

HOW TO LIVE LONG AND HEALTHY

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Medicine in the near future will place greater emphasis on preventing diseases. Our goal should be to live very healthy until over 90 then die quickly.

The 4 Horseman - the primary conditions that kill humans as we age: Fortunately for all but cancer, we have excellent screening tools to diagnose them early and good treatments to prevent them from occurring.

1. Cardiovascular and cerebrovascular disease.
2. Neurodegenerative diseases (e.g. Alzheimer's, Parkinson's, Dementias).
3. Insulin resistance and diabetes.
4. Cancer.

Genes versus lifestyle: Your genes account for about 15% of all premature deaths in the United States. Your lifestyle factors such as diet, exercise, sleep, not smoking, etc. account for about 85% of all premature deaths and disability. What is important to know is that even if you inherited a bad gene that predisposes you to diabetes, heart disease, Alzheimer's disease, etc., by having an excellent healthy lifestyle, you can significantly deactivate that gene. More importantly, you can slow the onset of the disease by years or decades. I would much rather develop dementia in my 80's than in my 60's.

Lifestyle versus medicine: The medical community spends an enormous amount of time, money and effort trying to keep people alive and healthy with medications, injections, therapies, surgeries, etc. However, a person's lifestyle is far more important in living a long healthy life compared to what modern medicine offers today. **Current scientific evidence indicates that the most important determinants in living a long and healthy life is to be as physically active as possible, have a nutritious diet (limit sugar and alcohol), not smoke, sleep at least 7 hours per night and have purpose in your life. Unfortunately, physicians receive almost no formalized training in exercise, nutrition and sleep medicine.**

Why are insurance companies against preventative medicine? Because their primary goal is to make money. Most people change jobs every five years, so they have no financial incentive to prevent disease in someone who is going to be insured by their competitor. More importantly, about 60% of the profit insurance companies make is from prescription medications. They own the Pharmacy Benefit Manager (PBM) companies, which are the middlemen that dictate your cost for prescription medication. For example, metformin will cost \$4 cash for a one month supply. If you have insurance, it will cost you a \$10 copay, and your insurance's PBM makes \$6. **Insurance companies make the most money if they have as many people as possible with multiple chronic diseases (which could have been prevented) taking multiple prescription medications.** This is a major reason why we pay 250% more for the same medication compared to the rest of the world. Additionally, physicians (who are reimbursed by the insurance company) are paid significantly more by doing procedures than they are for using their brain and spending time educating the patient to prevent chronic disease from ever occurring. A typical medical recheck appointment requires the physician to review several chronic conditions and review multiple medications in about 15 minutes. **Physicians are financially discouraged from spending time to prevent chronic diseases.**

Insulin resistance: Is a pathologic condition in which cells in the body do not respond normally to insulin. Your body compensates by making more insulin in order to keep your blood sugar level. It is present in about 75% of American adults and is primarily the result of our highly processed high sugar diet and sedentary lifestyle. Insulin resistance is associated

with everything bad: diabetes, hypertension, high cholesterol, belly fat, low testosterone, erectile dysfunction, heart disease, Alzheimer's disease, strokes, and some forms of cancer. Unfortunately, doctors miss about 90% of the cases (until they develop diabetes) and nearly 100% is reversible.

Why is insulin resistance not being diagnosed? Because doctors only check for a fasting glucose and hemoglobin A1c but do not check for a fasting insulin level. By the time the blood sugar is elevated, they have probably had insulin resistance for years and have already suffered some permanent damage. Here is a typical example: A 20-year-old man is in great shape and has a fasting insulin level of 2 (normal is less than 7) and a fasting glucose of 82 (normal is less than 100). His physician checks a fasting glucose level but does not check a fasting insulin level. He tells him he is normal which is correct. At age 30 he has put on a few pounds of stomach fat. His fasting insulin is now 6 and his fasting glucose is 85. Again, he is told he is normal. However, his insulin level has already tripled. This puts him at risk for everything bad. At age 40, he now has high blood pressure and high cholesterol which are being treated. His fasting insulin is now 12 and is fasting glucose is 98. Again, his physician only checks the fasting glucose and not the fasting insulin level, and he tells the patient that he is normal. At this point, he clearly has insulin resistance which was a primary trigger for his high cholesterol and high blood pressure. At age 50, he now has some tingling in his feet (neuropathy) and erectile dysfunction in conjunction with high blood pressure and high cholesterol. Again, his physician orders a fasting glucose which is 102 but he does not obtain a fasting insulin level which is now 20. He now tells the patient to diet and exercise but he does not have diabetes. At age 55 his fasting glucose is now 140 and his hemoglobin A1c is 6.5, so he is finally diagnosed with diabetes. Unfortunately, the patient now has irreparable harm because he has had insulin resistance for over 2 decades.

Diabetes: Type 2 diabetes is almost always preventable, often treatable, and sometimes reversible with diet and lifestyle changes. Carrying excess body fat is the #1 risk factor for type 2 diabetes. 90% of those with diabetes are overweight. Reducing belly fat may be the best way to prevent insulin resistance/prediabetes from turning into full-blown diabetes.

Cardiovascular and cerebrovascular disease: Over 80% of coronary artery disease can be prevented with a healthy diet, exercise, excellent blood pressure (120/80), excellent cholesterol levels, sleeping 7 to 8 hours per night and not smoking.

Lipoprotein (a): if you have a family history of heart disease, consider obtaining a lipoprotein (a) level. The level should be less than 15. If it is elevated, it is very likely that you will develop plaque buildup in your arteries in your 30s and 40s. This will cause heart attacks and strokes, and predispose you to Alzheimer's disease. Unfortunately, this is largely genetic and there is not much you can do to lower this (there are some new very expensive medications called PCSK9 drugs that can help lower this). If your lipoprotein (a) is elevated, you should aggressively treat your lipids so that your apolipoprotein B, LDL and triglycerides are very low and your HDL is very high.

Alzheimer's disease is about 40% preventable and the onset can almost always be delayed: What is good for our hearts is also good for our heads. Clogging of the arteries inside of the brain with atherosclerotic plaque is thought to play a pivotal role in the development of Alzheimer's disease. Aggressively treating risk factors such as high blood pressure, high cholesterol, insulin resistance/diabetes can help prevent Alzheimer's. Some people are now calling Alzheimer's disease diabetes type 3. A low sugar diet, limited alcohol intake, no smoking, regular exercise, getting 7 to 8 hours of sleep per night, vitamin B and omega-3 supplements can all help.

Apolipoprotein E genotype: If you have a family history of Alzheimer's disease, consider obtaining an Apolipoprotein E genotype. This will tell you if you are genetically at risk of developing Alzheimer's disease but also Lewy body dementia and Parkinson's disease. 78% of the population have the E3 variant which has an average risk of developing Alzheimer's. The E2 variant (8% of the population) decreases your risk of developing Alzheimer's and also increases your chance of living to 100 years old. The E4 variant (14%) significantly increases your risk of developing

Alzheimer's and significantly decreases your odds of living to 100. Every person gets 1 of these variants from each parent. If you have 1 copy of the E4 variant, it will triple your risk of getting Alzheimer's disease. About 1.5% of the population is very unlucky and will get the E4 gene from both parents. This will increase your risk of developing Alzheimer's by 10-12 times, and you are more likely to develop dementia in your 50's and 60's. However, if you have excellent lifestyle factors especially blood pressure and cholesterol levels, you can drop your odds of developing Alzheimer's disease from 10-fold down to just twice the risk. Unfortunately, this should be done in your 40s and 50s and maybe 60s. After that, it may be too late as the damage has already been done.

Cancer: Cancer is the second leading cause of death in United States, right behind heart disease. Unfortunately, cancer kills Americans at almost exactly the same rate as it did 50 years ago. **Unlike heart disease, diabetes and Alzheimer's disease it is much more difficult to prevent getting cancer.** There are a few things that you can do. Obesity, especially visceral fat, promotes inflammation which creates an environment to induce cells to become cancerous. Insulin acts as a kind of cancer enabler, accelerating its growth. By aggressively treating people with insulin resistance, prediabetes and diabetes we can help lower the risk of developing many types of cancer. **The key to not dying from cancer is to catch it early before it metastasizes** (spreads to other parts of the body).

The canary in the coal mine: Do we have any hints that we are at risk for developing diabetes, heart disease, Alzheimer's disease etc. Yes, we do.

1. **Belly fat:** From 1980 to 2020 the average American adult has gained 30 pounds (women from 140 pounds to 170 pounds and men from 170 pounds to 200 pounds). Most importantly, most of this excess fat is on their stomach. If you have abdominal fat, you most likely have insulin resistance and you are at high risk of a multitude of medical conditions that will kill you early.
2. **Erectile dysfunction (ED):** This is very common in middle-aged men in the United States and is primarily due to our artery clogging diet. The penile arteries are about half as big as the main coronary arteries in our heart. Since the penile arteries are smaller, they will clog before the coronary arteries. Therefore, you will usually be symptomatic in the penis years before you develop heart symptoms. Men with ED have a 43% increased risk of cardiovascular disease compared to men who do not.

Physical examination:

1. **Look for abdominal/visceral fat.** Your waist circumference should be less than 50% of your height (e.g. a 5 foot 4 inch woman should have waist circumference less than 32 inches). Greater than 40-inch waist circumference in a man and 35 inches in a woman is strongly associated with insulin resistance.
2. **Blood pressure should be less than 130/85.**

Cancer screenings: PSA total and free in men over 50, colonoscopy starting at 40-50, mammograms and Pap smears in women, chest x-ray in smokers.

Laboratory evaluation:

1. **Insulin resistance panel: The most important lab to check is a fasting insulin level. This should be less than 7** (most lab reports will say normal is between 2 and 22, but over 7 is indicative of insulin resistance). Unfortunately, doctors rarely order this test. Also check a hemoglobin A1c which should be less than 5.7 and a fasting glucose which should be less than 100.
2. **Lipid panel:** You want your total cholesterol, triglycerides and LDL to all be below the reference value and your HDL to be above the reference value. Additionally, your triglycerides should not be more than 2 times higher than your HDL.
3. **Apolipoprotein B:** This is one of the most important labs to draw as it is most closely associated with developing atherosclerosis. At a minimum, this should be less than 90 mg/dL (less than 70 mg/dL if high risk of cardiovascular disease).

4. **ALT:** If you are overweight, you should check this as it is the first indication that you are developing nonalcoholic fatty liver disease. It should be less than 40 IU/L.
5. **Homocysteine:** This may be elevated in people who have atherosclerosis (coronary artery disease, dementia). It can be lowered by taking B vitamins and having a healthy lifestyle.
6. **Prostate-specific antigen (PSA):** This should be obtained in any man over 50. You want your PSA total to be less than 2.5 and your percent free PSA to be greater than 20%.
7. **Routine labs:** CBC, basic metabolic profile, thyroid studies.
8. **High risk of coronary artery disease:** C-reactive protein, cardiac troponin, N-terminal pro-B natriuretic peptide, homocysteine.

Laboratory evaluation for genetic testing:

1. **Apolipoprotein E genotype:** For those with a very strong family history of Alzheimer's disease. You want the E2 or the E3 variant. You do not want the E4 variant.
2. **Lipoprotein (a):** Obtain this if there is a very strong family history of early coronary artery disease. You want this to be less than 15 mg/dL.

Procedures to assess health and longevity:

1. **CT heart calcium scan:** For those with a family history of coronary artery disease or other risk factors such as high blood pressure, high cholesterol, insulin resistance, diabetes or erectile dysfunction. This is a great screening tool to pick up early coronary artery disease. Can get this for \$99 at the hospital.
2. **CT angiogram of the coronary arteries:** If you have a high coronary calcium score or a strong family history/risk factors for heart disease, this scan will show a very detailed picture of your coronary arteries to determine your risk of a heart attack. This cost is about \$1000 and is covered by insurance if clinically indicated.
3. **VO2 max:** For measuring your peak physical fitness level. A high number is associated with improved longevity. This is available on your smart watch.
4. **DEXA bone density with muscle and fat scan:** A very detailed look at your bone strength, muscle mass and fat accumulation. This is very helpful for a person who is going to go on a weight loss program to determine how much of their weight loss is secondary to fat or muscle loss. It is the best test available to measure your visceral fat. Our office only charges \$99 for this very detailed test. A regular DEXA bone density test is covered by insurance for postmenopausal women and those at high risk of osteoporosis.
5. **Continuous glucose monitoring:** This is great for those with insulin resistance. It will let you know in real-time how foods affect your blood sugar. Cost is about \$35 for 2-week monitor.
6. **Vascular studies:** Abdominal aortic aneurysm, carotids, lower limbs for \$75 at Lima Memorial.
7. **Resting metabolic rate:** Great for a person who is going on a weight loss program to see how many calories they burn at rest. We charge \$79 for this 15-minute test.
8. **TruDiagnostic:** This is a blood test that looks at your telomeres and your DNA to determine your current biologic age. Cost is \$499.
9. **Smart watch:** These are great at tracking your activity level, sleep and vital signs.
10. **Routine tests:** Mammogram, colonoscopy, Pap smear, breast and testicle self-exam, hearing and vision, STDs, depression, dementia, stool.

Prevention/treatment:

Statins versus hormone replacement therapy: In people with high cholesterol, statins and hormone replacements are both used to prevent atherosclerosis and thus heart attacks and strokes. **Scientific evidence indicates improved mortality if the LDL and triglycerides are low and the HDL is high.** Statins are great at lowering total cholesterol and LDL but only help minimally with lowering triglycerides and increasing HDL. Hormone replacement therapy is good at lowering triglycerides and increasing HDL, but is not good at lowering LDL. Statins can lower testosterone level and worsen insulin resistance/diabetes by 30%. Therefore, in high risk people taking statins, I would also consider prescribing hormone replacement therapy including testosterone.

What is the most important determinant of all-cause mortality? Recent research indicates that **engaging in physical activity is the most important lifestyle behavior for improving all-cause mortality.** Studies show that **having a high VO2 max and strong muscles significantly improves life expectancy** more so than every other lifestyle/medical condition studied including hypertension, diabetes, obesity, hyperlipidemia, smoking, excessive alcohol intake, diet and sleep. A 2024 study in JAMA evaluating over 2 million adults for 12 years revealed 2 very interesting findings: **Exercise is always important at improving mortality but it is more important when we get older.** Additionally, **the more we exercise the lower our risk of death.** A recent study evaluating people between 50 and 80 years of age, simply tracked how much movement they had per day using a smart watch. They then tracked them to see who died in the following years. **The amount of physical activity that they did per day was more important in determining who died compared to every other variable: Age, gender, body mass index, race, educational level, alcohol consumption, smoking, diabetes, heart disease, congestive heart failure, stroke and cancer.**

Recommendations to live long and healthy:

1. **Exercise:** Aim for 5 hours/week. Any amount of physical activity is good but the more the better and the older you are the more important it is. Consider the following:
 - a. **Aerobic exercise** (jogging, biking, swimming, brisk walking) for 60 minutes 3 times per week.
 - b. **Resistance exercises.** Lift weights, whole body including core for 40 minutes 3 times per week.
 - c. **Simply move throughout the day.** Track with a smart watch.
2. **Nutrition:** Healthy low carbohydrate, high-protein diet. Eliminate fructose sweetened drinks (soda and fruit juices) and limit alcohol. For most people, the fewer calories they eat and the more water they drink, the longer and healthier they will live. Most people should double the number of vegetables they eat. Keep BMI under 25. Bowels should move daily.
3. **Sleep:** High quality sleep for at least 7 hours per night.
4. **Emotions/mental/spirituality:** Treat anxiety and depression. Have a positive outlook. You need to have purpose in life and have something that you are passionate about: Family, job, religion, etc.
5. **Bioidentical hormone replacement therapy:** This is most important in women with menopause (estrogen, progesterone, testosterone, DHEA, thyroid) and PCOS (metformin, progesterone, thyroid), and in men with low testosterone/insulin resistance (testosterone, DHEA, thyroid). For people taking a statin, consider also taking testosterone, DHEA, thyroid and metformin.
6. **Medications:** The key is to treat underlying medical conditions early and aggressively. For those with insulin resistance with a fasting insulin level of greater than 7, consider starting Metformin ER 500 mg daily. Blood pressure medications are very important to keep your blood pressure to around 120/80. Statin drugs are very good at lowering your total cholesterol and LDL but they can make your insulin resistance worse and also lower your testosterone levels. Closely monitor fasting insulin and testosterone levels if you are taking a statin. The new GLP-1 receptor agonist medications (Semaglutide, tirzepatide) are very effective for weight loss and should be total game changers in improving health span/lifespan. However, make sure you are lifting weights while taking these medications as they can cause significant muscle as well as fat loss.
7. **Supplements:** Vitamin D3 3000 IUs daily, magnesium 400 mg nightly, omega-3 fatty acids daily, B100 complex for those with elevated homocysteine levels/neuropathy, berberine 500 mg twice daily for those with insulin resistance.
8. **Miscellaneous: Do not smoke.** Limit sunlight. Avoid plastics in your microwave. Immunizations against flu, pneumonia and shingles. Treat medical conditions early.