Introduction:
In 2001, with the encouragement of friends and relatives, I wrote a little summary of findings and thoughts on how to stay healthy. It was revised in 2008 and 2016. This is not meant to replace professional medical advice for therapy. This advice is geared to generally healthy adults and is not directed to people who are ill or under treatment, children, or pregnant women. It is by no means complete or comprehensive. Also, I have not provided the evidence to back up my opinions, but I give an idea of how strong I think the evidence is (*** means near certain, ** means pretty likely, and * means likely, but not really sure), and an occasional explanation. Some things have changed since the earlier editions, and no doubt will change again as new evidence emerges. However, nothing that seemed near certain *** or pretty likely ** in earlier versions seems less certain now. These are the guidelines I try to follow. Feel free to distribute, but if you do, please pass along the whole piece together so my views are not taken out of context. Let me know if something is not clear or you want further information. A wonderful book is available—‘Eat, drink and be healthy’ by my friend and colleague, Walter Willett. The writing is aimed at a mass audience, but the content is accurate.

Smoking ***
Smoking overwhelms almost everything else. Even 1-4 cigarettes per day doubles risk of a heart attack, and about 90% of lung cancers are due to smoking. It contributes to numerous other diseases, causes wrinkles and stinks. E-cigarettes are better but not a good alternative. Quitting smoking has immediate (probably within weeks, and maybe even a day!) health benefits, no matter how long or heavily you smoked. However, it takes decades (if ever) to reach the health level of someone who never smoked. Passive smoking is also harmful.***

Physical Activity***
Regular physical activity of at least moderate intensity is extremely important for health. For nonsmokers, this is the single most important factor, and more important than any particular dietary factor. The health benefits of regular exercise are well established, and extend far beyond reduction in risk of heart disease and stroke.*** Regular exercise is associated with lower risk of cancer at several sites, reduced risk of diabetes, hypertension, and cognitive decline, enables weight control, etc. There is no substitute for physical activity. Exercise and being in shape makes me happy, and running or cycling with friends and family is a great joy. Much of the benefit can be attained with as little as one-half hour per day of vigorous walking at a brisk pace. The pace matters substantially; it is not enough just to take a stroll, but even that is much better than nothing. Any activity is better than none, but one-half hour per day of vigorous walking at a brisk pace should be considered a minimal level. Greater intensity and longer duration provide greater benefit, but with diminishing returns; running marathons confers no benefit over running half-marathons, and may even be harmful for the heart*. Our family does a lot of different activities: running, cycling (on the machine or outside), stair climber, elliptical trainer and swimming. A good exercise bike is steady and smooth enough to allow reading or watch a fun movie. Variety helps maintain interest and to exercise different muscles. If you run predominantly, be sure to have good shoes for cushioning and a wide toe box and try to avoid hard surfaces. Asphalt is better than concrete, but softer surfaces are better and easier on the joints and back*. Weight
bearing exercise has the added benefit of helping the bones. It is good to exercise at least five days a week. Be sure to get enough fluids, especially if you sweat a lot. Some advocate repeated short bouts of high intensity activity over steady activity. Evidence for a long-term benefit of this pattern is lacking, but it may add variety and help sustain interest. I try to incorporate this aspect into my routine.

Besides aerobic activities, it feels good to stretch, but only after you have warmed up – evidence for a health benefit is modest, but I like to do some yoga. Resistance training, like weight lifting, is important**, both for arms and legs. This helps build muscles and bones, which can reduce risk of fractures. Balance and flexibility exercises are good, but besides aerobics, I think strength is the most important. Greater muscle mass slightly improves weight control because muscle burns calories more than fat. And it feels good! Just ten minutes a day makes a big difference. Weight training has a benefit for heart disease and diabetes risk reduction that is independent of other forms of physical activity**. Resistance training is particularly important for those 50 years and older, when muscle mass declines. I strongly advocate a core, back and upper body exercise program to go along with the aerobic exercise, which mainly focuses on leg muscles. To avoid injury, get sound advice on specific exercises and the exact form for weight lifting. Even some machines are prone to cause injury, so be careful. Also, there is a lot of bad advice out there. A weight bench and small set of dumbbells take up little space and can work well.

I find it helps to try to plan for exercise nearly every day. I try to incorporate activity into the regular routine of most days. Beyond the scheduled activity, it is good to work activity into your daily life such as by getting in the habit of taking the stairs when feasible, and walking or cycling. If you have a safe route, commuting by bicycle or by foot is wonderful. If you are waiting in line, you can practice standing on one foot. Many people say they have no time for exercise, but nearly everyone could take a couple brisk 15-minute walks during the day. Even this low level of activity confers substantial benefit. Some people say they are too old, but old people need exercise the most. Exercise is critical, regardless of body weight**

Sleep**

Sleep requirements vary, but most people should aim for 7-8 hours per day. Both long and short durations of sleep are related to adverse health outcomes, though long sleep is more likely a marker of ill health rather than a cause (but it may relate to obesity). People vary in how fast they metabolize caffeine; my sleep noticeably improved after I stopped drinking coffee after noon. Getting into a regular sleep routine helps. Evening exercise and too much alcohol impairs sleep. Avoid screens in the bedroom. Certain wavelengths of light – especially blue light – suppress melatonin production and impair sleep. I downloaded the free computer program f.lux which changes the light on the computer with time of day. I use alarms very rarely, just for early morning flights.

Body Weight***
If you are average weight, you are overweight. There is a lot of misguided discussion that overweight people live longer. This is incorrect. Of course you can be too thin, but smokers tend to be thinner (making leanness look bad for health) and sick people often lose weight and become thinner. In fact, unintended weight loss is usually an ominous sign. When you account for these factors, risk for many diseases goes up pretty steadily with body fatness. Fatness is estimated by the body mass index (BMI) which is weight in kilograms divided by the square of height in meters.
Risk for a variety of conditions starts to increase at BMI levels higher than about 23, and especially at BMI over 25, which defines overweight. Asians have lower cut point for overweight, a BMI of 23. Since the increase in risk is graded, those under BMI of 25 do not need to worry about this too much, but still should try to lose weight to get to a BMI of 23 or so. Nearly everybody over BMI of 25 should make a concerted effort to lose weight.** The optimal BMI level varies according to lean body mass (muscle and bone) so that heavily muscled individuals can have a higher BMI than less muscular individuals and still not be fat. A frail person with thin bones could have a BMI below 25 and still be too fat. The ideal BMI for most is about 19-23. BMI is not as good a predictor of disease risk for those over about 65 because with age, people tend to lose muscle and bone, and gain fat, so that you could be the same BMI as age 20, but have considerably more fat. This is one reason why exercise and resistance training is especially important for older people (as noted above). Another measure of fatness is waist circumference; if waist size has increased since youth, even without weight gain, it reflects increased fatness. Individuals vary according to where they put on weight. Abdominal or central fat tissue is more active metabolically and has more adverse health consequences, but both forms are adverse and of course there is a lot of overlap. The healthy diet I describe and physical activity may improve the fat distribution*. There are many devices to estimate body fatness, but a combination of BMI and waist circumference is good enough for most purposes, and some of those devices are misleading. “Watch your waist, not just your weight” (F. Hu).

Keeping an ideal BMI is especially important for people with diabetes and hypertension, but it is also important to prevent those conditions. Both diabetes and hypertension are extremely common, and both are graded conditions, with a (semi)arbitrary cutoff point of blood sugar or blood pressure. Thus, overweight people tend to be much closer to the cutpoint for these conditions even if they are not (yet) diagnosed. Maintaining ideal BMI is one of the few practical ways to reduce risk of breast cancer after menopause***. Overweight increases risk of lots of problems including heart disease ***, stroke ***, hypertension ***, diabetes *** (about two thirds of diabetes could be prevented through avoidance of overweight) cancer at various sites ***, arthritis ***, etc. Many people underestimate the major adverse impact of overweight on health, especially on risk of cancer and arthritis. It also of course decreases quality of life.

Losing weight is hard. Rapid weight loss schemes can yield dramatic weight losses short term, but nearly everyone regains the weight since the changes are not integrated into the overall diet and lifestyle.** It needs to be a slow process. Avoiding fat in the diet is not very effective. Long term studies show no special benefit of low fat diets for weight reduction.** To the contrary, head to head comparisons generally favor the low carb or especially the moderate fat/Mediterranean style diet over low fat for sustained weight loss. Refined carbohydrates (more on this below) lead to quicker hunger than meals with adequate protein, fat, and minimally refined carbohydrates. Calories in liquid form are less satiating*, and sugar-sweetened beverages promote weight gain***. Also, some data suggest that the sweet taste from artificial sweeteners may habituate people to sweet taste and promote weight gain*. Avoiding sweetened beverages is a good start for a weight loss/weight maintenance diet. I think the best weight loss diet is the same as a healthy diet (Mediterranean style, described briefly below and in more detail in Walter’s book) only eating just a little less. Try to limit portion size, eat on a smaller plate, don’t necessarily clean your plate, and limit seconds (including seconds on wine). Try to eat only when you are actually hungry. Avoid munching on foods while doing other things like watching TV, and pay attention to eating.* It is very hard to lose weight and maintain weight loss without exercise. This is key.** In long-term
weight loss trials, some people lose weight in every tested diet, so you can try different ones to see which healthy dietary pattern tastes best and works for you long term to maintain healthy weight. These differences may in part reflect genetic differences.

Given the difficulty in losing weight, prevention of weight gain is critical, so keep watch and take action before it becomes a major issue. For some, frequent weighing may promote better maintenance of weight loss.* I weigh myself almost daily (!) – it is easier to make small changes than to find that there is, say, a 7-10 lb adjustment to make.

**Diet**

A common error, even among nutrition researchers, is to say that a particular food is “good” or “bad”. Unless people are drastically changing their weight or activity level, they eat approximately a constant amount of calories. Thus, any food with appreciable calories that is added to the diet must be balanced by something removed. Therefore, it does not make sense to ask, for example, is red meat bad? The question has to be, compared to what? Compared to equivalent calories from nuts, yes, unprocessed red meat is bad. Compared to sugar, it’s good. Of course some foods, like processed meats are just bad, regardless of the comparison, and should be avoided. This section on diet is organized by nutrients, but of course we eat foods, not nutrients, so I try to work that in.

- **Fat**

  The “fat is bad” notion is wrong and has caused some serious harm to health. Instead, we should consider types of fat. The most important type to avoid is trans fat*** Most trans fat comes through the industrial process of hydrogenating vegetable oils to make the fat more like a solid and prolong shelf life by destroying the essential highly polyunsaturated fats in the oils that are more prone to go rancid. Another source of trans fat is from fat of ruminant animals (due to the action of bacteria in the gut of cows, pigs, sheep etc) so dairy fat and meat contain a small amount of trans fat. This is not a major concern since it is a small amount quantitatively, and fat from these sources should be limited anyway. Also, the particular forms of trans fat from the bacteria are different from the industrial process of hydrogenation. Trans fat is unique in that it raises LDL (the bad cholesterol) and lowers HDL (the good cholesterol). For the overall cholesterol profile (LDL - HDL ratio), trans fat is about twice as bad as saturated fat*** Its effects on heart disease risk are even worse than one would predict based on the cholesterol effects.*** Packaged foods list trans on the nutritional label, but the labels are a little misleading. A product can be labeled as trans-fat free even though it has up to 0.5 gram of trans fat per serving. If the serving size is small, it can add up. Avoid foods that list “partially hydrogenated vegetable oil” in the ingredient list.*** If the oil is fully hydrogenated, it becomes saturated fat. “Lightly hydrogenated” is not better, and likely worse than heavily hydrogenated oils. Thanks to long overdue regulation, it will likely be essentially eliminated soon from the US, but remains a global problem. I avoid commercial cookies, cakes etc unless I know they are truly trans-free, and even then I usually avoid them.

**Saturated fats** should be limited, but unlike trans, you should not strive to bring the intake to zero (you cannot, anyway). Saturated fats raise LDL cholesterol, which is bad, but this is mitigated because they also raise HDL cholesterol. Hence, the net effect on risk of cardiovascular disease is not as bad as previously believed.*** The main ways that I try to limit saturated fat intake is by minimizing red meat consumption, and limiting dairy fat from milk and cheese. I am not concerned with saturated fat from vegetable sources, or from chicken and fish. So, we eat red meat very rarely (there are other reasons besides saturated fat to reduce red meat intake). The fats in poultry and fish are mainly unsaturated. Some kinds of meat are worse than others. High grade
beef has more marbled fat that is harder to cut out. Processed meats, like salami (my father-in-law, Alvin Blum, used to call these "embalmed meats"), are especially bad. So is bacon (besides being non-kosher!). We use ground turkey to make meatballs. We have only skim milk, and eat cheese only moderately. We have butter a little, but only when the taste really makes a difference. We use butter for baking only occasionally. You can make a fine brownie or pie crust without butter.

**Cholesterol** in the diet raises blood cholesterol levels, but is much less an influence than saturated and trans fat.*** Cholesterol comes solely from animal products. By omitting or curtailing consumption of red meat and dairy fat, you already are controlling the main sources apart from eggs. Eggs used to have a bad reputation, but unless you have a real cholesterol problem (or are diabetic – eggs seem to raise heart disease risk particularly in diabetics), there is no strong reason not to have the equivalent of, say, 1 egg per day. It is not associated with increased risk at that level**. However, as noted before, there are better alternatives – eggs are better than a doughnut, but not as good as steel-cut oats.

**Monounsaturated fat** is the main fat in olive and canola oil. There is no reason to limit intake of monounsaturated fat (except for the calories).** Olive oil seems to have special benefits***. Since my last update, results from the landmark randomized Predimed trial were published, demonstrating remarkable benefits of olive oil, particularly extra-virgin olive oil for several health outcomes. This should be the primary oil for cooking and table use. I recommend two tablespoons per day. Canola also has a lot of mono, and has the advantage of having lots of linolenic acid (see next section) so we use that too (in cooking – it has a higher smoke point), but try to use olive oil as much as we can. Olive oil slathered over a slice of whole grain bread made with seeds and nuts makes a wonderful and satiating breakfast.

Certain **polyunsaturated fats** are essential to the diet, and a large segment of the population is deficient in some key fats, especially linoleic acid.* This comes mainly from soybean and canola oil, and walnuts. People with low levels are more likely to develop heart disease. There is no human evidence to support the myth of harm from fairly high levels of intake of polyunsaturated fat. If you have lots of olive oil and nuts and other healthy fats, there is no reason to seek out additional polys. You can use a variety of vegetable oils depending on type of cooking and taste, but olive should be the first choice.

Besides olive oil, two other sources of fat should be a part of a healthy diet: fish*** and nuts***. Individuals who eat even a modest amount of fish have a lower risk of death from cardiovascular disease (especially sudden death from arrhythmia) than those who hardly ever eat fish. There may be other health benefits from fish (e.g., cognitive function, lower risk of lethal prostate cancer), especially in place of meat, but these are less well established. Therefore, I recommend at least one fish meal per week. There is inconclusive evidence for increasing benefit with eating more fish. In our house, we have fish about two or three times per week. I recommend not eating a lot of smoked or cured fish; some studies have raised the suspicion that these might increase risk of cancer.* I do eat these, but not regularly. Concern about mercury in fish is warranted, especially for pregnant women and children. However, the fears are often exaggerated. I avoid or limit intake (less than once a month) of species with the highest levels of mercury, like shark, swordfish and king mackerel, and to a lesser extent tuna (especially tuna steaks and canned white – the canned ‘light’ which is darker tends to have low levels of mercury) and halibut, but the benefits of fish, for a variety of health outcomes, outweighs the risks. Those who eat no fish at all should take a fish oil supplement.

Individuals who eat nuts are at around 40% lower risk for cardiovascular disease and diabetes. The benefits of nuts were confirmed in the Predimed trial. This partly may be due to the favorable fatty acids in nuts, which contain mostly unsaturated fats and, and the protein (more on that later). The benefit appears to extend to peanuts which are not true nuts, but are nutritionally
very similar. It is not clear which nuts are the healthiest, though walnuts are rich in linolenic acid. The Predimed trial used a combination of walnuts, almonds and hazelnuts. I recommend a handful of nuts every day. Nut butters can also be used. Seeds, like sunflower, are similar to nuts in nutritional content.

**Fruits and Vegetables**
Fruits and vegetables (including legumes - but don’t count potatoes or corn: both are mainly starch) should provide the mainstay of the diet. People who eat lots of fruits and vegetables are at lower risk for a variety of bad health outcomes, mainly cardiovascular disease** but there has been little work on identifying which specific ones are beneficial. For cancer, evidence for the health benefits of fruits and vegetables has been disappointing. One exception is tomato products which have specifically been associated with a lower risk of aggressive prostate cancer.** Lycopene is not well absorbed from raw tomatoes - it is best absorbed as tomato sauce (cooked, and with some olive oil).

Many claims have been made regarding health benefits for a wide range of specific fruits or vegetables, or classes of vegetables. One example is the cruciferous vegetables which include cabbage, broccoli, and cauliflower. Brussels sprouts are also crucifers, but preliminary evidence suggest it may be better to limit these to no more than a couple times per month. Some claim that these have specific anticancer properties; the evidence is suggestive but modest. Green leafy vegetables have been associated with lower risk of fracture* and (especially spinach) macular degeneration.† We tend to favor the dark green varieties for salad, as opposed to, say, iceberg lettuce. Carrots have lots of carotene and those baby carrots make a delicious healthful snack with hummus. Many health claims have been made regarding garlic, but these have not been confirmed and research is lacking.

We eat a variety of fruits, especially apples, citrus, and tropical fruits like mango, papaya and melon. We also like berries. Since the last revision, more evidence has accumulated for the special benefits of berries, especially blueberries*. I recommend a handful of berries most days. Fruit juices are a good source of many nutrients, but from a health view, it is better to eat the whole fruit to also get the fiber. In addition, it is easy to consume lots of calories by drinking fruit juice, so for thirst, it is better to drink water. If you do enjoy drinking juice sometimes, try diluting it with at least equal parts sparkling/still water. Again, be careful to examine the ingredient list. Some fruit drinks have little or no juice, and even the “all juice” blends are not necessarily all good. For example, grape juice has little advantage over sugar water. Good evidence for the highly touted pomegranate juice is also lacking (I don’t drink it).

**Carbohydrates**
The old “fat is bad” fad led to the erroneous conclusion that carbohydrate is good. Unlike fat and protein, carbohydrate is not essential for life. Traditionally, dietary advice has distinguished simple carbohydrates (that is sugar, i.e., mono- and disaccharides) from complex carbohydrate (everything else, but especially starch). This distinction, based on chemical composition, makes no sense physiologically. Starch (like that in potatoes and corn) is very rapidly metabolized to glucose, so physiologically there is little difference between eating starch and eating glucose. A much better classification, though more complicated, is based on the propensity of specific foods to raise blood sugar.

Different carbohydrate-containing foods raise blood sugar to varying degrees, and this depends not
only on the chemical composition, but even more so on the physical form of the food. ** Thus, foods can be classified according to the extent to which they raise blood sugar. This contributes to the overall glycemic load. When you eat a high glycemic load meal, your blood sugar goes up rapidly and this is followed by a sharp rise in insulin. The insulin causes the blood sugar to rapidly be reduced and the reduction may even go below the pre-meal level (and cause hunger again 3-4 hours after eating). This is accompanied by a rise in triglycerides and a decrease in HDL. Both of those are adverse changes in lipids. In contrast, a low glycemic load meal of the same carbohydrate and caloric content will cause a gradual rise in glucose, with only a very small increase in insulin rather than the sharp up and down pattern of the high glycemic meal.

People with a high glycemic diet had about twice the risk of heart disease than those with a low glycemic diet. ** Also, a high glycemic diet was strongly related to risk of diabetes. The key to a low glycemic diet is to minimize consumption of highly refined foods. This is a little complicated. For example, although a potato is unrefined, it has a very high glycemic index. Calorie for calorie, a potato will raise blood sugar even more than table sugar. The reason is that potatoes are mostly starch, which is glucose, whereas table sugar is sucrose, which is glucose and fructose. The fructose component is metabolized more slowly. Another example: quick-cooking oatmeal has a fairly high glycemic index, rolled oats have a medium level, and steel cut oats have a low glycemic index. Although they have the same chemical composition, the difference is in how finely the particles are ground. Less finely ground particles take longer to digest and delay the rise in blood sugar. One would suppose that pasta would be a high glycemic food, but it is not necessarily so. The semolina for pasta is crushed rather than finely ground, so it does not have an especially high glycemic index.

I try to eat whole grains, and a low glycemic diet (except for chocolate – see below) and minimize white flour and sugar. Even some whole wheat bread has fairly high glycemic index if the flour is very finely ground. White rice has a high glycemic index, but basmati rice and parboiled do not because of the differences in structure. We tend to have coarse whole wheat bread, pasta, brown rice, or kasha (buckwheat groats) or bulgur. We also have whole grain crackers and brown rice crackers. We eat potatoes, but infrequently. Among fruits, temperate fruits like apples and pears have a lower glycemic index than tropical fruits like bananas. People often ask that if a high glycemic diet is so bad for you, why was there not more heart disease in traditional China where white rice was the main source of calories? The answer is that the adverse effects of high glycemic diets are much more pronounced in the setting of overweight and sedentary lifestyles. A high glycemic diet has only a modest impact on lean and active individuals. Remember, though, that activity levels in our society, even for those who work out regularly, are much lower than traditional agricultural societies where people did hard manual labor. As lifestyles and nutritional transition changes in China, rates of obesity and diabetes are skyrocketing.

A prevalent myth is that carrots and fruit are high glycemic foods and should be avoided. Not so. The sugars in some of these foods are rapidly absorbed but typically there is not enough sugar in a serving to be of concern, and the nutritional benefits more than counterbalance the glycemic effects.

Part of the health benefit of a low glycemic diet is that it naturally leads to higher intake of whole grain foods and fiber. The benefits of fiber, especially cereal fiber, are independent of the benefits of the low glycemic load. Although fiber does not lower risk of colon cancer, it does lower risk of some bowel conditions, and appears to lower risk (especially fiber from grains) of weight gain,
hypertension, diabetes, and cardiovascular disease. Milling of grains causes loss of other nutrients, so just adding fiber is not the same (though better than nothing). Thus, a diet rich in whole grains provides a variety of health benefits. For packaged products, you have to be careful in reading the ingredient list to be sure you are getting whole grain. Some people try to avoid nearly all carbs to control weight – this is unwise because they lose out on the healthy grain fiber and other good parts of whole grains. Because fiber has a line on the nutrition label, some unscrupulous manufacturers add forms of fiber that are poorly digested and not part of the natural diet, like inulin or cellulose. One should always read the ingredient list as well as the nutrition label. I avoid products with added fiber unless I recognize the source, such as wheat bran, etc.

Sugar: Avoiding sugar sweetened beverages (including “energy” and sports drinks) except rarely as a special treat if you really like it. This includes some drinks that are “all juice” that use white grape juice or apple juice as the sugar instead of sugar or high fructose corn syrup. Many products have more sugar than you might think from reading the ingredients, which are listed in order of amount. Often you will see separate forms of sugar (e.g., sugar, high fructose corn syrup, malt syrup, etc.) that when added together would wind up with sugar as the first or second ingredient.

Evidence for the health benefits of dark chocolate have increased (yay!); small randomized trials show a reduction in blood pressure and improved glucose metabolism*. So, there is no need to avoid chocolate if you like it, as long as you keep the calories in balance. Stick to the good stuff (lots of “chocolate” candy does not have much chocolate) and savor it! Pay attention to each bite. I enjoy a little chocolate nearly every day, but not specifically for health.

Protein
Most Americans do not need to worry about getting enough protein. Moderate protein intake is certainly not harmful, but the sources matter. For example, replacing red meat with fish, poultry, nuts, legumes, low-fat dairy, or whole grains is associated with a lower risk of diabetes and total mortality. Good sources of protein are plant proteins, especially from beans (including tofu) and nuts. Soy is touted as having special health-promoting properties, but solid evidence thus far is modest. I recommend against soy concentrates, as they may contain estrogen-like compounds. Grains also contain protein. For animal protein, we stay mostly with chicken and fish, and very little red meat. We do not eat a lot of cheese because of the saturated fat content. As mentioned above, we also eat eggs occasionally. As compared with an equal amount of calories from carbohydrates, a meal rich in protein will tend to be more satisfying and lead to less hunger a few hours later.

Calcium and Milk and Bones
The “milk mustache” campaign to promote intakes of milk and dairy products for health promotion does not have scientific basis. Lots of milk does not improve bone health. Moreover, there is inconclusive but growing evidence that calcium/dairy products may raise risk of lethal prostate cancer,*** and that dairy products may increase risk of ovarian cancer*. I see no reason to promote milk consumption in adults, either men or women. For women, I favor increased calcium intake from vegetables and supplements, (perhaps 500 mg as a supplement). Even for calcium supplements, the evidence for long term benefits for bone health is sparse. The link between calcium and prostate cancer is not established, but I recommend against calcium supplements for men. However, too little calcium is associated with higher risk of colon cancer**. I drink little milk and eat some cheese and yogurt, but not a lot.
Salt
A high salt diet promotes high blood pressure, calcium excretion and has been linked to gastric cancer, so limiting salt intake is important. Limiting salt intake clearly has a benefit for blood pressure*. I keep a low salt diet and never add salt at the table. This is partly because salt obscures the other tastes of the foods as well as for health reasons. Individuals with high blood pressure should definitely reduce their salt intake. Most salt in the diet is hidden – maybe 10% of total salt intake comes from the salt shaker at the table. There is a huge amount of salt in processed foods including fast food, canned foods (especially soup) and baked goods (including many breads). This is another reason to minimize consumption of these prepared food items. Once you get used to low salt in food, you will notice how much there is in restaurant and processed foods. Lowering salt gradually, as opposed to all at once, may be a good way to decrease intake without noticing it too much. Although it is good to generally keep salt intake low, in the specific short term setting of prolonged exercise or other situations that cause lots of prolonged sweating, you should specifically be sure you are getting some sodium (and potassium too).

Vitamins and Supplements:
The most important point about supplements is how little they rank in importance to health compared to the key elements of avoiding smoking, physical activity, healthy diet and maintaining healthy weight (and moderate alcohol). By taking a multivitamin, one can simply forget about altering the diet to be sure of getting any particular vitamin, and can focus on other aspects of diet, like types of fat, whole grains, fruits and veggies etc. Most people do not get optimal levels of all the vitamins and the multivitamin provides a low cost nutritional insurance. If you eat a healthy diet and take a multivitamin, avoid other fortified foods like Vitamin Water, “health bars” or 100% fortified cold cereals to reduce the chance of having too much (especially too much folate and preformed vitamin A).

Some vitamin D comes from the diet but most is made by exposing skin to sunlight. In Northern latitudes (like Boston) the sunlight in winter is not sufficient to promote vitamin D formation by the skin, so it is good to get it in a supplement. Most Americans have inadequate levels of vitamin D, particularly those with darker skin, the elderly, the overweight, people who are not often outdoors, and those who live in Northern latitudes. The US government recommended “upper limit” for intake is 2,000 IU but this is too low a ceiling. I take a multivitamin containing 2000 IU, and I take an additional 1,000-2,000 IU per day (2000 IU extra in winter months). The optimal dose is still uncertain. Be sure to get the D-3 form, cholecalciferol, not the D-2 ergocalciferol.

Many people do not get enough magnesium or potassium, but the main sources for these should be dietary, and I do not recommend separate supplements. I also recommend against supplements with iron for men and postmenopausal women, as we have no good way to get rid of iron, and it is easy to get too much. Premenopausal women often have iron deficiency, so I recommend a supplement containing iron for menstruating women.

I do not subscribe to the theory that it is okay to take supplements even if there is no good evidence for benefit, as long as there is no harm. I do not recommend taking any other supplements besides the multivitamin and extra vitamin D. Many supplements have not been tested, and some are harmful. Just because a product is “natural” does not mean it is safe. Plants did not evolve with our health in mind, and many contain lots of nasty natural toxins.

Bottom line: I take the Cooper basic without iron that I buy on the internet, one per day. I also take one pill per day of the 1,000 IU vitamin D-3 from Freeda (two in winter), also purchased on internet. I take them with my first sip of morning coffee, so I remember to take them and also avoid double dosing. Disclosure: I know and admire Ken Cooper, but I have no...
I trust the product and know that Dr. Cooper keeps up with the science and adjusts the contents to keep them as close to optimal that current science suggests. I like Freeda because the pills are small and it is a brand I trust. There are many acceptable vitamin products available.

**Coffee and Tea**

Coffee does not raise risk of heart disease or cancer; to the contrary, it appears somewhat beneficial. One adverse effect for many people is on sleep (noted above). There is a possible increase in fracture risk due to increased calcium excretion with the caffeine. If you drink a lot of coffee, you should be sure to get enough calcium. Of course, caffeine can be mildly addictive, causing caffeine withdrawal headaches. In our studies, coffee drinkers were less likely to commit suicide*, get diabetes **, kidney stones**, tinnitus*, or Parkinson's*. The purported health benefits of green tea are not backed by good evidence, but some studies appear to show some promise. There is no health reason to avoid coffee and tea if you like them.

**Artificial colors and flavors**

Possible adverse health effects of these additives (especially the colors) are limited to test tube and animal studies. I generally try to avoid foods with artificial colors and flavors not so much for the health effect as the non-scientific reason that I do not like the idea. There might indeed be adverse health effects we do not know, and these are not balanced by any benefit. The colors and flavors are added either simply for decoration, or to disguise the fact that the real ingredient that might be giving the color or flavor is absent. We generally avoid those products. I also avoid artificial sweetened food or beverages. Although they have no calories, and no specific proven health risks, I speculate they might habituate individuals to sweet taste. Also, they may (speculation here) cause the brain to trigger the same physiologic effects as if you were eating sugar – modest data suggests this effect. But it’s still better than the full sugar versions.

**Alcohol**

Strong evidence supports the health benefits of moderate alcohol consumption for reducing risk of heart disease and ischemic stroke.*** The reduction in risk is substantial, on the order of perhaps 40% reduction, depending on the population. It also lowers risk of diabetes ** and risk of cognitive decline**. The official definition of moderation is one drink per day for women and two for men. The sex difference is both because of differences in body size, and differences in alcohol metabolism. A reasonable prudent level of moderation could extend to somewhat higher levels of intake, such as perhaps two drinks a day for women and three for men. The adverse health effects of excess consumption are well known and well established. One should never drink to the point of intoxication. Slim but growing evidence suggests that repeated bouts of intoxication can cause permanent brain damage.

For moderate consumption, there are no known adverse health effects except a small but real increase in risk of breast cancer***. One drink per day in women increases risk by approximately ten percent. Even in women (but not in young women), the overall risk benefit balance, as reflected in total mortality, strongly supports the benefit side. This is particularly true for women with cardiovascular risk factors.*** For lean women who exercise regularly, have no elevated LDL cholesterol, diabetes or hypertension, and follow the diet I outlined, their risk of heart disease is already extremely low. Therefore, the risk benefit balance might shift toward risk slightly. Overall, I recommend that men over the age of 45 have one or two drinks per day unless
there is a history of alcoholism, or apparent risk of it, or some specific health reason to avoid alcohol consumption. Obviously, this should be done in conjunction with the advice of a health care provider. For women, I think moderate consumption is fine, if you like alcoholic beverages. For women with a history of cardiovascular disease, or cardiovascular risk factors, on the average, the benefit on average will greatly outweigh the risk. It seems likely that, especially for women, even a half drink per day, or one every other day, may have substantial benefit. There is only slight inconclusive evidence to support red wine over other alcoholic beverages for the health benefit.** The main thing is moderation and preferably, consumption with or after meals to slow absorption of alcohol. Frequency of low doses (i.e. one or two drinks on most days) is much more important than the amount. I have a couple glasses of wine nearly every evening with dinner, the occasional beer, and a wee dram of scotch.

**Organic vs. Conventional Food and “The Dirty Dozen”**

In terms of impact on personal and environmental health, organic products tend to be preferable because organic farms do not use synthetic pesticides or antibiotics. Levels of pesticides in most conventional foods are probably safe, but the long-term health effects of many pesticides remain understudied or unknown. In terms of pure nutrient content, organic foods seem no better than conventionally grown foods. Items marked “100% organic” have met USDA guidelines as totally organic. An item simply labeled “organic” is 95% organic using the same standard.

To help determine which foods to consider purchasing organic, the Environmental Working Group, a non-profit organization, regularly reports a “Dirty Dozen” list of fruits and vegetables that contain the highest levels of pesticides based on USDA data. The 2015 list includes (in order): apples, peaches, nectarines, strawberries, grapes, celery, spinach, sweet bell peppers, cucumbers, cherry tomatoes, snap peas (imported), and potatoes. It’s still good to eat these foods (apart from potato) but I favor the organic if possible.

**Kidney Stones**

Kidney stones are not life threatening and a minor health problem, but are common and can be excruciatingly painful. Contrary to popular opinion, dairy products, which contain a lot of calcium (calcium oxalate stones are the most common form) actually decrease the risk. Calcium supplements can increase risk, so it’s better to take them with food. I try to have cheese when I eat spinach (and rhubarb, beets, Swiss Chard – but kale is ok), which has lots of oxalate (the calcium binds the oxalate to lower risk of stones). If you have had a calcium oxalate stone, it is safest to avoid or greatly restrict spinach. The main advice to reduce risk of kidney stones is to drink more fluids, especially if you sweat a lot, to maintain urine output. Water is great, but some fluids are better than others. Tea, coffee, beer, and wine are all even better than water to lower risk, but sugary beverages are worse. **

**Screening**

This is a big and controversial topic, and I give my opinions here in a very brief form. Despite the controversies, I believe the evidence is sufficient to support mammography**, but unfortunately the benefit, though real, is small. Evidence is strong for colonoscopy***, which not only can diagnose early colon cancer, but also prevent colon cancer by identifying and removing precancerous polyps. People with no special risk factors should have their first one around age 50, and if it is clear (no cancer or polyps), then two more at ages 60 and 70 or so. People with polyps should have a colonoscopy more frequently, every 5 years or so. Following the dietary (including
supplements) and activity recommendations here very likely reduces risk of colon cancer so much that the benefits of colonoscopy get smaller, but it is still worthwhile. Cervical cancer screening (Pap smears) is important for sexually active women. After three consecutive negative screens, only periodic (every few years) is enough for monogamous women. Despite the controversy, PSA screening for prostate cancer is worthwhile (almost surely PSA screening caused the recent 40% decline in prostate cancer death in the US), as is self exam of skin for melanoma, especially for those with a family history of the disease or of its precursor, dysplastic nevus. I do not recommend other forms of cancer screening. For heart disease, it is important to get a blood pressure check every year or two (for younger adults, every few years, but with increasing frequency at older ages), fasting glucose, and cholesterol (including total and HDL cholesterol, and fasting triglycerides). A check of intraocular pressure during an eye exam every couple years is important. I do not recommend other screening practices for normal healthy persons. In general, the benefits of screening vary with risk, which is usually highly related to age. Screening is nearly useless when risk is very low, and the benefits diminish or disappear with older ages. For example, men with life expectancy under 15 years should not have PSA testing.

Common medications - statins, aspirin, other analgesics, and anti-hypertensives

You can have a good BMI, exercise, eat a good diet etc. and still have high cholesterol (I do now). Because statins are so safe, and may have other health benefits besides reduction of cardiovascular disease, I have a low threshold for recommending statins, but not unless there is an elevated LDL, or prior diagnosed atherosclerosis, or an unusually high risk for it.

In a change from my previous advice, I now recommend routine aspirin (enteric coated regular aspirin, 325 mg/day), for adults over age 50, mainly for the benefit of reducing cancer mortality. At younger ages, the benefits are small whereas the risks are about the same. Aspirin can cause stomach bleeds and upset stomach. I take it at night when I brush my teeth, so it is after dinner.

Routine chronic use of other analgesics should be avoided unless you need it for pain control. Chronic use of NSAIDS (nonsteroidal anti-inflammatory agents, like ibuprofen) and Tylenol are associated with high blood pressure, and hearing loss, and increases risk of MI. It’s ok to take them every now and then if needed.

It is important to diagnose and treat hypertension early and vigorously to keep blood pressure at a low level. There are many good medications, so if one causes side effects, you can try another. You can have a healthy lifestyle and still have hypertension (I do now) so you need to check for it, and treat it.

Role of genes and family history
Most health conditions have some element of familial predilection, partly genetic and partly due to shared environments (e.g. similar diets etc). The presence or absence of family history is typically accorded far too much importance, by physicians as well as the general public, than the evidence would support. Few conditions are highly inherited. For example, the relatively rare BRCA1 mutation confers a high risk of breast cancer among carriers, but overall genetic factors are estimated to account for no more than about 15% of breast cancer. The estimate is less for heart disease. Thus, family history should not be ignored, but its presence should not induce alarm (or worse, fatalism!) nor its absence, complacency. Healthy diet and lifestyle are generally far more important.
It is likely that many of these guidelines will have different effects among individuals depending on genetic predisposition. At present, I recommend against any routine genetic testing in normal healthy individuals for risk identification. As knowledge grows, I expect this to change.

**Conclusion**

It is difficult to quantify the degree of disease risk reduction that can be achieved by adhering to these guidelines, partly because it depends on the baseline level of risk. In the Nurses’ Health Study, we estimated that about 80% of the heart disease could be avoided by a somewhat less stringent version of these guidelines. However, the estimate was statistically unstable because only 3% of the participants adhered to the guidelines. This risk reduction did not take into account the benefit from rational pharmacologic treatment of hypertension and high cholesterol. (Of course, these drugs cannot compensate for an unhealthy diet and smoking and inactivity.) Similarly, the vast proportion of type 2 diabetes, probably 90%, would be avoided, and most hypertension and colon cancer mortality (colonoscopy alone can more than halve mortality risk from colon cancer). Risk of many other conditions will substantially be reduced, likely including risk of cognitive decline. Breast cancer risk will be only modestly reduced because most of the known risk factors relate to reproductive factors not readily modifiable (lower risk with later menarche, earlier childbirth, more children at a young age).

This is a work in progress, and some of the advice may well turn out to be wrong. I am confident that future research will continue to expand the realm in which prevention can feasibly be applied. This is my chief aim in work. Good physical health is a blessing, but mental and spiritual health are even more important – A small simple start: every morning when you wake up, think of three things you are grateful for (and it’s ok to recycle them!). It might sound hokey, but it works**. Perhaps I will write more about those aspects next time, but for now, pay attention.

**Important!** If you found this information useful, and you feel inclined, my colleagues and I would gratefully welcome donations to The Friends of the Nurses’ Health Study, Channing Division of Network Medicine, 181 Longwood Avenue, Boston, MA 02115. These donations are particularly valuable in our current era of declining public investment in prevention research.

**About the Author**

Meir Stampfer earned his MD at NYU Medical School and Doctor of Public Health (epidemiology) at Harvard School of Public Health (HSPH). He is Professor of Epidemiology and Nutrition at HSPH and Professor of Medicine at Harvard Medical School. He served as Chair of the Department of Epidemiology at HSPH 2000-2007, and is Principal Investigator of the Nurses’ Health Study, the largest (n=121,700) and longest running (now 41 years) study of women’s health with repeated assessments. This study is a source for much of the material described. Dr. Stampfer is also a founding co-investigator for three other large cohorts: Physicians’ Health Study, Health Professionals’ Follow-up Study, and Nurses’ Health Study II. He has been consistently listed among the five most highly cited investigators in clinical medicine for the past 25 years.

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