

Letter to Charles

Dear Charles,

First of all, I want to congratulate you on taking the first step in making major health changes to improve your life. This is not going to be an easy process, but I am confident in your ability of succeed. It is important for you to know that even though we are creating a fitness program for you, we are not a replacement for regular medical care and you should continue to see your doctor regularly. It may seem like all of the screening precautions are unnecessary, but it was imperative that we took accurate baseline data so that we can compare your results and see how much you have progressed. Charles, even though you feel healthy now, your risk for developing disease is quite high as you will see in the "Know Your Numbers" explanation. The good thing is that almost all of your risk can be eliminated through lifestyle modifications such as diet and exercise. Since you started this program, you have already made significant changes and your risk has already started to decrease. I encourage you to keep making these lifestyle changes and as you continue it will get easier to stick to the program. In this program we will continue to increase your exercise as well as encourage you to modify your diet to include more healthy food. I encourage you, Charles, to set both long-term and short-term goals for yourself. These goals give you something to push towards and objectify your results. I want to remind you that this is a lifelong process and will not be completed overnight. It is important that you remember why you have started this program; it is to improve your health!

In the next few pages, I will spend a lot of time explaining your risk for disease and how to target your risk factors for heart disease, stroke, and diabetes. I will also be presenting your current results and designing an exercise protocol to help you succeed and reach your goals.

Charles, I am very excited about working with you and I cannot wait to see how much you progress. Please don't hesitate to ask any questions you may have.

Sincerely,
Clinician

Table of Results

Variable	Your Values	Recommended/Normative Ranges
Height (in)	72.5	-----
Weight (lb)	366.2	-----
BMI (kg/m ²)	49.7	18.5 – 24.9 kg/m ²
Waist Girth (inches)	47.4	≤40
Percent Fat	54.5%	11-21%
Blood Pressure (mmHg)	132/88	<120/80 mmHg
Resting HR (bpm)	81	60-100bpm
Cholesterol (mg/dL)	183	<200
LDL-Cholesterol (mg/dL)	113	<130
HDL-Cholesterol (mg/dL)	42	>40
Triglycerides (mg/dL)	141	<150
Glucose (mg/dL)	94	<100
Treadmill time (mm:sec)	8:49	20:00
Maximal Heart Rate	185	-----
VO ₂ (ml/kg/min)	26.6	43.9
Aerobic fitness Level	Very Poor	Fair
*Hand grip (Kg)	R-48.51 L-38.46	R- 55 L-50.5
Flexibility (in)	9.5	15.75(excellent)
*Sit ups (# in 60 seconds)	8	38

Your Test

Maximum of Push-

Push-up Results:

Number ups You

Performed: 2

Your Fitness Category (based on your age and gender): Needs Improvement

CATEGORY	AGE									
	20-29		30-39		40-49		50-59		60-69	
	M	F	M	F	M	F	M	F	M	F
EXCELLENT	36	30	30	27	25	24	21	21	18	17
VERY GOOD	35	29	29	26	24	23	20	20	17	16
	29	21	22	20	17	15	13	11	11	12
GOOD	28	20	21	19	16	14	12	10	10	11
	22	15	17	13	13	11	10	7	8	5
FAIR	21	14	16	12	12	1	9	6	7	4
	17	10	12	8	10	5	7	2	5	2
NEEDS IMPROVEMENT	16	9	11	7	9	4	6	1	4	1

Your Sit - Up Test Score:

Maximum Number of Curl-ups You Performed: 8

Your Fitness Category (based on your age and gender): Very Poor

RATING	% RANKING	SIT-UPS	SIT-UPS	SIT-UPS	SIT-UPS
		MEN 18-25	MEN 26-35	WOMEN 18-25	WOMEN 26-35
EXCELLENT	100	60	55	55	54
	95	54	50	48	42
	90	50	46	44	40
GOOD	85	48	45	41	37
	80	46	42	38	34
	75	45	41	37	33
ABOVE AVERAGE	70	42	38	36	32
	65	41	37	34	30
	60	40	36	33	29
AVERAGE	55	38	34	32	28
	50	37	33	30	26
	45	36	32	29	25
BELOW AVERAGE	40	34	30	28	24
	35	33	30	26	23
	30	32	29	25	21
POOR	25	30	28	24	20
	20	28	25	22	18
	15	26	24	20	16
VERY POOR	10	24	21	17	12
	5	17	12	10	2
	0	12	6	4	1

Your Trunk-Flexion Results:

Your age: 27

Gender: M or F

Trial 1: 9.5 in (24.1cm) Your Category: Needs Improvement

***This data is presented in centimeters*

CATEGORY	AGE									
	20-29		30-39		40-49		50-59		60-69	
	M	F	M	F	M	F	M	F	M	F
EXCELLENT	40	41	38	41	35	38	35	39	33	35
VERY GOOD	39	40	37	40	34	37	34	38	32	34
	34	37	33	36	29	34	28	33	25	31
GOOD	33	36	32	35	28	33	27	32	24	30
	30	33	28	32	24	30	24	30	20	27
FAIR	29	32	27	31	23	29	23	29	19	26
	25	28	23	27	18	25	16	25	15	23
NEEDS IMPROVEMENT	24	27	22	26	17	24	15	24	14	22

Know Your Numbers Explanation

Explanation of “Know Your Numbers”

“Know you Numbers” is a tool commonly used to identify a person’s risk for developing disease. This tool focuses on the specific lifestyle factors that can be modified to reduce risk for disease. From this summary of your results we can assess your risks for certain diseases including Coronary Heart Disease, Type II Diabetes, and Atherosclerotic Stroke.

Explanation of Coronary Heart Disease

Coronary heart disease is also known as atherosclerosis and can be defined as the narrowing of blood vessels. When the blood vessels get smaller it means that less blood can get through and heart will not get the necessary oxygen it needs which can cause the heart to stop beating. The blood vessels narrow because of the buildup of plaque. Plaque is a fatty, calcium rich substance that gathers on the blood vessel walls. For people who are not health professionals, fat and calcium can sound almost contradictory; people understand that fat is bad

but may think that calcium is good for health. Calcium is for good bone strength, but in terms of heart health, it causes the arteries to get hard which is atherosclerosis. Inside of the plaque is cholesterol; when blood hits the plaque, it can cause the cholesterol core to be exposed and broken which leads to blood clots. The clots also cause the blood vessels to have decreased blood flow which can cause extreme pain or a total blockage. The coronary arteries should be strong and quite flexible, but they are not flexible when plaque builds up. The symptoms of Coronary Heart Disease can be very prevalent or not prevalent at all. Some people do not know they have atherosclerosis until they have a heart attack while other people often have chest pain, also known as angina, shortness of breath, or fatigue. Angina is not just felt in the heart, it can also be experienced as pain in the neck, stomach, upper back, or even in the arm.

Risk Factors for Coronary Heart Disease

Coronary heart disease (CHD) kills more people every year than any other disease including cancer and it is estimated that 14 million people in the United States suffer from some form of CHD. Risk factors for CHD can either be modifiable or non-modifiable. The non-modifiable risk factors, such as age, gender, genetics, and race are things that increase the risk regardless of preventative measures. The risk for CHD increases with age and is higher for males. If an immediate family member had CHD, you are at an increased risk to have it as well. Some races are also at an increased risk, specifically African Americans, Hispanics, Asian Americans, and American Indians. That being said, a 60 year old African American male with a family history of heart disease is at a higher risk than a 20 year old European American woman with no family history of heart disease. There are modifiable risk factors that can be changed in order to decrease risk of CHD such as obesity, diabetes, smoking, high blood pressure, high triglyceride levels, high LDL cholesterol, and physical inactivity.

Targeting Modifiable Risk Factors

Physical activity is one of the easiest changes to make that can have an extraordinary impact of CHD. Moving from a sedentary lifestyle to a physically active lifestyle does not mean that you become physically fit, though that is ideally a goal, but the increase activity has been scientifically shown to decrease risk of all-cause mortality. It is good that you already have a moderate level of physical activity but you should continue to increase your physical activity to at least 30 minutes for most days of the week. The other risk factor that needs to be addressed is blood pressure. Blood pressure is the amount of blood pumped by the heart and the resistance of the blood vessels. Blood pressure is broken down into four categories, normal, pre-hypertensive, hypertensive stage I, and hypertensive stage II. The following chart summarizes the criteria for each blood pressure classification.

Stage	Systolic		Diastolic
Normal	<120 mmHg	and	<80 mmHg
Pre-hypertensive	120-139 mmHg	or	80-89 mmHg
Stage I Hypertension	140-159 mmHg	or	90-99 mmHg
Stage II Hypertension	>160 mmHg	and	>100 mmHg

You are classified as pre-hypertensive right now with a blood pressure of 132/88. Systolic blood pressure is the blood pressure when the heart is contracting. Your systolic blood pressure is right in the middle of the pre-hypertensive blood pressure range. Diastolic blood pressure is the blood pressure when the heart is relaxed. Your diastolic blood pressure is very close to being in the hypertension stage I category which would make your overall blood pressure classification hypertensive stage I. By increasing exercise and decreasing your sodium intake, you can decrease you blood pressure which will decrease your risk for CHD. According to your 7 day

food log, it does not appear that you take in a large amount of sodium which should make lowering your blood pressure easier. Changing your diet is a helpful way to lower blood pressure. A diet called the DASH diet has been shown to lower blood pressure immensely. The chart below summarizes the amounts of each type of food you should take in with the DASH diet.

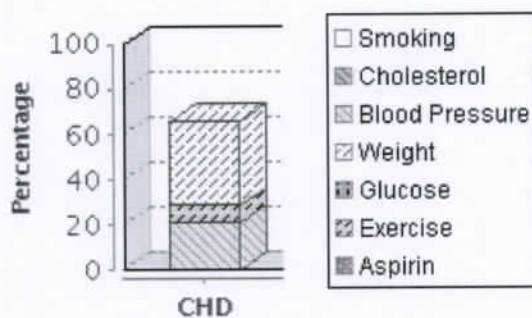
Type of Food	Servings for a 1600-3100 calorie diet	Servings for a 2000 calorie diet
Grains	6-12	7-8
Fruits	4-6	4-5
Vegetables	4-6	4-5
Low fat/Non Fat Dairy	2-4	2-3
Lean meats, Fish/Poultry	1.5-2.5	2 or less
Nuts, Seeds, and Legumes	3-6 per week	4-5 per week
Fats and Sweets	2-4	limited

There are also a number of ways to cut 100 calories per day. While this number may not seem like a lot, that means you cut a total 35,000 calories per year. There are 3,500 calories in one pound of fat, so that means in one year you can lose 10 pounds just by cutting out 100 calories per day. One way you can do this is by eating 5 fewer potato chips and walking for 6 minutes. You could also eat ¼ cups less spaghetti with tomato sauce then walk for 11 minutes. All of the other modifiable risk factors do not apply to you. You do not smoke, your triglyceride levels are within normal range, and both your LDL and HDL cholesterol were normal. Even though your

LDL, HDL, and triglycerides are all normal, it is important to know the healthy ranges for each type of cholesterol. They are explained in the chart below.

Cholesterol type	Optimal level (mg/dL)
Low-Density Lipoproteins (LDL)	<130
High-Density Lipoproteins (HDL)	>40
Total Cholesterol	<200
Triglycerides	<150

Your 5-year risk for developing CHD is only 0.82% but that is because of your age. If you do not make changes, as your age increases, it is highly likely that you will develop CHD. With that being said, you are in the 82 percentile of people your age for developing CHD, meaning that you are worse off than 82% of the population. Of that 82% risk, 66% can be eliminated with the changes that were mentioned above. According to the “Know your Numbers” information, your risk is broken down into three categories: weight, blood pressure, and exercise.



Your modifiable risk could be cut by more than half simply by losing weight. The weight loss would come from exercise and diet which would decrease blood pressure and your modifiable risk factors would be eliminated.

Explanation of Type II Diabetes

Type II Diabetes is a very prevalent disease in the United States affecting nearly 26 million people. Diabetes is caused by the body not responding to insulin to maintain blood glucose. People with diabetes are insulin resistant which means that glucose is not transported into the cell to be stored as energy. Since the glucose is not going into the cell, it is staying in the blood. High blood glucose leads to eye, kidney, nerve, and heart damage. The majority of people who are diagnosed with Type II Diabetes are overweight because fat does not facilitate insulin transporting glucose very well. Diabetes can go without being diagnosed for a long time because it forms slowly over a long period of time. The first symptoms that arise from Type II Diabetes are blurred vision, increase in thirst, increase in urine output, and hunger.

Risk Factors of Type II Diabetes

As with CHD, age and race are non-modifiable risk factors for Type II Diabetes. Everyone over the age of 45 is at an increased risk as well as African Americans, Hispanics, Asian Americans, and American Indians. Family history of Type II Diabetes also is a non-modifiable risk factor. The modifiable risk factors for Type II Diabetes include: excess waist girth, low HDL Cholesterol, high triglycerides, high blood pressure, and physical inactivity.

Targeting Modifiable Risk Factors

Based on your Know Your Numbers sheet, your fasting glucose level is 94mg/dl which is within the normal range of <100 mg/dl. This does not mean however, that you are in the clear for the rest of your life, or even your immediate future unless you make lifestyle changes by targeting your modifiable risk factors. Your five-year risk for developing Type II Diabetes is 15%. That puts you in the 99th percentile for men of your age, meaning that you are worse off than 99% of the population. The good news is that 98% of that risk is modifiable. The best way

to decrease your risk would be decrease your waist girth through exercise. Exercise will not only reduce your weight and waist but will increase your insulin sensitivity. Insulin sensitivity is the amount of insulin it takes to maintain normal blood glucose levels. In untrained individuals, such as yourself, the amount of insulin required to regulate glucose can be up to three times higher than in trained individuals. Moving from a sedentary lifestyle to an active lifestyle will increase your insulin sensitivity two fold. It is important that you keep training once you start because adding weight back on will increase your insulin resistance and increase the likelihood of developing Type II Diabetes. As with CHD, having an elevated blood pressure increases your risk of developing Type II Diabetes. Having an active lifestyle will help to decrease your blood pressure and lower your risk of developing this disease. Overall, by simply continuing to exercise, you will reduce your BMI, waist girth, and blood pressure which will all decrease your risk of Type II Diabetes. The chart below explains how BMI and waist girth are directly related to the development of disease.

	BMI (kg/m ²)	Disease risk for men with a waist circumference >102cm
Underweight	<18.5	-----
Normal	18.5-24.9	-----
Overweight	25.0-29.9	High
Obesity class I	30.0-34.9	Very High
Obesity Class II	35.0-39.9	Very High
Obesity Class III	≥40	Extremely High

As you can see, your BMI of 47.7 kg/m² puts you in the obesity class III category and since your waist girth is 119.4cm, your disease risk is extremely high.

Explanation of Atherosclerotic Stroke

A stroke is any time the brain does not get enough oxygen supply. It can be caused by either a burst blood vessel or when arteries become too narrow and there is a blockage to the brain. An Atherosclerotic stroke is the latter of the two and is caused by Atherosclerosis. As defined when describing CHD, atherosclerosis is the narrowing of the arteries because of a build-up of plaque. Over time with this build-up of plaque, a blockage forms and blood flow to the brain can be obstructed. The brain can only survive a few minutes before the tissue starts to die. When the tissue dies, brain damage occurs and there will be serious side effects such as memory loss, loss of motor function, losing the ability to speak, or even death. Often times, people do not know they are at risk until the stroke has already occurred.

Risk Factors for Atherosclerotic Stroke

The number one risk factor for a stroke is having high blood pressure. Besides high blood pressure, there are other modifiable and non-modifiable risk factors for stroke. Again, the non-modifiable risk factors are age, family history, and race. The risk of stroke increases after the age of 55 and African Americans are more likely to die from a stroke. The modifiable risk factors include: Type II Diabetes, high cholesterol, obesity, and smoking.

Targeting Modifiable Risk Factors

Since the major cause of Atherosclerotic stroke is high blood pressure, you should target ways to lower blood pressure in order to lower your risk. You will be killing three birds with one stone by lowering blood pressure since having high blood pressure is a risk factor for CHD, Type II Diabetes, and Stroke. Right now, your five year risk for having a stroke is 2.9%. While that may seem relatively low, you are actually in the 99th percentile for 27 year old men, which is

very bad. As with diabetes, almost all of your risk can be reduced by targeting your modifiable risk factors. The major risk besides blood pressure that needs to be targeted is weight. It may sound like I'm beating a dead horse, but by decreasing weight by increasing physical activity the health benefits that can be seen are exponential. It is good that your cholesterol is normal and you do not smoke so that you do not have to target as many risk factors but the ones you do have to target are substantial. Overall, in order to make sizable differences in your health, exercise is the key. It won't be easy, but with the motivation that you are showing by simply going through the preliminary stages of this evaluation I know that you will succeed.

Exercise Prescription

When designing an exercise prescription, it is important that there are three different sections: aerobic, muscular strength, and flexibility. While all are important, we are going to focus mostly on the aerobic aspect. Your aerobic capacity was assessed in the Balke treadmill test that you took and that value is called the VO_2 max. When your body goes from resting to being active, the amount of oxygen required must increase. By designing an aerobic exercise prescription we will aim to increase your VO_2 max. Right now, your VO_2 max is quite low and puts you in the 1st percentile. While that might sound bad, it mostly means you have plenty of room to grow! There are many factors that affect VO_2 including age, gender, physical activity, smoking, and diet. We will focus on your physical activity level in order to increase aerobic capacity. By increasing your aerobic capacity you will be able to do more of the things you love such as walking in the Greenville Greenway or playing tennis/racquetball. Below is a guideline for your aerobic exercise. As you progress, the intensity, duration, and frequency are going to be increased as your body adapts to the activity level.

Week	Frequency (times per week)	Intensity (%HRR)	Heart Rate (BPM)	Duration (Minutes)
1	3	30-40	112-122	15-20
2	3-4	30-40	112-122	20-25
3	3-4	30-40	112-122	20-25
4	3-4	40-50	122-133	25-30
5-7	4-5	40-50	122-133	25-30
8-10	4-5	40-50	122-133	30-35
11-12	4-5	50-60	133-143	30-35

In order to have you follow this plan, I would have you walk on a treadmill at a low speed and with a small incline such as 3.0mph with a 1-2% grade. I would like you to monitor your heart rate so that it stays within the range that is in the chart. As this get easier and you move farther into your exercise regimen, you can increase both the speed and the incline while still keeping your heart rate in the correct range. Since you like to walk on the Greenway, I encourage you to keep doing that but maybe walk faster than you are used to. Eventually you can start running since one of your goals is to be able to run without stopping. I know that you have a previous injury to your knee and if pain becomes worse with the increase in impact from running, you can switch to biking which should cause less pain in the knee.

The strength component of the exercise prescription will still be included, but will not be as much of a focus point. The major benefits of increasing muscular strength is that is helps maintain bone mass, improve glucose tolerance, and helps with musculotendinous integrity

which lowers the risk for low back injury and pain. To test your muscular strength and endurance we had you do push-ups and curl-ups. During the push-up test you only performed two push-ups. For your age group, this puts you in the “needs improvement” category. In the curl-up test, you only performed 8 curl-ups, this puts you in the “very poor” category for your age group. It is important that we build muscular strength and endurance so that you can keep performing activities of daily living. You also mentioned that you would eventually like to be able to climb the rock wall in the Student Recreation Center, and building muscular strength and endurance is the way to do that. In order to build this strength and endurance we would have you continue to do curl-ups and other abdominal exercises as well as push-ups. To improve your muscular strength in your abdominal muscles, I would have you start by doing 2-3 sets of 10 curl-ups on 1-2 days per week. As this gets easier (which it will) you should increase the number of curl-ups per set. You should continue to build upper body strength as well by doing push-ups. I would start you off by doing 2-3 sets of 5 push-ups on 1-2 days per week. Again, the number should be increased as it gets easier. If the push-ups are too much strain on your shoulders, you can substitute bicep curls with a dumbbell of a weight that is challenging but you are still able to do 2-3 sets of 8-12 repetitions on 1-2 days per week.

Lastly, the flexibility component is what we will focus on the least. Flexibility helps people perform activities of daily living and prevents loss of range of motion with aging. Since you are young, it is important that you keep up with flexibility now. We measured your flexibility with the sit and reach test and you scored 9.5 inches which puts you in the “needs improvement” category for your age. You can improve this number by stretching after you have warmed up for your workouts. Make sure you hold the stretch between 15-60 seconds and

include your major muscle groups including the hamstrings (the back of the thigh), the quadriceps (the front of the thigh), and the back.

Summary

Charles, I cannot stress enough how glad I am that you are taking the steps to improve your lifestyle. I am confident in your ability to succeed. Make sure you keep up with your exercise plan and really focus on your diet. Remember, it's the little things that make differences such as not snacking or choosing to take the stairs instead of the elevator. Keep in mind that this is going to be a lengthy process that will not happen overnight; this is a concept I like to call delayed gratification. It may be hard now and there will be days that you do not want to get up and go to the gym or eat healthy, but you have to keep in mind the end result. Charles, I am very proud of you already for starting this process, and I am delighted to work with you. Please don't hesitate to contact me with any questions.

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