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Healthy Heart Project

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Healthy Heart Testing

CLIENT M.J.B.

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Aleashia Hoskins, and Kylie Keil
Health and Human Performance Dept.
The University of Montana
Exercise Disease and Aging Class-HHP483



Your Stress Test, Risk Factor, Strength and Flexibility Report

Name: M.J.B.

Date: April 3, 2018

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Dear M.J.B.,

Thank you for your participation in the Healthy Heart program. Faculty and students within the Department of Health and Human Performance and the University of Montana are committed to promoting healthy lifestyles. This fitness testing program is a prime example of our student-based outreach and is designed to simultaneously provide experimental learning to our upper division students, as well as informative, personalized health fitness assessments to our community members. The following information will detail your testing outcomes, reinforce healthy behaviors, and provide direct suggestions where improvements can be made.

In particular, we appreciate that you agreed to test at such short notice. This process gives us valuable experience as pre-professional undergraduate students. We all enjoyed meeting with you and getting to know about your lifestyle and exercise habits, so that we could put our testing skills into practice. The importance of taking good care of oneself into the later years of life is missed on many, but you have provided an excellent example of what to do correctly! Great work! Hopefully this was a good experience for you as well and will provide you with valuable information for maintaining your health. Take care, and if you feel like testing again next year, please get in touch with Dr. Quindry.

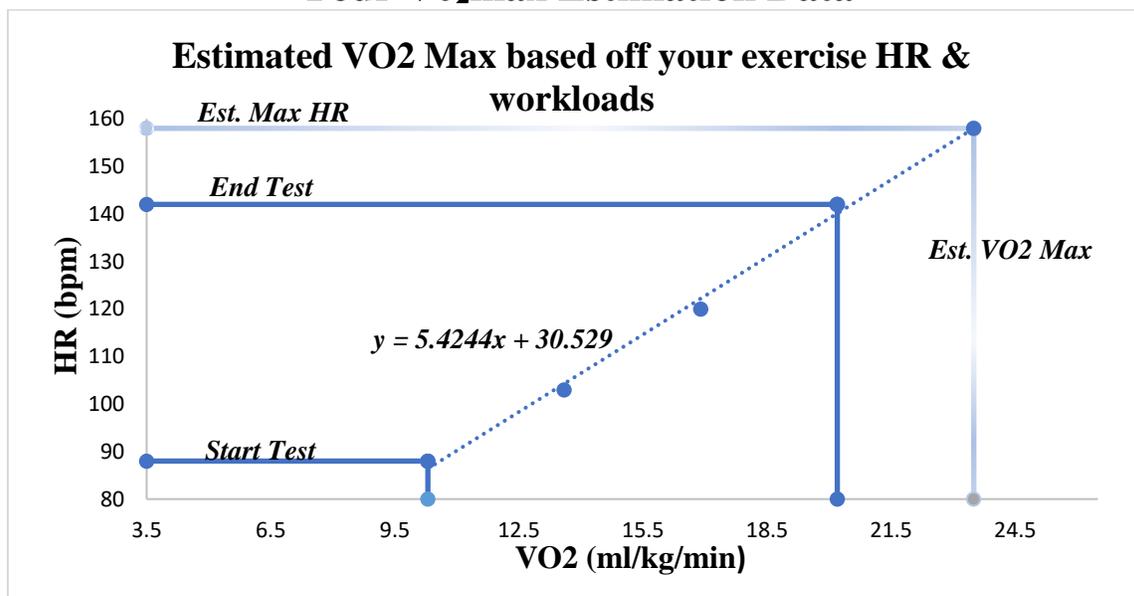
Sincerely,

Emily, John, Kyle, Aleashia, and Kylie

Cardiovascular Fitness Assessment & VO₂max Estimations

VO₂max is the maximal capacity of the body to transport and utilize oxygen. Reaching a VO₂max means that a person has reached their true physiologic limit. VO₂max is the “gold standard” means by which scientists and health care professionals evaluate an individual’s cardiovascular fitness level. As such, elite marathon runners have the highest values, diseased individuals have the lowest VO₂max numbers. In the Healthy Heart program, we estimate VO₂max based on your observed exercise performance at various workloads during the cycle ergometer test in conjunction with your estimated max HR. Your estimated VO₂max is **23.5 ml/kg/min**, a value that ranks **fair** for your age, and sex. **Improving** your VO₂max can be accomplished by increasing frequency and duration of aerobic exercise. Later in this document we provide individualized recommendations for improving your cardiorespiratory fitness.

Your VO₂max Estimation Data



Normative Values for VO₂ Max

Women	Low	Fair	Avg	Good	High	Athlete
20-29	<28	29-34	35-43	44-48	49-53	54-59
30-39	<27	28-33	34-41	42-47	48-52	53-58
40-49	<25	26-31	32-40	41-45	46-50	51-56
50-65	<21	22-28	29-36	37-41	42-45	46-49
Men						
20-29	<38	39-43	44-51	52-56	57-62	63-69
30-39	<34	35-39	40-47	48-51	52-57	58-64
40-49	<30	31-35	36-43	44-47	48-53	54-60
50-59	<25	26-31	32-39	40-43	44-48	49-55
60-69	<21	22-26	27-35	36-39	40-44	45-49

Dumke, Chuck. *Kin 321 Lab Manual*. 16 June 2016

Aerobic Exercise General Guidelines for Health

Even small increases in caloric expenditure with physical activity may improve health/fitness. The minimum and maximum amount of exercise remains more precisely quantified for benefits as follows:

There are three basic recommendations for meeting aerobic guidelines for health:

1. Moderate intensity aerobic exercise done at least 5 days a week to accumulate 150 minutes each week in at least 10 minutes at a time. Moderate exercise should modestly increase your heart rate and be an intensity that you can maintain easily for 60-90 minutes or more. For most people starting an exercise program this is the equivalent of brisk walking.
2. Vigorous intensity exercise done at least 3 days a week to accumulate at least 75 minutes. Vigorous aerobic activity should substantially increase your heart rate and be an intensity that you can maintain for 30-60 minutes or more. For most people this is at least a jog or slow run or equivalent intensity. You should have one day with less PA or moderate intensity between the vigorous intensity days.
3. A weekly combination of 3-5 days a week combining moderate and vigorous exercise is recommended for the majority of adults to achieve and maintain health/fitness benefits.

What is aerobic exercise?

Rhythmic, sustained exercises of at least moderate intensity that involves large muscles groups and requires little skill to perform such as walking or running are recommended aerobic activities for all adults to improve health and fitness. Elliptical machines, treadmills, cycling, rowing machines and swimming are also excellent aerobic exercise. Other exercise and sports requiring skill to perform or higher levels of fitness are recommended only for individual possessing adequate skill and fitness to perform the activity. Examples are cross country skiing, soccer, basketball, volleyball and other sports that require sustained movements.

Body Composition

Body composition plays an essential role in cardiovascular and total body health. Excess body fat, particularly when located centrally around the abdomen, is associated with hypertension, metabolic syndrome, Type 2 diabetes mellitus, stroke, cardiovascular disease and dyslipidemia. Most people exhibit increased fatness and a lower percentage in lean body tissues as they age. The good news is that intentional lifestyle interventions can improve body composition with direct impact on health.

Ways to improve or maintain your body composition include dietary interventions and participation in both strengthening and cardiovascular exercise. **Though we were unable to obtain body composition measures for your testing, it is important to note that your exercise routine should emphasize increasing lean body mass and decreasing fat mass by performing aerobic and resistance exercises together.** There should be less emphasis on scale weight, and more on total body composition, i.e. increasing lean body mass, which is a stronger indicator of health.

Should you desire to have your body composition measured in the future, you can do so at the Health and Human Department at the University of Montana. We can perform an underwater weighing (UWW) assessment or other body composition analysis via skin fold measures, body densitometry scan, or bioelectrical impedance.

Hydrodensitometry (Underwater) Weighing:

In the Healthy Heart program we perform underwater weighing (UWW) to assess body composition – the long standing “gold standard” measure. UWW body composition assessments are based on Archimedes’ principle that states when a body is immersed in water, it is buoyed by a counterforce equal to the weight of the water displaced. This loss of water allows for calculation of body volume.

Reference: Lippincott, Williams, and Wilkins. ACSM’s Guidelines for Exercise Testing and Prescription. Ninth Edition. Ed. Walter R. Thompson. Baltimore, 2014).

Normative Values for Body Composition

Men (Percent fat)						
Age	Underweight	Excellent	Good	Moderate	Overweight	Obese
≤19	<3	12.0	12.1 - 17.0	17.1 - 22.0	22.1 - 27.0	≥27.1
20 - 29	<3	13.0	13.1 - 18.0	18.1 - 23.0	23.1 - 28.0	≥28.1
30 - 39	<3	14.0	14.1 - 19.0	19.1 - 24.0	24.1 - 29.0	≥29.1
40 - 49	<3	15.0	15.1 - 20.0	20.1 - 25.0	25.1 - 30.0	≥30.1
≥50	<3	16.0	16.1 - 21.0	21.1 - 25.0	25.1 - 31.0	≥31.1

Women (Percent Fat)						
Age	Underweight	Excellent	Good	Moderate	Overweight	Obese
≤19	<12	17.0	17.1 - 22.0	22.1 - 27.0	27.1 - 32.0	≥32.1
20 - 29	<12	18.0	18.1 - 23.0	23.1 - 28.0	28.1 - 33.0	≥33.1
30 - 39	<12	19.0	19.1 - 24.0	24.1 - 29.0	29.1 - 34.0	≥34.1
40 - 49	<12	20.0	20.1 - 25.0	25.1 - 30.0	30.1 - 35.0	≥35.1
≥50	<12	21.0	21.1 - 26.0	26.1 - 31.1	31.1 - 36.0	≥36.1

Body Mass Index

Body Mass Index (BMI) is a common measure to assess weight relative to height and is calculated by dividing body weight in kilograms by height in meters squared. For most individuals, obesity-related health problems increase beyond a BMI of 25. While BMI is not as informative as UWW in terms of the interface between lifestyle and body composition, BMI remains an important predictor of health, with very high and very low values being associated with poorer health outcomes.

Your BMI at the time of test was **29.5**, which ranks as **overweight**. Keep in mind that desirable change in BMI should emphasize the concepts of appropriate body composition change, de-emphasizing scale weight.

BMI	
Underweight	<18.5
Normal	>18.5-25
Overweight	>25-30
Obese	>30
Morbidly Obese	>40

180 lbs ----- Current Weight
153 lbs ----- Your weight at a BMI of 25
27 lbs ----- How much to lose in order to achieve a BMI of 25.

Exercise Recommendations for Weight Loss

Expert consensus from the CDC and the ACSM recommend individuals engage in 150 minutes per week to achieve optimal health. For those with an aversion to activity, the 150-minute total is sometimes most manageable when negotiated in installments that equal 30 minutes a day, most days of the week. Notably, the 150-minute total is a good starting point for promoting weight loss with physical activity. To accelerate weight loss one should progress to 300 minutes of weekly physical activity, accounting for at least 60 minutes a day/5 days out of a week. The goal of aerobic exercise or physical activity is to increase energy expenditure and hopefully advance into longer duration activities. Participation in longer duration exercises elicits physiologic responses that further benefit fat utilization. The goal of weight loss is ultimately the aim of trying to reduce or manage the adipose stores on the human body while building or preserving lean muscle tissue.

Using the FITT framework to program exercise: **F**requency **I**ntensity **T**ime (Duration) **T**ype
The American College of Sports Medicine recommends: **F**requency: ≥ 5 days out of the week. The goal to weight loss or more importantly, fat loss, is calorie expenditure. Calorie expenditure will ultimately lead to a reduction in weight followed by weight maintenance. **I**ntensity: the ACSM recommends a moderate- to vigorous-intensity program to be used and encouraged for weight loss. Moderate to vigorous is classified as 40-60% of a person's heart rate reserve (HRR) and 50-75%, respectively. Most people starting an exercise program or increasing their physical activity for weight loss may not be able to achieve vigorous intensity due to increased body size or a de-conditioned state. The emphasis should then be on duration versus intensity. **T**ime, **D**uration: 30 – 60 minutes daily or 150-300 minutes weekly. Physical activity can be accumulated throughout a day in bouts of 10 minutes. **T**ype: aerobic activities that incorporate large muscles groups. For example, walking, rowing, swimming, and cycling all count toward aerobic activities incorporating large muscle groups. The activities that one likes and will perform regularly are emphasized. While this discussion is directed at altered body composition, one should always remember that aerobic activities also benefits health, counters the aging process, and helps to prevent or lessen the impact of all major forms of morbidity.

Recommendations for weight loss are criteria-driven, and relate to body size and composition. The BMI thresholds (> 25 BMI). Waist circumference is another diagnostic criterion; when exceeding > 102 cm in men or > 88 cm in women. The last and most diagnostically valuable criterion measure is overweightness or obesity as determined by underwater weighing (UWW). UWW is used to find out how much a person is carrying as fat mass versus lean body mass. A general range for men of 10-22% body fat is generally accepted as healthy. For women, 20-32% body fat is accepted as healthy.

According to the ACSM, a person that seeks to lose weight and alter body composition should approach changes through a combination of nutrient-dense dietary changes and physical activity. The changes sited in the ACSM's Guidelines for Exercise Testing and Prescription manual recommend a 500 to 1000 calorie deficit be achieved via dietary changes and physical activity participation.

Adapted from Lippincott, Williams, and Wilkins. ACSM's Guidelines for Exercise Testing and Prescription. Ninth Edition. Ed. Walter R. Thompson. Baltimore, 2014

Energy Balance & Physical Activity

The relationship between physical activity engagement and total energy balance is simple in concept (calories in vs. calories out), but more complicated in practice. Physical activity estimations for improved, or maintained energy balance, are provided below. Estimations are based on averaged responses to caloric deficits created by increased physical activity. Averages do not work for everyone, but there are ranges which will cover nearly all individuals. The possible range of dietary consumption practices and physical activity for you is shown below. Daily adherence is necessary to achieve projected goals. While “splurge” meals or events or trips are certainly feasible, they should be integrated into the overall plan.

To establish your current physical activity practices, we recommend **wearing a pedometer, smart watch, or smart phone pedometer** feature for one to two weeks to count your daily steps.

To establish your dietary patterns, we recommend that you maintain a food log for several days. You can use the dietary analysis program at the free government site www.mypyramid.gov to evaluate your diet.

Finally: Recommendation for physical activity for *health* are:

- A minimum 30 minutes a day at least 5 days a week.
- The intensity should be moderate (brisk walk for average fitness levels) and should result in a light sweat.
- The 30 minutes can be accumulated in 3 sessions of 10 minutes or more.

Ranges of daily diet and physical activity you may require in order to lose weight				
Lose five lbs per year:				
	Additional walking:	0.25-0.5 miles	Try: +0.25 miles	then increase as necessary.
	Diet Reduction:	24-48 kcal	Try: -24 kcal	then increase as necessary.
Lose 10 lbs per year:				
	Additional walking:	0.75-1.0 miles	Try: +0.75 miles	then increase as necessary.
	Diet Reduction:	72-96 kcal	Try: -72 kcal	then increase as necessary.
Your goal: 9 lbs per year:				
	Additional walking:	0.67- 0.9 miles	Try: +.67 miles	then increase as necessary.
	Diet Reduction:	43-86 kcal	Try: -43 kcal	then increase as necessary.

Blood Pressure Standards

Chronic high blood pressure raises the risk of cardiovascular disease (CVD) and stroke, the leading causes of death in the United States. High blood pressure is often called the “silent killer” because it usually has no warning signs or symptoms. For individuals 40-70 years old, each increment of 20mmHg in systolic or 10mmHg in diastolic BP doubles the risk of CVD across the entire BP range of 115/75 to 195/115mmhg. For these reasons, it is important to check blood pressure regularly.

Your resting BP was: Systolic **126** mmHg / Diastolic **78** mmHg which, if observed over a long period of time, would rank as **pre-hypertension**. Adhering to some of the lifestyle changes below will help you **improve** your blood pressure to a healthy reading.

Reference: CDC.gov, Lippincott, Williams, and Wilkins. ACSM's Guidelines for Exercise Testing and Prescription. Ninth Edition. Ed. Walter R. Thompson. Baltimore, 2014

Blood Pressure Standards		
	Systolic (mmHg)	Diastolic (mmHg)
Normal	<120	And <80
Pre-hypertension	120-139	Or 80-89
Stage 1 hypertension	140-159	Or 90-99
Stage 2 hypertension	≥160	Or ≥100

Lifestyle Changes to Benefit BP

- Physical activity (At least 30 or more minutes of moderate physical activity per day)
- Weight reduction (If needed)
- DASH eating plan
 - Diet rich in fruits, vegetables and low-fat dairy products with a reduced content of saturated and total fat.
- Dietary sodium reduction
- Moderation of alcohol consumption

When Medications are Probably Justified

- Stage 1 hypertension
- Stage 2 hypertension, two drug combinations for most

Most patients with hypertension who require drug therapy in addition to lifestyle modification require two or more antihypertensive medications to achieve the goal BP (<140/90 mm Hg or <130/80 mm Hg for patients with diabetes or chronic kidney disease). One should recognize that regular exercise will lower blood pressure. Thus, if you have (or develop hypertension) and haven't already discussed exercise as part of your blood pressure management plan with your physician, you should. The key point is that medication doses can often be lowered (ONLY AS DIRECTED BY AN MD OR PA) or discontinued in those who exercise regularly. Because responses are so individualized, you should seek qualified medical professionals prior to altering BP medications – and never make changes on your own or without physician direction.

Blood Glucose Standards

Why do we care about our blood glucose?

Diabetes is a chronic disease that affects how your body turns food into energy. Most of the food you eat is broken down into sugar (called glucose) and is released into your bloodstream. Your pancreas makes a hormone called insulin, which transfers blood glucose out of your bloodstream and into your body's cells for use as energy. If you have diabetes, your body either doesn't make enough insulin or can't use the insulin it makes as well as it should. Either way, sugar is staying in the blood and not getting into the tissues where it's needed. Not having this needed energy comes with symptoms like dizziness and confusion. Elevated blood sugar is also a significant disease risk factor in that chronically elevated blood sugar causes serious health problems such as heart disease, kidney disease, or vision loss.

Taking a fasted blood glucose measure will allow clinicians to assess whether insulin is doing its job in your body with a value below 100mg/dL, or if further tests should be done if you have a value higher than 100mg/dL. At the time of testing your fasted blood glucose was **92 mg/dL**, which ranks as **normal blood sugar**.

Adapted from CDC.gov

Fasted Blood Glucose Guidelines:

<70 mg/dL	Low blood sugar
70-100 mg/dL	Normal blood sugar
100-126mg/dL	Pre-Diabetic (glucose intolerant)
>126 mg/dL	Diabetes

Lifestyle Changes to Control Blood Glucose

- **Physical Activity:** Being active on a daily basis helps weight reduction (see below) and also helps improve insulin sensitivity to normalize blood glucose. Anyone that is diabetic or pre-diabetic should engage in **daily** physical activity. This activity could be as little as 3 installments of walking for 10 minutes. But remember, within reason, more physical activity is better when it comes to combating diabetes.
- **Weight reduction** has a positive effect on lowering blood glucose levels and helps your body improve insulin sensitivity, and thereby maintain normal blood glucose. Normalizing body weight is one of the most effective methods to control blood glucose and reduce your risk for diabetes and heart disease.
- **Diet** also plays a part in lowering blood glucose levels. Low-glycemic foods that are digested more slowly by the body are a better option for delivering a more "time-released" dose of sugar to the blood stream. High-glycemic foods enter the bloodstream easily and rapidly, causing the pancreas to work harder to produce insulin. Low-glycemic foods that can help lower blood glucose levels include whole fruits such as pears, apples, and oranges. Oatmeal, peanuts, beans, peas, and granola are all low-glycemic foods. High-glycemic foods include potatoes, rice, and white bread. Research indicates that potatoes and white bread are converted extremely quick by the body into glucose, and as such, should be consumed in moderation – or not at all in uncontrolled diabetics.

Cholesterol and Blood Lipid Standards

Your Total Cholesterol is **145** mg/dL which ranks as **optimal**

Your LDL (Bad) Cholesterol is **58** mg/dL which ranks as **optimal**

Your HDL (Good) Cholesterol is **38** mg/dL which ranks as **low**

Your Total:HDL Cholesterol Ratio is **3.8** which ranks as **normal**

Your Triglycerides are **245** mg/dL which ranks as **high**

Cholesterol Guidelines

Total cholesterol (TC) goal values:	<200—Optimal 200-239—Borderline High ≥240—High
LDL cholesterol goal values:	<100—Optimal 100-129—Near optimal 130-159—Borderline high 160-189 High ≥190 Very High
LDL cholesterol goal values:	<100—Optimal 100-129—Near optimal 130-159—Borderline high 160-189 High ≥190 Very High
HDL cholesterol goal value:	≥60—High (good) <40—Low (bad)
Total:HDL Ratio	<3.5—optimal <4—normal
Triglyceride (TG) goal value:	<150—Normal 150-199—Borderline high 200-499—High ≥500—Very high

Cholesterol 101

Cholesterol is a waxy substance that is necessary for cell structure and function. But too much cholesterol is problematic to long term health. Cholesterol comes from two sources: 1) your liver makes it naturally, and 2) the remaining cholesterol comes from animal-derived food consumption. For example, meat, poultry and full-fat dairy products contain cholesterol (called dietary cholesterol). More importantly, these foods are also high in saturated and *trans* fat. Trans fat is a problem because these fats cause your liver to make more cholesterol than it otherwise would. For some people, this added cholesterol production means they go from a normal cholesterol level to one that's unhealthy.

Why high cholesterol matters

Cholesterol circulates in the blood, and as blood cholesterol levels rise, so does cardiovascular disease risk. Thus, it's important to have cholesterol tested regularly, in order to intervene when levels get too high.

In your blood, there are "bad" and "good" forms of cholesterol. LDL cholesterol is the bad kind. HDL is the good kind. Too much of the bad kind — or not enough of the good kind — increases the chances that cholesterol will promote disease processes within the inner walls of arteries that feed the heart, brain, and other regions of the body.

Simplistically, think of LDL cholesterol as similar to a family member who carries things throughout the house and drops them along the way. HDL cholesterol is analogous to someone who picks up the mess and puts it away.

Together with other substances, cholesterol forms a thick, hard deposit that can narrow the arteries and make them less flexible. In the heart this condition is known as atherosclerosis. If a clot forms and blocks a narrowed artery, a heart attack (or in the brain, a stroke) occurs.

High cholesterol is one of the major controllable risk factors for coronary heart disease, heart attack and stroke. If you have other risk factors such as smoking, high blood pressure or diabetes, this risk increases exponentially. The more risk factors you have and the more severe they are, the more your overall risk rises. Adapted from: American Heart Association

Ways to lower LDL, Triglycerides and raise HDL

- Physical activity (30+ minutes of moderate physical activity/day) will benefit your cholesterol and triglycerides.
 - HDL quickly (within days) improves with lightly higher intensity (jogging) or long duration physical activity (1 or more hours of walking or hiking).
 - LDL will slowly come down (within weeks) and after several years may lower as much as 40-50 mg/dL.
 - Triglycerides respond beneficially to acute and chronic physical activity.
- Weight reduction (If needed)
 - Is very effective to lower LDL cholesterol and triglycerides.
- Nutrition
 - DASH Diet--rich in fruits, vegetables and low-fat dairy products with a reduced content of saturated and total fat.
 - High fiber diet
- Medication
 - When LDL > 250 mg/dL medications plus lifestyle changes are recommended.
 - When LDL < 250 mg/dL try lifestyle changes first.

Cardiovascular Disease Risk Factor Assessment

Cardiovascular disease (CVD) encompasses many conditions and diseases such as heart attack, coronary artery disease, congestive heart failure and stroke. Due to CVD being the number one killer worldwide, research indicates certain risk factors that could make an individual more disease susceptible. Some risk factors are unavoidable, such as age and family history, while others are readily modifiable with lifestyle change. Throughout this packet we provide your specific information in the context of CVD risk factor stratification.

With this information, you are in the **moderate** risk factor category. Use this information to take an educated step toward improving your health through fitness and healthy lifestyle choices. Throughout this packet we outline many approachable lifestyle interventions that will help guide you toward a healthy/healthier future!

Check all that apply

Age: Women ≥ 55 years old, Men ≥ 45 years old

Family History: You have a close blood relative who had a heart attack or heart surgery before age 55 (father or brother) or age 65 (mother or sister)

Smoking: Currently or quit within the last 6 months

Sedentary: You are physically inactive (i.e. you get < 30 min of physical activity on at least 3 days per week)

Obesity: BMI ≥ 30 kg/m²

Hypertension: Blood pressure is $\geq 140/90$ mm Hg or you take blood pressure medication

Dyslipidemia: Your total blood cholesterol level is ≥ 200 mg/dL, LDL is ≥ 126 mg/dL or you do not know your cholesterol level

Dyslipidemia: Your HDL cholesterol is ≥ 60 mg/dL, **minus (-1)**

Prediabetes: Fasting blood glucose is ≥ 100 mg/dL or you do not know your fasted blood glucose

Total Risk Factors

Total Risk Factors

Risk Factor Categories

< 2 —Low

≥ 2 —Moderate

*Though you indicated performing physical activity 2x/wk, it does not meet the ACSM recommendation of 150 min/wk of moderate intensity physical activity, so we suggest increasing frequency of scheduled exercise. See pg. 33-34 for recommendation.

**It is recommended to speak to your primary care physician about dyslipidemia.

Flexibility Report

Flexibility is the ability to move a joint through its complete range of motion. Flexibility is important in all people just as it is in athletic performance. Indeed, the ability to carry out activities of daily living rely on proper flexibility. Your Sit and Reach Score at the time of test was **11.8** in. which ranks as **good**. Your Reach Behind score at the time of test was **poor**. To **improve** your flexibility you should perform a stretching regimen for 2-3 days a week for all major muscle-tendon groups. It is recommended to hold a stretch in a static position (no bouncing) for 30-60 seconds for the greatest benefits.

Excellent	Good	Needs Improvement
Able to reach sufficiently past toes; >70% of age and gender rank; excellent flexibility	Able to reach toes or just past; <70%, >40% age and gender rank; good flexibility	Unable to reach toes; <40% gender rank; Flexibility may need improvement

Reach Behind Test

Standards for "Reach Behind" Test	
Good	Fingers are touching
Fair	Fingertips are not touching but are less than two inches apart.
Poor	Fingertips are greater than two inches apart.

Muscular Strength

Development of muscular strength improves bone mass, glucose tolerance, musculotendinous integrity, and increased fat free mass. Acquiring these benefits help in the prevention of osteoporosis, injury and low back pain, as well as being beneficial for weight management. Resistance training is the main mode of exercise to improve muscular strength and is essential in order to perform daily tasks, support leisure time activities, and sustain a healthy lifestyle.

Your estimated leg press based off of your 1RM is **231** lb (=1.28 lb/lb ratio) placing you in the **90th** percentile. Your number of pushups was **7** which ranks as **good**. Your right handgrip was **45.2** lb, your left handgrip was **54.6** lb, and your combined handgrip was **99.8** lb which ranks as **moderate**.

To **maintain** your muscular strength you should adapt a weekly strength training program. Later in the packet we provide a personalized program that will help meet your needs and goals.

Muscular Strength Normative Values

Leg Press Norms for Men (lb/lb)					
	Age				
Percentile	20 - 29	30 - 39	40 - 49	50 - 59	60+
90	>2.08	>1.88	>1.76	>1.66	>1.56
80	2.04	1.84	1.73	1.63	1.53
70	2.00	1.80	1.70	1.60	1.50
60	1.91	1.71	1.63	1.53	1.43
50	1.83	1.63 1.5661	1.56	1.46	1.37
40	1.74	1.58	1.53	1.43	1.34
30	1.65	1.55	1.50	1.40	1.31
20	<1.64	<1.54	<1.49	<1.39	<1.30

Leg Press Norms for Women (lb/lb)					
	Age				
Percentile	20 - 29	30 - 39	40 - 49	50 - 59	60+
90	>1.63	>1.42	>1.32	>1.26	>1.15
80	1.58	1.38	1.29	1.19	1.11
70	1.54	1.35	1.26	1.13	1.08
60	1.44	1.27	1.19	1.06	1.00
50	1.35	1.20	1.12	0.99	0.92
40	1.31	1.18	1.09	0.92	0.89
30	1.26	1.13	1.06	0.86	0.85
20	<1.25	<1.12	<1.05	<0.85	<0.84

Muscular Strength Normative Values cont.

Ratings for Men (Full Pushups), based on Age

	20-29	30-39	40-49	50-59	60+
Excellent	> 54	> 44	> 39	> 34	> 29
Good	45-54	35-44	30-39	25-34	20-29
Average	35-44	24-34	20-29	15-24	10-19
Poor	20-34	15-24	12-19	8-14	5-9
Very Poor	< 20	< 15	< 12	< 8	< 5

Ratings for Women (Modified Pushups), based on Age

	20-29	30-39	40-49	50-59	60+
Excellent	>48	>39	>34	>29	>19
Good	34-48	25-39	20-34	15-29	5-19
Average	17-33	12-24	8-19	6-14	3-4
Poor	6-16	4-11	3-7	2-5	1-2
Very Poor	< 6	< 4	< 3	< 2	< 1

AVERAGE PERFORMANCE OF ALL SUBJECTS ON GRIP STRENGTH (POUNDS) - TEST RESULTS												
MEN						Age	Hand	WOMEN				
Mean	SD	SE	Low	High	Mean			SD	SE	Low	High	
121.0	20.6	3.8	91	167	20-24	R	70.4	14.5	2.8	46	95	
104.5	21.8	4.0	71	150		L	61.0	13.1	2.6	33	88	
120.8	23.0	4.4	78	158	25-29	R	74.5	13.9	2.7	48	97	
110.5	16.2	4.4	77	139		L	63.5	12.2	2.4	48	97	
121.8	22.4	4.3	70	170	30-34	R	78.7	19.2	3.8	46	137	
110.4	21.7	4.2	64	145		L	68.0	17.7	3.5	36	115	
119.7	24.0	4.8	76	176	35-39	R	74.1	10.8	2.2	50	99	
112.9	21.7	4.2	73	157		L	66.3	11.7	2.3	49	91	
116.8	20.7	4.1	84	165	40-44	R	70.4	13.5	2.4	38	103	
112.8	18.7	3.7	73	157		L	62.3	13.8	2.5	35	94	
109.9	23.0	4.3	65	155	45-49	R	62.2	15.1	3.0	39	100	
100.8	22.8	4.3	58	160		L	56.0	12.7	2.5	37	83	
113.6	18.1	3.6	79	151	50-54	R	65.8	11.6	2.3	38	87	
101.9	17.0	3.4	70	143		L	57.3	10.7	2.1	35	76	
101.1	28.7	5.8	59	154	55-59	R	57.3	12.5	2.5	33	86	
83.2	23.4	5.1	43	128		L	47.3	11.9	2.4	31	76	
89.7	20.4	4.2	51	137	60-64	R	55.1	10.1	2.0	37	77	
79.8	20.3	4.1	27	118		L	45.7	10.1	2.0	29	66	
91.1	20.6	4.0	56	131	65-69	R	49.6	9.7	1.8	35	74	
76.6	19.8	3.8	43	117		L	41.0	8.2	1.5	29	63	
75.3	21.5	4.2	32	108	70-74	R	49.6	11.7	2.2	33	78	
64.8	18.1	3.7	32	93		L	41.5	10.2	1.9	23	67	
65.7	21.0	4.2	40	135	75 +	R	42.6	11.0	2.2	25	65	
55.0	17.0	3.4	31	119		L	37.6	8.9	1.7	24	61	
104.3	28.3	1.6	32	179	All	R	62.8	17.0	0.96	25	137	
93.1	27.6	1.6	27	160	Subjects	L	53.9	15.7	0.88	23	115	

Basic Resistance Training Recommendations for Health, Fitness and Weight Loss

Using frequency, intensity, time, and type (FITT), the guidelines for resistance training are as follows:

Frequency – 2-3 times a week with a day of rest in between workouts.

Intensity – comfortable pace, moderate intensity

Time –

Outcome	RM	Speed	Rest (Min)	Sets	Freq	Type
Health	8-12	Comfy	2	1-3	2-3	Circuit
Strength	1-6	Slow	3+	2-4	2-3	Set-Rep
Power	8-15	Fast	3+	2-4	2-3	Set-Rep
Body Building	8-15	Slow to Moderate	<1	4+	4-12	Set-Rep
Muscular Endurance	20+	Fast	<1	2-6	3-6	Circuit

Type- circuit training, larger muscle groups

Circuit training is a form of resistance training exercises that combine resistance and aerobic activities resulting in a total body workout. One set of an exercise is performed followed by another set of a different exercise. This process is continued until one set of all required exercises has been completed. The “circuit” of full body exercises is then repeated for a second and third set. Circuit training can be performed at home or at a fitness center, using Therabands, free weights, weight machines, or even random objects found around the house. Circuit training includes exercises that engage the entire body, especially the larger muscle groups of the back, trunk, legs, arms, and shoulders. Such exercises might include back extensions, dumbbell rows, lunges, deadlifts, squats, straight leg raises, tricep curls, bicep curls, overhead press, chest flies, push-ups, sit-ups, and planks.

Once the starting point for resistance training is determined and familiarization with the exercises is established, a progression plan should be created. Start by increasing the number of days a week from 1 to 2 or even 3 times a week. After increasing days, you can then increase the number of sets performed from 1 to 2 or as many as 3 sets, but use the same resistance. Once you are up to 2-3 days/week and 2-3 sets per exercise, slowly progress to increasing the amount of resistance and decreasing the number of sets performed. Use a variation of hard, moderate, and easy weeks to promote adaptations, periodization, rest and recovery.

Resistance Band Exercises

For the **Resistance Band** exercises below, complete 2-3 sets of 12-15 repetitions (or up to 25 repetitions for easier colored bands). You should warm up first with 5-10 minutes of light aerobic exercise and cool down with another 5-10 minutes of gentle exercise, plus some stretching exercises.

Resistance Cord Squats

1. Start by stepping on the cord with both feet shoulder width apart.
2. Hold the cord at shoulder level with both hands. Start into a full squat while holding the band at shoulder height.



3. Return to the starting position and repeat.

Bent Over Rows:

1. Start by placing the cord under one foot and stepping backwards with the other foot.
2. Bend over keeping your back flat and stop at a 45 degree angle.
3. Pull the bands up towards your waist keeping your elbows in close together.
4. Squeeze your shoulder blades together when performing rowing motion.



Alternate Lying Chest Presses:

1. Lie on your back and place the cord under your back and hold the ends with both hands.
2. Start by pressing one arm up towards the ceiling and then return to the starting position.



Repeat with the other arm.

Diagonal Woodchops:

Starting Position: Loop the cord under your left foot and grasp either end. Keep hands together and extend arms down towards left foot.

1. Bring cord up and away in a wood chopping motion.
2. During this motion your feet stay stationary and you rotate at your trunk. Repeat this motion for the desired repetitions and then repeat in the opposite direction.



Triceps Extension :

1. Start by holding the cord in one hand and placing that hand behind your back.
2. Now grab the other end of the band with the arm that is over your head.
3. Extend the top elbow until your arm is fully extended.
4. Return to the starting position and repeat for the prescribed repetitions.



Lunges:

1. Stand with feet hip width apart. Take left leg and step back approximately two feet standing on the ball of the foot. Place cord under front foot and hold the other end with your hands.
2. Start position: Feet should be positioned at a staggered stance with head and back erect and straight in a neutral position.
3. Lower body by bending at right hip and knee until thigh is parallel to floor. Body should follow a straight line down towards the floor.



4. Return to start position.
-

Lateral Rows:

1. Step onto cord with feet hip width apart and knees slightly bent.
2. Start position: Grasp ends with a neutral grip (palms facing each other). Arms should hang down to sides with elbows slightly bent.
3. Raise band to side of body at shoulder height keeping elbows only slightly bent.



4. Return to start position.
-

Biceps Curls:

1. Stand with feet shoulder width apart, knees slightly bent, and at a staggered stance.
2. Step onto middle of tubing with back foot or both feet.
3. Start position: Grasp ends with underhand grip (palms facing forward) with arms hanging down at sides. Elbows should be close to sides.
4. Flex at the elbows and curl band up to approximately shoulder level. Keep elbows close to sides throughout movement.
5. Return to start position.
6. Remember to keep back and head straight in a neutral position throughout movement. Shoulders should be stabilized by squeezing shoulder blades together slightly - only the elbow joint should be moving.



Dumbbell Exercises

Arms

Curls

Sit holding a dumbbell in each hand with arms hanging down and the palms of the hands facing the body.

- Inhale and bend the elbow, rotating the palm up before the forearm reaches horizontal
- Continue by raising the elbows at the end of the movement.

This exercise takes the biceps through its complete range of motion.

Shoulders

Seated dumbbell presses

Sit on a bench, keeping the back straight, and hold dumbbells at shoulder level with an overhand grip (thumbs pointing inward)

- Inhale and extend the arms vertically
- Exhale at the end of the movement

This movement may also be performed standing or alternating the arms. A backrest helps prevent and excessive arch in the back.

Chest

Dumbbell Presses

Lie faceup on a horizontal bench, with feet flat on the ground for stability and elbows bent, holding dumbbells with an overhand grip at chest level:

- Inhale and extend arms vertically while rotating the forearms so that the palms face each other.
- Once the hands face each other, perform an isometric contraction to focus the effort on the sterna head of the pectoralis major.
- Exhale at the end of the movement.

This exercise is similar to the bench press, but with its greater range of motion, it stretches the pectoralis major.

Back

One-arm dumbbell rows

Grasp a barbell with the palm facing in; use the opposite hand and knee on the bench to support the back:

- Inhale and lift the upper arm and elbow as high as possible next to the body with the elbow bent.
- Exhale at the end of the movement.

To maximize the contraction, rotate the torso slightly toward the working side at the end of the row.

Legs

Dumbbell squats

Stand with the feet slightly apart, a dumbbell in each hand and the arms relaxed, looking straight ahead:

- Inhale, slightly arch the back, and bend the knees
- When the thighs reach horizontal, extend the legs to return to the initial position
- Exhale at the end of the effort

There is no point in working with heavy weights. Working with moderate weights in sets of 10 to 15 repetitions provides the best results.

Buttocks

Dumbbell Lunges

Stand with the legs slightly apart and hold a dumbbell in each hand:

- Inhale and take a big step forward, keeping the torso as straight as possible.
- When the forward thigh reaches horizontal or slightly below, use tonic extension to return to normal position.
- Exhale at the end of movement

Because all of the weight is supported by the front leg in the lunge position and the exercise requires a good sense of balance, work with light weight to protect knees.

Adapted from Delavier, Frederic. Strength Training Anatomy. 2nd ed. Paris: Editions Vigot, 2006.

Weight Machine Exercises

Hamstring Curls



1. Lay on your stomach on a hamstring curl machine. During the exercise, keep your hips flush against the bench.
2. Keep your abdominal muscles tight and a natural arch in your spine.
3. Under control, curl the weight up to a 90° angle from the machine.
4. Stop where you feel comfortable (do not let your hip come up) and lower the weight back.
5. Under control, lower the weight, stop just before your knees are straight and reverse the motion back up.

Lat Pulldowns



1. In [correct posture](#), hold the bar at a shoulder width grip.
2. Slightly lean back while keeping your abdominal muscles tight, shoulders back and chest up.
3. Under control, pull the weight down while focusing on bringing your shoulder blades together.
4. Stop just after your elbow joints are in line with your shoulders and reverse the motion back up.
5. Under control, reverse the weight back up, stop just before your elbow joints are straight and reverse the motion back down.

Leg Press



1. In [correct posture](#), sit on a leg press machine. During the exercise, keep your back flush against the back pad.
2. Keep your abdominal muscles tight, knees slightly bent and chest up.
3. Under control, lower the weight while keeping your hips back (your knees should not move above your toes). Your focus should be on splitting the weight between your hip joints and knee joints.
4. Stop where you feel comfortable and push the weight back up.
5. Under control, stop just before your knees are straight and reverse the motion back.

Abdominal Crunch



1. In [correct posture](#), sit on an abdominal machine.
2. Keep your abdominal muscles tight, neck straight and chest up.
3. From your sternum, crunch your weight up and forward. Do not pull from your arms, keep your focus on your abdominal muscles.
4. Your lower back should remain flat on the back pad at all times. Remember, this is an abdominal crunch not a sit up.
5. Under control, lower the weight, stop just before your starting position and reverse the motion back up.

Bicep Curls



1. In [correct posture](#), sit on a bicep machine. During the exercise, keep your back flush against the back pad.
2. Keep your abdominal muscles tight, chest up, and elbows in. Your elbows should remain stable in a fixed position on the pad.
3. Under control, lift the weight directly up while focusing on your bicep muscles.
4. Stop when the weight is 90° from your shoulder joint and reverse the motion back down.
5. Lower the weight down, stopping just before your elbows are straight and reverse

Chest Press



1. In [correct posture](#), sit on a chest press machine. During the exercise, keep your back flush against the back pad.
2. Keep your abdominal muscles tight, shoulders down and chest up.
3. Under control, push the weight out while focusing on bringing your elbows together.
4. Stop just before your elbow joints are straight and reverse the motion back.
5. Under control, lower the weight, stop when your elbow joints are in line with your shoulders and reverse the motion.

Leg Extension



1. In [correct posture](#), sit on a leg extension machine. During the exercise, keep your lower back flush against the back pad.
2. Keep your abdominal muscles tight, knees bent and chest up.
3. Under control, push the weight up while focusing on your legs (your upper body must remain stable through out the exercise).
4. Stop just before your knees are straight and reverse the motion back down.

Seated Row



1. In [correct posture](#), sit on a rowing machine. During the exercise, a natural arch in your spine should be maintained.
2. Keep your abdominal muscles tight, shoulders back and chest up.
3. Under control, pull the weight back while focusing on bringing your shoulder blades together.
4. Stop just after your elbow joints are in line with your shoulders and reverse the motion back.
5. Under control, lower the weight, stop just before your elbow joints are straight and reverse the motion back.

Calf Raise



1. In [correct posture](#), stand on a calf raise machine.
2. Keep your abdominal muscles tight, knees slightly bent and chest up.
3. Under control, lower the weight from your ankle joints.
4. Stop before you are all the way to the bottom and push the weight directly back up.
5. Under control, pause at the top, while keeping your knees slightly bent. Then, reverse the motion back down.

Tricep Pushdowns



1. In correct posture, stand as you hold a bar shoulder width apart.
2. Keep your abdominal muscles tight, chest up, and elbows stable.
3. While keeping your elbows in and stable, under control, lower your weight down.
4. Stop just before your elbows are straight and reverse the motion back up.
5. Stop when your elbows are 90° from the ground and then reverse back up.

Goals

- **Reduce Risk Factors**

- Reduce/modify sedentary behaviors – think of ways you can walk/stand/move while doing your activities for the day.
- Decrease total triglycerides and increase HDL cholesterol – this can be as simple as exchanging animal fats for plant-based fats such as nuts, seeds, and olive oil.

- **Fitness and Strength**

- Increase VO_2 – try bumping your daily step goal up from 8,000 to 10,000 steps.
- Balance! – unfortunately, with balance, you either use it or lose it. Practice simple balance exercises throughout your day increase activity and improve your balance. This can be as simple as standing on one foot while you brush your teeth.
- Incorporate flexibility work – 2-3 days/week, 10-30 seconds per stretch.
- Increase upper body strength – find meaningful activities that use upper body muscles (e.g. gardening, painting, outdoor games, etc.).

- **Other Behavior Changes:**

- Progress slowly – don't be afraid to start small. It is important to maintain and improve your health, but it is just as important to not overdo it.
- Incorporate variety – the last thing we want is for you to lose interest in being active! Make sure you're adding variety of exercise/activities into your schedule to keep things fun and interesting.
- Make it meaningful – The best way to adhere to physical activity is to make the activity meaningful to your life. This could mean planting a garden that you have to take care of, walking yours or your neighbor's dog, or any number of things that add meaning to your activity.

Recommendations for Activity Program – Attaining Goals:

Aerobic exercise:

Frequency: ≥ 5 days/week

Intensity range (HR): 79-95 bpm (RPE): 5-6

Duration range/session: 30-60 min.

Modes: brisk walking; aerobic machines e.g. treadmill, elliptical, cardio-focused rec center classes

Resistance activities:

Frequency: ≥ 2 days/week

Reps: 8-12 Sets: 1-3

Rest: 3-5 min.

Modes: body-weight exercises: pushups, sit-to-stands; gym weight machines; resistance band exercises

Main resistance focus: upper body and balance

Note: Progress slowly when increasing aerobic or resistance exercise program.

Program Planning Sheet Sample Program

Day of the Week	Resistance	Aerobic	Behavior Modification Ideas
Sunday			-Take time to plan meals for the week.
Monday		30 minutes – hike, bike, walk, swim.	-Find an exercise buddy.
Tuesday	Active for Life	30 minutes – hike, bike, walk, swim.	-Take stairs whenever possible.
Wednesday		30 minutes – hike, bike, walk, swim.	-Park farther from store entrances while shopping to > step count.
Thursday	Active for Life	30 minutes – hike, bike, walk, swim.	-Hydrate. Carry a large bottle of water with you at all times.
Friday		30 minutes – hike, bike, walk, swim.	-Don't forget to stretch after exercise.
Saturday	Chest Press 2x8 Seated Row 2x8 Seated Dumbbell Press 2x8 Lat Pulldown 2x8 Dumbbell Curls 2x8 Push-ups 2x5	30 minutes – hike, bike, walk, swim.	-Do something outside that you enjoy.