.11	2101	108	78
68	M/As/C/Ch	3	23.4	165.5	52.0	19.0	19.0	60.0	87.5	0.69	19	33.9	0.56	1.237	2588	112	64
69	As/J	2	20.6	167.1	52.1	18.7	19.0	60.5	89.5	0.68	37	42	31.1	1.18	2573	114	76
70	M/As/C/F	3	22.5	176.1	62.6	20.2	20.0	67.0	94.0	0.71	11.5	27.7	0.42	1.204	2713	92	64
71	M/As/C/J	3	19.6	162.9	70.2	26.5	26.0	78.0	101.0	0.77	48.3	49.4	0.98	1.155	2698	106	52
72	As/J	2	21.1	154.0	65.3	27.5	28.0	78.0	98.0	0.80	50.4	49.3	1.02	1.093	1959	126	78
73	M/As/C/K	3	19.9	165.5	58.3	21.3	21.0	65.0	93.0	0.70	24.2	33	0.73	1.203	2620.5	118	68
74	M/As/C/F/NH/PI	3	20	158.7	51.8	20.6	21.0	61.5	91.0	0.68	23.4	36.1	0.65	1.058	2129	106	68

I.D.	Ethnicity	Code	Age/yrs.	Ht/cm	Wt/kg	BMI	BMI	Waist/cm	Hip/cm	W/H ratio	Android	Gynoid	A/G Ratio	BMD	BMC	sbp	dpb
75	M/As/Ch/J/NH	3	23.7	168.5	57.9	20.4	20.0	66.0	90.5	0.73	40.3	44.8	0.9	1.133	2442	110	88
76	M/As/C/J/NH	3	21.1	151.3	46.7	20.4	20.0	66.0	90.0	0.73	38.9	47.5	0.82	1.077	2001	108	62
77	M/As/Ch/J/F/Hsp	2	26.3	150.7	45.6	20.1	20.0	61.0	89.0	0.69	28	45.1	0.62	1.131	1981	108	44
78	M/As/C/Ch//NH	3	21.3	170.9	85.0	29.1	29.0	86.0	110.0	0.78	46.5	51.8	0.9	1.251	3298.0	97	70
80	PI/S	4	22.2	155.1	71.3	29.7	30.0	84.0	107.0	0.79	55	52.6	1.05	1.296	2937	108	68
81	As/Ch	2	20.3	158.6	45.8	18.2	18.0	61.5	82.0	0.75	21.9	37.5	0.58	1.221	2316	106	68
82	PI/S	4	20.9	178.5	79.6	25.0	25.0	78.0	108.0	0.72	43.7	48.4	0.90	1.180	3118	112	68
83	PI/Chamorro/Hsp	4	22.3	155.5	51.6	21.4	21.0	63.0	93.0	0.68	26.5	45.9	0.58	1.045	1958	100	64
84	PI/Palauan	4	20	164.9	77.9	28.6	29.0	85.0	106.0	0.80	49.0	49.5	1.0	1.205	2845.0	114	70
85	M/As/Ch/F/NH	2	20.4	145.8	45.0	21.2	21.0	62.5	84.0	0.74	32.6	43.8	0.74	1.075	1781	124	82
86	As/Ch	2	20.3	168.7	55.1	19.4	19.0	65.0	93.0	0.70	47.9	42.7	1.1	1.046	2249.0	104	78
87	NH/C	4	26	162.2	85.5	32.5	32.0	84.0	116.0	0.72	49.2	54.8	0.9	1.338	3055.0	111	82
88	M/As/C/Ch/NH	3	19.3	174.7	56.8	18.6	19.0	63.5	95.0	0.67	32.2	40.7	0.79	1.118	2565.7	122	78
89	M/C/Amin/NH/Ch	3	22.2	172.0	59.6	20.1	20.0	70.0	96.0	0.73	29.9	42.4	0.7	1.247	2770.0	110	70
90	PI/Palauan/J	4	22.7	154.8	66.5	27.7	28.0	83.0	102.0	0.81	52.7	47.1	1.1	1.085	1968.0	104	68
91	PI/S/F	4	20.3	164.2	53.7	19.9	20.0	68.0	89.0	0.76	36.2	36.1	1.0	1.069	2211.0	90	70
92	NH	4	21.4	179.83	65.45	20.2	20.0	72	95	0.76	31.6	38.9	0.81	1.194	2887	124	64
93	M/NH/C/Ch/Amin	4	26.7	159.0	53.3	21.1	21.0	63.0	88.0	0.72	26.8	37.5	0.7	1.2	2409.0	124	74
94	M/As/C/Ch/F/NH	3	22	162.95	61.95	23.3	23.0	70	97	0.72	35.5	38.1	0.93	1.288	2995	112	64
95	M/As/Ch/J	3	18.8	156.24	49.3	20.2	20	66	90	0.73	35	43.5	0.8	1.087	2132.4	108	76
96	PI/Chamorro	4	23.1	169.12	61.25	21.4	21.0	68	96	0.71	32.6	43.6	0.75	1.176	2695	120	84
97	NH/AA	4	20.4	170.0	68.0	23.5	24.0	70.0	103.0	0.68	39.5	47.0	0.8	1.203	3124.0	110	64
98	PI/Chamorro	4	20.9	154.1	56.2	23.7	24.0	71.0	95.5	0.74	33.5	44.2	0.8	1.053	1928.0	120	68
99	PI/S	4	19.9	161.58	80	30.6	31	81	110	0.74	49.7	51.1	0.97	1.259	3073.7	102	64
100	NH	4	22.5	169.23	95	33.2	33	87	117	0.74	52.4	52.9	0.99	1.087	2529	128	68
101	As/Ch	2	18.4	167.82	62.3	22.1	22	69	91	0.76	42.8	47.2	0.91	1.126	2582.6	104	64
102	As/K	2	19.5	160.59	65.4	25.4	25	71	103	0.69	42.6	53.6	0.79	1.222	2720.3	108	70
103	M/As/Viet/Camb	2	23.3	154.06	57.35	24.2	24	71	95	0.75	44.3	51.5	0.86	1.158	2265	108	66
104	As/J	2	20.5	160.04	50	19.5	20	63	84	0.75	38.8	44.3	0.87	1.157	2211	94	62
106	As/K	2	19.3	173.24	63.65	21.2	21	69	98	0.70	40.2	39.1	1.03	1.173	2712.3	106	76
107	NH	4	23.8	167.72	100.2	35.6	36	112	112	1.00	59.3	47.9	1.24	1.25	2941	140	94

Cholesl	Tri	HDL	LDL	chol/HDL	FastGlu	PostGlu	delta glu	Tri	Thigh	Supra	Chest	Abd.	Subscap	Axil. L.	Sum 7skf	Jackson BD
123	65	50	60	2.46	90	111	21	19	24	30	21	29	17	17	157	1.03468579
187	77	92	80	2.03	85	102	17	23	28	23	14	22	16	15	141	1.03953107
138	68	57	67	2.42	85	102	17	16	22	16	8	19	8	12	101	1.052911498
226	131	59	141	3.83	83	87	4	26.6	35	30	24	30	22	17	184.6	1.027052876
110	50	64	36	1.72	78	117	39	27	34	26	13	26	17.5	17	160.5	1.033612793
162	66	43	106	3.77	73	104	31	35	41	45	29	54	38	35	277	1.007498218
122	41	49	65	2.49	80	125	45	25	27	23	13	26	16	16	146	1.037947636
161	126	61	75	2.64	79	86	7	24	31.5	18	9	22	16	17	137.5	1.040642023
149	84	99	33	1.51	88	92	4	12	20	12	8.6	21	12	11	96.6	1.054504164
194	67	74	107	2.62	82	111	29	13	14	8	7	13	9	7	71	1.064138854
144	142	44	72	3.27	82	93	11	21	23	27	22	28	23	18	162	1.033256096
156	63	64	79	2.44	82	128	46	19	21	18	11	27	16	10	122	1.045695724
173	53	89	73	1.94	85	95	10	18	19	16	11	16	11	11	102	1.052555468
148	60	75	61	1.97	88	103	15	24	25	23	14	30	16	16	148	1.037363152
173	79	84	73	2.06	93	71	-22	17	30	20	11	22.6	16	10	126.6	1.044111312
166	86	49	100	3.9	85	85	0	19	22	23	17	28	17	18	144	1.038626396
188	175	94	59	2	88	65	-23	19	22	12.3	9	14	10	9	95.3	1.054654383
170	45	76	85	2.24	87	86	-1	18	20	27	13	24	17	15	134	1.0416769
157	62	50	95	3.14	90	76	-14	26.6	24	33	20	39	16	24	182.6	1.027478408
160	55	73	76	2.19	89	110	21	27	39	33	22	39	26	24	210	1.020735032
132	91	61	53	2.16	86	74	-12	24	25	15	13	24	15.6	17	133.6	1.041843326
146	68	62	70	2.35	84	80	-4	27.6	32	21	15	31	21	11	158.6	1.034178548
160	133	50	83	3.2	94	77	-17	36	35	39	22	55	29	39	255	1.01132891
160	108	39	99	4.1	91	118	27	17	21	12	11	20	11	8	100	1.053268648
161	88	53	90	3.04	82	74	-8	27	27	29	18	37	18	26	182	1.02768904
157	117	47	87	3.34	87	85	-2	16	16	28	16	18	24	12	130	1.043054176
145	55	56	78	2.59	83	99	16	25	31	29.3	17	36	20	20	178.3	1.028706081
202	96	93	90	2.17	75	106	31	31.3	36	39	20	39	26	21	212.3	1.020121653
164	98	53	91	3.09	94	78	-16	26	31	30	19	30	18	17	171	1.030707026
162	43	83	70	1.95	78	78	0	16.6	26	14	11	21	13	10	111.6	1.049207394
185	64	74	98	2.5	80	95	15	41	48	34	19.3	40	30.3	27	239.6	1.014271358
144	42	64	72	2.25	84	57	-27	18	26	22	14	29	12	14	135	1.041409142
207	85	81	109	2.56	84	56	-28	29	29	16	12	21	15	15	137	1.040735878

Cholesl	Tri	HDL	LDL	chol/HDL	FastGlu	PostGlu	delta glu	Tri	Thigh	Supra	Chest	Abd.	Subscap	Axil. L.	Sum 7skf	Jackson BD
168	57	68	89	2.47	92	122	30	23.3	32	30	14	35.6	20	20	174.9	1.029617775
211	52	73	128	2.89	94	112	18	16.3	18.3	11	12	17	10	9	93.6	1.055619414
195	243	61	85	3.2				18	25	20	20	28.3	15	19	145.3	1.038239211
151	45	84	58	1.8	93	108	15	34	31	38	25	38.3	28	34	228.3	1.016631037
125	32	43	76	2.91	87	70	-17	22	32	16.3	13	22	18	12	135.3	1.041352123
136	37	62	67	2.19	78	88	10	22	22	16.6	10	20	13	13	116.6	1.047472148
109	31	42	61	2.6	110	80	-30	26	31	22	19.3	28	17	22	165.3	1.032285247
147	79	65	66	2.26	101	91	-10	30	31	21	15	24	23	15	159	1.034074634
164	85	64	83	2.56	84	93	9	22	30	16.6	11.3	20.3	13	11	124.2	1.044978508
188	92	59	111	3.19	138	212	74	31	35	35.75	23.5	42	38	32.25	237.5	1.013939827
171	60	64	95	2.67	78	69	-9	12	17	12	9.6	19.3	12	9	90.9	1.056390591
134	73	57	62	2.35	80	91	11	21	28	29	20.3	29	27	18	172.3	1.030333497
176	80	69	91	2.55	93	130	37	20	22.3	18	22.3	28	22	14.6	147.2	1.037568186
149	51	71	68	2.1	84	97	13	12.6	19	8	6	14.3	10	7	76.9	1.061869055
166	92	76	72	2.18	90	133	43	14	21	19	14	22	15	10	115	1.047721126
187	88	69	100	2.71	82	120	38	19	29	18	14	23	15	14	132	1.042036184
162	59	60	90	2.7	89	92	3	15.83	20.66	24	14.66	28	20	14	137.15	1.040765418
165	78	58	91	2.84	95	109	14	22.3	36.6	33	22.3	31.3	28	24	197.5	1.023035539
165	110	71	72	2.32	91	70	-21	25	31	25	13	27	15	14	150	1.036154576
167	123	56	86	2.98	99	110	11	40	42	41	31.33	42	38	33.33	267.66	1.008433604
86	39	52	26	1.65	100	98	-2	11	21	17	7.66	16	12	7	91.66	1.055687985
173	81	61	96	2.84	80	95	15	24	30	21	21	28	21	19	164	1.032707452
172	88.0	81.0	73.0	2.1	85.0	105.0	20	22.3	34	27	22	28	27	22	182.3	1.027506705
126	46	59	58	2.14	87	86	-1	10	18	12	10	15	8	8	81	1.059574586
141	60	63	66	2.24	85	103	18	40	42	40.5	28	40	37.75	32.33	260.58	1.009421053
194	62	68	114	2.85	87	61	-26	15	22	17	7	20	14	9	104	1.051551724
176	125	61	90	2.89	84	115	31	28	29	29	27	30	27	26	196	1.023460876
167	171	44	89	3.8	85	75	-10	21	26	26.33	19.5	29	18	16	155.83	1.034465952
177	111	84	71	2.11	91	84	-7	17	18	14	8.6	22.3	11	10.3	101.2	1.052481018
137	62	40	85	3.43	77	73	-4	15	22	10	5	15	11	8	86	1.057744948
151	72	85	52	1.78	81	114	33	17	23	19.66	12	27.3	35	9	142.96	1.038652725
174	37	106	61	1.64	95	41	-54	12	16	8	7	11	9	6	69	1.06436987
147	64	64	70	2.3	83	115	32	28	31	26	18	28	20	21	172	1.030262632
148	131	65	57	2.28	84	175	91	30.6	25	37.6	19	40	26.6	23	201.8	1.022310828
121	42	58	55	2.09	92	85	-7	12	13	12	5	18	10	8	78	1.061216888
173	75	85	73	2.04	82	65	-17	11	19	8.6	8	13	9	7	75.6	1.062124926

Cholesl	Tri	HDL	LDL	chol/HDL	FastGlu	PostGlu	delta glu	Tri	Thigh	Supra	Chest	Abd.	Subscap	Axil. L.	Sum 7skf	Jackson BD
187	156	51	105	3.67	87	72	-15	29.6	23.3	23.3	22	21	20	20	159.2	1.03337493
197	52	119	68	1.66	82	91	9	22	21	20	9	21	19	12	124	1.044659812
156	49	66	80	2.36	86	116	30	17	26	14	10	15	12	10	104	1.050833356
195	180	81	78	2.41	85	95	10	30	30.3	29	21	28.3	32	23	193.6	1.024321118
127	68	51	62	2.49	91	86	-5	27	36.3	36	21.6	35	34	30.3	220.2	1.017875344
133	42	72	53	1.85	85	60	-25	13	20	17	8	17	12	9	96	1.054464716
139	63	81	45	1.72	91	45	-46	23.6	32.66	20.33	14	21	22	15	148.59	1.036888972
122	72	71	37	1.72	85	79	-6	22	24	14	8	21	14	9	112	1.048556476
146	83	43	86	3.4	95	112	17	32	36	31	25.3	35.6	30.6	24.6	215.1	1.019309865
139	53	59	69	2.36	84	89	5	20	24	19	13.3	24	23	14	137.3	1.040448627
167	109	73	72	2.29	97	103	6	24	29.3	27	26	31.33	22.66	18	178.29	1.028452222
152	101	77	55	1.97	96	123	27	35	40	25	26.6	25.3	34	23.6	209.5	1.019839015
203	166	72	98	2.82	94	61	-33	12	19	18	12	24.3	15	13	113.3	1.048494711
148	130	74	48	2	88	106	18	26.25	28.3	23	17	29	16	16	155.55	1.034638443
162	119	59	79	2.75	85	77	-8	21	32.5	30	18.6	35.75	27.33	28	193.18	1.024247833
144	76	52	77	2.77	83	116	33	21	20	23	20	29	22.25	21.5	156.75	1.034528389
109	45	54	46	2.02	86	89	3	18	20	17.6	15	20	16	10	116.6	1.047100136
161	54	80	70	2.01	87	70	-17	12	18	15	6	25	14	12	102	1.051490744
167	85	65	85	2.57	97	101	4	22	23	25	15	30	19.6	18	152.6	1.03554068
196	82	74	106	2.65	86	100	14	24	21	21.6	20	30	16.3	12	144.9	1.038285123
141	74	45	81	3.13	86	68	-18	21	34	16	12	22	10	8	123	1.044734642
139	101	49	70	2.84	90	81	-9	26	30	17	14	23.83	22.5	18	151.33	1.036126304
154	74	71	68	2.17	79	95	16	24	37	23	16.75	30.6	22	19	172.35	1.029998962
126	69	42	70	3	82	72	-10	31	41	29.6	19	31.3	25.3	19.3	196.5	1.023772073
204	75	62	127	3.29	94	88	-6	31	23	29	20	33	31.6	30	197.6	1.02316463
147	62	64	71	2.3	91	90	-1	23	20	20.33	15	29	20	19	146.33	1.037897966
161	139	54	79	2.98	84	70	-14	31	36	32.3	26.3	33	26.3	31	215.9	1.019191325
164	131	49	89	3.35	84	73	-11	27	35	25	24	32.6	30.6	20	194.2	1.023913032
106	42	74	24	1.43	89	103	14	16	22	22	13	25	17	16	131	1.04244841
144	53	77	56	1.87	95	65	-30	18	16	19	14	23	19	17	126	1.044231296
210	157	57	122	3.68	85	134	49	36	23	41	22	36.6	35	34	227.6	1.016049926

Siri 4.95/Db-4.50	Siri SKF-BF%	SIRI BF%	Brozek 4.57/Db-4.142	Brozek SKF-BF%	Brozek BF%	DEXA%BF	RJL %BF	Phase Angel	Resist	Reac
0.284061063	28.40610626	28.4	0.274799809	27.47998093	27.5	27.5	30.1	6.4	593	66
0.261762436	26.17624358	26.2	0.254212996	25.42129963	25.4	35.3	31.2	6.2	636	69
0.201249829	20.12498291	20.1	0.198345802	19.83458018	19.8	29.2	19.5	5.5	702	68
0.31961554	31.96155403	32.0	0.307624852	30.76248524	30.8	35.4	34	5.8	533.5	54
0.289027413	28.90274129	28.9	0.279384904	27.93849044	27.9	38.2	34.3	6.9	650	79
0.413160055	41.31600548	41.3	0.393988172	39.39881718	39.9	46.7	49.9	7.4	573	74
0.26902671	26.90267103	26.9	0.260919609	26.09196093	26.1	36.8	34	6.2	650	71
0.256678945	25.66789449	25.7	0.249519753	24.95197532	25.0	35.3	34.1	5.9	579.5	60
0.194149318	19.41493176	19.4	0.19179038	19.17903801	19.2	31.0	32.2	5.4	651.5	61.5
0.15164859	15.16485902	15.2	0.152552335	15.25523348	15.3	24.3	22.5	5.3	662	61
0.290680664	29.06806639	29.1	0.280911239	28.09112392	28.1	35.8	39.1	6.5	516	59
0.233690582	23.36905817	23.4	0.228296153	22.82961532	22.8	30.6	30.5	7	623	77
0.202840041	20.28400407	20.3	0.199813937	19.98139366	20.0	24.1	26.1	7	639	83
0.271713734	27.17137344	27.2	0.263400357	26.34003568	26.3	29.7	27.9	5.8	647	66
0.240873837	24.08738369	24.1	0.234927967	23.49279666	23.5	28.6	24.8	5.5	753	72
0.26591007	26.59100703	26.6	0.258042227	25.80422265	25.8	33.3	29.5	6.6	631	73
0.193480706	19.3480706	19.3	0.191173096	19.11730963	19.1	20.8	22.6	5.7	695.5	70
0.251953317	25.19533168	25.2	0.245156901	24.51569006	24.5	27.9	34.7	7.4	568.5	74
0.317619488	31.7619488	31.8	0.305782032	30.57820324	30.6	33.0	34.7	6.2	621	68
0.34944657	34.94465702	34.9	0.335165823	33.51658234	33.5	42.5	37.7	6.3	607	67
0.251194233	25.11942327	25.1	0.24445609	24.44560896	24.5	28.7	31.2	6.4	640	72
0.286407542	28.6407542	28.6	0.276966155	27.69661549	27.7	33.6	34.8	6.7	572	67
0.394550083	39.45500826	39.5	0.376806844	37.6806844	37.7	43.5	42.6	5.8	554.5	56
0.199655695	19.96556951	20.0	0.196874046	19.68740457	19.7	26.7	23.5	5.8	620	63
0.316632082	31.66320816	31.7	0.304870427	30.48704269	30.5	35.3	39.2	6.5	530	60
0.245678713	24.56787134	24.6	0.239363984	23.93639839	23.9	27.7	31	6.5	533.5	60.5
0.311870066	31.18700662	31.2	0.30047398	30.04739803	30.1	38.6	33.2	6.3	614	68
0.352362445	35.23624447	35.2	0.337857853	33.7857853	33.8	43.0	42.2	7.4	558	72.5
0.302528629	30.25286285	30.3	0.291849663	29.18496631	29.2	34.2	37.1	7.6	530	71
0.217847044	21.78470436	21.8	0.213668887	21.36688867	21.4	25.5	26.1	6.1	601.5	64
0.380350769	38.0350769	38.0	0.363697579	36.36975786	36.4	44.4	41.4	6.2	618	67
0.253175097	25.31750974	25.3	0.246284888	24.62848879	24.6	32.7	30.7	6.1	690	74
0.256249981	25.6249981	25.6	0.24912372	24.91237199	24.7	28.3	32.3	6.8	602	72

Siri 4.95/Db-4.50	Siri SKF-BF%	SIRI BF%	Brozek 4.57/Db-4.142	Brozek SKF-BF%	Brozek BF%	DEXA%BF	RJL %BF	Phase Angel	Resist	Reac
0.307609311	30.76093111	30.8	0.296540313	29.65403134	29.7	37.0	29.6	5.6	730	71
0.189190002	18.91900018	18.9	0.187211779	18.72117795	18.7	26.4	21.6	7.7	757.5	102
0.267687394	26.76873939	26.8	0.259683109	25.96831091	26.0	20.7	26.4	5	645	56.5
0.369023095	36.90230948	36.9	0.353239504	35.32395037	35.3	41.4	40	4.9	612	52
0.253435355	25.34353546	25.3	0.246525166	24.65251658	24.7	36.6	29.3	6.2	616.5	67
0.225662645	22.56626454	22.6	0.220884503	22.08845029	22.1	27.6	33.2	6	513	54
0.295186226	29.51862264	29.5	0.28507092	28.50709201	28.5	41.9	37.3	6.1	644.5	68.5
0.286888525	28.68885255	28.7	0.277410214	27.74102144	27.7	36.4	35.5	5.4	629	59
0.236939526	23.69395258	23.7	0.231295683	23.12956834	23.1	29.6	29.5	7	598.5	73
0.38194651	38.19465102	38.2	0.365170819	36.51708185	36.5	40.8	39.6	6.9	446	54
0.18576684	18.57668405	18.6	0.184051406	18.40514062	18.4	21.9	19.8	6.2	682.5	74
0.304269698	30.42696976	30.4	0.293457074	29.34570744	29.4	34.4	34.8	6.5	583.5	66
0.270770794	27.07707936	27.1	0.262529803	26.25298033	26.3	32.3	29.5	5.5	597	58
0.161591727	16.15917269	16.2	0.16173216	16.173216	16.2	23.0	17.8	5.9	665	69
0.224539648	22.45396482	22.5	0.219847716	21.98477156	22	23.4	20.1	6.9	561	68
0.250314889	25.03148893	25.0	0.243644251	24.36442513	24.4	32.6	29.7	5.5	650	63
0.256114984	25.61149841	25.6	0.248999086	24.89990864	24.9	27.5	27.6	6.7	634.5	75
0.338541587	33.85415866	33.9	0.32509799	32.509799	32.5	43.4	39	6.4	651	73
0.277279486	27.72794858	27.7	0.268538838	26.85388384	26.9	38.3	37.9	5.7	610	61
0.408602789	40.86027892	40.9	0.389780757	38.97807569	39.0	45.9	46.1	6	576	61
0.188885421	18.88854212	18.9	0.186930581	18.69305808	18.7	25.1	24.9	6.8	659	79
0.293225797	29.32257973	29.3	0.283260989	28.32609886	28.3	37.3	29.1	5.6	701.5	69
0.31748681	31.74868096	31.7	0.305659539	30.56595393	30.6	43.1	38.4	5.3	657.5	61
0.171686227	17.16862271	17.2	0.171051729	17.10517289	17.1	23.2	23.9	6.4	683.5	77
0.403801033	40.38010326	40.4	0.38534762	38.534762	38.5	53.1	45.7	6.5	549.5	62.5
0.207329071	20.7329071	20.7	0.203958354	20.39583544	20.4	30.1	24.9	6.1	758.5	80.5
0.336530752	33.65307518	33.7	0.323241522	32.32415223	32.3	44.2	41.3	5.5	589.5	57
0.285077738	28.5077738	28.5	0.275738437	27.57384369	27.6	37.0	33.7	5.9	627	65
0.203172707	20.31727066	20.3	0.200121065	20.01210645	20.0	25.5	20.8	5.4	745	71
0.179767093	17.97670926	18.0	0.178512245	17.85122451	17.9	21.4	22.1	7.5	646	85
0.265789259	26.57892589	26.6	0.257930689	25.79306895	25.8	31.1	24	5.1	712	64
0.150638974	15.06389738	15.1	0.151620224	15.16202243	15.2	15.5	21.8	6.9	564	68
0.304600154	30.46001536	30.5	0.293762162	29.37621621	29.4	42.1	38.4	6.5	565.5	64
0.341971602	34.19716025	34.2	0.328264692	32.82646916	32.8	42.0	42.6	6.4	619	69
0.16445649	16.44564895	16.4	0.164377001	16.43770014	16.4	22.2	26.3	6.2	581	63
0.160468727	16.04687271	16.0	0.16069537	16.06953702	16.1	22.8	23.7	7.5	576	76

Siri 4.95/Db-4.50	Siri SKF-BF%	SIRI BF%	Brozek 4.57/Db-4.142	Brozek SKF-BF%	Brozek BF%	DEXA%BF	RJL %BF	Phase Angel	Resist	Reac
0.290129753	29.01297529	29.0	0.28040262	28.04026203	28.0	34.3	28.9	5.5	690	66
0.238384633	23.83846331	23.8	0.232629853	23.26298532	23.3	34.8	27.8	6	669.5	70.5
0.210547083	21.05470832	21.1	0.206929327	20.69293273	20.7	30.6	26.2	6	658	69
0.332468954	33.24689543	33.2	0.31949154	31.94915396	31.9	42.8	41.2	6.4	518.5	58.5
0.363070932	36.30709322	36.3	0.347744275	34.77442748	34.8	45.9	42.4	6.3	527	58
0.194324926	19.43249261	19.4	0.191952508	19.19525075	19.2	23.3	19.3	5.9	653	67
0.273895886	27.38958862	27.4	0.26541499	26.54149899	26.5	39.2	36.8	6.1	596	64
0.220775765	22.07757649	22.1	0.216372777	21.63727769	21.6	30.7	29.9	6.3	650	72
0.356226916	35.62269158	35.6	0.341425658	34.14256576	34.1	42.2	42.5	6.7	564	66
0.257563103	25.75631027	25.8	0.250336036	25.03360363	25.0	30.6	25.7	6.6	581	67.5
0.313057813	31.30578126	31.3	0.301570546	30.15705461	30.2	34.4	26.9	6.5	719	82
0.353707229	35.37072295	35.4	0.339099402	33.90994018	33.9	48.2	46.6	6.3	521	57.5
0.221053856	22.10538558	22.1	0.216629519	21.66295194	21.7	29.6	25.7	5.6	752	74
0.284279991	28.42799907	28.4	0.275001931	27.50019308	27.5	30.7	27.5	6.3	674.5	74
0.332814715	33.28147152	33.3	0.319810757	31.98107572	32.0	39.5	41.1	7.6	571.5	76
0.284788948	28.47889483	28.5	0.275471817	27.54718169	27.5	27.0	25.1	6.6	642.5	74
0.227341571	22.7341571	22.4	0.222434541	22.24345413	21.9	27.8	28.2	5.9	681	70
0.207602067	20.76020671	20.8	0.204210393	20.42103933	20.4	23.8	21.1	6.6	506.5	59
0.280111586	28.01115857	28	0.271153525	27.11535246	27.1	27.9	30.5	7.4	549	71
0.267476575	26.74765748	26.7	0.259488474	25.94884741	25.9	32	30.5	5.4	745.5	70
0.238045242	23.80452423	22.4	0.232316517	23.23165166	21.9	27.8	28.6	7.1	614.5	76
0.277409838	27.74098385	27.7	0.268659184	26.86591842	26.9	38.1	33.8	6.9	605	73
0.305830085	30.58300854	30.6	0.294897675	29.48976748	29.5	35.7	37.8	6	699	74
0.335060587	33.50605868	33.5	0.321884218	32.18842185	32.2	43.8	44.5	7	536.5	66
0.337931118	33.79311176	33.8	0.324534385	32.45343854	32.5	47.4	47.4	6.4	517	58
0.269254937	26.92549372	27	0.261130316	26.11303157	26.11	36.4	32.7	5.9	662.5	68
0.356791733	35.67917333	35.7	0.341947115	34.19471154	34.2	42.5	39.9	6.5	654.5	74
0.334394957	33.43949568	33.4	0.321269687	32.12696874	32.1	38.6	35.1	6.5	604	69
0.248436424	24.84364238	24.8	0.241909991	24.19099913	24.2	34.6	29.3	5.8	767	77.5
0.2403291	24.03291004	24	0.234425048	23.44250483	23.4	31.3	28	5.9	617	63.5
0.371807847	37.18078465	37.2	0.355810476	35.58104765	35.6	44.6	50.6	7.8	521	71

Wang:FFM	Wang:FM	Wang BF=FM/BM	Wang BF%	Hout:FFM	Hout:FM	Hout:BF=FM/BM	Hout %BF	Luk:FFM	Luk:FM	Luk:FM/BM
43.29237738	21.10762262	0.327758115	32.8	47.02	17.38	0.2699	27.0	45.4009	18.9991	0.2950
44.59484837	21.70515163	0.327377853	32.7	46.77	19.53	0.2945	29.5	45.0455	21.2545	0.3206
37.021718	11.878282	0.242909652	24.3	37.65	11.25	0.2301	23.0	37.1842	11.7158	0.2396
40.88512068	23.56487932	0.365630401	36.6	46.73	17.72	0.2749	27.5	43.8952	20.5548	0.3189
38.89296011	21.10703989	0.351783998	35.2	40.81	19.19	0.3198	32.0	39.9961	20.0039	0.3334
47.38970976	40.51029024	0.460867921	46.1	51.23	36.67	0.4171	41.7	46.9008	40.9992	0.4664
35.5908213	19.6091787	0.355238745	35.5	37.74	17.46	0.3164	31.6	36.4136	18.7864	0.3403
40.32773139	22.67226861	0.35987728	36.0	44.45	18.55	0.2945	29.4	41.9922	21.0078	0.3335
35.9244366	18.6755634	0.342043286	34.2	38.00	16.60	0.3040	30.4	35.9355	18.6645	0.3418
35.2915135	13.3084865	0.273837171	27.4	37.14	11.46	0.2359	23.6	35.9544	12.6456	0.2602
51.95991318	33.74008682	0.393699963	39.4	58.94	26.76	0.3123	31.2	55.1387	30.5613	0.3566
39.45663285	19.34336715	0.328968829	32.9	42.20	16.60	0.2823	28.2	41.6972	17.1028	0.2909
34.12666298	15.37333702	0.310572465	31.1	36.69	12.81	0.2588	25.9	37.3588	12.1412	0.2453
35.45585748	16.24414252	0.314200049	31.4	37.70	14.00	0.2708	27.1	36.5381	15.1619	0.2933
37.62135724	13.87864276	0.269488209	26.9	36.91	14.59	0.2832	28.3	36.2043	15.2957	0.2970
37.53590437	17.96409563	0.323677399	32.4	40.12	15.38	0.2771	27.7	39.4185	16.0815	0.2898
37.18907689	13.41092311	0.265038006	26.5	37.98	12.62	0.2495	24.9	37.4591	13.1409	0.2597
43.3939556	24.6060444	0.361853594	36.2	47.91	20.09	0.2954	29.5	46.5829	21.4171	0.3150
47.13598261	25.56401739	0.351637103	35.2	49.74	22.96	0.3158	31.6	47.3360	25.3640	0.3489
49.14527473	29.25472527	0.373147006	37.3	52.18	26.22	0.3344	33.4	49.1238	29.2762	0.3734
41.92296678	20.47703322	0.328157584	32.8	44.04	18.36	0.2943	29.4	42.7601	19.6399	0.3147
41.42399501	23.77600499	0.364662653	36.5	45.79	19.41	0.2977	29.8	43.8752	21.3248	0.3271
50.13682631	35.16317369	0.412229469	41.2	55.07	30.23	0.3544	35.4	50.2651	35.0349	0.4107
40.93499574	15.96500426	0.28058004	28.1	43.84	13.06	0.2296	23.0	42.6715	14.2285	0.2501
43.73920477	28.86079523	0.397531615	39.8	49.62	22.98	0.3165	31.6	46.4477	26.1523	0.3602
41.11333774	21.78666226	0.346369829	34.6	47.06	15.84	0.2519	25.2	45.1993	17.7007	0.2814
36.84757458	20.15242542	0.353551323	35.4	39.95	17.05	0.2991	29.9	38.4564	18.5436	0.3253
38.96703548	28.13296452	0.419269218	41.9	43.68	23.42	0.3491	34.9	41.5061	25.5939	0.3814
40.11611328	25.38388672	0.387540255	38.8	45.98	19.52	0.2980	29.8	44.4336	21.0664	0.3216
35.55569018	15.94430982	0.309598249	31.0	39.16	12.34	0.2397	24.0	38.1361	13.3639	0.2595
44.59864489	29.70135511	0.399749059	40.0	47.18	27.12	0.3650	36.5	43.8675	30.4325	0.4096
35.01208209	16.98791791	0.326690729	32.7	36.16	15.84	0.3047	30.5	35.3937	16.6063	0.3194
38.06134122	20.23865878	0.347146806	34.7	41.50	16.80	0.2882	28.8	40.4653	17.8347	0.3059

Wang:FFM	Wang:FM	Wang BF=FM/BM	Wang BF%	Hout:FFM	Hout:FM	Hout:BF=FM/BM	Hout %BF	Luk:FFM	Luk:FM	Luk:FM/BM
36.844982	16.455018	0.30872454	30.9	36.81	16.49	0.3094	30.9	35.6506	17.6494	0.3311
36.1162324	11.8837676	0.247578492	24.8	35.45	12.55	0.2615	26.1	37.9700	10.0300	0.2090
37.20415661	15.99584339	0.300673748	30.1	39.41	13.79	0.2593	25.9	37.4010	15.7990	0.2970
39.18545864	25.81454136	0.39714679	39.7	42.18	22.82	0.3511	35.1	38.1212	26.8788	0.4135
34.64946285	19.25053715	0.357152823	35.7	37.80	16.10	0.2988	29.9	36.3431	17.5569	0.3257
44.13606239	22.21393761	0.334799361	33.5	51.20	15.15	0.2284	22.8	48.9168	17.4332	0.2627
35.70333606	21.74666394	0.378532009	37.9	37.99	19.46	0.3388	33.9	36.0620	21.3880	0.3723
37.71676183	21.93323817	0.36769888	36.8	40.31	19.34	0.3243	32.0	37.5337	22.1163	0.3708
38.90209393	18.89790607	0.326953392	32.7	42.47	15.33	0.2652	26.5	41.8247	15.9753	0.2764
43.77144795	30.72855205	0.412463786	41.2	53.49	21.01	0.2820	29.7	50.1709	24.3291	0.3266
35.03966	11.76034	0.251289316	25.1	36.35	10.45	0.2233	22.3	36.5844	10.2156	0.2183
36.35850922	21.34149078	0.369869857	37.0	40.41	17.29	0.2996	30.0	38.6929	19.0071	0.3294
41.17180004	19.82819996	0.325052458	32.5	44.76	16.24	0.2662	26.6	42.5507	18.4493	0.3024
29.22762634	10.12237366	0.257239483	25.7	31.53	7.82	0.1988	19.9	31.6796	7.6704	0.1949
37.4270409	14.0229591	0.272555084	27.3	42.48	8.97	0.1744	17.4	42.5241	8.9259	0.1735
38.33906911	18.11093089	0.320831371	32.1	40.31	16.14	0.2859	28.6	38.5172	17.9328	0.3177
38.98058095	17.31941905	0.307627337	30.8	41.41	14.89	0.2645	26.4	41.0160	15.2840	0.2715
39.76211047	24.68788953	0.383054919	38.3	41.58	22.87	0.3549	35.5	39.5169	24.9331	0.3869
42.4372966	25.8627034	0.3786633	37.9	45.41	22.89	0.3352	33.5	42.2663	26.0337	0.3812
42.43384198	33.26615802	0.439447266	43.9	46.37	29.33	0.3875	38.7	42.0536	33.6464	0.4445
37.52080345	15.12919655	0.28735416	28.7	39.30	13.35	0.2535	25.4	39.5381	13.1119	0.2490
35.54372059	16.15627941	0.312500569	31.3	36.34	15.36	0.2971	29.7	35.1901	16.5099	0.3193
37.59534738	23.20465262	0.381655471	38.2	39.38	21.42	0.3523	35.2	36.3992	24.4008	0.4013
37.29739385	14.25260615	0.276481206	27.6	38.40	13.15	0.2550	25.5	38.4685	13.0815	0.2538
45.12798322	35.07201678	0.437306942	43.7	50.01	30.19	0.3765	37.6	45.7428	34.4572	0.4296
26.55861515	11.34138485	0.299244983	29.9	27.35	10.55	0.2784	27.8	28.0243	9.8757	0.2606
40.97853675	28.12146325	0.40696763	40.7	44.60	24.50	0.3546	35.5	40.7616	28.3384	0.4101
41.21293731	22.03706269	0.348412058	34.8	43.73	19.52	0.3086	30.9	41.5650	21.6850	0.3428
32.28740374	10.91259626	0.252606395	25.3	32.38	10.82	0.2504	25.0	32.1907	11.0093	0.2548
38.02178235	13.97821765	0.268811878	26.9	40.18	11.82	0.2273	22.7	41.2910	10.7090	0.2059
37.95878186	14.14121814	0.271424532	27.1	38.25	13.85	0.2659	26.6	36.9290	15.1710	0.2912
45.31937457	17.23062543	0.275469631	27.5	50.49	12.06	0.1928	19.3	50.1124	12.4376	0.1988
42.95552909	27.24447091	0.388097876	38.8	47.47	22.73	0.3238	32.4	44.6837	25.5163	0.3635
38.2068039	27.0931961	0.414903462	41.5	41.02	24.28	0.3718	37.2	38.3055	26.9945	0.4134
40.39508652	17.85491348	0.30652212	30.7	44.62	13.63	0.2339	23.4	43.3698	14.8802	0.2555
36.46555084	15.33444916	0.296031837	29.6	40.92	10.88	0.2101	21.0	41.3488	10.4512	0.2018

Wang:FFM	Wang:FM	Wang BF=FM/BM	Wang BF%	Hout:FFM	Hout:FM	Hout:BF=FM/BM	Hout %BF	Luk:FFM	Luk:FM	Luk:FM/BM
40.16047945	17.72952055	0.306262231	30.6	40.88	17.01	0.2939	29.4	39.2168	18.6732	0.3226
31.90004375	14.79995625	0.316915551	31.7	33.85	12.85	0.2751	27.5	33.2656	13.4344	0.2877
31.476391	14.123609	0.309728268	31.0	33.75	11.85	0.2598	26.0	33.2037	12.3963	0.2718
50.30338541	34.69661459	0.408195466	40.8	56.90	28.10	0.3306	33.1	52.7676	32.2324	0.3792
41.14477716	30.15522284	0.422934402	42.3	46.96	24.34	0.3413	34.1	43.2922	28.0078	0.3928
34.08408662	11.71591338	0.255805969	25.6	36.27	9.53	0.2081	20.8	36.0032	9.7968	0.2139
50.31445121	29.28554879	0.367908904	36.8	53.83	25.77	0.3238	32.4	50.5961	29.0039	0.3644
34.67206395	16.92793605	0.328060776	32.8	36.89	14.71	0.2851	28.5	36.1551	15.4449	0.2993
45.74530786	32.15469214	0.412768834	41.3	50.21	27.69	0.3555	35.6	46.7435	31.1565	0.4000
30.43003664	14.56996336	0.323776963	32.4	34.88	10.12	0.2248	22.5	34.5330	10.4670	0.2326
39.23446425	15.86553575	0.287940758	28.8	39.23	15.87	0.2880	28.8	39.2905	15.8095	0.2869
47.47097306	38.02902694	0.444783941	44.5	53.50	32.00	0.3743	37.4	48.4818	37.0182	0.4330
41.31030825	15.43969175	0.272065053	27.2	40.26	16.49	0.2905	29.1	39.4568	17.2932	0.3047
41.88725308	17.71274692	0.29719374	29.7	42.96	16.64	0.2791	27.9	42.1813	17.4187	0.2923
39.23379245	27.21620755	0.409574229	41.0	43.50	22.95	0.3453	34.5	41.7549	24.6951	0.3716
38.09579801	15.60420199	0.290581043	29.1	40.34	13.36	0.2489	24.9	40.1083	13.5917	0.2531
45.928271	19.521729	0.298269351	32.5	46.64	18.81	0.2874	31	45.1379	20.3121	0.3103
37.85211077	15.44788923	0.289829066	29.0	45.07	8.23	0.1545	15.5	44.4346	8.8654	0.1663
40.95552444	20.99447556	0.338893875	33.9	46.30	15.65	0.2526	25.3	45.4725	16.4775	0.2660
33.59601993	15.70398007	0.318539149	31.9	33.61	15.69	0.3183	31.8	32.4432	16.8568	0.3419
42.01776205	19.23223795	0.313995722	32.5	45.01	16.24	0.2651	31	44.5346	16.7154	0.2729
44.23565398	23.76434602	0.349475677	34.9	47.44	20.56	0.3023	30.2	45.9199	22.0801	0.3247
35.1125844	21.0874156	0.375220918	37.5	36.08	20.12	0.3580	35.8	34.5226	21.6774	0.3857
45.55358601	34.44641399	0.430580175	43.1	50.99	29.01	0.3626	36.3	47.3052	32.6948	0.4087
52.4831308	42.5168692	0.447545992	44.8	58.85	36.15	0.3805	38.1	53.2173	41.7827	0.4398
41.39362928	20.90637072	0.335575774	33.6	42.82	19.48	0.3127	31.3	40.9279	21.3721	0.3431
40.00135226	25.39864774	0.388358528	38.8	41.70	23.70	0.3625	36.25	39.5821	25.8179	0.3948
36.19775339	21.15224661	0.368827317	36.9	39.62	17.73	0.3092	30.9	38.0895	19.2605	0.3358
34.81528854	15.18471146	0.303694229	30.4	34.18	15.82	0.3164	31.7	33.7208	16.2792	0.3256
43.98791812	19.66208188	0.308909378	30.9	46.89	16.76	0.2633	26.3	45.1526	18.4974	0.2906
53.31619863	46.88380137	0.467902209	46.8	59.30	40.90	0.4082	40.82	54.0396	46.1604	0.4607

LukaskiBF%	Frnt:FFM	Frnt:FM	Frnt:FM/BM	Frnt %BF	VO2 - 1	VO2 - 2	VO2 - 3	VO2max	Campus	On/Off	Meals	HighSch	HS.A	SM	BirthCont
29.5	49.2283	15.1717	0.235585404	23.6	11	5	4	41.8	1	1	1	3	3	2	0
32.1	49.8136	16.4864	0.24866365	24.9	11	9	7	47.4	3	2	1	3	3	2	0
24.0	38.08906	10.81094	0.221082618	22.1	9	7	6	46.9	1	1	1	3	3	2	0
31.9	47.60545	16.84455	0.261358417	26.1	10	4.5	4	38.6	1	1	1	3	3	2	0
33.3	44.26556	15.73444	0.262240667	26.2	7	4	7	40.0	1	1	1	3	3	2	1
46.6	58.33996	29.56004	0.336291695	33.6	7	5	6	32.1	1	1	1	3	3	2	0
34.0	39.72614	15.47386	0.280323551	28.0	8	8	6	43.0	1	1	1	3	3	2	0
33.3	46.2161	16.7839	0.266411111	26.6	6	4	1	33.6	1	1	1	3	3	2	1
34.2	38.96366	15.63634	0.286379853	28.6	9	7	2	40.3	2	2	2	1	1	2	0
26.0	37.0016	11.5984	0.238650206	23.9	7	3	7	42.3	1	1	1	1	1	1	0
35.7	61.7535	23.9465	0.279422404	27.9	10	8	5	39.8	1	1	1	3	3	2	0
29.1	45.1301	13.6699	0.232481293	23.2	9	6	1	39.0	2	2	2	1	1	2	1
24.5	38.90836	10.59164	0.213972525	21.4	11	9	5	46.9	1	1	1	2	1	1	0
29.3	38.60682	13.09318	0.253252998	25.3	12	10	10	52.2	2	2	2	1	1	2	0
29.7	37.9245	13.5755	0.263601942	26.4	5	3	4	38.9	1	1	1	3	3	2	0
29.0	42.2487	13.2513	0.238762162	23.9	9	8	3	42.4	1	1	1	3	3	2	0
26.0	38.91686	11.68314	0.230892095	23.1	8	7	6	45.5	3	2	2	3	3	2	1
31.5	51.3957	16.6043	0.244180882	24.4	10	3	7	40.2	3	2	2	3	3	2	0
34.9	53.4785	19.2215	0.264394773	26.4	8	8	8	44.0	1	1	1	3	3	2	0
37.3	56.5198	21.8802	0.279084184	27.9	6	6	6	38.3	1	1	1	3	3	2	0
31.5	46.9674	15.4326	0.247317308	24.7	10	6	5	42.9	3	2	1	3	3	2	0
32.7	48.43392	16.76608	0.257148466	25.7	10	9	9	46.2	1	1	1	3	3	2	0
41.1	58.9444	26.3556	0.308975381	30.9	7	5	7	36.3	3	2	2	3	3	2	0
25.0	44.8147	12.0853	0.212395431	21.2	9	8	6	46.0	1	1	1	1	1	2	1
36.0	52.19798	20.40202	0.281019559	28.1	9	8	5	39.3	1	1	1	3	3	2	1
28.1	48.13328	14.76672	0.234765024	23.5	8	9	8	44.5	1	1	1	3	3	2	0
32.5	41.91476	15.08524	0.264653333	26.5	8	7	6	42.0	1	1	1	2	1	2	0
38.1	47.5725	19.5275	0.291020864	29.1	4	2	4	29.6	1	1	1	3	3	1	1
32.2	48.8721	16.6279	0.253861069	25.4	9	7	6	40.2	1	1	1	3	3	2	0
25.9	39.77844	11.72156	0.227603107	22.8	8	6	5	42.2	1	1	1	3	3	2	0
41.0	51.5631	22.7369	0.306014805	30.6	6	3	1	30.9	1	1	1	3	3	2	0
31.9	37.7504	14.2496	0.274030769	27.4	9	6	7	44.4	3	2	3	3	3	2	0
30.6	43.93368	14.36632	0.246420583	24.6	10	9	5	44.3	1	1	1	3	3	2	0

LukaskiBF%	Frnt:FFM	Frnt:FM	Frnt:FM/BM	Frnt %BF	VO2 - 1	VO2 - 2	VO2 - 3	VO2max	Campus	On/Off	Meals	HighSch	HS.A	SM	BirthCont
33.1	38.1293	15.1707	0.284628518	28.5	9	6	5	43.5	1	1	1	3	3	2	0
20.9	38.70892	9.29108	0.193564167	19.4	4	3	0	35.6	1	1	1	3	3	2	0
29.7	39.56444	13.63556	0.256307519	25.6	10	9	3	44.8	2	2	2	1	1	2	0
41.4	43.9053	21.0947	0.324533846	32.5	2	2	3	29.1	1	1	1	1	1	2	0
32.6	39.261	14.639	0.271595547	27.2	6	5	2	35.9	2	2	2	1	1	2	1
26.3	51.19413	15.15587	0.22842306	22.8	10.5	9	8	46.5	1	1	1	3	3	2	0
37.2	40.13835	17.31165	0.301334204	30.1	7	5	2	35.7	2	2	2	1	1	2	0
36.5	41.85213	17.79787	0.298371668	29.4	7	9	4	40.5	1	1	1	1	1	2	0
27.6	44.76948	13.03052	0.225441522	22.5	11	10	7	48.1	2	2	2	1	1	2	0
32.7	54.03516	20.46484	0.274695839	27.8	5	3	3	29.1	3	2	2	2	1	2	0
21.8	37.10788	9.69212	0.207096581	20.7	10	7	5	46.6	2	2	2	1	1	2	0
32.9	42.28448	15.41552	0.267166724	26.7	5	4	3	34.2	1	1	1	2	1	2	0
30.2	45.91148	15.08852	0.247352787	24.7	3	3	3	33.8	1	1	1	2	1	2	1
19.5	30.64735	8.70265	0.221160102	22.1	3	2	1	34.7	1	1	1	3	3	2	0
17.4	42.88663	8.56337	0.166440622	16.6	11	9	1	44.3	3	2	2	1	1	2	0
31.8	41.61727	14.83273	0.262758725	26.3	11	11	8	50.2	1	1	2	4	2	2	0
27.2	43.75146	12.54854	0.222887034	22.3	7	4	6	40.8	1	1	1	1	1	2	1
38.7	45.20885	19.24115	0.298543832	29.9	5	1	2	30.8	3	2	2	1	1	2	0
38.1	48.25448	20.04552	0.29349224	29.3	12	10	3.5	43.7	2	2	1	3	3	2	0
44.5	50.52488	25.17512	0.332564333	33.3	5	3	1	27.3	1	1	1	3	3	2	0
24.9	41.50271	11.14729	0.211724406	21.2	13	9	1	45.9	1	1	1	3	3	2	0
31.9	37.35208	14.34792	0.277522631	27.8	9	6	2	41.0	2	2	2	1	1	2	0
40.1	41.30332	19.49668	0.320669079	32.1	7	3	1	33.2	1	1	1	1	1	2	1
25.4	40.20433	11.34567	0.220090592	22.0	7	3	3	39.1	2	2	2	1	1	2	1
43.0	54.51798	25.68202	0.320224688	32.0	3	3	1	25.5	2	2	2	1	1	2	0
26.1	26.12782	11.77218	0.310611609	31.1	10	7	2	43.9	2	2	2	1	1	2	0
41.0	47.31692	21.78308	0.315239942	31.5	5	5	3	32.7	3	2	2	2	1	2	1
34.3	46.19291	17.05709	0.269677312	27.0	10	8	4	42.7	2	2	2	1	1	2	1
25.5	31.8177	11.3823	0.263479167	26.3	6	2	4	39.5	1	1	2	2	1	2	0
20.6	42.78064	9.21936	0.177295385	17.7	10	9	8	49.7	2	2	2	1	1		0
29.1	38.79842	13.30158	0.255308637	25.5	3	1	2	34.1	1	1	1	2	1	2	1
19.9	51.54445	11.00555	0.175948042	17.6	11	9	5	47.2	1	1	2	2	1	2	0
36.3	50.54602	19.65398	0.279971225	28.0	9	6	6	39.5	1	1	1	3	3	2	0
41.3	44.52578	20.77422	0.318135069	31.8	7	3	1	31.1	3	2	2	2	1	1	1
25.5	45.65611	12.59389	0.21620412	21.6	11	10	6	47.9	1	1	1	2	1	2	0
20.2	42.4863	9.3137	0.179801158	18.0	12	10	7	49.9	3	2	2	1	1	2	1

LukaskiBF%	Frnt:FFM	Frnt:FM	Frnt:FM/BM	Frnt %BF	VO2 - 1	VO2 - 2	VO2 - 3	VO2max	Campus	On/Off	Meals	HighSch	HS.A	SM	BirthCont
32.3	42.60771	15.28229	0.263988426	26.4	8	8	1	40.9	2	2	2	1	1	2	1
28.8	34.32088	12.37912	0.265077516	26.5	3	3	1	33.5	1	1	2	2	1	2	0
27.2	33.95412	11.64588	0.255392105	25.5	9	5	6	43.6	2	2	2	1	1	2	1
37.9	60.1522	24.8478	0.292327059	29.2	3	3	1	26.9	1	1	1	2	1	1	1
39.3	49.6486	21.6514	0.303666199	30.4	3	3	1	26.5	3	2	2	4	2	2	0
21.4	36.28048	9.51952	0.207849782	20.8	8	6	5	44.2	2	2	2	1	1	2	0
36.4	57.73464	21.86536	0.274690452	27.5	7	5	5	37.6	1	1	1	3	3	2	0
29.9	38.3789	13.2211	0.256222868	25.6	5	5	5	38.9	1	1	2	1	1	2	1
40.0	54.57276	23.32724	0.299451091	29.9	6	4	4	32.6	1	1	1	4	2	2	1
23.3	35.04524	9.95476	0.221216889	22.1	9	4	1	38.1	1	1	1	1	1	2	0
28.7	41.97772	13.12228	0.238153902	23.8	7	4	2	38.8	3	2	2	4	2	2	0
43.3	57.73754	27.76246	0.324707135	32.5	5	3	6	29.8	3	2	2	2	1	1	0
30.5	42.37111	14.37889	0.253372511	25.3	5	3	1	36.3	2	2	2	1	1	2	1
29.2	45.6515	13.9485	0.234035235	23.4	8	4	4	40.5	3	2	2	3	3	1	1
37.2	47.64967	18.80033	0.282924454	28.3	3	5	5	32.6	3	2	2	4	2	2	0
25.3	42.19022	11.50978	0.214334823	21.4	9	2	3	39.1	1	1	2	1	1	2	0
33.7	49.66281	15.78719	0.241209931	26.7	9	7	4	43.4	2	1	2	1	1	2	0
16.6	44.13572	9.16428	0.171937711	17.2	8	7	7	44.4	3	2	2	1	1	2	0
26.6	48.43015	13.51985	0.218238095	21.8	10	7	7	44.2	3	1	2	2	1	2	0
34.19	33.92168	15.37832	0.311933469	31.2	7	5	6	42.0	3	2	2	2	1	2	0
33.7	47.93609	13.31391	0.217369959	26.7	5	5	3	37.3	3	2	2	4	2	2	0
32.5	51.04336	16.95664	0.249362353	24.9	8	3	0	34.0	2	2	2	1	1	2	1
38.6	38.28056	17.91944	0.318851246	31.9	6	5	6	38.7	3	2	2	4	2	2	0
40.9	55.51706	24.48294	0.30603675	30.6	9	5	1	31.7	1	1	2	1	1	1	0
44	63.85286	31.14714	0.327864632	32.8	5	2	2	25.4	2	2	2	1	1	2	1
34.3	45.46124	16.83876	0.270285072	27	9	8	3	41.9	2	2	2	1	1	2	0
39.48	45.58088	19.81912	0.303044648	30.3	5	4	1	32.0	2	2	2	1	1	2	1
33.6	41.78717	15.56283	0.271365824	27.1	2	2	1	29.2	2	2	2	1	1	2	0
32.6	35.20828	14.79172	0.2958344	29.6	3	1	1	32.6	2	2	2	1	1	2	0
29.1	48.80143	14.84857	0.233284682	23.3	9	9	6	45.7	2	2	2	1	1	2	0
46.1	66.68504	33.51496	0.334480639	33.4	7	6	7	32.0	2	2	2	1	1	2	0

Appendix **GLM Program for Ethnic Group Analysis.**

```
Data Glucose;
Input ID Code chol_hdl;
cards;

1       1       2.46
2       1       2.03
3       1       2.42
4       1       3.83
5       1       1.72
6
.
.
.
100

;
proc GLM;
Title 'chol_hdl by group';
classes code;
model chol_hdl = code;
means code/duncan;
run;
```

Appendix
GLM Data analysis of ethnic group differences.
Ethnic codes: code 1 = Caucasian, 2 = Asians, 3 = Mixed Asians, 4 = Native Hawaiians and Pacific Islanders.

age by group
The GLM Procedure

Dependent Variable: age

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	116.3108789	38.7702930	10.50	<.0001
Error	96	354.5742211	3.6934815		
Corrected Total	99	470.8851000			

R-Square	Coeff Var	Root MSE	age Mean
0.247005	9.510780	1.921843	20.20700

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	116.3108789	38.7702930	10.50	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	116.3108789	38.7702930	10.50	<.0001

age by group
The GLM Procedure

Duncan's Multiple Range Test for age

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	96
Error Mean Square	3.693481
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	1.104	1.162	1.200

Means with the same letter are not significantly different.

Duncan Grouping		Mean	N	Code
	A	21.6450	20	4
	A			
B	A	20.7957	23	3
B				
B		20.0914	35	2
	C	18.4682	22	1

height by group

The GLM Procedure

Dependent Variable: height

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	721.464496	240.488165	5.49	0.0016
Error	96	4204.465548	43.796516		
Corrected Total	99	4925.930044			

R-Square	Coeff Var	Root MSE	height Mean
0.146463	4.076649	6.617894	162.3366

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	721.4644964	240.4881655	5.49	0.0016

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	721.4644964	240.4881655	5.49	0.0016

height by group

The GLM Procedure

Duncan's Multiple Range Test for height

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	98
Error Mean Square	43.79652
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	3.802	4.001	4.133

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	Code
A	165.305	22	1
A			
A	164.329	20	4
A			
A	163.124	23	3
B	158.815	35	2

weight by group
The GLM Procedure

Dependent Variable: weight

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	2367.75005	789.25002	6.48	0.0005
Error	96	11684.30245	121.71148		
Corrected Total	99	14052.05250			

R-Square	Coeff Var	Root MSE	weight Mean
0.168499	17.99868	11.03229	61.29500

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	2367.750050	789.250017	6.48	0.0005

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	2367.750050	789.250017	6.48	0.0005

weight by group
The GLM Procedure

Duncan's Multiple Range Test for weight

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	96
Error Mean Square	121.7115
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	6.338	6.669	6.889

Means with the same letter are not significantly different.

Duncan Grouping		Mean	N	Code
	A	68.785	20	4
	A			
B	A	64.250	22	1
B				
B	C	60.193	23	3
	C			
	C	55.881	35	2

bmi by group

The GLM Procedure

Dependent Variable: bmi

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	165.621479	55.207160	3.62	0.0160
Error	96	1465.768521	15.268422		
Corrected Total	99	1631.390000			

R-Square	Coeff Var	Root MSE	bmi Mean
0.101522	16.84986	3.907483	23.19000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	165.6214794	55.2071598	3.62	0.0160

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	165.6214794	55.2071598	3.62	0.0160

bmi by group

The GLM Procedure

Duncan's Multiple Range Test for bmi

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	96
Error Mean Square	15.26842
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	2.245	2.362	2.440

Means with the same letter are not significantly different.

Duncan Grouping		Mean	N	Code
	A	25.550	20	4
	A			
B	A	23.455	22	1
B				
B		22.609	23	3
B				
B		22.057	35	2

waist by group

The GLM Procedure

Dependent Variable: waist

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1158.646880	386.215627	5.34	0.0019
Error	98	6946.393120	72.358262		
Corrected Total	99	8105.040000			

R-Square	Coeff Var	Root MSE	waist Mean
0.142954	12.17282	8.506366	69.88000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	1158.646880	386.215627	5.34	0.0019

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	1158.646880	386.215627	5.34	0.0019

waist by group

The GLM Procedure

Duncan's Multiple Range Test for waist

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	96
Error Mean Square	72.35826
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	4.887	5.142	5.312

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	Code
A	76.100	20	4
B	70.384	22	1
B			
B	68.861	23	3
B			
B	66.691	35	2

hip by group

The GLM Procedure

Dependent Variable: hip

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1126.179099	375.393033	6.77	0.0003
Error	96	5325.068401	55.469463		
Corrected Total	99	6451.247500			

R-Square	Coeff Var	Root MSE	hip Mean
0.174568	7.799133	7.447782	95.49500

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	1126.179099	375.393033	6.77	0.0003

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	1126.179099	375.393033	6.77	0.0003

hip by group

The GLM Procedure

Duncan's Multiple Range Test for hip

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	96
Error Mean Square	55.46946
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	4.278	4.502	4.651

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	Code
A	101.225	20	4
B	96.250	22	1
B			
B	95.283	23	3
B			
B	91.886	35	2

sbp by group
The GLM Procedure

Dependent Variable: sbp

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1208.89472	402.96491	4.05	0.0093
Error	96	9556.10528	99.54276		
Corrected Total	99	10765.00000			

R-Square	Coeff Var	Root MSE	sbp Mean
0.112299	9.350620	9.977112	106.7000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	1208.894720	402.964907	4.05	0.0093

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	1208.894720	402.964907	4.05	0.0093

sbp by group
The GLM Procedure

Duncan's Multiple Range Test for sbp

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	98
Error Mean Square	99.54276
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	5.731	6.031	6.230

Means with the same letter are not significantly different.

Duncan Grouping	Mean	N	Code
A	111.550	20	4
A			
A	107.696	23	3
A			
A	106.857	35	2
B	101.000	22	1

Hdl by group

The GLM Procedure

Dependent Variable: HDL

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1978.86280	659.62093	3.04	0.0327
Error	96	20823.29720	216.90935		
Corrected Total	99	22802.16000			

R-Square	Coeff Var	Root MSE	HDL Mean
0.086784	22.56103	14.72784	65.28000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	1978.862795	659.620932	3.04	0.0327

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	1978.862795	659.620932	3.04	0.0327

Hdl by group
The GLM Procedure

Duncan's Multiple Range Test for HDL

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	96
Error Mean Square	216.9093
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	8.460	8.903	9.197

Means with the same letter are not significantly different.

Duncan Grouping		Mean	N	Code
	A	69.486	35	2
	A			
	A	68.174	23	3
	A			
B	A	61.500	22	1
B				
B		58.750	20	4

chol_hdl by group

The GLM Procedure

Dependent Variable: chol_hdl

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	3.10208115	1.03402705	3.19	0.0272
Error	96	31.15157485	0.32449557		
Corrected Total	99	34.25365600			

R-Square	Coeff Var	Root MSE	chol_hdl Mean
0.090562	22.50494	0.569645	2.531200

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	3.10208115	1.03402705	3.19	0.0272

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	3.10208115	1.03402705	3.19	0.0272

chol_hdl by group

The GLM Procedure

Duncan's Multiple Range Test for chol_hdl

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	96
Error Mean Square	0.324496
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	.3272	.3444	.3557

Means with the same letter are not significantly different.

Duncan Grouping		Mean	N	Code
	A	2.7450	20	4
	A			
	A	2.7218	22	1
	A			
B	A	2.4483	23	3
B				
B		2.3437	35	2

rjl by group

The GLM Procedure

Dependent Variable: rjl

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	409.289085	136.429695	2.47	0.0663
Error	96	5296.422515	55.171068		
Corrected Total	99	5705.711600			

R-Square	Coeff Var	Root MSE	rjl Mean
0.071733	23.12348	7.427723	32.12200

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	409.2890853	136.4296951	2.47	0.0663

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	409.2890853	136.4296951	2.47	0.0663

rjl by group

The GLM Procedure

Duncan's Multiple Range Test for rjl

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	96
Error Mean Square	55.17107
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	4.267	4.490	4.638

Means with the same letter are not significantly different.

Duncan Grouping		Mean	N	Code
	A	35.755	20	4
	A			
B	A	32.786	22	1
B				
B		30.952	23	3
B				
B		30.397	35	2

wang by group

The GLM Procedure

Dependent Variable: wang

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	218.486382	72.828794	2.61	0.0559
Error	96	2678.727518	27.903412		
Corrected Total	99	2897.213900			

R-Square	Coeff Var	Root MSE	wang Mean
0.075413	15.45953	5.282368	34.16900

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	218.4863825	72.8287942	2.61	0.0559

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	218.4863825	72.8287942	2.61	0.0559

wang by group

The GLM Procedure

Duncan's Multiple Range Test for wang

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	96
Error Mean Square	27.90341
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	3.034	3.193	3.299

Means with the same letter are not significantly different.

Duncan Grouping		Mean	N	Code
	A	36.945	20	4
	A			
B	A	34.395	22	1
B				
B		33.183	23	3
B				
B		33.089	35	2

PAR by group

The GLM Procedure

Dependent Variable: PAR

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	52.2998885	17.4332962	3.20	0.0267
Error	96	522.6276115	5.4440376		
Corrected Total	99	574.9275000			

R-Square	Coeff Var	Root MSE	PAR Mean
0.090968	56.70100	2.333246	4.115000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Code	3	52.29988848	17.43329616	3.20	0.0267

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Code	3	52.29988848	17.43329616	3.20	0.0267

PAR by group

The GLM Procedure

Duncan's Multiple Range Test for PAR

NOTE: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	96
Error Mean Square	5.444038
Harmonic Mean of Cell Sizes	23.87999

NOTE: Cell sizes are not equal.

Number of Means	2	3	4
Critical Range	1.340	1.411	1.457

Means with the same letter are not significantly different.

Duncan Grouping		Mean	N	Code
	A	5.2727	22	1
	A			
B	A	4.5000	20	4
B				
B		3.6429	35	2
B				
B		3.3913	23	3

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