Arterial Disease Prevention and Treatment

Live Long, Live Well, Age Well

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Third Edition

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C O N T E N T S

LET'S GET STARTED

With the first two editions of this workbook, it has been a pleasure to see many of you undergo testing, take good treatment and overcome the nationwide tendency to let genetics, blood pressure, cholesterol, diabetes and lax habits cause heart attack and stroke.

You responded to Jere Segrest, M.D. PhD: "the challenge for the future is not just to reduce the risk but to approach complete elimination of the risk for coronary artery disease". The science is *so* good these days, we *can* confidently approach "*complete elimination"* of the risk for coronary artery disease. In fact, the few heart attacks I have seen in recent years, have tended to occur in folks who clearly decided against good tests and treatments. **We know the causes and have effective treatment – let's not let bad things happen.**

This workbook puts you in charge of your own outcome by helping you choose specific tests to adequately define the condition of your arteries. **If we find a problem, you are shown what to do about it.**

I wish this meant no more problems for anyone, but we could still get to some people too late in the process or others could elude even excellent efforts to avoid an event. I suppose there will always be plane crashes, heart attacks and strokes, but good work can, thankfully, make them rare.

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Bold boxes like this have been spaced throughout this third edition to give you a "heads up" regarding what matters in the section that follows. It would be helpful right now to leaf through every page of this workbook, reading just these boldest boxes, to get a solid glimpse of where we are headed.

I

“Please Stop Having Those Avoidable Heart Attacks and Strokes.”

Read lightly through page 13 without concern for remembering details. This section gives you a specific vision for figuring out how much or how little artery trouble you are in for and how to mount a vigorous defense that reflects your personal preference.

"Please stop having those avoidable heart attacks and strokes."

Ten Good Thoughts

1. Heart attack and stroke are the most common cause of death and medical disappointment in the United States (men *and* women), affecting about half of us. In selecting you to read this, I am saying you are at risk to be hurt by these avoidable problems.
2. Most cases are avoidable, but occur anyway because physicians and patients fail to succeed in preventing them. *We often get distracted by details that do not matter*.
3. After a heart attack or stroke, almost all doctors, patients, and families say, "I wish we had done more," especially when the patient was too young to die.
4. By giving you this to read, I am plainly stating you need attention to at least one of the six major problems that cause heart attack and stroke:
    a. Family history of heart attack or stroke.
    b. High LDL cholesterol (the bad), high triglycerides (a blood fat associated with arterial disease), or low HDL cholesterol (the good).
    c. Hypertension or possible hypertension (high blood pressure).
    d. Diabetes or metabolic syndrome, glucose intolerance, borderline diabetes, pre-diabetes, syndrome X, impaired fasting glucose or insulin resistance. (These are all similar.)
    e. Tobacco use.
    f. A prior history of heart attack, stroke, ministroke, carotid artery disease, coronary or peripheral vascular disease.
5. Reasons physicians fail to prevent heart disease include: lack of time or knowledge, underestimation of the problem and ineffective communication. This approach is designed to overcome physician failure.
6. Patient reasons for failure are many, but can be summarized by *failure to obtain and follow accurate advice*. This workbook is designed to overcome patient failure.
7. You can obtain accurate advice by reading the material, understanding what we discuss, asking questions to clarify and, if you are uncertain, getting a second opinion from a qualified expert. These are *effective* ways to become well-informed.
8. *Ineffective* ways to become informed likely include well-meaning friends, family, health stores, package inserts, the Internet, personal research, TV doctors, etc. These may help you learn more about the subject but often *decrease* the probability you will get accurate information. You can *fail to obtain and follow accurate advice* because the above sources are *inferior* to a careful history and physical by a doctor who knows the literature and your case and who will show you what to do, based *precisely* on who you are.
9. *Avoidable* sudden death commonly results when inaccurate information is relied upon (e.g. runners who write books and die young, famous baseball pitchers who die or almost die and have emergency bypass surgery, tennis players who need bypass or everyday people who respond to their risk with a single inadequate approach, i.e. diet and exercise alone, pills alone, etc.).
10. The decision to *get and follow accurate advice* is, appropriately, up to your personal preference.

"Where do heart attacks and strokes come from?"

Although diet, exercise and other lifestyle issues matter, **most heart attacks result from *genetic* factors and the failure to identify and effectively deal with them.**

Some well-read people may have the misperception that heart attacks are mostly caused by diet, exercise and lifestyle rather than these genetic factors, perhaps due to several decades of public health education efforts to encourage all of us toward better eating and activity. This is good, smart, public policy, given that such things are fundamental and cheap. Regrettably this has been misperceived as suggesting that heart attack and stroke *primarily* arise from lifestyle.

The next section will accurately identify what, in addition to personal habits, causes heart attack and stroke. This will enable you to develop *self-efficacy* – the ability to be in charge of your own case.

It is time to put you in charge.

As you ask yourself the next seven questions, mentally begin to decide whether you are at **low, intermediate or high risk** of heart attack or stroke. Keep in mind about 50% of people have trouble, I have selected you as a possible candidate and it is not unlikely you may be involved.

1. Are you a male over 45 or female over 55?
2. Do you have a family history of heart attack or stroke?
3. Do you use tobacco?
4. Do you have high LDL cholesterol (the bad), high triglycerides (another type of blood fat associated with arterial disease) or low HDL cholesterol (the good)?
5. Do you have high blood pressure?
6. Do you have diabetes or any of the pre-diabetic syndromes?
7. Do you already have known coronary artery disease, stroke, ministroke, peripheral or carotid artery disease?

If you find your answer to all these questions is "no", then I think you can truly be considered **low risk.**

If, on the other hand, you already have any type of arterial disease, if you simply have diabetes, or if you have a significant accumulation of the other risk factors, then you are likely at **high risk** for heart attack or stroke.

The largest group will be in the **intermediate risk** category; that is to say, they have *some* of these risk factors but not the aforementioned high risk profile.

"Okay, so I have a rough idea of who I am, what do I do about it?"

Low risk people should practice good diet and exercise, enjoy their low risk status, and be periodically re-evaluated.

High risk patients should be appropriately assertive with diet and exercise efforts, as well as with medicine, testing, stents or bypass to diminish risk as much as is practical. High risk individuals will need to take a *lot* of personal initiative if they intend to enjoy a regular life.

With the **intermediate risk** crowd, it is more difficult to know which approach is best, yet not too difficult. We first get more information by doing a C-reactive protein blood test, which is an eighth indicator that, depending on the results, will suggest you belong in the **low, intermediate** or **high risk** category. While this test is not perfect, it is quite good and serves as an eighth piece of information to help in figuring out who you might be. (See pages 89-90 for more about C-reactive protein blood testing.)

A ninth piece of information about intermediate risk persons is gained by undergoing **E**lectron **B**eam **C**omputed **T**omography of the coronary arteries (EBCT/Heartscan). This is a simple x-ray test of the coronary arteries that does not involve an injection, walking, running nor dye. It is done by lying on a table and holding your breath thirty seconds. These x-rays can demonstrate early arterial plaque, a finding which gives you a better idea of whether you are trending toward the **high risk** or **low risk** category. While the EBCT is also not a perfect test, certainly if it shows plaque, we know that you *do* have some plaque and, depending on the amount, it will help guide us regarding diet, exercise, selecting appropriate testing and treatment. (See pages 90-92 for more about EBCT/Heartscan.) In women under age 67 at risk, a different test that measures artery wall thickness might be better. This **C**arotid **I**ntima-**M**edia **T**hickness test (CIMT) is described more on page 92.

"<u>Give me an example.</u>"

A forty-eight year old man comes in for a physical because his wife asks him to, though he feels entirely well, with no chest pain or shortness of breath.

He says his father passed away at age 57 from a heart attack. He does not smoke and has normal blood pressure and blood sugar. He has a normal HDL cholesterol (the good kind) and triglycerides (another blood fat that can be associated with arterial disease).

His LDL cholesterol (the bad kind) is slightly elevated at 150.

Question: In looking at his case, would we consider him to be **low, intermediate** or **high risk**? Answer: because he is a male over 45, has a slightly elevated LDL cholesterol and a family history of coronary artery disease, he is certainly *not* low risk.

On the other hand, he does not have a huge accumulation of risk factors, nor does he have diabetes or known arterial disease, all of which would have put him into the high risk category. Therefore, he is **intermediate risk**.

The most fundamental thing for this man to consider is that he should be practicing good diet and exercise.

The first thing his doctor should do is look to see if the elevated LDL cholesterol meets **National Cholesterol Education Program Guidelines** for treatment with a pill. These guidelines represent consensus expert opinion, and serve as an excellent rule of thumb for who is at enough risk to take a cholesterol lowering pill. (See page 62 for more about the National Cholesterol Education Program Guidelines.)

Using these guidelines, his physician sees that this particular man does *not* meet criteria for automatic treatment. This makes his doctor somewhat *concerned*, given this man has an elevated cholesterol that is not normal and he is nine years away from the age his father died.

His physician knows that the arterial disease that killed the father surely got started *more* than nine years before he died, and withholding treatment from this patient could ultimately prove fatal. In order to get a better idea of his risk, this man elects to have C-reactive protein blood testing. The results classify him once again in the **intermediate risk** category.

This ongoing ambiguity leads to a subsequent EBCT/Heartscan which shows 80 points of calcium, putting him in the top quarter of calcium score for men his age and giving him an approximately 20% ten-year risk of heart attack. The finding of <u>any</u> calcium means coronary artery plaque that can cause heart attack is present, though the lower the score, the less the risk. (A man who had a heart attack last year and survived is also at an approximately 20% ten-year risk of a subsequent heart attack, so this finding of 80 points by EBCT/Heartscan is fairly serious.)

Based on all available information, the doctor advises specific diet and exercise efforts geared toward long term success and advises one baby aspirin per day, as well as Lipitor 40 mg. per day to lower his LDL cholesterol to a new goal of under 70.

To summarize this fairly common scenario, a middle-aged man with **intermediate risk** gathered nine pieces of information about himself and decided what he believes his risk for heart attack or stroke is. Given his risk is fairly significant, he elected to take careful, well thought-out steps to substantially minimize his future risk.

Said a slightly different way, this man has the rough appearance of having the genetic intent to follow in his father's footsteps and is well on his way to taking charge of seeing to it that he does *not* fulfill that genetic destiny.

"<u>So now what does he do?</u>"

Now that he is practicing good diet and exercise, as well as taking his aspirin and Lipitor, which has lowered his LDL to the desired goal of under 70, it is time to undergo a test to determine whether he might have *current* arterial disease to such an extent that diet, exercise, aspirin and medication may not have adequate time to be effective.

To that end, he undergoes nuclear treadmill testing which, in his case, is normal. (See pages 92-94 for more on nuclear treadmill testing.) This means he has a low risk of a coronary event in the next one year, so he certainly does not need to undergo cardiac catheterization which, if it showed the wrong type or location of narrowing, might require balloon angioplasty, stent or even bypass surgery. (See page 96-98 regarding catheterization, angioplasty, stents and bypass.)

<u>Is that all?</u>

Now his doctor says he should have specialized blood testing for traits that could be inherited from his father; these may require more complex treatment than simple diet, exercise, aspirin and Lipitor. These traits include lipoprotein (a) (an inherited blood fat and protein combination),

LDL particle size (there are seven types of LDL particles, rather than just one; you need to have the right kind), HDL subtypes (there are five subtypes and some are better than others). Fortunately, his results are normal and do not require more complicated, combination cholesterol treatment. (Should you ever need these "novel risk factor" blood tests, they are explained more fully on pages 98-101.)

"<u>What about upcoming years?</u>"

One year later, he goes back to his doctor, dieting, exercising, taking his aspirin and Lipitor, and feeling well with no chest discomfort. His doctor advises him to consider repeating the EBCT/ Heartscan to see whether progression of his calcium score has been adequately slowed down. The patient decides to wait another year to do this and, two years after beginning treatment, he finds his score has progressed from 80 points to 97 points of calcium, a 10% *per year* increase in the calcium score.

His doctor informs him this is quite *slow* progression and is associated with about a *thirteen-fold* reduction in heart attack, compared to people who progress at the usual *untreated* rate of 30% or more. This good report is encouragement that his diet, exercise, aspirin, Lipitor and testing efforts are paying off.

Periodic future nuclear treadmills and EBCT/Heartscans will serve as further insurance to monitor whether he is likely succeeding in shifting his genetic destiny to a more desirable, older age.

With so many safeguards in place, it is difficult to envision him slipping up and having a heart attack. **He may well be "approaching complete elimination of the risk for coronary artery disease".**

"<u>I think I get it, but give me another example.</u>"

A fifty-seven year old woman sees her doctor, saying she is somewhat tired and just wants to get a physical. She has no chest pain or shortness of breath.

She does not smoke and her mother, father and siblings have had no heart attack or stroke. Her mother passed away at age 82 from cancer, her father at 81 from a rare blood disease.

She is found to have slightly elevated blood pressure at 148/96 (normal is less than 140/90). Her LDL (bad cholesterol) is normal but her HDL (good cholesterol) is low at 34 (normal is greater than 50 in women, 40 in men) and her triglycerides (a blood fat associated with arterial disease) are elevated at 244 (normal is less than 150). She is overweight and her elevated blood sugar shows she is clearly **diabetic**. This is news to her, though she has not had blood testing in several years.

This woman is already **high risk** because she has diabetes. We know that diabetes, on average, goes through a pre-diabetic stage that is also harmful to arteries, approximately *fifteen years* before the actual diagnosis of diabetes is made. Because she is already **high risk**, a C-reactive protein test might not add a lot more information. (The test will be done but we *know* she will

need *a lot* of treatment, regardless of the results.) An EBCT/Heartscan will help to give a "report card" as to how much arterial plaque she might already have.

Her EBCT/Heartscan shows 411 points, a number which puts her at a 50%, ten-year risk for a coronary event – *far* too dangerous. Given these findings, besides prescribing baby aspirin, her physician advises diet, exercise and **Glucophage** (a diabetes pill) to assist her in not only losing weight but also in helping to control her diabetes.

In addition, she is started on **Tricor** to lower triglycerides and raise HDL, as this class of medicine has been found to decrease coronary events in diabetics.

She is also placed on **Zestril,** 10 mg. per day, in hopes of lowering her blood pressure down to 130/80 in the office, as blood pressure in diabetics needs to be lowered further than in non-diabetic people with high blood pressure.

A subsequent nuclear treadmill suggests she has a narrowed artery on the front of her heart. This results in her undergoing heart catheterization (see page 96 for more on heart catheterization) at which time the cardiologist finds a significant narrowing. A drug-coated stent is placed to remedy the narrowing and hopefully prevent re-narrowing. Thankfully, her narrowing does not result in a heart attack, nor does she require bypass surgery.

From this date forward she will need **very aggressive medical therapy** to include not only diet, exercise, baby aspirin, **Tricor, Glucophage and Zestril**, but also supplementation of omega-3 fatty acids (see page 58) given she has known arterial disease. She might also benefit from a "statin" like **Lipitor**, even if her LDL is not elevated.

A year later her weight has improved, her blood pressure, HDL and triglycerides are also improved, and she sees her cardiologist on an annual basis, all in an effort to keep her from developing further arterial disease that could harm her. She will have periodic repeat nuclear treadmills and, if necessary, heart catheterization. **Several different safeguards will be in place to do everything possible to keep her from heart attack or stroke**.

"So Many Medicines, Isn't There Some Other Way?"

Initially this diabetic patient with heart disease will require a *lot* of medicine and a lot of repeated blood testing; this *is* better than dying. Sometimes with heroic success at getting into shape by diet and exercise, *some* diabetics will be able to quit *some* medicine. It is preferable to not *become* diabetic and, if you do, it is preferable to focus on what you have to do to stay *alive*. Plan to pay the piper with medication, diet and exercise *or* with your life. I am not familiar with a third option.

"Are there other examples?"

There are dozens of combinations that can give one arterial disease. The middle aged man was an example of mostly *inherited* arterial disease, whereas the middle aged woman was an example of arterial disease almost entirely *acquired* by getting out of shape and becoming diabetic, a condition which is rather bad, since it led to her coronary artery disease.

Getting out of shape and therefore becoming diabetic is occurring with increasing frequency nationwide and will probably result in current generations experiencing more, not less, heart attack and stroke than their parents.

One could construct scenarios that involve tobacco use and years of untreated high blood pressure, as well as more ruthless inherited coronary syndromes, etc. These two illustrations serve to outline the value of using *seven pieces of information* to classify yourself as **low, intermediate** or **high risk** and, if you are intermediate risk, using further testing to clarify your status.

With these findings, a roadmap based on good art, science and logic will be constructed by me. If you follow *your* blueprint, you optimize your chances of avoiding common arterial disease.

"I've got to get my psychology in gear."

No one really wants to have arterial disease and no one really wants to become an active participant in the healthcare system. Given we know so many will be disappointed by their arteries before age 80, finding out your risk and applying a measured, appropriate response with vigor can free you from concern about such avoidable trouble.

If you assess your own risk and find it to be **intermediate** or **high**, no doubt this is a bit disappointing.

Perhaps a good way to look at this is: you went to high school with some who have died of cancer or other problems, and some who have already died of heart attack or stroke. If your lot in life is to find out at an early stage that you are in the arterial disease ballgame, it seems reasonable to take a moment to be disappointed, then get over it and get to work.

It is smart to have a great attitude when the time comes to start medicine, increase medicine, or change medicine. Be thankful when it is time to go to the drugstore, get blood drawn, have a test done, etc. These are the things that separate you from a legacy of early tragedy. If there was ever a good time to have developed arterial disease, it is now; there is so much good science that can save your life.

Such enthusiasm will help you past the very normal sense of not really wanting to need to do any of this.

It is a great feeling when months of fine-tuning several different risk factors result in that magic moment when we both realize you have defined and defeated each issue and your future is better and more relaxed for it.

"Just tell me what to do and I'll do it."

Be of good cheer. Success does not depend on bad-tasting food or unsustainable exercise programs, but rather on learning and implementing modern tools that can keep you from heart attack and stroke.

While studies show the effectiveness of diagnostic and treatment approaches to prevent heart attack and stroke, they also show doctors and patients use any *one* of these tools properly about

25% of the time. This means, on average, if you have two or more risk factors, we may get it right less than 10% of the time. You are not average – we intend to get it right *all* the time.

How?

For my part, I have been working for quite some time to assist my patients in achieving optimal outcomes. You may well have been working with me for years in this effort. Once we classify you as **low, intermediate or high risk**, then I will combine conversation and letters to advise what tests and treatments I think are best. **Understand every goal, every test advised, every treatment and read to understand every section of the workbook that applies to you.**

This is how you capture that extra ten to forty years of life or quality of life that may slip away without your good effort. I hope you catch the vision *and* catch the rhythm of assess/fine-tune, assess/fine-tune…until you achieve and maintain your goals.

Why so many changes?

Arterial disease treatment is a changing field where knowledge and "best thinking" are constantly developing. Goals and advice will likely change from time to time with advances. Take such changes in stride and view them as "progress." Keep your eye on the prize and remember that after months of good work, all this will settle down to an *infrequent* item on your "to do" list.

II

A Word About Arterial Plaque and How You Intend To Defeat It (You'll love the next four pages – the good guys win.)

Last section, I proposed you need not concern yourself with details. If you will read the next four pages *carefully* using all of your "study power", you will "get it" in a way that will make knowing what you are doing easy.
It is probably worth reading a second time – especially the picture pages.

A Word About Arterial Plaque and Medication

Imagine how good it is for the inside of your arteries to be smooth. (figure 1, page 17) Blood flows easily and there are no rough spots for platelets to form a clot upon, thereby avoiding the heart attack-causing blockage of blood flow.

Plaque is the deposition of material on the inside of your arteries composed of cholesterol, white blood cells, and inflammatory chemicals like those contained in a skin infection or abscess. (figure 2, page 17)

Now imagine how cholesterol, high blood pressure, poor diet and exercise, tobacco, and diabetes get together and "fertilize" the plaque and cause it to grow. Pretty soon the plaque, due to an increase in this fatty substance and inflammatory condition, can ***rupture*** into the inside of the artery. (figure 3, page 18) The platelets in the blood stream come along and do their job – they adhere to all the "rough stuff" and form a clot, which suddenly makes an artery which was 20% narrowed instantly 100% narrowed and the portion of heart muscle supplied by the artery dies from lack of oxygen. This is a heart attack.

A much more pleasant scenario: though you, like 50% of us, were perhaps put here to have the above problem, instead you **take treatment that counteracts plaque formation** by taking cholesterol out of plaque and decreasing the destructive inflammatory activity of white blood cells and chemicals inside the plaque. (figure 4, page 18) You treat blood pressure, cholesterol and diabetes, quit tobacco and work at good diet and exercise – making your arteries smoother and hopefully delaying problems until a very advanced age, or *reversing* your risk altogether.

What To Do, What To Do?

The tests and treatments I propose to you represent the anti-plaque stance you can take. Begin to think in terms of "cooling off" or ***stabilizing*** inflamed plaque so it will not rupture, rather than the out-dated thinking we used to encourage; i.e., knowing what percent *narrowing* your arteries have. Medicines, good diet, exercise, and quitting tobacco ***stabilize*** inflamed plaque, thereby decreasing plaque *rupture* and heart attack, so we are not so concerned with how *narrow* the arteries might be.

Stable plaque *seldom* ruptures, mostly independent of how narrow the artery is. A narrow artery with **stable** plaque may ***never*** cause a heart attack. On the other hand, *minimally narrowed* arteries *with unstable plaque* routinely rupture and cause heart attack or stroke. Therefore, we will spend our time thinking in terms of **plaque stability,** with less emphasis on narrowing.

Frequently, to stabilize plaque, medication is called for. These medicines are often true modern day miracles, easily and effectively delivering years of extra quality life. Interestingly, medicines primarily designed to lower cholesterol have been found to *also* keep the endothelium (inner lining of the artery, see figure 1) healthy so it will not allow cholesterol and white blood cells to go *inside* the endothelium where plaque is formed. (figure 2) These cholesterol lowering medicines *also* work against the inflammatory chemicals in plaque. Some blood pressure medicines and diabetes pills

also do more than "lower blood pressure" or "treat diabetes" – they keep endothelium healthy. *They too can work against the inflammatory chemicals that promote plaque rupture.*

As you take cholesterol, blood pressure or diabetes medicines, begin to enjoy knowing you are doing *several* good things for your body – not just "lowering cholesterol", "lowering blood pressure" or "lowering blood sugar", etc. but also *stabilizing plaque* in *other* ways as well.

Lifestyle does matter, but lifestyle measures alone are almost never adequate to avoid arterial disease risk.

"<u>Show me pictures.</u>"

In studying the following figures, you may derive pleasant satisfaction in visualizing how you are taming the plaque that could cause a heart attack or stroke or, more subtly, diminish you in other ways that are not as well defined, i.e. no heart attack or stroke, but "memory loss" or just "growing old".

Those who understand these four drawings well will understand arterial disease and, in reading the text, will know precisely how to take charge of their own arterial health.

"<u>Did you say "growing old"? – Not me.</u>"

Though we do not have an excellent scientific explanation as to how arterial disease is also implicated in the process of being sixty-nine and "elderly", opposed to sixty-nine and "vigorous", we certainly have a strong indication that arterial disease plays *some* role.

While roughly 50% of us might have the serious outcome of heart attack or stroke, even more of us may be harmed by arterial disease in the more subtle form of "growing old early". An example involves having multiple "ministrokes" that diminish our memory but do not get counted in the statistics as "heart attack" or "stroke". **To the extent this is avoidable, do not let it happen.** We know treating arterial disease well reduces dementia.

The contents of this workbook probably represent the best modern science has to offer you to live long, live well *and* age well.

III

Medication and Working Well Together

Understanding the next four pages makes your life really easy by helping you get the hang of making tests and refills work for you.

"Are Medications Safe?"

Yes. In twenty-five plus years, my experience with these medicines has been *zero* deaths, *zero* disabilities, *zero* cases of liver failure, a few probable injuries, and hundreds if not thousands of temporary, inconvenient nuisances.

A probable injury occurred when a likely drug rash caused an infection behind the eye that required surgery, thankfully with complete recovery.

Another likely drug effect was experienced by a man on ***two*** cholesterol medications for *severe* arterial disease who experienced substantial muscle weakness that was slow to improve.

Contrast this twenty-five plus years safety record with the *many* untreated patients I have seen die early, *avoidable* deaths from heart attack, suffer a disabling stroke or grow "prematurely old".

"Are Lifestyle Changes Alone Safe?"

No. Lifestyle changes in coronary disease prevention are smart but not usually effective alone. The dead runners who were thin and had great diet and exercise do exist. They really are not flukes, but rather point out how often heart disease is ***genetic***, rather than mainly caused by poor diet, exercise or tobacco habits. Acting otherwise represents a cause of ***avoidable*** early death in the United States.

What About the Nuisance of Taking Medication?

The average experience of someone taking medicine is they *eventually* do not even know they are on it.

As for the nuisance of medication, my perspective is: **no way would I ask you to take something long-term that bothers you. Why would *anyone* want to do that?** Further, the fact is: you will ***not*** continue taking something long term that bothers you so you can work from a perspective of good humor that says, "I am investing in my future quality and quantity of life and, if I encounter some rough spots along the way, I am going to hang in there just like I have over the years when job, family, finances and other troubles came my way".

Most of the time if you *do* have a medicine effect that bothers you, it is *temporary*. **Skipping doses**, **lowering the dose** and the **passage of time** can all be *briefly* employed by you to allow your body to *slowly and eventually* adjust to medicine over a period of a few weeks. We have talked about you being in charge; exercising these limited, flexible options to reach your goals is an important part of your arsenal.

Before reporting a medicine side effect that we already know *might* occur, and then *might* go completely away, it is better to use these techniques to safeguard against harm, yet also fully explore being able to take the first-choice medicine, before we decide to permanently scrap it and move on to the next best choice.

It is a great idea to look in the Medication Index (page 102) as a starting place to learn a little about any medicine you are taking. The more you know your medicine, the more likely you are to do well.

If any one treatment is simply intolerable, it does not make sense to continue it, but **neither does it change the good idea it was to treat in the first place**. A suitable alternative should be patiently sought with determination. Focus on being successful with the next remedy.

Prescriptions – Working Well Together

The easiest approach for both of us is if I write a "90-day, three refills, one-year" prescription for all your medicines. If you mail away such a prescription, insurance will usually provide 90-days, and your timely phone calls to the mail-in pharmacy will keep your refills coming most inexpensively, with no standing in line at a pharmacy.

If the same "90-day, three-refills, one-year" prescription is taken to the local pharmacy, often you will be given a 30-day supply. The pharmacy does this because most insurance plans will only cover thirty days locally and most people do not want to pay cash for the other sixty days.

Regrettably, when your first thirty-day bottle is given, some pharmacies will mark your bottle ***and*** their computer "no refills" even though you presented a legal prescription for **twelve months** of medicine.

You can avoid such aggravation if you keep track of what the prescription I give you says, and ask them to refer to my original prescription if you are ever told that you do not have refills remaining when you *know* you do. Certainly a valid prescription should be fully honored.

Good So Far

Most arterial disease treatment medicine *cannot* be written as a "90-day, three refills, one-year" prescription due to safety or monitoring requirements. Best for you and for me is to write the prescription for as long as possible, allowing plenty of time for needed lab tests, at which you receive the next prescription – written for as long as possible . . .

Though frequent monitoring can be a chore, try to be enthusiastic, as it serves to get your numbers where they belong so you beat the national trend of avoidable heart attack, stroke and premature "old guy syndrome".

"Explain Please"

High blood pressure medicines – most can be written for "90 days, three refills, one-year". An exception is a new prescription for a diuretic (a water pill that can deplete sodium and potassium) which is written for 90-days, no refills with advice to check electrolytes (sodium, potassium, chloride and bicarb) in twenty-eight to fifty-six days, at which time you receive a new prescription – good until your annual exam.

If your case requires more than 25 mg. **HCTZ**, or more than 2.5 mg. **Indapamide**, **Spironolactone,** any **Lasix** or other "strong" diuretics, likely you will get six-month prescriptions and instead need to check electrolytes *twice* a year.

Incidentally, 7:30 – 8:15 AM can be our busiest time since so many are on their way to work. If your schedule allows, you might be better served getting lab *after* 8:15. Fasting lab does not have to be done *early*, just fasting.

Diabetes medicines – **Insulin, Diabeta**, **Glyburide**, **Glipizide** and **Byetta** can be written for one year, but Metformin **(Glucophage)**, **Actos, Avandia** and some others require closer monitoring which we always try to specify clearly to you at the time we draw blood and give prescriptions, etc.

In general, if you take Metformin **(Glucophage)**, plan on a blood test every eight to twelve weeks. If **Actos** or **Avandia**, plan on every two months initially and "periodically" after that. ***Diabetes is so unkind to arteries that such frequency of monitoring is actually very good for your case anyway, so try not to grow weary.***

We will often be looking at your weight, blood pressure, blood sugar and cholesterol in making the adjustments needed to try to keep diabetes from ruining you. Be ***ambitious*** to meet goals in hopes of avoiding heart attack, stroke, or the nasty eye, kidney and foot problems of diabetes.

Cholesterol Medicines – while none of these prescriptions are suitable for one year, six month prescriptions are given once we finally arrive at the dose you belong on long-term. This means over the long run, check blood once a year at your annual physical and drop in one other time six months into the year. When you *start* a new cholesterol medicine we check lab at six weeks, then every six months. If the dose is increased – again in six weeks, then every six months. This is true for all statins **(Lipitor, Zocor, Pravachol, Mevacor**, **Crestor, Lescol and Vytorin)**, fibrates **(Lopid** and **Tricor)**, as well as **Zetia, Welchol,** over-the-counter niacin and prescription **Niaspan**, as well as **Advicor** (which contains **Niaspan**).

Cholesterol medicines usually require some adjusting, so hang in there a little while and you will soon enough be the "once-at-my-annual and drop-in-once-in-six-months" blood donor, all the while confident you are making your contribution toward stable, healthy arteries.

The Next Two Pages

Even if you are not inclined to actually use the next two pages, take a moment to study them with an eye to just how many different ways you and I can do *poor* work together.

The most common problem: **not getting blood testing before medication runs out**. This loses time in achieving goal numbers, causes refill problems and involves some risk of being off medication.

On the bright side: for your convenience I do not ask you to make an appointment to review labs, though you should do just that if you prefer – I enjoy seeing you. This means you can more easily do what needs to be done by dropping by on your *own* schedule and be on your way much faster than with a fixed appointment to see me. When I receive your lab, I will send you a copy and a letter with new advice. Once again, the rhythm is, "adjust/fine-tune, adjust/fine-tune . . ."

In my own imperfect way, I try to always tell you when the next lab checking should take place. In anticipation of me dropping the ball, help the team by studying this text and letters I send you well

enough that you know *yourself* when your medication or condition should be monitored. This is another part of self-efficacy – putting **you** in charge.

Your health outcome will be better if you know your medicines, their doses, when they need refilling, what testing is needed and when. Thank you for your help.

MY MEDICINES

This page could be used to keep track of your medication. It is best to get the information off the actual prescription we give you. (BID = twice daily, TID = three times daily, QID = four times daily, q = every, d = day, h = hour)

Doctor	Medication Name	Size (mg. mcg. etc.)	Instructions	When does refill run out?

TESTS

You might use this page to keep track of the next date you are supposed to drop in without an appointment for lab or a blood pressure check. It can also serve to note your next appointment.

Date of NEXT Lab, Blood Pressure Check, or Appointment

Date	Date	Date

IV

What To Do If You Already Have Arterial Disease

DECLARE WAR AND WIN

If You Already Have Arterial Disease

Any arterial disease is important, even if it was detected subtly and early on an EBCT/Heartscan, CIMT or PET scan. Certainly an abnormal heart catheterization or some other procedure that shows narrowing suggests perhaps even more advanced disease. *Any* plaque on heart catheterization matters as it can rupture and cause heart attack. (figure 3, page 18).

If one has had a stent, balloon angioplasty or bypass procedure, this is *more* serious still and, if you have had a heart attack or stroke, this would be the *most* serious.

Regardless of the severity, once we know you have arterial disease, the most fundamental things to do are practice good diet and exercise, quit tobacco, take aspirin if appropriate and isolate all problems with cholesterol, high blood pressure, diabetes and, if appropriate, novel blood risk factors (see page 98). All of these risk factors should be treated with appropriate medications – we want to plug all the holes. These steps are designed to see to it that you not *progress* in your arterial disease and, hopefully, have *regression* of your plaque.

Study figure 4 on page 18. The goal is to enjoy the rest of your life with confidence, based on good treatment, that you likely have the *stable* plaque shown in figure 4.

An appropriate combination of blood testing, blood pressure checks, weight checks, EBCT/ Heartscan, CIMT, nuclear treadmills, PET scans and heart catheterization will be suggested by me and/or your cardiologist/neurologist and serves to give an idea whether your arterial disease is improving or worsening, which can help us know whether we need to be *more,* or perhaps less, aggressive in our treatment.

Certainly such testing can lead to the somewhat disappointing, *mechanical* phase of protection, which is balloon angioplasty, stenting or bypass. We all hate that it can come to this, but these tools can help you bridge the gap until your diet, exercise and medical regimen have had adequate time to *stabilize* your plaque and diminish your chances of heart attack or stroke. These mechanical tools are also helpful when your disease is so advanced that medical treatment alone may simply be inadequate.

If you have had one of the more severe forms of coronary artery disease, certainly you should have a relationship with a good cardiologist and see him at least once per year so he can re-evaluate your case and suggest any testing that might be appropriate, as well as perform any procedures that might be necessary.

While we will be working very hard to try to make it where you never need the more advanced, mechanical services of the cardiologist or bypass surgeon, we are thankful for these well trained, talented physicians, at the same time hoping they never have to bail you out of an acute situation.

If you have ever had a stroke or even a ministroke, I believe it is similarly a good idea to have a relationship with an expert neurologist and see him once a year to see if he has any ideas in addition to what we will be doing.

Summarize

- If you have known arterial disease, taking the right medications in addition to your good diet, exercise and quitting tobacco efforts serve as the best approach to stabilize plaque and prevent you from progressing.

- Have periodic testing to determine whether your arterial problem is improving or worsening over time so that we can make appropriate adjustments. **Become an *expert* on the contents of Chapter XIII – "Tests"**.

- If you have bad enough disease, then keep an ongoing relationship with a good cardiologist/neurologist in case more drastic measures might be called for.

Relax and enjoy the process. Remember the things we do tend to be effective. We do not have to do *perfect* work, but rather have *some* success in delaying anything dreadful happening for a decade, two or three, in order to have achieved *good* success and a "ripe old age", free from arterial complications.

V

Diabetes: Metabolic Syndrome, Borderline Diabetes, Pre-Diabetes, Syndrome X, Impaired Fasting Glucose, Glucose Intolerance and Insulin Resistance – Different Words to Describe Varying Degrees of the Same Bad Thing

Unless you are old and soon to die anyway, these things will hurt you if you do not learn the subject and beat it.

Why get hurt?

"I have what?"

Look at the name of this chapter. We have come up with *a lot* of different ways to talk about *one* condition because it is such a *bad* thing to have. Do not *fear* diabetes – get *mad* at diabetes – fight it – beat it or it *will* beat you.

By the time we use the label "diabetes" you have usually had a condition that hurts arteries for an average of *fifteen* years. We might not have said *one word* about it before we give you the formal diagnosis of "diabetes".

Better understanding has made us faster to use all the other labels ("Metabolic Syndrome", "Pre-diabetes", "Insulin Resistance", "Glucose Intolerance", "Syndrome X", "Impaired Fasting Glucose" or "Borderline Diabetes"). This is our way of calling you *something* so we know to treat vigorously *before* it gets as bad as "diabetes".

Diabetes

Diabetes and all the pre-diabetic conditions like Metabolic Syndrome are diseases that intend to harm you. Many successfully fight this and avoid early death, disability or pleasure-sapping nuisance.

If *blood sugar* stays poorly controlled we are concerned about limb amputation, blindness, kidney failure and dialysis, as well as hands, feet and other body parts that burn and sting; so we control blood sugar.

With diabetes, the risk of eventually dying from heart attack or stroke rises to ***75%.*** *Current* risk of having a heart attack is the *same* as someone who *just* had one. Therefore, we use a *different* standard and vigor in treating **weight, blood pressure, cholesterol and tobacco use, to combat artery problems.**

> Do ***whatever*** is required: hard work has *remarkable* potential to reward; failure will likely destroy.

Dave

At 42 years of age, Dave's sixty extra pounds and **size 46 waist** are a tribute to his lifestyle since high school: he is busy, likes food and doesn't like exercise.

At his recent physical, his **blood pressure** was up a little at 142/92. His **HDL** (good cholesterol) was a bit low at 38, his **triglycerides** were high at 187 and his **blood sugar** was borderline at 112.

Dave has the "Metabolic Syndrome"

When pre-diabetes or diabetes *causes* blood pressure to rise and low HDL and high triglycerides to appear, this causes artery plaque inflammation, which leads to plaque rupture, heart attack or stroke and, at worst, death. (figures 2 and 3, pages 17&18) This nasty condition is called the "Metabolic Syndrome".

"Define it Please."

The Metabolic Syndrome is when any three of the following five exist:

1) Blood pressure greater than or equal to 130/85.
2) Triglycerides greater than or equal to 150.
3) Fasting sugar (glucose) greater than or equal to 110.
4) HDL (good cholesterol) less than 40 in men, less than 50 in women.
5) Waist circumference greater than 40 inches in men, greater than 35 inches in women.

Dave has all five, but only *three* are required for the diagnosis of Metabolic Syndrome.

Who gets the Metabolic Syndrome?

85% of people with adult onset diabetes (Type II) have this artery destroying problem, as do a lot of people who are trying to *become* diabetic but are not there yet. ("Pre-diabetes", etc. – they have the Metabolic Syndrome.)

Consider this:

- Diabetes is bad because it has the associated Metabolic Syndrome, which hurts arteries.
- When you don't have a diagnosis of diabetes, but see the increase in blood pressure, triglycerides, waist circumference, glucose (sugar), or the decrease in HDL (good cholesterol), you can be quite certain that your body is *trying* to become diabetic and your job is to not let it happen.
- If you are already diabetic and have the Metabolic Syndrome or just have the Metabolic Syndrome due to "pre-diabetes", we must declare war on weight, blood pressure, cholesterol, tobacco and blood sugar.

"How can I fight the Metabolic Syndrome?"

Get into shape. Whether you are already diabetic or just a diabetes wannabe, losing at least one pound a month until you are at ideal body weight *and* exercising are the two things you *must* succeed in doing.

This is so necessary for this life threatening condition that I have outlined, very specifically, *exactly* how to succeed in losing to ideal body weight *and* acquire a lifetime exercise habit in Chapter VI, "*Getting into Shape*". If you are already at ideal body weight and have a lifetime exercise habit, you need no advice from me.

If you do not have both these qualifications, master the chapter and, even after a lifetime of failure, you *will* succeed. No longer entrust your health to *old* ways – they did not work – do it *this* way – it *will* work.

The *Getting into Shape* chapter details 100% of what you need to get into shape and *begin* to fight the Metabolic Syndrome.

What else?

If you are pre-diabetic, besides developing momentum getting into shape (one study showed that with exercise and loss of 7% of body weight, pre-diabetics had a 58% reduction in the onset of diabetes), I may advise you to take Metformin **(Glucophage)**. This pill lowers sugar and, more importantly, *assists* you in your weight loss efforts. (The same study also showed that with Metformin **(Glucophage)** there was a 31% reduction in the onset of diabetes.)

The three together (diet, exercise, Metformin/**Glucophage**) represent the most aggressive approach you can take to spend your life being non-diabetic and not suffer the consequences of the Metabolic Syndrome, which can be present before, during and after the diagnosis of diabetes.

"Back up and explain more about my body."

Normal Physiology: The pancreas gland is a hot dog sized and shaped organ situated just behind the stomach, which produces insulin. When you eat and absorb food into your bloodstream, fats, carbohydrates (bread, rice, pasta, potatoes and sweets) and protein can be converted to glucose (sugar) for your body's cells to use for energy.

This is necessary for life, as glucose being in your bloodstream does your body no good. In order for your body to use the glucose, it must go from the *bloodstream* where it is not needed (but where we actually measure it by drawing your blood) into the *cells* that need it for energy. Under normal circumstances, insulin assists cells in taking glucose in from the bloodstream.

With most Type II diabetics, adults inherit a gene with a tendency toward diabetes, usually combined with weight gain and birthdays, and often have a pancreas initially making *plenty* of insulin.

However, the cells of the body become somewhat *resistant* to that insulin so they do not allow sugar inside and it stays in the bloodstream. Because the pancreas is a computer of sorts, it sees that blood sugar is going up and actually secretes *more and more* insulin.

Early on, there may be no lack of insulin in Type II Diabetes, just an *insensitivity* to it (insulin resistance). This *insensitivity* causes increased blood sugar, and the first treatment is to *lose weight* and *exercise* so the cells become more sensitive to the insulin.

Having said this, there are some Type II diabetics who do not make quite enough insulin. This is especially the case in thin diabetics and those who have had diabetes for a long time. This may also be true for those who experience rapid onset diabetes characterized by a sudden increase in thirst, increased urine volume, visual blurring and "unearned" weight loss. This is why sometimes a Type II diabetic, though referred to as a "non-insulin-dependent-diabetic", can require insulin for optimal treatment.

Do all diabetics have the Metabolic Syndrome that hurts arteries?

No. Some Type I Diabetics (Juvenile Onset, insulin dependent) do not have the Metabolic Syndrome.

Furthermore, 15% of Type II (Adult Onset) diabetics do not have the Metabolic Syndrome, are often thin, often needed insulin relatively early in the course of their diabetes, or their pancreas was destroyed by pancreatitis or an immune reaction against their pancreas and they may *not* have the Metabolic Syndrome. In reality these people have a different disease than the common Type II, Adult Onset Diabetes that is accompanied by the Metabolic Syndrome, and that this chapter is most appropriately devoted to, since the Metabolic Syndrome is mostly what hurts the arteries.

A diabetic without the Metabolic Syndrome may not have *so* much arterial risk, but as a human they are still at significant risk, as *all* of us are.

Diagnosing Diabetes

Normal, fasting blood sugar is less than 100. When fasting blood sugar is greater than 125 or greater than 200, two hours after a 75 gram glucose orange drink that we might give you, we make the formal diagnosis of "diabetes".

Often blood sugars just less than these numbers, although not called "diabetic", are *not* normal and signal the upcoming probability of diabetes, as well as the *current* likelihood of the artery harming "Metabolic Syndrome".

"Tell me some things I can forget."

You don't need to remember this, but be aware that perhaps the earliest testing manifestation of you trying to become diabetic is an elevated blood level of **fasting insulin.**

The next most likely occurrence would not be an elevated *fasting* blood sugar but rather a blood sugar **two hours after 75 grams of glucose that is greater than 140.**

The next likely hint you are trying to become diabetic would be a **fasting glucose** greater than 100 but still not up to the 125 level where we diagnose diabetes.

The order in which these three tests will become abnormal is somewhat predictable, as outlined. At some time in the process, HDL going lower, triglycerides going higher, blood pressure going up and the rising of a test that is a three-month average of your sugar, called the **Hemoglobin A1c,** all occur in a more unpredictable fashion, but will serve as extra hints to me that you *are* or *are not* headed to the Metabolic Syndrome/Diabetes, which hurts arteries and needs our attention.

I wouldn't bother to try to remember any of the above; I have included the information to give you the perspective that I use a lot of different tools to have an *accurate* idea of who you are and how much attention you might need.

Summarize so far.

So far all we have really said is there are lots of ways to determine you are headed toward diabetes and I will hopefully be telling you *early* in the process – that is my job.

Respond to such a diagnosis with determination to make it go away or control it well if "making it go away" is not possible. S*tudy* figure 4, page 18, and be determined you will do whatever is called for to convert any heart attack-causing arterial plaque you might have to this, the more desirable, *stable* plaque.

Those who succeed enjoy a normal life; those who fail get referred to as, "you know, the guy with the diabetes – it was a shame what happened to him".

The Treatment

If diet, exercise and weight loss fail, there is a preferred order of medication types. Medicine is an ineffective substitute for diet, exercise and weight loss. Metformin **(Glucophage)** breaks the cycle of insulin resistance, which was making weight loss difficult and now *promotes* some weight loss. It is the preferred, first choice for anyone with *any* weight to lose because it likely helps reduce coronary artery disease in diabetics.

Metformin **(Glucophage)** should not be used by anyone with poor kidney or liver function, congestive heart failure, men who drink more than ten servings of alcohol per week nor women more than seven servings per week. You should not take it 24-hours before, during or after any x-ray tests using contrast dye, or when you feel sick or have surgery.

The common side effect of Metformin **(Glucophage)** is intestinal upset. Since this medicine is the first choice, you should take the first dose with supper, skip doses later on if you must, go slowly in increasing the dose and even put up with some side effects at first, in a strong effort to tolerate this good medicine.

Almost everyone can eventually take Metformin **(Glucophage)** without side effects. Never forget the damage diabetes/Metabolic Syndrome causes; be prudently tenacious and clever with medication and be successful. If you are still not successful taking Metformin **(Glucophage),** then come see me for a second best approach.

Rosiglitazone **(Avandia)** or Pioglitazone **(Actos)**: These are the next choice of medicine that are often added to **Glucophage**. They make the cells more sensitive to the action of insulin, again a very desirable effect. They also have favorable effects on the cholesterol profile and fight to stabilize plaque. (figure 4, page 18)

Rosiglitazone **(Avandia)** or Pioglitazone **(Actos)** are usually well tolerated but should not be taken by anyone with liver disease or diminished liver function, those who take in more alcohol per week than stated for **Glucophage,** nor should they be used by anyone with congestive heart failure. At first, blood testing every two months is *mandatory*.

Avandia or **Actos** often cause fluid retention and some *real weight gain* as well. This weight gain is typically subcutaneous fat (under the skin) which is not as harmful to arteries as the *organ fat* that

these medicines can actually help diminish. Fight this tendency to weight gain with good diet and exercise.

Even though they are favorable for your arteries and your diabetes, the weight gain is what keeps them from being the *first* choice in my mind, though in truth, they may be metabolically somewhat *better* than **Glucophage.**

See what we are doing? Our first choice is diet, exercise and weight loss to control the problem and if that doesn't work, then we still hold onto the desire for diet, exercise and weight loss to get it by adding **Glucophage**, which will assist in weight loss and is somewhat metabolically favorable. We are trying to avoid treatments that may give you long-term weight gain.

This is a great goal, but if we get going too late in the process, or you fail to lose weight or have the wrong type of diabetes, then you have to move up the food chain to medicines that have the *net* effect of being good for you, but the downside of things like making weight loss more difficult, instead of less difficult.

If I give you the diagnosis of early Metabolic Syndrome, the notion of eventually needing less desirable medication should serve as *huge* incentive to "nip the Metabolic Syndrome in the bud."

More pills

Next-choice diabetes medicine includes Glyburide **(Diabeta, Micronase)**, Glipizide **(Glucotrol XL)** and Glimepiride **(Amaryl).** These are used to stimulate your pancreas to secrete more insulin. We know the increased insulin secretion makes weight loss more difficult. We would much prefer that diet, exercise and **Glucophage** be successful by themselves.

Thin diabetics, those with inadequate insulin production and those who are not losing weight "fast enough" can require these pills to avoid dialysis, blindness, neuropathy and amputation, so we use them often. **To decrease heart attack and stroke, we must treat cholesterol, blood pressure and tobacco vigorously.**

I Hear Injections Hurt?

A new, easy-to-use injection can promote weight loss and make blood sugar better. (Kind of takes the sting out of an injection.) This diabetes treatment does not require finger-stick monitoring and is not prone to make sugar go too low. The *same dose* is given before breakfast and supper.

This injection, called Exenatide (**Byetta**), was approved in 2005, so, as of this writing, is still "new", calling only for *cautious* excitement. Because it lowers sugar, usually without weight gain, (promotes weight loss?) and is very easy to use (same dose every time and no finger-stick monitoring) it likely represents a true breakthrough for many, though only more time will tell.

Most of the time this medicine will be used with Metformin **(Glucophage)** and represents our best "last chance" for diet and exercise to make the disease go away before having to use less desirable,

but necessary, medicines that can promote weight *gain*, while lowering sugar. Though Byetta tends to suppress appetite, you can still overeat and gain, so think of it as a weight loss *tool*.

Because the medicine can initially cause nausea that usually goes away with time, I suggest you start using it less than fifteen minutes before your evening meal, and skip doses as needed until well tolerated. After that, you could be more flexible, taking it as much as one hour before the meal and *only then* expand to twice a day as the label will say.

Eventually, the first meal of the day is when the first shot should be given and it needs to be separated by at least six hours before the next injection, which, typically, would be given with the evening meal.

One more great treatment

Insulin injection is another option and sometimes should be used *early* to gain good control if your sugar is rather high, as "glucose toxicity" can make diet, exercise and other efforts *ineffective* until we bring your sugar down into a close to normal range, at which time other efforts begin to work better.

It is *not* the truth that if you go onto insulin injections you must wind up "stuck on them for life". It is possible we could use insulin early to gain excellent control and then, as you have success at diet, exercise and pills, we get you off and this will have been a superior approach, as we have the *theory* that the longer you are diabetic, the *less* the chances of your condition being reversible. Therefore, we want to gain excellent control quickly, begin diet, exercise and **Glucophage**, then try to get rid of other diabetes treatments in hopes you have a condition that, if treated early and vigorously, will be reversible.

This is an excellent *theory,* embraced by some very bright people, but I don't want to give the wrong impression we have excellent proof it is true, nor the wrong impression that there are not people out there who do everything right but still progress to diabetes that ultimately needs lifetime insulin treatment.

This *hope* has a sound theoretical basis, even if we ultimately are not successful in keeping you from being a "full blown" diabetic.

Perhaps the best support for this hopeful theory that you can become "nondiabetic" comes from studying diabetics who had weight loss surgery and lost *a lot* of weight quickly. **83% of such people became non-diabetic. Wow!** No doubt some in the 17% group of persistent diabetics had the type of diabetes not *caused* by weight in the first place, and perhaps some had just been diabetic "too long".

Time to Avoid a Heart Attack

Beyond getting your blood sugar adequately controlled to avoid *non-cardiac* complications, (vision, kidneys and limbs) we must be very attentive to coronary disease. Getting into shape and heart healthy eating are the first steps.

You should be on one coated **baby aspirin** per day (e.g. **Ecotrin** 81 mg.) unless you are on Warfarin **(Coumadin),** allergic to aspirin, have gastrointestinal bleeding or other reasons not to take aspirin.

Next, unless we already know you have coronary artery disease some other way, you should have an **EBCT/Heartscan** done. Schedule and have it done and contact me for results and significance if you have not received a letter from me two weeks after the test was done. See pages 90-92 for more about the **EBCT/Heartscan**.

Next, your **cholesterol and blood pressure** must be *ruthlessly* dealt with. As a diabetic, you must shed the usual reluctance for pills and aggressive treatment if you plan to do well. Someday when you get into great shape and shed those pounds, you may be able to shed some pills as well.

We want to get your blood pressure to less than or equal to 130/80. It can be a smart idea for you to be on certain types of blood pressure pills, even if your blood pressure is normal or barely abnormal, as these medications are good at ***stabilizing arterial plaque***, as well as avoiding kidney dialysis, even if you don't have high blood pressure.

Lastly, smoking is something non-diabetics do. The combination is horrible – master the "Quitting Tobacco" chapter and quit.

Monitoring

Monitoring for Type II Diabetes must be simple to not interfere needlessly with your life. A *random* blood sugar done after eating or a *fasting* blood sugar gives a momentary snapshot of how you are doing. If we are going to get a view of how you are *truly* doing over a period of time, and how high your blood sugar has been on *average*, the **Hemoglobin A1c,** done as a blood draw in the office, is best utilized. Think of the Hemoglobin A1c as a blood test of your *average sugar*, every minute of every day, for the last three months.

Good blood sugar control is defined nationally as a three-month average Hemoglobin A1c less than or equal to 7.0 or 6.5, depending on which organization you listen to. In most instances **we** will insist on a **Hemoglobin A1c** of less than or equal to 5.7, which is *normal*.

We consider anything over 8.0 terrible. In view of the fact most Type II diabetics are not prone to becoming hypoglycemic (low blood sugar) and our treatments are designed to have a slow effect over time, it is logical strategy to check your A1c every one to three months after an adjustment has been made in treatment. **Please learn about this test, know your number, look for it to be better each time you get a letter and copy of your lab and take charge of it, rather than passively waiting to see what I say.**

Additionally, periodic *fasting* or *random* blood sugars to assist in assessing your progress are sometimes employed. For the majority of Type II Diabetics, home glucose monitoring by sticking your finger on a frequent basis has been proven *not* to add benefit to your care, although most Type II Diabetics who require insulin will usually benefit from some home glucose monitoring.

All Type II Diabetics should purchase a "one-touch" type machine from the pharmacy and become familiar with it. Practice using it before the three meals and at bedtime. Great numbers are less than

100 before breakfast and less than 140 all other times. Not "too bad" numbers are less that 125 before breakfast and less than 180 other times.

Use the machine awhile so you know what it is and what the numbers mean, then perhaps forget it. The lab blood sugar and A1c are more accurate and will usually be what I use for treatment decisions. Even though I don't need for you to check sugars day in and day out, it is a useful skill to have. At times, especially if using insulin, I may call on you to monitor your home sugar often.

"More Summary Please."

Type II Diabetics usually have inherited the Metabolic Syndrome which can be helped with diet, exercise and weight loss. Left untreated, diabetes usually causes devastating consequences.

It is known that aggressive efforts treating high blood pressure, cholesterol, tobacco and excess weight will pay off with a *decrease* in complications. While I will make an effort to assist you in treatment of your Diabetes/Metabolic Syndrome, there is no substitute for your own continuing education and verification that all proper efforts are being made to meet stated goals.

If we do not get your A1c under 7.0 in less than one year, I advise you get a second opinion from a diabetes expert. It is reasonable to see a diabetes specialist *any* time, if you are willing or interested. You would likely learn more and you and I could focus *more* on preventing heart disease. Call my office for a referral if you would like.

Using Insulin

There are many types of insulin and many ways to use insulin. I will teach you *my* way.

First, if you are heavy, this will work much better if you are slowly losing weight through diet and exercise. We may or may not keep you on diabetes pills. If you use a total of more than 50 units of insulin per day, we don't have your A1c under 7.0, *and* you are not on **Avandia** or **Actos** to increase your insulin sensitivity, ask me why not.

Glargine Insulin **(Lantus Insulin)** is a terrific product that you should think of as being injected into your body once in 24 hours and providing *exactly* the same amount of insulin in your bloodstream for *exactly* 24 hours.

We both know there is no way any product could do *exactly* that. Nonetheless, we will think of Lantus as giving us a ***basal*** (baseline) *background* insulin level in your bloodstream that stays the *same* for 24 hours. This can be adjusted up and down to serve your needs and, if you only nibble small amounts of food every ten minutes throughout 24 hours, around the clock, with no sleep, this insulin alone will be near perfect.

Since you won't be nibbling small amounts of food every ten minutes for 24 hours, then besides this *basal* insulin which will serve you 24 hours, we will need to come up with insulin that serves you during the three meals, in addition to perhaps any larger snacks that you might eat.

Don't be dismayed at the notion of taking a lot of shots, for two reasons: First, these insulins now come in convenient pen forms that can be fairly easily carried anywhere.

Secondly, it can actually be quite freeing to be able to go anywhere, eat anything and possess the ability to get tight control of your blood sugar in spite of an irregular schedule.

Meal and Snacktime Insulin

Insulin Lispro **(Humalog Insulin)** is a very short acting insulin that also comes in pen form. It will start working to lower your blood sugar very quickly, so you will have to eat right away. In addition to working quickly, the effect will go away quickly so you will be using just the right amount of insulin, depending on the amount of food you intend to be eating and what your finger stick blood sugar might be at that moment.

Get the picture? You use **Lantus** as a 24-hour *basal, baseline or background* amount of insulin to take care of you between meals and for your routine body maintenance. Then, at meals and larger snacks, you will give yourself a quick shot of the appropriate amount of **Humalog**. Because **Humalog** acts quickly and goes away quickly, troubles with low blood sugars will be greatly diminished with this regimen.

Self-Monitoring

If you are going to be on insulin, it is a good idea to use the table on page 42. Get a blood sugar level before each meal and at bedtime for awhile to get the hang of how to adjust your insulin. Initially I will tell you how much baseline 24-hour **Lantus** to use and even suggest how much **Humalog** you might use with each meal, but we will have to see what your sugars do with my initial suggestions and make adjustments.

At first, monitoring and adjustments might best be done by you keeping a one-week diary of your sugars and then come see me with the diary in hand and let's make adjustments. Then you go home and do the same thing again; a week's worth of sugars logged, then come and see me and make an adjustment.

Pretty soon, what is supposed to happen is, you get to where *you* understand what I am doing and, in fact, you will be *better* at figuring out what your sugars are doing and what your insulin requirements should be. There will be a natural time when we both recognize there is no longer a need for you to keep coming to see me for coaching, as you will be better at it than I can possibly be with my artificial, after-the-fact efforts.

Relax and let it come naturally. If you need to see me once or twice before you get the hang of it, fine. If you need to see me seven or eight times before you get the hang of it, that's fine too.

Low sugars (lightheaded, fast pulse, anxious, irritable or clammy) can occasionally be a problem with insulin injections and, if that happens, you need to eat a low fat snack or have a drink that has some calories, i.e. milk, juice, candy, a sandwich, etc. Also, solicit from me a prescription for **Glucagon Injection** which you or a family member can give, that immediately increases the blood sugar, if such urgency is called for.

If I were having to do blood sugar checks frequently, I might rather have one of the devices that works on the forearm or some other more painless site than the finger tip. I am uncertain about the cost of such devices and insurance coverage, etc. so I will do nothing more than encourage you to

investigate and do whatever works best for you. Make the assumption I am delighted to *prescribe* anything you might want or need as diabetic supplies; I just don't know what your particular insurance will or will not cover of the various available devices.

Insulin Summary

Get started, keep good records, preferably on my diary sheet on page 42 and come see me about once a week until you get the hang of it. If you use a copy of page 42, instead of a less familiar or less clearly understood record, I stand the best chance of giving you accurate advice.

If you do not achieve an A1c of less than 7.0 in twelve months, you need to see the endocrinologist. He usually has a diabetes teaching staff and a variety of other tools I do not have.

Other Treatment Considerations

In addition to using diet, exercise, weight loss, pills or insulin to control your blood sugar, as well as your blood pressure and cholesterol, and quitting tobacco, there are other treatment matters that diabetics should consider.

Immunization against pneumonia is a single injection, which should be given to all diabetics – ask for it. This is done in an effort to prevent you from getting pneumococcal pneumonia, the most common form of community acquired bacterial pneumonia. The shot will not make you sick but can make your arm sore.

In addition to the pneumonia immunization, you should remember to get a flu shot every year in the Fall. October 1st is an ideal time, although the injection can be given later than that. The flu shot is given in an effort to prevent you from getting influenza and subsequently developing a severe bacterial pneumonia that can be fatal.

In my opinion, diabetics should see an ophthalmologist each year for an eye exam. Additionally, diabetics with any foot problems in the form of athlete's foot, nail fungus, peripheral neuropathy or even minor foot problems should see a podiatrist once each year, or more often if necessary.

As mentioned, treating blood sugar, high blood pressure, high cholesterol and cigarette smoking is critical, as is the necessity you begin to somewhat "over-report" some symptoms you might have.

For example: chest pain that "is probably just indigestion" should be quickly reported rather than ignored, as should other symptoms, in view of the fact that diabetes puts you at risk for other health problems.

A Final Thought

Many patients have been a joy to work with over the years as they have grown to understand what it is to be threatened by the Metabolic Syndrome, which usually accompanies diabetes or pre-diabetes. These individuals make it their business to understand the subject and methodically attack the problem. In doing so, they are typically adding years of quality and quantity to their life – something they enjoy and something I enjoy as well.

If you find it tough to be one of those patients yourself, let me encourage you to hang in there. A good start is to study this section over and over until you *understand* the subject well.

As a second step, you can take pleasure in slowly beginning to get yourself into good physical condition with diet, exercise and weight loss, as described in Chapter VI *Getting into Shape*.

If you are failing at either of these first two steps, make an appointment, come see me and let's discuss it.

Getting the medication right is the third step and certainly includes not only treatment for blood sugar, but also cholesterol, blood pressure and tobacco.

I am rooting for you.

Name:_____

Home Sugar Readings

You could make multiple copies of this. For home readings I prefer them on this sheet to avoid errors. If you leave me a copy of this with your sugars filled in, it makes a very useful page in your chart.

Date	**Insulin Type, Amount, and When Taken** (For Example**: Breakfast Humalog 6 units, Lunch Humalog 8 units, Supper Humalog 7 units, Bedtime Lantus 30 units** **Also list Diabetes pills**	Before **Breakfast** Sugar	Before **Lunch** Sugar	Before **Supper** Sugar	**Bedtime** Sugar

Name _____

In Office Diabetes Lab

Date	Diabetes Medicines	Weight	Fasting Sugar	A1C	Random Non-fasting Sugar

VI

Getting Into Shape

Scientific fact:	If one thousand humans attempt to get into shape, *most* will **fail**.
Scientific opinion:	If one thousand humans attempt to get into shape by adhering to the next three pages, *most* will **succeed**.
Why:	1. Facts, not fancy. 2. Easy, not hard (thus *increasing* probability of success).
Unfortunately:	Most humans will continue to fail by ignoring the facts and clinging to fancy.

Where do we get our Facts?

The National Weight Control Registry is an ongoing study through Brown University School of Medicine that has studied more than five thousand people from *across* the United States who have done the *unusual* – lost an average of 65 pounds and *kept* it off for an average of five or more years. They were studied in order to find out what traits they shared. **Others will benefit from emulating them.**

These are not the *unimpressive* people who have taken a lot of weight off and *regained* it. These are the winners. **To the extent one deviates from what these people have done, one *increases* the probability of failure.**

Just the Facts (and opinions)

Fact One: **People who take weight off and *keep* it off, exercise.**

Opinion One: **One should exercise *at least* eight minutes, 365 days per year.**

Behavior scientists have found acquiring a *new* habit is most likely when consistency is achieved by: **"breaking the desired behavior down into a unit of work *so small* that success is virtually guaranteed".**

About 15% of adults have been good, steady exercisers since high school – always have been, always will be. These need read no further in this section – rather just keep up their good work. The other 85% can be called "recyclers": since high school, off and on exercise programs (probably mostly off). A lot of "woulda, coulda, shoulda, gonna" language.

Typically, if a recycler decides to exercise, he will most likely rely on *motivation* (bad) and go back to efforts similar to what he tried, and *quit*, before. The result will almost *surely* be the same (non-exercise), so instead, he should rely on *strategy* (good). **Strategy: *at least* eight minutes, 365 days, no exceptions.**

Once one has proven talent at exercising *at least* eight minutes every day, he should strive to achieve 200 minutes per week, but in no case ever go below eight minutes every single day.

Fact Two/Opinion Two

Fact Two: **People who take weight off and *keep* it off, eat lower, but not low-low fat.**

Opinion Two: **One must develop a taste preference for eating lower, but not low-low fat.**

In the same way many have developed a taste preference for diet sodas and lower fat milk, one can develop a similar taste preference for lower fat meals, one meal at a time.

The amount of fat needed in any one meal will depend on lifetime taste preference, amount of recent fat intake, emotions of the moment, location of the meal, occasion of the meal and type of food available. If one does not develop a pattern of eating less fat over the weeks, months and years, he will almost certainly fail at taking weight off and keeping it off.

Those who have no idea how to do this can learn by participating in Weight Watchers. The program is perfect to learn how to eat any food, anytime, anywhere and eat lower, but now low-low fat food. However, it is slightly too deprivational, (resulting in too-rapid weight loss) so adding a bit more fat than advised will *increase* the likelihood of long-term success.

One can learn from their system *how* to eat, even if he does not ultimately decide to utilize their point-count system (wrong for some people). He will have the tools to eat right, one meal at a time.

Fact Three/Opinion Three

Fact Three: **People who take weight off and keep it off "self-monitor".**

Opinion Three: **One should self-monitor ten seconds, 365 nights per year, briefly recording exercise and diet.**

Ten Seconds

Five seconds should be spent recording the *number of minutes* of exercise done that day.

Also, five seconds to record eating. If one prefers not to count calories or Weight Watcher points in his head throughout the day and then record them in the evening, he should record a simple "grade" for the day's eating of A, B, C or D. Elaborate self-monitoring increases the probability of quitting; therefore, it should be kept simple.

Fact Four/Opinion Four (A fair return on investment)

Fact Four: **Humans who diet and exercise lose ten to twenty pounds per year.**

A summary of sixty five studies between 1974 and 1990 involving almost 5000 humans who were approximately 50% overweight found, with diet and exercise, they lost an *average* of ten to twenty pounds per year *and* did not tend to keep it all off. More recently, Tufts University researchers found four very different popular diets resulted in about the same amount of weight loss in a year – 5% of body weight.

This does not mean one *cannot* lose thirty, forty or even more pounds per year. It *does* mean if one does, he is exceeding what is characteristic of his fellow human beings and his chances of regaining weight will *increase*.

Opinion Four: **One should set a goal to lose *AT LEAST* one pound per month until at ideal body weight, even if it takes years.**

If one wants to lose weight *and* keep it off, he *might* succeed at whatever rate he chooses, but a rate characteristic of what other humans do is *easier* and more likely to succeed long *and* short term.

Summary

1. **Exercise – 365.**
2. **Eat lower fat.**
3. **Write it – 365.**
4. **Lose *at least* 12 a year.**

One who follows the Four Facts/Opinions emulates those who succeed. One who deviates, diminishes his prospects.

Three brief pages, easily adhered to, change one thousand humans headed to probable failure into one thousand humans headed to probable success. Like gravity, finances and many of life's other realities, one always has a choice between fact and fancy, with their respective rewards and punishments.

Weight Loss Surgery

The best weight loss surgeries, when indicated and when all goes well, can be a near-miracle, just a very good thing or just a slightly good thing.

No question, the Four Facts and Opinions should be skillfully practiced and talent developed, *before*, during and after the surgery.

If one views the surgery as an outstanding tool that can help him practice the Four Facts, he will have the right idea and will optimize his prospects for hitting a "home run".

If he views surgery as a shortcut and does not bother with being like everyone else, he may be one of the statistics who has a less than good outcome.

At some point, the post-surgical party of rapid weight loss ends, usually before one gets to ideal body weight. He then needs to lose at least a pound a month like everyone else. The difference is, he will be in possession of a great tool. If he doesn't bother with the Four Facts at this point, expect weight regain.

Who is a candidate?

Generally, if one has a body mass index (BMI), (calculated by multiplying height in inches by height in inches, taking this number and dividing it *into* weight in pounds and multiplying the results by 703) of 40 or more, or greater than or equal to 35 with underlying health problems like diabetes, heart disease, hypertension, arthritis and high cholesterol, etc. one *might* be an appropriate candidate.

Given that some are candidates but instead just lose it, and given a case in which a woman lost 165 pounds, down to her ideal weight, without surgery, and has kept it off sixteen years (she exercises one hour per day and very often eats *exactly* the same low fat meals she has found work well for her), one cannot say the BMI is the best way to decide.

Using BMI as a rule of thumb, considering the Four Facts, individual situations and interest in a lifetime of "not getting to eat like before", one can decide for himself.

Given that the surgery has some small mortality (death) and morbidity (complications) associated with it, this is a serious individual decision to be made by the patient, weighing all the factors.

Which surgery is best?

The Roux-en-Y gastrojejunostomy or, so called, "gastric bypass surgery" is the one that has been around a good long time and has lots of data supporting its value, including a knowledge of complications. It is the surgery that is most likely to produce good weight loss that does not return as easily as it can with other procedures.

Sometimes this can be done laproscopically where the abdomen is not cut wide open, other times it cannot.

Certainly the best surgeons should be chosen by doing the homework and matching appropriately with one's insurance. (Insurances often will pay for this procedure, though as the years go on there *may* be a trend *away* from insurance companies paying for it.)

This gastric bypass procedure makes a small pouch in the stomach and then severs the small intestine shortly after it leaves the stomach and hooks the furtherest open piece of intestine up to the new small stomach pouch, takes the closer, open end of intestine and reattaches it to the side of the intestine further down the line. This "bypasses" the stomach and the portion of the small intestine that absorbs a lot of nutrients.

As a consequence, if one overeats sweets, he will often get uncomfortable gastrointestinal symptoms that discourage further sweet intake.

In a study of 608 patients over 14 years, weight fell from an average of 304 pounds to an average 192 pounds at year one. Average weight was maintained at 205 pounds at five years, 207 pounds at ten years, and 205 pounds at fourteen years.

83% of patients with non-insulin dependent diabetes became non-diabetic and 99% of people who had pre-diabetes were no longer pre-diabetic.

If one is interested, he should obtain specific names of surgeons who *may* be well qualified to do the surgery. Some surgeons doing the surgery might not be well qualified and others may be doing a potentially inferior procedure. One should do his homework. There is risk, even with a surgeon whose reputation is good.

"<u>Sum it all up.</u>"

Fact One:	People who take weight off and *keep* it off, exercise.
Opinion One:	**One should exercise *at least* eight minutes, 365 days per year.**
Fact Two:	People who take weight off and *keep* it off eat lower, but not low-low fat.
Opinion Two:	**One must develop a taste preference for eating lower, but not low-low fat.**
Fact Three:	People who take weight off and keep it off "self-monitor".
Opinion Three:	**One should self-monitor <u>ten seconds</u>, 365 nights per year, briefly recording exercise and diet.**
Fact Four:	Humans who diet and exercise lose ten to twenty pounds per year.
Opinion Four:	**One should set a goal to lose *AT LEAST* one pound per month until at ideal body weight, even if it takes years.**

1. **Exercise – 365.**
2. **Eat Lower Fat.**
3. **Write it – 365.**
4. **Lose *at least* 12 a year.**

Date **(Month)**	**Exercise**	**Eating** **(Calories/points or ABCD)**	**Miscellaneous**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
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VII

Heart Healthy Eating and Dietary Supplements

Don’t let details overwhelm you. Most of the benefits in this section can be easily carried around in your head, if you read this lightly.

First Things First

If your physical conditioning is not perfect or you have *any* weight to lose, first master *Getting into Shape*. Once you are working toward getting into good physical condition and losing toward ideal body weight, then appropriately incorporate the following heart healthy eating and dietary supplement advice. Though your diligence at *eating* heart healthy may depend on the severity of arterial disease you might have, or your motivation, begin to *know* the subject well now.

"It is all so confusing – give me somewhere to start."

Every time you turn on the TV, look at a newspaper or, even when I read my medical journals, a variety of experts are giving their opinions – some more scientific and, therefore, "better" than others.

I will try to stick to well-established science and consensus opinion as a starting point. This is *more* than enough information to reap *almost all* of the benefit that can be had by diet and supplements.

How important is diet to heart disease?

Some people have arterial disease, perhaps even early, no matter how well they diet and exercise. Others with terrible habits will *not* have arterial disease; we have all known such people.

Between these two extremes are people who *genetically* would not have much arterial disease, but their poor habits and weight gain worsen cholesterol, raise blood pressure, perhaps cause diabetes, and therefore they get coronary artery disease. In their case, it is *certainly* a matter of diet and exercise failure, not just genetics that causes the arterial disease.

"I just love dietary exchange lists and counting fat grams."

We are not going to be using the exchange list nor counting *anything* and we will dispense quickly with telling you things you have already heard that are *good* for you to eat. Those things would be fruits, vegetables, beans, grains, fish, nuts and low-fat/no-fat dairy products.

You don't have to read books, study charts or consult with experts, but rather learn to eat all foods, develop a preference for the "good" foods and minimize your intake of the "bad". There are so many unlabeled packages, meals away from home and other unknowns, that *you* need to be the expert. The information needs to be in your *head*, not something you have to constantly refer to in writing.

Study the following and you will know how to optimize heart healthy eating.

Becoming Close Friends With Your Fats

The *amount* of fat you consume has little to *no* bearing on heart healthiness. The *type* of fat is what causes or prevents arterial disease.

If you are overweight, then getting to ideal body weight is desirable for arterial health and learning to *skillfully* lower the fat content of your diet as described in the *Getting into Shape* chapter *is* important. Learn to incorporate all aspects of heart healthy eating as you lose to ideal body weight.

We will define "good fats" and "bad fats". Eat *some* bad fat, but develop a taste preference over time for less of the bad fat and learn to enjoy food that happens to be composed of the good fat.

Question: how much of the bad fat is okay to eat? Answer: **as little as you will sustain over the long term**. Over the next several years, as you become more of a "health nut", you can transition to being a guy who eats better and still enjoys his quality of life.

"<u>So, what are the bad fats?</u>"

It is easier to remember what is bad and strive not to eat it:

- **There are three "bad" fats: *saturated, partially hydrogenated/trans fat and cholesterol.***
- **All nonfish meat fat is bad. (Saturated and cholesterol)**
- **All dairy fat is bad. (Saturated and cholesterol)**
- **All organ meats are bad. (Saturated and cholesterol)**
- **All high cholesterol shellfish are bad. (Cholesterol)**
- **All tropical oils are bad. (Saturated)**
- **All "partially hydrogenated/trans fats", miscellaneous *saturated fats* and miscellaneous items with high *cholesterol* are bad.**

That's it. All you have to do is memorize and carry this list around in your head, **(partially hydrogenated/trans fats, saturated fat, cholesterol)** and spend the rest of your life trying to eat less and less of this and develop a taste for better ways to eat.

"<u>More details please.</u>"

Let's flesh out the seven bullet points above with more detail.

First, **all nonfish meat fat is bad.** Obviously chicken and turkey are quite good, but the reason you have always heard, "don't eat the skin or the dark meat", is because even chicken and turkey can give you more of the bad fat than is a good idea.

When eating beef, lamb and pork, pick lean cuts of meat, don't eat very large servings, and don't eat them very often.

All dairy fat is bad. You don't have to wonder about the fat in ice cream, milk, cheese, yogurt, etc. It is bad fat and to the extent you learn to eat these products fat free – good for you. To the extent your taste preference just isn't ready for the fat free products – that's okay, just develop a taste for small quantities of the lower fat version first and maybe someday you and fat-free will become close friends.

Organ meats like liver, gizzards, sweetbread, etc. are all high in cholesterol and saturated fat so, if you are going to eat them, it ought to be small amounts and infrequently.

Shellfish that contain high cholesterol like shrimp and others are items to be aware of as not being perfect.

Even though they are "seafood" they should be eaten infrequently and in small amounts.

Tropical oils like palm and coconut oil are contained in things like snacks, desserts and nondairy creamer. As you become a savvy label reader you will recognize these things. They are saturated fat.

That Last Bullet Point

The last bullet point contains **"everything we haven't talked about". Partially hydrogenated/trans fats** which used to be good fats, i.e. vegetable oils that have been changed in the process of putting them into a snack food like chips, cookies, granola bars, etc. This is also the case for fats that wind up stored in the refrigerator like margarine, etc. When these good fats are used in the process, they are converted to the bad "partially hydrogenated/trans fats", and these are particularly bad for arterial health.

The government has helped by requiring that labels specify how much of this artery clogging stuff each product has.

Due to these labeling requirements and consumer demand, many food manufacturers have created snacks that taste good and do not contain hydrogenated/trans fat.

Get started as a label reader who knows what he is looking at, "bad", **partially hydrogenated/trans fat, saturated fat, and cholesterol**. These three fats make up the "bad" fats.

"I am confused."

Become a discerning label reader and **in a short period of time you will not have to do a lot of investigating – you will know which foods are good for you and which are not.**

Saturated fat (bad) is contained in meats, organs, tropical oils and dairy products.

Cholesterol is interesting in that it can occur in certain sneaky locations like the shellfish. A perfect example is egg yolks – something that could be overlooked. Meat and dairy are the other main sources of cholesterol.

"Okay, so I'm an expert. But don't you have a book for me?"

If you memorized the previous bullet points and know what all the bad things are, and are now eating better, then a couple of cookbooks can be helpful to create ideas.

To that end, the American Heart Association has two excellent, popular cookbooks. One is entitled *The New American Heart Association Cookbook* and the other is *Low-Fat, Low-Cholesterol Cookbook*.

Both of these can be inexpensively purchased in paperback at www.ballentinebooks.com and likely are also widely available in local bookstores. Both are from the American Heart Association.

So what are the good fats?

Let's concisely summarize what the good fats are:

- **All vegetable oils except tropical oils and partially hydrogenated/trans oils.**
- **Nuts**
- **Avocados**
- **Fish**
- **All mono*un*saturated and poly*un*saturated fats are good.**

Good fats go by the name mono*un*saturated and poly*un*saturated. There has been a fair amount of conversation between experts as to which of the two is better and I think the short answer is they are *both* good fats and we can have these fats in unlimited amounts and still have good arterial health, if not overweight.

Monounsaturated fats include nuts, avocados, olive oil, canola oil, sunflower and safflower oils. It is fine to eat nuts and avocados. If you happen to like these two things, they can be indulged on, given that your diet is in some ways otherwise restricted by not eating much "bad" fat.

Polyunsaturated fats come in two types: The first, Omega 6, is in corn, soy and walnut oils as well as others.

The other, the famed Omega 3 fatty acids contained in fish, are also found in flaxseed oil, canola oil, beans and leafy vegetables.

"Please Let Me Count Stuff."

I want to avoid counting, but for the counters out there, let's review a portion of the American Heart Association Step One and, more stringent, Step Two Dietary Guidelines:

> **Step One Diet**: Less than 10% of daily calories as saturated fats and less that 300 mg of cholesterol per day. (The guidelines do not specify an acceptable amount of partially hydrogenated/trans fat but rather suggest that the daily amount eaten should be "low".)
>
> **Step Two Diet**: Less than 7% of daily calories as saturated fat and less than 200 mg of cholesterol per day.

Knowing too much

It may be good to know a *little* too much.

> **If you know the bad fats and eat as little of them as possible and eat all the good fat you like, provided you are not overweight, you are practicing heart healthy eating.**

Become a little more knowledgeable, by learning what there is to know about carbohydrate.

Recall, there are only three nutrients: **fat, carbohydrate and protein**.

Because overweight people will be trying to reduce their fat, it can be natural to compensate by eating more carbohydrate. In doing so, triglycerides will go up some and the HDL (good cholesterol) will go down some. In this situation, if the guy who is trying to lose weight will make the fat he *does* eat as much of the *good* fat as possible, he will be eating to lose weight *and* eating heart healthy.

He will be even better served if he works hard to increase the low-fat/no-fat **protein** content of his diet with Egg Beaters, soy burgers, low-fat/no-fat lunch meat, no-fat hot dogs, no-fat cottage cheese, low-fat/no-fat cheese, etc. so that he will eat less carbohydrate. This will not only help his triglycerides and HDL but will also keep him from overfeeding on carbohydrate, which is an easy way to gain weight as well.

If a guy is already thin, he is better served by eating good fat and carbohydrate as he pleases. Both the heavy guy and the normal weight guy should find themselves eating a carbohydrate amount that is not low and not high.

To further assist in not having too much carbohydrate effect on HDL and triglycerides, one can increase meal frequency and decrease the amount eaten at each food encounter. Also, eating complex carbohydrate that contains fiber, like fruits, vegetables and grain is preferable to simple sugars contained in sweets and non-fiber carbohydrate, like white bread, rice, pasta and potatoes, though these should still be enjoyed in moderation.

For those who are heavy, such lower but *not* low carbohydrate eating will also result in less insulin secretion. (Insulin secretion is perhaps metabolically unfavorable to arteries and also promotes hunger and overfeeding.)

"My mind is saturated, please summarize."

So far everything we have said is easily summarized and remembered as follows:

- Don't eat much bad fat. (Partially hydrogenated/trans fat, saturated fat, cholesterol)
- If you are thin, eat all the good fat you want as long as you continue to maintain your thin weight.
- Eat low, but not very low carbohydrate. Choose more complex, not simple, carbohydrate.
- If overweight, reduce calories by eating less fat and work to get a lot of low-fat/no-fat protein instead, so you will not eat too much carbohydrate.

Dietary Supplements

Most people do well to take a simple, cheap multi-vitamin each day. (Containing iron if you are a menstruating woman.) Take two if you want to take more – this was supported by the best position paper written in a century in the *Journal of American Medical Association.*

For arterial disease patients, a lot of supplements have been discussed, promoted and proposed and I will do my best to summarize, trying to give you published, peer-reviewed, replicated information – though a clear consensus does not often exist and the field is rapidly changing.

My enthusiasm for supplements is low until someone has *clearly proven arterial disease*. The worse the disease – the greater my enthusiasm.

If your only known disease was discovered at an early stage by a Heartscan, PET scan or carotid study, I think your personal preference might best decide whether to use supplements or to what degree. If you have had a heart attack, angioplasty or bypass surgery, perhaps you should be on just about anything that has *any* credible shred of benefit, especially if it is relatively harmless.

The following have adequate data to support clear-cut benefit, or at least hint at benefit, for those who are motivated.

Omega 3 Fatty Acids

With known coronary artery disease, Omega 3 fatty acids, to include **EPA** and **DHA** found in fish oil, as well as **alpha-linolenic acid,** have been proven to be of benefit, with studies showing a 20% reduction or more in mortality and a 45% reduction in the risk for sudden cardiac death.

The data for fish oil containing **EPA** and **DHA** is more robust than that for the **alpha-linolenic acid** found in flaxseed, etc. I think that some people are concerned about the potential for mercury or organophosphate contamination with fish oil, though supplements are thought to be essentially mercury free.

My advice would be: The more serious the heart disease, the more one stays with **DHA** and **EPA** contained in fish oil and fish. The more one is simply hedging his bets, then instead, using flaxseed oil or other sources of **alpha-linolenic acid** is reasonable.

The starting dose for each is 1000 mg. per day. That would be 1000 mg. of **DHA + EPA**, *not* just "fish oil" and the same is true for the **alpha-linolenic acid;** you want 1000 mg. of *it*, not just 1000 mg. of "flaxseed oil". (Read labels and notice 1000 mg. of "fish oil" does *not* give you 1000 mg. of **DHA + EPA**.)

For some of you who have particularly high triglycerides, I may recommend higher doses of fish oil to lower them. This might involve you taking many capsules per day.

A new, prescription, Omega 3 supplement called **Omacor**, might be the best for some and, if so, I will prescribe it. If the cost of this new medicine is an obstacle, over-the-counter fish oil can be substituted, but over-the-counter is weaker and will require more capsules.

Fish that contain the most Omega 3 fatty acids are, in descending order: mackerel, herring, tuna and salmon.

Lower amounts are found in halibut, rainbow trout, Atlantic cod, catfish and flounder. The mackerel has twenty five times more than the flounder, three times more than the halibut and twice as much as the tuna. The mackerel contains 2500 mg. per three ounces of raw fish. Three ounces of salmon has about 1000 mg.

Flaxseed, dried butternuts, English walnuts and soy beans are the only significant dietary sources of alpha-linolenic acid.

Antioxidants

Studies have adequately shown vitamins E and C and other "anti-oxidants" to be of no benefit and perhaps actually harmful, if you have low HDL we are trying raise with medication. In theory they *should* work but it appears they don't and *might* be harmful. Currently, no antioxidant is advised.

Alcohol

The medical literature suggests I should never give advice to a nondrinker to take up drinking alcohol for purposes of coronary artery disease prevention. I agree with this advice completely for people who do not have important amounts of established coronary artery disease and for anyone who has ever been a problem drinker.

The benefits of alcohol for coronary artery disease prevention are such that I would be of the opinion that a nondrinker with established coronary artery disease would probably do well to consider drinking two to four servings of alcohol per week.

Over the years, the medical literature seems to suggest that it is the *alcohol*, not the *type*; therefore it is not necessary for it to be red wine, though this is the alcohol product that original studies generated enthusiasm for.

In the spirit of what the literature is trying to say, I would certainly hate to see a nondrinker become a problem drinker in pursuit of better coronary health. Two to four servings per week *does* confer benefit and it seems to me a bit paternalistic that we not commend this to your consideration.

Fake Margarine

I recommend against the use of cholesterol lowering margarines like Benecol and Take Control. Though they lower cholesterol as much as 15%, they raise plant sterol concentrations in blood, which *might* promote arteriosclerosis. (It does in rats). The low calorie, heart healthy margarine substitutes that do not contain plant sterols or stanols can be tasty and safe.

Aspirin and Plavix

81 mg. of a coated, "baby" aspirin each day may be advised on a case by case basis in hopes of making the platelets less "sticky", less able to clot, less likely to cause heart attack or stroke or lessen the severity of any such problems.

The smaller, 81 mg. dose is adequate to provide the benefit in most people, with less likelihood of bleeding complications than the higher doses. A "coated" aspirin like name brand **Ecotrin** may reduce gastrointestinal bleeding.

If you have very bad arterial disease or "fail" aspirin treatment by having an "event", I *might* give you a prescription for a second anti-platelet medicine called Clopidogrel **(Plavix)**. This medicine should not be used *routinely,* as it will further increase bleeding risk and complications.

Someday, perhaps soon, I think we will have clinically available testing that helps us know who among us genetically does not "respond" to aspirin, or who has developed *resistance* to lower doses of aspirin and will need either higher aspirin doses (like 325 mg.) and/or Clopidogrel **(Plavix)**. For now, awareness of such a possible development is our only tool.

VIII

High LDL Cholesterol, Low HDL Cholesterol and High Triglycerides

Read every word, but you will do well if all you remember is HDL is “Good”, LDL is “Bad”, and medicine, if needed, is very, very good.

High LDL, Low HDL, High Triglycerides

This chapter will explain the numbers you see on your routine lab report. The only three components of the profile you need to learn about are: **LDL** ("bad" cholesterol), **HDL** ("good" cholesterol) and **triglycerides.** (Triglycerides are a third blood fat that has *some* relationship to arterial disease.)

When you study your lab report, become knowledgeable about these three "lipids" and pay no attention to, for example, "total cholesterol" when you see it on the report. (It can be "high" due to a lot of the good **HDL** and therefore it can be *good* to have high total cholesterol.)

Ignore the "VLDL" – high VLDL is *not* "good" but we use the **LDL, HDL** and **triglycerides** to assess your risk – the VLDL adds little incremental information to this.

Forget about the "ratio" of total to **HDL** cholesterol (this is a useful statistical tool, but a good ratio does *not* negate the risk of an elevated **LDL** or high **triglycerides.**)

Chapter XIII will explain the seven kinds of **LDL** and five kinds of **HDL** and that one needs to have the "right" kind. This same chapter will also discuss other "novel" risk factors in blood. First though, becoming familiar with high **LDL,** low **HDL** and high **triglycerides** will put you in charge of meeting goals.

High LDL

This "bad" **LDL** cholesterol is elevated by genetic *overproduction* in your liver and less so from not eating "heart healthy". (See Heart Healthy Eating, Chapter VII)

LDL cholesterol gets "oxidized" and *directly* attacks and damages the healthy endothelial cells (figure 1, page 17) allowing cholesterol and white blood cells to get past the endothelium lining and close to the muscle layer, to form heart attack-and-stroke-causing *unstable* plaque. (See the damaged endothelium and *unstable* plaque in figure 2, page 17)

Our job is to lower your LDL with diet, exercise and, if called for, medication so you have the *stable* plaque seen in figure 4, page 18, and are less likely to suffer a heart attack or stroke from the plaque rupture shown in figure 3.

As a *starting* place to decide who, beyond practicing good diet and exercise, should also take a cholesterol lowering medication, I use the **National Cholesterol Education Program Guidelines – Adult Treatment Program Treatment III. (ATPIII.)**

Over a decade in the making, this hundreds of pages document represents the best published, peer-reviewed, consensus opinion regarding treatment. The guidelines carefully propose treatment for 37 million Americans – do not be surprised if *you* are one of them.

It is not possible to summarize here all that determines best advice, but good guidance is:

1. Anyone with an LDL of more than 190 is so high, they should take medicine.
2. Anyone with an LDL of more than 160 and **intermediate risk** (a fair amount of risk) should take medicine.
3. Anyone with an LDL of more than 130 and **high risk** should take medicine.
4. Diabetics or those with known coronary artery disease and an LDL of more than 70 should take medicine.
5. In general, if taking medicine, the LDL goal will be less than 70.

Few people who are destined to get arterial disease will derive adequate benefit from diet and exercise **alone**. Whether you need medication or not is seldom based on your past, present or future diet and exercise.

Somewhat more broadly than these ATPIII rules, I consider the seven questions: age, sex, family, tobacco, blood pressure, cholesterol profile (LDL, HDL, triglycerides) and blood sugar, plus C-reactive protein, EBCT/Heartscan or Carotid intima-media thickness test (see page 90-92) and any known arterial disease you already have to best decide who most appropriately might take cholesterol lowering medicine.

How Does Treatment of High LDL Cholesterol Work?

When we lower LDL, it lessens damage to the endothelium *and* decreases the amount of cholesterol available to be deposited inside plaque. (figure 4, page 18)

How Good is Treatment?

At a conference I attended, the editor of a prominent cardiology journal likened the "statin" class cholesterol lowering medicines (see page 65) to the discovery of penicillin in significance. While I consider this a mild overstatement, his point is well taken.

Diet and Exercise

Your LDL, whether good or bad **is mostly genetically determined**. Diet and exercise will not change LDL *numbers* much, in the majority of people – this is genetic – you may not be able to change it.

I quit counting thin, heart-healthy-eating runners with very high cholesterol a long time ago – I know too many of these inherited situations – ditto the heavy, out-of-shape guys with *great* numbers.

In a minority of people, diet and exercise will have a more significant but still *moderate* effect on cholesterol – also genetic.

In a *small* minority, lifestyle habits will have a *very impressive* effect – again genetic.

Do not be dismayed when good diet and exercise do not give great improvement. Good eating and exercise *do* give you benefits, which the numbers may not reflect. Such lifestyle efforts, for example, can convert the "wrong" type of LDL (small, dense LDL is the "wrong" type and causes arterial plaque – see page 99) to the "right" type LDL.

Being out of shape and eating a high saturated fat diet *will* cause heart attacks that good cholesterol lab numbers may not predict.

Is Cholesterol Testing Accurate?

Cholesterol testing is only accurate plus or minus 20%. Because of this rather wide variation in accuracy, do not let any *one* reading surprise you. Repeat readings over time serve to clarify what your numbers *truly* are. This has practical value when medicine, diet or exercise efforts do not give you `expected lab results – it may be that test *inaccuracy* is why the numbers seem "wrong", and subsequent testing will clarify your true situation.

LDL Summary

Make it your business to see to it we lower your LDL to goal (often less than 70), whether by diet and exercise alone, or in combination with medication.

Low HDL Cholesterol

A low HDL cholesterol (the "good" cholesterol) can be a cause of severe coronary artery disease. It is a common mode of transmission for *inherited* artery problems, but can also be present due to smoking, diabetes and lack of exercise.

HDL is "good" because it causes "reverse cholesterol transport". Look at figures 2 and 4, on pages 17 and 18 and imagine how HDL takes cholesterol out of the *unstable* plaque in figure 2 and helps it become the *stable* plaque in figure 4, which is now *not* prone to rupture and cause a heart attack or stroke.

HDL goals are usually greater than 40 in men and greater than 50 in women – **the higher the better**. HDL is increased (it is *good* so we want it increased) by *aerobic* exercise, medicine (especially niacin), quitting smoking, good diabetes control and, only a little, by diet.

Some people will not get to enjoy seeing much *increase* in their HDL with these maneuvers on routine lab, but in fact will improve to a more favorable pattern of HDL 2b (the most favorable of five kinds of HDL). Said another way, exercise, medicine, quitting smoking and better diabetes control will usually give you the right *subtype* of HDL, which matters greatly, even if you do not get the satisfaction of seeing it on your *routine* lab report. (See page 100 for more on HDL subtypes.)

High Triglycerides

High triglycerides are interesting in that we are not *so* sure what they mean – they are perhaps not as powerful a predictor of arterial disease as high LDL and low HDL can be.

In one extreme, they are elevated in diabetes/Metabolic Syndrome and we *know* this is a ruthless cause of arterial disease. Treat diabetics with a pill that reduces triglycerides and increases HDL and they have fewer heart attacks, but we don't know whether it is because we lower the triglycerides or not.

On the other end of the spectrum, some have very high triglycerides, i.e. greater than 2000 (normal is less than 150) due to a familial genetic defect, and some of these people have *no* arterial disease whatsoever. (Triglycerides greater than 600 *must* be treated to avoid their causing pancreatitis, unrelated to arterial risk.)

Other things elevate triglycerides, but it is not at all clear whether these have an adverse effect on arteries or not. These include alcohol (remember, modest amounts of alcohol are *good* for arteries), beta blockers and diuretics. (Both are used to treat high blood pressure and it seems their *net* effect is good for arteries.)

High triglycerides improve most with medicine, decreased alcohol intake, achievement of ideal body weight, good diabetes control and lowering carbohydrate intake, especially by limiting sweets, bread, rice, pasta, potatoes and other low fiber carbohydrates.

It will be more difficult for you to *know* the *significance* of high triglycerides in your case than it is for you to understand the more straightforward high LDL or low HDL. Be confident I am constantly considering the two dozen or so complex factors that help determine the best response to *your* uniquely elevated triglycerides.

The "Statin" Class of Cholesterol-Lowering Medication

Examples: Atorvastatin **(Lipitor)**, Simvastatin **(Zocor)**, Pravastatin **(Pravachol)**, Lovastatin **(Mevacor, Altocor)**, Fluvastatin **(Lescol XL)**, Rosuvastatin **(Crestor),** Niacin/Lovastatin **(Advicor),** Ezetimibe/simvastatin **(Vytorin).**

Statins work to decrease your genetic *overproduction* of cholesterol in the liver. They do a great (the best) job of lowering LDL, help increase HDL some and lower triglycerides only a little. They do not improve inherited lipoprotein (a) or "small dense" LDL (the most worrisome subtype of LDL – see page 99) but statins have extra useful properties that stabilize arterial plaque (see figure 4, page 18), thereby decreasing heart attacks *more* than would be expected from how much they lower LDL.

Statins are fabulously safe, relative to the remarkable event reduction they give. In five large trials with 30,000 patient-years, there were *zero* cases of liver failure and one case of serious muscle inflammation called rhabdomyolysis. This patient recovered completely.

Though generally well tolerated over the long run, some people may have abdominal symptoms and some muscle or joint aching. This often resolves by skipping a few doses at first and giving the medicine and your body time or, if necessary, switching to a different statin. Finding a way to **make it work** is the idea with this terrific class of medicine.

If you have impressive muscle aching, you should hold the medicine and immediately drop by my office and tell my staff. They will do a blood test to check for the muscle enzyme problem called rhabdomyolysis. I have never had a single case of this in my practice of an estimated, greater than 7,000 patient-years on these medicines. Combining a statin with a fibrate drug for cholesterol increases the risk of this, but is sometimes a needed combination. If you are on both, then be appropriately more diligent to investigate muscle aching.

COQ10, which can be bought over-the-counter, has *theoretical*, but *unproven* reasons it might counteract muscle problems with statins. As long as we know we have no *proof* of benefit, if you have statin-related muscle aching, you might try 100 mg per day for several months to see if it helps you, as some patients have told me it helps them. (This is the dreaded "anecdote". We would prefer solid *proof*.)

Anytime you are acutely ill, feeling badly or undergoing major surgery, it may be a reasonable idea to hold your dose of statin, but you should let me know first.

We test liver enzymes and cholesterol for progress often and, every year, I have to take a handful of patients off medication due to elevated liver enzymes, but have never seen *any* liver damage. Routine, familiar and trivial things like Advil, Tylenol and alcohol also commonly elevate liver enzymes. These slight elevations of liver enzymes virtually always resolve without ill effects and do not represent *any* long-run problem. So, though we *will* be cautious, do not be alarmed by common liver enzyme elevations in and of themselves.

Please help me, my staff and yourself by keeping track of when to get your blood draws and refills. Prescriptions are written for an excess amount of medicine to allow plenty of time for the blood draw, to get results and to get refills.

Niacin

Niacin **(Niaspan)**, Niacin/Lovastatin **(Advicor)** and over-the-counter *immediate release* niacin (**not** "slow release", "extended release", "flush-free", etc) can be tough to use, so I usually propose it only when we mean business. Niacin has unique abilities to raise HDL, treat lipoprotein (a) and convert small dense LDL to the more favorable, large, buoyant LDL. (See Novel Risk Factors, pages 98-101) If you have proven arteriosclerosis and any one of these conditions, niacin is best and we need to be as clever as necessary to *find* a way for you to take it. Though not most powerful, niacin also lowers triglycerides and LDL.

Niacin's most common problem is uncomfortable but innocent skin flushing (hot flashes). We attempt to avoid this temporary sense of warmth and redness by using prescription **Niaspan** for slower release. (Over-the-counter "*slow release*", "*extended release*", "*flush-free*" niacin preparations should not be taken due to potential liver toxicity.) In some cases we will use over-the-counter, non-slow-release niacin. Over-the-counter has the advantage of coming in smaller, 100 mg. sizes that can be used to *very slowly* get onto niacin and tolerate increasing doses.

Other important ways to avoid skin flushing include taking it at bedtime with a low fat snack, keeping alcohol, caffeine and spicy food as far away from the dose as possible and, importantly, by taking one *adult* 325 mg. aspirin thirty minutes before the dose, to diminish skin flushing.

A good perspective is to know that if you have skin flushing, it is likely to occur *less* over time, so try to tolerate it and, initially, even *skip* some doses or *lower* the dose if you need to. This will allow your body time to get accustomed to the medicine. Please re-read this paragraph. If I have advised you to take niacin – it matters. You will be well-served to use your own cleverness and resourcefulness to find a way to tolerate niacin – even if it takes you months and years – go slow enough and use low enough doses to start, and you will succeed.

Fran is a woman in my practice who had a heart attack in her forties and has spent the last two decades enjoying excellent health, having been on niacin. She has been on as much as ***5000 mg.*** per day of over-the-counter, non-slow release niacin.

Don't you *know* she has likely paid some dues over the years, but today she is healthy and has no perception of taking any niacin – she has no side effects.

Now imagine, if you encounter initial difficulty you could do something like back down to 100 mg. of over-the-counter, non-slow-release niacin per day until well tolerated and *someday* increase very slowly to 200 mg . . . until *someday* you get to the dose you need to be on and it is well tolerated. If it takes you *three years* to be slowly successful, you will enjoy the fruit of this success all the rest of your days.

If you need niacin, think of Fran and think of friends who have had worse (e.g. cancer chemotherapy) and don't be shy to pay your niacin dues.

Other Considerations

Niacin can cause gout – we have another pill to help if it does. Niacin can cause itching. See above hints regarding skin flushing and use Benadryl or Claritin if needed. Niacin can cause a rash. If you think it has, **hold it** and *see me immediately* to confirm, as this is one side effect that, if present, will be a reason **you will have to abandon taking this important medicine.**

Niacin can increase blood sugar slightly but is often an important medicine for the very type of lipid problems we see in diabetics. If you have diabetes, we lower sugar to avoid all the complications *except* coronary artery disease. To avoid coronary artery disease, we must vigorously treat blood pressure, tobacco and cholesterol, so that if niacin is needed but worsens sugar slightly, we may still want to use it and increase the treatment of your diabetes as needed.

We monitor your blood closely on niacin. If you have muscle aching, follow the instructions under the "statins" section for muscle aching.

Niacin can be combined with the statin Lovastatin **(Mevacor)** in a pill called **Advicor.**

A Final Word on Niacin

Since I only advise niacin when I perceive it is *really* needed, you should practice the highest level of self-efficacy.

I have outlined what I know to tell you about how to do well with niacin (start with a low dose, go slowly, aspirin, skip doses, bedtime, etc.). You help yourself, your longevity and your quality of life if you calmly and patiently work through successfully being on niacin.

Please inform me if you believe you cannot take niacin. Best would be to make an appointment to come and discuss it with me. At this visit, if we cannot successfully troubleshoot for success with niacin, we *can* accomplish outlining the *second best* approach. My having advised niacin in the first place is an indication your case is worth such effort.

Fibrates

A third common medicine class is the fibrates, such as Fenofibrate **(TriCor)** and Gemfibrozil **(Lopid)**. These are the *most effective* medicines to lower triglycerides. They help raise HDL some and have less effect on lowering LDL.

Their failure to lower LDL much, along with favorable properties of the statin class, makes the combination of the two sometimes called for. Though fibrates tend to be well tolerated, you should read and follow the "muscle aching" section under the statins, even if you are taking the fibrate alone.

Gastrointestinal bother is relatively uncommon and will almost always subside over time or with initial, skipped doses if need be.

Zetia

Ezetimibe **(Zetia)** is a medicine that inhibits absorption of cholesterol from the intestines and can lower LDL as much as 20% more, when combined with a statin.

It is a convenient, once-a-day, small pill – safe and well tolerated. It can be used alone but is not highly effective that way. It is *much* better combined with at least *some* statin. We will often use it if you are having trouble tolerating higher doses of statin or, to avoid having to use the *highest* dose of statin, we might *add* Zetia instead. Ezetimibe/Simvastatin **(Vytorin)** is Zetia and a statin combined in one pill.

Sequestrants

Another medicine we use is a bile acid sequestrant called Colesevelam **(WelChol)** that is actually not absorbed by the body, which is good. It is used exclusively to lower LDL, is not very powerful, and finds use only when no statin can be tolerated or a full dose statin and Zetia do not lower LDL enough.

Gastrointestinal symptoms can occur with this medicine that requires three to six large capsules at supper but can usually be avoided or minimized by resourcefully going slowly up to six capsules or, if desperate, you can spread them out at breakfast, lunch, and supper, but with less good effect.

This medicine can raise triglycerides, and we will monitor for that.

Summary

I will look at your HDL, LDL and triglycerides in the context of many other factors, then propose a goal and treatment. Study your goal and meet it by way of the proposed treatment. Please stay current on necessary labs and refills.

I look forward to seeing you on the good side of your goals.

Name_____

Cholesterol Profile Readings

Date	Cholesterol Medicines and Doses	Total Cholesterol	Triglycerides	HDL	LDL

IX

You Say Hypertension, I say High Blood Pressure – They are the Same Thing.

I prefer not to be harmed by this “silent killer”. Avoiding such from this sneaky condition requires the understanding you will gain in five good pages.

Hypertension

The stroke Jim's father had at sixty-seven left him unable to walk well, in need of assistance for daily activity, prematurely "old" and deflated. At thirty-eight, Jim feels his good health may mean he will not inherit the family trait. Since he feels fine, he is not too concerned when his doctor mentions that his blood pressure is up a little.

Not until two years later, after several days of a vague, "strange feeling" does he makes an appointment and find his blood pressure is 158/94. (Normal is less than or equal to 139/89.) As requested, he comes in weekly to have his pressure checked and, within three weeks, it is clear he *does* have high blood pressure – he has probably had it the entire two years.

As an aside, the "strange feeling" was a virus that got well – high blood pressure usually does not make you feel badly until it ruins you, usually decades later.

Since he has already been practicing pretty good diet and exercise and is not drinking too much alcohol, he elects to go on the medication his doctor suggests. Within weeks after beginning a pill, his readings are consistently better than the 137/83 proposed goal.

Facing up to and defeating high blood pressure, unlike the hopeful neglect of the last two years, now gives Jim *valid* confidence he will avoid his father's fate.

What's wrong with a little high blood pressure?

The reason we do not want your blood pressure to be high is because it damages the healthy endothelium (figure 1, page 17). This allows arterial plaque to form (figure 2), and then it can rupture (figure 3, page 18).

Poorly treated high blood pressure is most prone to cause a *stroke,* though it also contributes to heart attack, kidney failure, congestive heart failure and atrial fibrillation. These lead to dialysis, shortness of breath, chest pain, tiredness, blood thinner treatment and paralysis or loss of other function, making nursing home placement necessary – in short, the complications sometimes make death look pretty good.

Good blood pressure treatment can help avoid these complications.

Does Misery Love Company?

The good news? Hypertension is treatable. The bad news? If you have it, you are not alone. About 40% of men have it in their fifties, rising to greater than 50% in their sixties. **If you have *normal* blood pressure at age 55, you *still* have a 90% lifetime risk for developing high blood pressure** – it happens, especially as arteries "stiffen" when we all age. The choice is: beat it or get *beat up*. Though women get high blood pressure a few years later than men, the problems and complications are identical.

Beginning at a reading of 115/75, the risk for cardiovascular disease *doubles* with each increase of 20/10; even the "normal" reading of 135/85 is *twice* the risk of 115/75. If your reading is 155/95 – look out. Worse than that? – unspeakable.

Most people with high blood pressure are undertreated. Since it does not "hurt", it can be easy to ignore.

If a person *might* or *does* have high blood pressure, our bias should be *in favor of* effective treatment. Though we will not be hasty, we *must* dispense with destructive avoidance tendencies, a bias against medication, and unrealistic expectations for diet and exercise, etc.

To live long, live well and age well, demand that goal numbers be met by whatever means necessary.

How Do We Diagnose It?

Three readings (separated by a week or more) greater than 139 on top or 89 on bottom make **hypertension** very likely. If previous doctors "hinted" you might have "borderline readings", this adds likelihood. If either parent or any siblings have hypertension, this makes it more likely in you.

The diagnosis is often complex, often rationalized away erroneously and often goes for years untreated, with near certain detriment. (Perhaps something as subtle as at age 62 not being as mentally sharp had it been treated, or perhaps less subtle like a devastating stroke at age 52 or 72.)

Pre-hypertension is defined as 120-139/80-89. Such people *already* have increased risk, even though "only" lifestyle changes, and not yet medication, may be called for. If your numbers are in this range, begin to soften your brain to the notion that, soon enough, you will likely be well-advised to take a pill.

So What Readings Are We Going to Believe?

Readings outside a doctor's office have value *and* limits. Outside readings, when greater than 139/89, strongly *support* the diagnosis of hypertension. However, non-office readings are known to be **lower** than office readings. (About 15/10 on average, but no telling how much or how little in *you*.) Therefore "good" non-office readings **do not** necessarily prove you do not have hypertension.

From the medical journal *Circulation*, "Isolated office hypertension (high in office, low at home) has a noticeable prevalence in the population and is accompanied by structural cardiac alterations". **"Structural cardiac alterations" represent the pounding your arterial endothelium takes year after year, are associated with stroke, and should be avoided – *fearfully* avoided – if that is what it takes to be motivated.**

To summarize: high readings outside the office serve to *secure* the diagnosis, but low, non-office readings *do not* nullify high office readings. (See "Home Readings Part II" to get an idea how I will use home *and* office readings to best define the meaning of your blood pressure).

Once you have a diagnosis, I will suggest an in-office goal, usually 137/83, but if you have diabetes or known arterial disease, 130/80 or sometimes even lower.

Let's Treat It.

The two most important non-medication treatments are to lose to ideal body weight and keep alcohol at less than seven servings per week in women and ten per week in men. Weight and excess alcohol can be *reversible* reasons one has high blood pressure, along with a handful of medical conditions I constantly look for.

Most hypertensives, even *if* they are overweight or are drinking too much alcohol, have "essential hypertension", meaning no known cause except "genetic"– you just have it and must choose between active treatment or likely consequences. Besides "just genetic", increased arterial "stiffness" with age accounts for why so many of us *eventually* have hypertension and wind up on blood pressure medicine.

The Dash Diet

Dietary treatment incorporates the Dash Diet, which is defined as:

- **Nine servings per day of fruits and vegetables**
- **Grains**
- **The purposeful daily intake of low fat dairy products**
- **Moderate salt restriction: 2.4 grams sodium or 6 grams sodium chloride per day. (Sodium chloride is table salt. A teaspoon of water weighs 5 grams for comparison.)**

This is an intelligent approach that *all* hypertensive people should follow, but will seldom be enough. Exercise alone is even less effective in lowering blood pressure. The Dash Diet and exercise are, however, precisely the optimal approach for those who have pre-hypertension. (120-139/80-89)

The Dash Diet is in every way consistent with, and can be incorporated into, the advice given in the chapters on Getting into Shape and Eating Heart Healthy.

Medication

Most people with high blood pressure will require medicine to successfully avoid unhealthy endothelium leading to plaque formation, plaque rupture, heart attack and stroke. **"I am going to take whatever I reasonably need for good readings"** is more likely to serve well than, "Gee, I really don't like medicine". In the days of Daniel Boone and our grandfathers, so many just died early from high blood pressure.

Medicine is the gift of our times that puts you in charge of your own outcome, rather than becoming a helpless victim.

The JNC 7 report says, " most patients with hypertension will require two *or more* anti-hypertensive medications to achieve goal blood pressure." (italics mine).

If your blood pressure is controlled by one pill, once a day, and you do not even notice taking it – good for you. In the unlikely event it takes two years to find the *seven* medicines you take three times a day to gain good control and not be bothered – also good for you. I admire your clear thinking. **It really isn't about how hard it is to achieve, but rather that the alternative is worse.**

As an aside, if your current medicine does not adequately control your pressure, we almost always *add to* it, rather than change. So, if I propose a second pill, continue the first one unless I specify stopping it. The first medicine is, in fact, "working", even if your number is not right yet, and we do not want to give up its effect if you tolerate it well.

Home Readings Part II

If I suggest you take a pill, I also suggest you purchase a good-quality, home kit that takes readings from your *upper arm.* ("Omron" is a decent name-brand – widely available in drugstores, etc.) Though some may say, "my readings at home are always great so I don't need to make that change because of a high office reading" we know that people whose blood pressure is high in the doctor's office and low at home, *do* suffer damage.

Best is to take and *record* home readings, then *bring and leave them* when you come in for an office visit or blood pressure check. Even as few as *four* readings from home in a year add *a lot* of good information – imagine the value of a lot more readings. Record readings within one hour of when you first arise in the morning, any time in the evening and especially when you are stressed or upset. These are the times your readings will be the worst, and that is what we want to see.

Jim stayed open-minded and allowed his doctor to interpret the meaning of his home and office readings. Let's look at why he was well served by getting his physician's opinion about whether his pressure was best-treated: He brought a diary of home readings that averaged around 135/82 and his goal was "less than or equal to 137/83" – so far he had the appearance of good control. If he *also* read 135/82 in the office, he *did* have good control.

If, on the other hand, his reading in the office had been 150/92 (we already know that blood pressure is, *on average*,15/10 higher in the office than at home), these ***same, "okay"*** **home readings** would have *now* been *consistent with* the high office reading and, together, they suggest **he should be on *more* medication.**

Assuming *identical* home readings, the *office* reading might say you are "looking great" or might serve to tell us you "need more treatment". Give me the home numbers and seek my opinion whether you are adequately treated. (Preferably on 8½ x 11 paper so I can make it a page in your chart. Page 80 can be copied and used.) Thankfully, no treatment is irreversible. If *my* imperfect judgment is wrong, we can change.

A home kit has two other advantages. If the readings are higher than goal at home, we *know* we are not getting it right. Also, if you feel light-headed and get *really* low readings at home, like 92/52, it can help to know this to make adjustments. Low readings that do not bother you are harmless and sometimes necessary to achieve in-office goals.

"I Got Rhythm."

The rhythm of blood pressure treatment is: Each time a medicine is started or changed, *wait* three weeks to give it time to have full effect, *then* begin recording home readings and, *importantly*, drop in for a no-charge, no-appointment, convenient blood pressure check and **leave me your home diary,** approximately six weeks after the medicine change was made.

Catch The Rhythm.

Each time we make any change in blood pressure medicine it should be an automatic, you already-know-it reaction that you plan to drop in six weeks later, any time of day, without an appointment and re-check your blood pressure, with a written record of supplemental home readings. (Remember, don't record home readings on new medicine doses until three weeks *after* you start them, so your record will reflect the medicine's full effect.)

Always take your medications the day we are checking blood pressure, even if fasting for lab work. When we *finally* reach goal, take it upon yourself to drop in four times per year to be sure you are staying at goal. Expect it may take two to fifteen, or more, adjustments and you will not likely get too frustrated.

Each time you get a blood pressure check, it goes on my desk and I review your chart. If I propose a change, you will hear from us and, you already know – **check it six weeks after the change.** If you are at goal or close enough, you may not hear from me and you already know – **check it four times per year to be sure**.

This is about the *only* time in my practice where we do a test and, if it is okay, we do *not* contact you. This is partly because *you* are supposed to know your own goal anyway and partly because the sheer volume of blood pressure checks we do precludes my getting back to you to say it is normal.

Nothing else we do to avoid arterial disease complications relies on your attention and good work as much as hypertension treatment.

Work hard for months and months, expect medication changes and look forward to consistently meeting that goal in the office, as well as having even better readings at home.

The Medicines

There are dozens of medicines and some pills have two medicines in one, but there are really only a *few* **classes** of medicines. The following text briefly explains their benefits and some possible side effects.

Some classes are better for who you are and I will choose them accordingly – i.e. are you old/young, diabetic, asthmatic, black/white, male/female? Do you have heart failure, kidney failure, migraines or depression? Is your problem a high top number or high bottom number, etc.?

As I said earlier, maybe one pill, maybe a number of pills. Focus on getting good numbers and feeling well, *not* on how many pills it takes to get there. The pills save lives and have so far not damaged anyone in my twenty-plus years of experience. (Plenty of temporary nuisance though).

Any drug could cause a side effect. However, several of these medications are similar to placebo regarding tolerability. Be clever on your own to *wait it out* and *give it time* if you think a medicine is bothering you. *Your body may adjust* in days or weeks or *it may not be the medicine*. When starting a medicine you can *skip one day's dose* at first if you think it may help tolerability. It is best to *make an appointment and come see me to discuss*, if you ultimately think we need to change medicines.

Ace Inhibitors

Examples: Lisinopril **(Prinivil, Zestril)**, Benazepril **(Lotensin)**, Amlodipine/Benazepril **(Lotrel)**, Ramipril **(Altace)**, Enalapril **(Vasotec)**, Captopril **(Capoten)**, Quinapril **(Accupril)**, Fosinopril **(Monopril)**, Moexipril **(Univasc)**, Perindopril **(Aceon)**, Trandolapril **(Mavik)**, Captopril/Hydrochlorothiazide **(Capozide)**, Enalapril/Hydrochlorothiazide **(Vaseretic)**, Lisinopril/Hydrochlorothiazide **(Zestoretic, Prinzide)**, Moexipril/Hydrochlorothiazide **(Uniretic)**, Quinapril/Hydrochlorothiazide **(Accuretic)**, Enalapril/Felodipine **(Lexxel)** and Trandolapril/Verapamil **(Tarka)**.

Ace Inhibitors dilate blood vessels, lowering pressure by affecting kidney physiology. They are especially effective combined with a diuretic (water pill), or if you are dehydrated. (Too effective can make you *too* low and light-headed.) Aces are good to use with diabetes and heart failure. Never ending, but reversible, dry cough occurs often enough that I frequently use **ARB's** instead. Ace Inhibitors keep blood potassium up, even when combined with a diuretic, so potassium supplements should *not* be taken unless blood testing shows a low potassium.

If you perspire a lot on any given day, the medicine can work "too well" and make your pressure low enough to make you lightheaded. Drinking fluids and having something salty should help. If you encounter such light-headedness, **taking the medication in the evening, when you have all day to get hydrated and are finished with activities that cause fluid loss through perspiring, will often eliminate the problem**.

ARB's

Examples: Valsartan **(Diovan)**, Valsartan/Hydrochlorothiazide **(Diovan HCT)**, Losartan **(Cozaar)**, Losartan/Hydrochlorothiazide **(Hyzaar)**, Irbesartan **(Avapro)**, Irbesartan/Hydrochlorothiazide **(Avalide)**, Candesartan **(Atacand)**, Olmesartan **(Benicar)** and others.

These work similarly to Ace inhibitors but do not cause a dry cough. Often they have a mild effect on blood pressure until we change to one pill with an ARB *and* diuretic in it. ARB's also do not need a potassium supplement. They are well-tolerated medicines, but read the ACE Inhibitor passage about working "too well" and causing light-headedness – the same information applies to ARB's – just not the cough.

Diuretics

Examples: Hydrochlorothiazide – HCTZ **(Hydrodiuril)**, Triamterene/Hydrochlorothiazide **(Dyazide) or (Maxide)**, Bisoprolol/Hydrochlorothiazide **(Ziac)**, Indapamide **(Lozol)**, Spironolactone **(Aldactone)** and Spironolactone/Hydrochlorothiazide **(Aldactazide)**, Furosemide **(Lasix)** and others.

These cause salt to be lost in the urine and lower blood pressure. If used with triamterene, spironolactone, Ace or ARB, diuretics may not need a potassium supplement, otherwise they usually do need *prescription* potassium.

Diuretics especially make other medicines work more effectively and are generally well tolerated. They can normally be taken in the early evening without getting out of bed to use the bathroom because their effect is usually only a few hours, but they are often best taken in the morning to avoid the question. Diuretics need electrolyte blood testing one month after started or increased, and then once a year, or twice a year if higher doses or stronger diuretics like Furosemide **(Lasix)** or potassium-raising Spironolactone **(Aldactone)** are used. Diuretics can raise uric acid and cause gout. If they do, we can stop the diuretic or add a medication to lower uric acid.

Calcium Blockers

Examples: Amlodipine **(Norvasc)** Verapamil **(Calan, Calan SR, Covera-HS, Isoptin SR, Verelan PM)**, Nifedipine **(Adalat CC, Procardia XL)** and others.

Calicium blockers dilate blood vessels. They can cause transient headache or constipation. They somewhat often cause completely reversible foot swelling that will probably require a reduced dose, addition of a diuretic, or a change in medicine. Usually calcium blockers are well tolerated overall.

Beta Blockers

Examples: Atenolol **(Tenormin)**, Metoprolol **(Lopressor, Toprol-XL)**, Propranolol **(Inderal)** and others.

Beta blockers decrease the forcefulness of the heart and affect blood vessel tone to lower blood pressure. They slow the pulse, help heart palpitations and migraines, but can make asthma worse. They are generally well tolerated. It is wise not to abruptly stop or run out of beta blockers, to avoid excess heart stimulation.

Central Alpha Agonists

Examples: Clonidine **(Catapres)**

These lower blood vessel tone and blood pressure. They can give you a pesky dry mouth. There is a patch form, that is usually better tolerated and changed once a week, that stays on, even while getting wet. The pill form requires two or three times per day dosing. It is important to never run out of nor abruptly stop this very effective class of medicine as you can experience dangerous *rebound* high blood pressure.

If the patch causes skin rash, call us for a cortisone lung inhaler that can be dry-sprayed onto the skin before applying the patch, and will often make the patch tolerable.

Attention Men!

Male sex drive has many different components e.g. How old are you? Your stress level? How much alcohol do you drink? What mood are you in? Are you diabetic? Do you have other blood vessel disease or nerve injury? etc.

Some blood pressure medicines can add to the mix and, if this does not improve in a few weeks, I suggest you consider the above list and make constructive changes.

If the problem remains, the options are Sildenafil **(Viagra)** (or other similar medicines) or a change in medication. I favor **Viagra** if possible, as years of experience in changing medicine has been mostly unsuccessful and **high blood pressure can kill you**. If **Viagra** is not a perfect remedy, it is still perhaps the best option.

Now What?

Plow through obstacles: Check your blood pressure here when you should and leave a home diary. See me for problems you cannot solve on your own and double check that my advice is taking you below the goal number. Enjoy your new, better arteries.

Name:_____________________________

Blood Pressure Checks

Date	Blood Pressure	Location (home, drugstore, etc.)	Medicine Names and Doses

X

Quitting Tobacco

You will if you want to; you will not if you don't want to.
These two pages give your good intentions great ammo.

Quitting Tobacco

Quit? You will if you want to; you will not if you don't want to. This is written to give you as much information as I have about increasing the quit rate in someone who wants to.

Starting with a little motivation, I am skipping over, "did you know those things can kill you?" in favor of some good news.

About seven years after you quit smoking, the risk of you getting all the dreaded smoking diseases goes down to around 1.2 times more than someone who never smoked. Compare this to the 4.0 risk you have while smoking. Pipe and cigar smokers, dippers and chewers *may* have lower risks to start. This material is ideally suited for those who are trying to quit non-cigarette tobacco as well.

Studies? I will tell you what the studies show. Studies show you are more likely to quit if it is your own idea and also if you quit at the same time as a smoking spouse. (Don't wait for them – lead.)

Studies show you are more likely to quit if your doctor says you should – "Okay, I say you should!"

Studies show if you set a date and get psyched up, you are more likely to quit than if you act on a moment's inspiration.

Like most everything, humans quit tobacco *cold turkey* much better than if they taper. If a thousand "two-packers" taper from forty to four cigarettes per day, they are more likely to go back to forty than go to zero.

So make up your mind, line up your spouse the best you can, pick a date, get psyched and quit cold turkey.

Only when you have the above arranged are you ready for the other goodies that will increase the probability of your success. Please do not waste these good tools on a third-rate effort and later tell me, "No, those don't work". Of course they don't work, they are inanimate tools – *you* do the work, *they* make it easier and more likely you will meet with success.

Studies show that if you take the pill **Zyban,** which is also called **Wellbutrin,** at least two weeks before your quit date, you are more likely to quit. Those who take it for a year also gain less weight with quitting. You cannot take Zyban/Wellbutrin if you have ever had seizures or a serious head injury. It is taken twice per day, at least eight hours apart and not too close to bedtime, or it may bother your sleep.

Studies also show that more people quit with **Zyban** plus a **nicotine patch** than using either alone.

If you smoke twenty cigarettes or more a day, I suggest one month of the 21 mg. patch, one month of a 14 mg. patch and one month of a 7 mg. patch. Change it every morning. Take it off at bedtime to avoid vivid dreams or restless sleep and don't get overconfident or cheap and quit early – they are cheaper than the cigarette habit.

Ten to twenty cigarettes per day – I advise the 14 mg. patch one month and 7 mg. patch one month. Less than ten per day – 7 mg. for two months. You may buy nicotine patches at the drugstore without a prescription.

So you have decided to quit, enlisted your spouse, set a date, used **Zyban** two weeks before, quit cold turkey and are using the patch and you *still* want to smoke? Wow! Have we got a treat for you. The studies show that people who use the nicotine patch and a nicotine inhaler quit more than with either alone, so fill the prescription for **Zyban/Wellbutrin** *and* the nicotine inhaler I give you, buy the right size patches yourself and, when you still want to smoke, puff on your nicotine inhaler. People really do quit all the time. Do not underestimate the difficulty or assume these steps are needlessly elaborate, but rather take them to maximize and insure your good effort.

There are new quit-smoking products other than **Zyban,** which have recently made it to market. As of this writing, none have been around long enough for me to prescribe, until their safety is more established.

Now it is time for a non-study, unscientific conversation on the problem of restarting after months and even years of having quit. I have seen no studies about this, but offer you the following observations and advice:

First, the very day most people ruin months or years of good, hard work, they wake up that day and don't have a clue they are going to start back smoking. Usually people do it on the spur of the moment – ninety per cent of the time they are upset, ten per cent of the time they are out having a good time with the guys.

In that potentially fatal moment, "Big Lie One" and "Big Lie Two" get told. Big Lie One is: "I'm really not starting back, I'm just going to have this one."

Big Lie Two is: "I'm really not going to keep smoking – I'm just going to finish this pack" and poof! – you are back to smoking.

I have never seen a study that addresses this too-common problem, but let's you and I talk. You are full-grown, this is America and if you really want to restart smoking, that certainly seems your right.

If you do not want to restart, then when you quit this time, make a "contract deal" with yourself that goes something like this: "I don't buy a new house in two seconds, or a new car in two seconds; I reserve my right to buy a house, a car or to start back smoking, but I promise myself I won't do it without seventy-two hours of thought."

I doubt very many people will start back after the seventy-two hours is up. Think about it *now,* make yourself this psycho-deal and make a real effort to avoid being one of these disappointed people.

If you want to quit, the best way is to **set that date now!** This will give you time to start getting psyched up and line up all the other things in this section.

I know you can do it. When you have quit eight weeks, please contact my office so we can note it in your chart. Good luck.

XI

What if You Have A Family History of Arterial Disease?

Read this and begin to think you are better served by assuming you will get the family curse (even if it isn't so) instead of hoping not, being wrong, and not doing something to avoid it.

Family Arterial Disease

If anyone in your family has had arterial disease, this puts you at risk. We should start by assuming you are their genetic clone and will experience their *exact* fate, at *exactly* the same age. The earlier their problem, the worse their disease, and the closer they are related to you, the higher your risk. A **sibling** with arterial disease is the riskiest for you, followed by parents, then by more distant relatives.

Next we like to know, "were there extenuating circumstances"? For example, if this relative had long-standing diabetes – diabetes is so bad that *perhaps* your risk is less. However, we should not automatically make this assumption, since a family member with diabetes puts *you* at risk to have diabetes and follow the same course.

If a family member was a smoker, this also might put quite a bit of distance between you and that person, but once again, we should not assume so. Keep in mind, *lots* of people who smoke do not have *early* arterial disease – perhaps the *real* problem is a family trait.

Consider that *inherited* factors like lipoprotein (a), small dense LDL and insufficient HDL 2b are ways that inherited arterial disease can be passed to you, in spite of you perhaps having better habits than the affected family member. (See pages 98-101 for more about these novel blood risk factors which can be inherited, not related to lifestyle and are *invisible* on routine lab.)

If your habits are *worse* than your "clone", we need to be concerned you could have the same problem *earlier*.

Bottom line? If you have a family member with arterial disease, let's assume you *are* going to have it, just like they did. We will test you appropriately to *prove* you do. If we are unable to make the case – good for you. We then need to keep a cautious eye out as the years go on and periodically try again to show you have the family problem, each time hoping we "cannot make the case".

Contrast this safe, pre-emptive approach with those who explain away their family history with: "he was fat", "she smoked", "he was under tremendous pressure", "her diet was all bacon and gravy", "he never got off the couch", etc. This discounts just how genetic arterial disease often is and ignores the millions of people who do the same thing as this family member but do not have the early heart attack. **Such thinking, though reassuring, can be deadly – we know better.**

Make it your business to be familiar with assessing your age, sex, family history, cholesterol, blood pressure, blood sugar, tobacco use, C-reactive protein, EBCT/Heartscan and/or Carotid intima-media thickness tests as we have outlined.

Take comfort in hoping you don't have the family problem, and in *knowing* that if you do, we will likely figure it out and have a good remedy.

XII

Women and Their High Risk for Arterial Disease

By now, most people know women have *more* heart attacks and strokes than men and more deaths from arterial disease than from all cancers combined. Read this page to understand a little more.

Mary

Mary is diligent about getting her mammogram and routine exam with her gynecologist. She has friends with cancer and isn't about to leave her future to chance.

Her husband has coronary artery disease and she sees to it he remembers his cholesterol and blood pressure medications and has lab work done on time to help him avoid a heart attack. She has heard, "most women die of cancer and most men die of heart problems".

In actuality, **cardiovascular disease** is the number one cause of death in women, accounting for more deaths than *all* cancer deaths *combined*. Annual deaths due to coronary heart disease are *higher* in women than men and **44% of women die within one year of a heart attack, compared to 27% for men.**

Though it is true women are as much as *fifteen* years behind men in coronary event incidence in their younger years, by their mid to late sixties, the incidence has caught up to being the same.

This suggests that *at least* the same medical diligence practiced in preventing cancer deaths should be applied toward avoiding arterial problems.

Though arterial disease death is ten to twelve *times* more common than say, breast cancer death, we continue to have a poor track record standing against arterial disease.

Keep seeing the gynecologist and get a mammogram?. . . Of course.

Underestimate arterial risk? . . . Of course *not.* Assess your own risk as we outlined in Chapter I and pursue whatever is necessary to delay or entirely avoid *your* heart attack or stroke.

XIII

Tests – Lots of Tests, Plus Angioplasty, Stents and Bypass

Two Things: 1) No test is perfect.

2) We should do enough imperfect testing in you, done enough *different ways*, that we have **confidence** in our impression of the status of your arteries – not stopping until we have a clear enough picture to tell us how hard to treat you, or not.

Overview

In this section we are going to discuss a lot of tools available to help tell us more *precisely* who you are.

Move past looking at any one of these as being *the* ideal test that will tell us just *exactly* who you are – none of them have the ability to do that.

Instead, we will piece together as much information as appropriate to have a detailed idea of whether you do or don't have arterial disease and, if so, how much. If you don't have demonstrable disease, we will nonetheless want to know what we consider your *risk* for future disease to be.

The first seven pieces of information we use to classify you as **low, intermediate** or **high risk** are seven "tests" that *begin* to give us a *general* idea of your risk category: age, sex, family history, cholesterol, blood sugar, blood pressure and tobacco use.

If you are *intermediate risk,* we demonstrated in the case studies of Chapter 1 how C-reactive protein and EBCT/Heartscan or carotid intima-media thickness testing can be useful to help us see if perhaps you are on the higher or lower end of the intermediate risk scale.

If your risk or known arterial problem is bad enough, there are other tests that will give us even more, and often better, information. With this additional data, we can do our best to give you good treatment *before* anything bad happens.

As we define C-reactive protein, EBCT/Heartscan, nuclear treadmill, PET scan and others, keep reminding yourself that *none* of the tests are perfect. Each one has a certain **sensitivity** (sensitivity means if a problem is present, the test will detect it – no test has perfect sensitivity) and **specificity** (specificity means if the test says you have a problem, you do indeed have a problem i.e. it is not a "false positive" – no test has perfect specificity.)

Ten Tests

Depending on what we find out about you from the seven questions, some or all of the following ten tests will help better define you: C-reactive protein, EBCT/Heartscan, Carotid intima-media thickness test, nuclear treadmill, PET scan, CT Angiography, heart catheterization, Lipoprotein (a), LDL subtypes and HDL subtypes.

C-reactive protein

This protein is made in the liver and serves as a *marker* of inflammation in arterial plaque. (See figure 2, page 17) A value of less than 1.0 suggests "low risk", whereas a value greater than 3.0 suggests "high risk". Therefore, 1-3 is "intermediate risk". Since no test is perfect, if this test says you are "high risk" or "low risk", that does not make it so. For perspective though, the C-reactive protein test is roughly two times "better" than our best cholesterol assessment at stating who is at risk for heart attack.

C-reactive protein can be falsely elevated by underlying inflammatory conditions – anything from minor infections you are not even particularly aware of, to major inflammatory diseases like arthritis or inflammatory bowel disease, etc. Hormone replacement also falsely elevates C-reactive protein.

Values over ten are to be considered *falsely* elevated though, in all probability, that is not *always* the case. (I suspect that sometimes when people score 11, 12, 13 and 14 it is *not* an underlying inflammatory condition but rather they are quite high risk for arterial disease.) If you test in the "high risk" category, especially if you score over 10, then repeating the test in four to twelve weeks is a good idea.

A C-reactive protein that is "artificially low" does *not* tend to occur and therefore, on any given occasion, if you get a low C-reactive protein, this is probably a good indication that the C-reactive protein test is going to classify you as "low risk". This does not mean anything more than one of our seventeen tests or questions is suggesting you are "okay".

EBCT/Heartscan

EBCT stands for Electron Beam Computed Tomography and it describes the specialized type of CT scanner used for this test. The word "Heartscan" is actually a name brand. Whenever I use the word "Heartscan" I really mean EBCT and am referring to the test being done at the Memorial Wellness Center on the Southwest Freeway.

EBCT/Heartscan is a CT scan, which passes a simple x-ray beam through the coronary arteries without an injection, dye or exercise and is completed in approximately thirty seconds. The test detects calcium that might be deposited in arterial plaque and the computer generates a number score for you that we use to know a lot about you.

For example, in men under 35, only about 5% will score *any* calcium, and therefore *any* calcium would be highly significant, indicating that plaque is present at a very young age. On the other hand, in men 50-54, about 50% of men have begun to score *some* points, with the top 5% scoring about 600 points and the group at the 50th percentile scoring about five points.

People who score 400 points have a 50% chance of a heart attack in the next ten years and people who score 1000 points have a 50% risk in *three years*. So, for example, 600 points gives us a specific idea of a 52-year-old man's risk and will help us know how vigorously to pursue tests or treatment.

Any calcium score except zero means there is *some* plaque present and the potential for plaque rupture (see figure 3, page 18) is present. While it is true we might not want to ignore the guy who scores five points at age 52, we will nonetheless be somewhat reassured that he is leaning toward the 50th percentile and perhaps *so* much vigor in testing and treatment may not be called for. Since half of us eventually have arterial problems, this guy likely needs *some* kind of treatment.

A guy who had a heart attack last year and survived has at least a 20%, ten-year risk of a heart attack. Since he survived, by definition, he is not the worst type of heart disease patient – they die. An EBCT/Heartscan score of 80 corresponds with a 20%, ten-year risk of a heart attack – score 80

points and you have about the same risk as a guy who had a heart attack last year. More than that, more risk; less than that, less risk.

I wish a zero score on a Heartscan means you are in the clear forever, but certainly that is not the case. Though it is uncommon for anyone to have a heart attack in the year they have a zero Heartscan score, nonetheless "soft plaque" does not contain calcium, doesn't show up on a Heartscan, but has potential to rupture and cause a heart attack. (See figure 3, page 18) We recognize the test has this limitation and will not turn our back on other risk factors, nor erroneously *undertreat* when other tests suggest treatment is called for.

In the 50-54 age group, about one half of men have finally scored some points and that may well define most of the men who are ever going to have arterial problems. In women it is not until the 65-69 age group that 50% of women will have finally begun to score some points, implying *this* will be the group who might eventually have trouble. This especially means that men under the age of 52 and women under the age of 67 should not have false confidence in a zero EBCT/Heartscan score and if enough risk is present to suspect trouble, more testing might be advised. Having underlying coronary artery disease in spite of a zero score is quite a bit more common in *women* than in men.

Plaque Progression and Regression

EBCT/Heartscan calcium scores tend to increase at 30-60% or more per year, when left untreated. If treatment is effective, we hope to see a reduction in that annual rate of increase to 20%, 10%, *no* growth or even *regression* in the number.

Limited studies show that, compared to those with a growth rate of 30% or more, those who slow their growth rate down to 20% per year have about a *four-fold* reduction in coronary events and those who slow it to a 10% per year increase in calcium score enjoy an approximately *thirteen-fold* reduction in coronary events, compared to those with 30% or more increase per year.

For the fortunate few who have *no* growth or even regression, they experience almost *no* coronary events.

Once you have an EBCT/Heartscan that shows *any* score, we will apply what we feel is the best treatment combination for you and often recheck your EBCT/Heartscan in one, two or three years to see at what rate the number is increasing or decreasing. This will give us an excellent basis for determining whether we should be even more diligent in our efforts or whether what we are currently doing is working well.

Details

While we should ask the "seven questions" of everyone, not everyone should have a C-reactive protein, nor should everyone have an EBCT/Heartscan test.

If I suggest you get the test, as of this writing, it can be had for $300 at the Memorial Herman Wellness Center at 7731 SW Freeway, Houston, TX. The phone number is 713-448-8383.

Locations, phone numbers and prices change, so you might want to doublecheck. Often, insurance companies will take the position the test is a screening test and therefore they don't want to pay for it.

We will be happy to order the test, give you whatever diagnosis is appropriate and try to make the case that the test should be paid for. However, in the end, if you fall in the "intermediate risk" category, and have a chance of sudden death, I think this is a price that makes sense, even if you wind up incurring out-of-pocket costs, though that decision is up to you.

The imaging center will send me a report and I will contact you within two weeks, otherwise you should call me for results. The test is wide open, not confining, for those who don't like tight spaces.

If you are "intermediate" or "high risk", this test can be useful, particularly if it is abnormal, in assisting us regarding decisions about further testing or different treatments.

Carotid intima-media thickness test/CIMT

Especially in women under 67 and men under 52, with enough risk, a Heartscan score of zero may not be reassuring enough. In such cases, I will often suggest a cheaper test, closer to home and usually covered by insurance.

The Carotid intima-media thickness test (CIMT) is a simple ultrasound (sonogram, soundwave test) of the artery in the neck, similar to the test old guys get all across America, looking for old-guy artery *narrowing*. This test is slightly different in that almost no one I have asked to get this more subtle test will be anywhere near *narrow*. This test instead measures *thickness* of the *wall* of the artery and the report tells me *your* "artery age", based on your wall thickness, compared to an average person's age of the same sex. So, for example, if a 57-year-old woman at risk has a zero Heartscan score but a CIMT that shows the wall thickness of an average *eighty*-year-old woman, we will interpret this as a strong suggestion to be *vigorous* in our preventive efforts.

As of this writing, the test costs $160, is usually covered by insurance, and is done one day a month only. You call and make the appointment, get this done, they send me a report and I will send you a letter or occasionally ask to see you.

The imaging center will send me a report and I will contact you within four weeks, otherwise you should call me for results. The test is wide open, not confining, for those who don't like tight spaces.

If you are "intermediate" or "high risk", this test can be useful, particularly if it is abnormal, in assisting us regarding decisions about further testing or different treatments.

Nuclear Treadmill

The job of a nuclear treadmill is to find the person who has so much *narrowing* of their arteries that they are getting inadequate blood flow to the muscle.

We would be suspicious enough to do this test in two different settings: first would be **chest pain** in someone who has reasonable risk of having underlying coronary artery disease.

If you tell a great story of tight squeezing chest discomfort that comes on only with exertion and goes away within *minutes* of rest, then certainly we would be impressed enough by that story to be rather fast to do a nuclear treadmill test, even if the seven questions did not reveal a lot of risk in you.

If, on the other hand you have quite a bit of risk according to the seven questions and/or C-reactive protein, and/or EBCT/Heartscan, then we would be much faster to want to do such a test, even if your story is more "atypical", i.e. a sharp pain or a pain that lasts hours or only seconds, or a pain that might or might not occur with exertion or might occur at rest, etc.

If you have a lot of risk, we don't want to be too picky about how suspicious your story is, but rather we want to be fast to err on the side of testing, so that we do not let symptoms that were trying to tip you off lead to an avoidable heart attack. For example, we might want to look into "indigestion", "jaw aching", or "left arm aching", etc.

Scheduling

The nuclear treadmill is typically scheduled through my office, though you can do it on your own. It is usually done at Memorial Hospital – The Woodlands, next door. It can also be done at a variety of other places, including in some cardiologists' offices.

I do not do the test, but rather a qualified cardiologist is in attendance while you are hooked to the usual electric wires on your chest. You then walk up to twelve minutes on a treadmill, while the cardiologist is watching for certain EKG changes as you exercise.

You are injected with a tracer into a vein, usually close to when you are exercising (similar to when we take a blood sample in the office – this is not an *invasive* test and does not use "dye" that commonly causes a reaction). Pictures will be taken near exercise and then sometime later at rest.

If a physical problem keeps you from walking, you can still do a nuclear "treadmill" by getting an injection of a medication that will speed up your heart and accomplish the same purpose. Let us know in advance if you can't physically walk well. If you are just out of shape, not a problem, your heart rate will go up faster and they can stop the completed test sooner than twelve minutes.

If you take Digoxin, Lanoxin or blood pressure medicines that slow the heart rate like beta blockers and some calcium blockers, do not take them for at least 24 hours before the test or they will not be able to get the heart rate up as needed.

Interpretation

What if your test shows a "hole" in the picture in a certain location of your heart during exercise and then the hole fills in when they take your picture after you have rested awhile? This *implies* that you have an artery that is narrowed and unable to deliver the tracer to the muscle during exercise, though, eventually at rest, the area fills in.

If, on the other hand, you have a "hole" that does not fill in with rest, this either implies that you have had a previous heart attack and the muscle is dead, or some type of testing artifact like your diaphragm or breast getting in the way, or your body build being somewhat heavy and diminishing the accuracy of the test.

If the nuclear treadmill says you have a narrowed artery – that does not mean that it is so, but only that the test says so.

What to do in such a case

In my opinion, if the nuclear treadmill implies a narrowed artery and you have a lot of risk and a good story or a suspicious sounding story, then certainly a heart catheterization (angiogram – explained later) is reasonable. Having said that, read the upcoming CT Angiogram and PET scan sections for a potential alternative.

If, on the other hand, the nuclear treadmill test is minimally abnormal and you don't have so much risk and your story is not very suspicious sounding, then a good cardiologist might suggest to you that you be retested at a later date or might suggest heart catheterization. In such a case, the CT Angiogram or PET scan explained in the next sections might be a *smart* alternative.

Is "normal" really normal?

If you have a completely normal nuclear treadmill but have never had an EBCT/ Heartscan, then definitely I suggest getting the EBCT/Heartscan to "doublecheck". If you are a candidate to have a treadmill test, this means we have *some* suspicion in you. I have in my practice a number of individuals who have had a ***normal*** treadmill test with *some* risk and *some* chest symptoms. A subsequent EBCT/Heartscan was very ***abnormal***, leading to a subsequent heart catheterization and the finding that they had rather severe arterial disease.

If both the nuclear treadmill *and* an EBCT are normal, the likelihood of critically narrowed arteries is quite small.

The "warranty" on a nuclear treadmill is about one year. That is to say its job is to find you if you have narrowed arteries and, depending on where you have the test done, it will do so about 95% of the time in individuals who are slated to have a heart attack within the next one year. If you had a nuclear treadmill three years ago that was normal, this is not of zero value but certainly it provides limited information now.

The test's likelihood of making a false claim, if it says you have a narrowed artery, is in the neighborhood of 10%, again depending on a lot of factors such as where the test is done, who interprets it, etc. A follow-up heart catheterization that is "normal" is how you would know if an abnormal nuclear treadmill is a "false positive".

What if we still "don't know"?

In cases where a nuclear treadmill test and a Heartscan or CIMT have provided information that remains ambiguous, we are doing fine – that is a normal-enough situation, since no test(s) are perfect. We are pleased that, so far, only time and money and *not* invasive testing have been called for.

In this common (but not *very* common) situation, we might advise invasive heart catheterization, if your entire situation is risky enough to justify the small risk of an invasive test.

Often, however, your overall risk will be low enough that we will be inclined to accept as accurate, another, non-invasive test – either a CT Angiogram or a PET scan.

If you find yourself being advised such, consider two principles: 1) a possible heart attack is common enough and bad enough to justify putting yourself to such trouble (it *can* be tiresome) and 2) in a lot of cases, making every effort to avoid the small risk of invasive testing is best.

Whenever you have the nuclear treadmill done, I should get back to you with results within two weeks time or you should contact me for results, as occasionally we do not know you are having the test or we fail to track down results when they are not forthcoming.

I will routinely contact you by mail if your results are normal, though when I find abnormal results, we will endeavor to contact you as quickly as possible by phone, etc.

Cardiac PET Scan

This test has some features similar to an EBCT/Heartscan or CIMT and some features similar to a nuclear treadmill. Like the EBCT/Heartscan and CIMT, it can detect arterial disease long *before* it might cause any trouble. Also, like the nuclear treadmill test, the PET scan is an excellent tool to evaluate someone at risk, with chest symptoms, for coronary artery narrowing that might need more *immediate* attention.

Currently, the test is best done at the University of Texas Medical School, consulting with Dr. Lance Gould, Professor of Cardiology at the medical school, and an expert on coronary artery disease prevention and treatment.

In having the test done, you see Dr. Gould, he performs the test and typically interprets it on the spot, as well as giving you detailed advice regarding your next best steps, including a written report of such advice.

The test is performed by injecting a tracer into a vein (non-invasive) and giving you a medicine to speed up your heart rate without exercise. A camera device similar to a CT scan is then used to generate a color flow scan to detect *early* heart disease as well as diminished *flow* that might represent a more immediate threat.

The advantage of the PET scan is that it is more *sensitive* and more *specific* than the nuclear treadmill in giving a picture of current blood flow or deficiencies of blood flow that might indicate a narrowed artery.

This increased sensitivity and specificity can be useful in cases where a nuclear treadmill is abnormal, even though our pre-treadmill suspicions might have been somewhat low. In this situation, a normal PET scan will often allow Dr. Gould to render a cardiologist's opinion that an invasive catheterization is *not* called for, based on the results of the PET scan, thus saving the patient not only time and money, but more importantly, an invasive procedure.

Also, the Pet scan is a great test to repeat two or more years after excellent treatment, to see if you are better, worse or the same. Those who are better have likely *stabilized* their plaque (see figure 4, page 18) and have a *low* likelihood of heart attack. Those who are worsening need better treatment.

The disadvantage of a PET scan, as of this writing, is that it costs around $3000 and, though it is sometimes covered by insurance, insurance companies will sometimes make an effort not to pay for this test. In general it has appeared to me over the years that if a person has chest pain or known coronary artery disease, often insurance companies *do* pay. If instead a person only has a lot of *risk*, then insurance companies might elect not to pay by claiming it is a *screening* test, which in truth it is not. If you have risk, finding out who you are, including the use of a PET scan when appropriate, is practicing optimal medicine – not "just screening".

CT Angiography of Coronary Arteries

Recall that no *one* test is perfect and each test adds unique information to help us gain an adequate understanding of your arteries, so that we may respond accordingly with treatment.

An invasive heart catheterization (described in the next section) has some risk, but provides a good (not perfect) actual picture of artery size and narrowing.

Nowadays, we are able to get almost as good a picture without the risk of putting a tube into the heart. This test is a CT Angiogram. In this test (CT Angiogram), dye is injected into an arm vein (no different than the tens of thousands of CT scans done everyday all across America) and a CT scan takes pictures of the coronary arteries that do a good job (remember, never great, never perfect) of showing blockage of major arteries.

Though totally different than a PET scan, this test also might be used best in the setting of an abnormal nuclear treadmill test when the chances of a "false positive" are thought to be pretty high and the small risk of a invasive heart catheterization might not be appropriate.

Heart Catheterization

"Heart catheterization", "heart cath", "cath", "angiogram", "angiography", "coronary angiogram" and "arteriogram"; these are all words for the same procedure – namely inserting a tube that is not as big around as the outside of a Bic pen into an *artery,* up to the heart and into the blood vessels that go to the heart muscle itself – the coronary arteries.

Dye is then injected into the arteries and a video picture is taken for close scrutiny of whether narrowing can be found in any of the main coronary arteries or their branches.

Usually the catheter is inserted into an artery near the groin, though arm arteries or other locations can be used.

The test is done by a cardiologist and is usually done as an outpatient. Complications from a heart catheterization alone are infrequent and the most common problems are with bruising or artery damage at the location in the groin, opposed to problems at the heart.

The usual reason to get a heart catheterization is because chest symptoms lead to an abnormal nuclear treadmill or an abnormal PET scan. If your symptoms sound a lot like heart disease and you are high risk, it is sometimes better to proceed *directly* to heart catheterization.

What will we learn?

Let's go through some of the possible information that can be gleaned from the heart catheterization: First, you can be told that your arteries are entirely "normal". Since the heart catheterization, like all other tests, has a sensitivity and specificity that is *not* perfect, it is possible to have a "normal" heart catheterization and an *abnormal* EBCT/Heartscan and/or PET scan that shows disease is definitely present and is a risk to your health. It is not uncommon to have a "normal" heart catheterization and some *short* time later wind up with *severe* coronary artery disease.

Certainly, a normal outcome on a coronary arteriogram is reassuring, though it is just a *part* of the total package of information regarding what is best for the health of your arteries.

Watch out.

You can be told you have some "minor plaque" but "thankfully", no major blockage.

As you know, "minor plaque" can rupture and kill you at any time and is a serious disease, even though it may not call for immediate intervention with physical, mechanical approaches like balloons, stents and bypass. Such mechanical intervention should be thought of as buying time until medical treatment has *stabilized plaque.* (See figure 4, page 18)

If you are told you have "minor plaque", take this seriously as you now have *proof* that you have a disease that could hurt you at any time. (See figure 3, page 18) Thankfully though, "minor plaque" suggests your situation is such that there is likely time for medical treatment alone to stabilize your plaque and diminish your risk substantially.

Other Possibilities?

After heart catheterization, you can be told that you have "diffuse disease" that needs "only medical therapy". In this situation, you might have very extensive arterial disease – this is often true of diabetics. Even though the arterial disease may be fairly severe, it does not happen to be the type that would improve with a balloon or stent or bypass surgery – it is just capable of hurting you.

"Diffuse disease" is *very* serious and maximal medical efforts should be made to diminish your risk.

"Don't be so critical."

You can receive a report that says you have a "critical blockage" in one or more arteries and, depending on the size, location, and number of arteries, you might be an appropriate candidate for balloon dilation, (angioplasty) the placement of a mechanical stent to "prop open" the artery or you might be told that your disease is of such a pattern that bypass surgery represents the best approach to minimize your risk of heart attack.

Balloon angioplasty that dilates a narrow artery was developed in hopes of doing less bypass and has been effective, but subject to a lot of re-narrowing of the arteries. Stents that "prop open" arteries were developed and represent a bit of an improvement, though they too have problems with re-narrowing.

Drug eluting stents have been developed that are coated with medication that retards arterial plaque development and have been successful at preventing re-narrowing of the arteries. As of this writing, drug eluting stents are not so well studied that we have perfect confidence in their safety and effectiveness, but they are one of many tools to make the best of a bad situation. Once again, it must be stressed that the *best* answer to arterial disease is appropriate diet, exercise and medication that halts the process, even if we have to employ these mechanical measures to "buy you time".

In summary, the heart catheterization is done to see if you need urgent, mechanical correction of severe narrowing of the arteries. A result that stops short of requiring mechanical intervention may, nonetheless, give you information that tells us you *do* have arterial disease that needs aggressive attention to diminish your risk.

Even if the heart catheterization is 100% normal, it is prudent to recall that the test has its limitations and a "normal" report would not negate any concerns that the seven questions, a C-reactive protein and an EBCT/Heartscan or CIMT might have raised.

Novel Blood Risk Factors

There are currently three factors that we might commonly measure in blood that have an association with coronary artery disease: lipoprotein (a), seven types of LDL (the bad cholesterol), and five types of HDL (the good cholesterol).

Unlike the seven questions, which we apply to *everyone* to get an idea whether they might be **low**, **intermediate** or **high risk**, these three novel blood tests should be reserved primarily for people who we already *know* have arterial disease.

The reason to limit these tests to people with known arterial disease is: Though there is excellent science and there are hundreds of published, peer-reviewed journal articles associated with each, the proof of their *causation*, or that *treatment* is effective, is not nearly as well established as it is for treating high blood pressure or treating cholesterol with a statin drug like Lipitor; nor is it as well established as the science that demonstrates that exercise and quitting smoking are good for you.

If the seven questions put you in the **intermediate** risk category and you have a good enough C-reactive protein and a zero EBCT/Heartscan, it is *not* a good idea to pursue this testing, as we would be increasing the probability of making a *false* claim that you have "such and such" a problem and need "such and such" treatment.

If, on the other hand, at a relatively young age you just got off the bypass table following your second heart attack, then certainly we should be very assertive with any and all tools that have decent science behind them to suggest potential benefit.

For many people who are between these two extremes, i.e. intermediate risk with an abnormal EBCT/ Heartscan, whether to pursue this testing or not is a judgment I will make. This will be based on my assessment of whether your risk is high enough to merit further (potentially more difficult) treatment that may not be clearly proven to be as effective as more established treatments.

Often, your personal preference is an excellent guide in such "intermediate" cases. Some patients want to pursue the potentially best outcome, regardless of difficulty, others prefer a minimalist approach. Both preferences can be sensible in some of these intermediate cases.

Lipoprotein (a)

Lipoprotein (a) is largely determined *genetically* by autosomal dominant inheritance, which means if a parent has this factor, there is a 50/50 chance they will pass it along to their children.

Here is what we know about lipoprotein (a):

- It is genetically determined and will *not* be favorably or unfavorably affected by diet and exercise.
- High levels are an independent predictor for developing coronary artery disease.
- We still have no proof that it is *causative* of coronary artery disease, though that notion makes practical sense.
- Lipoprotein (a) can be lowered with niacin – a B vitamin that, in the high doses we use, can be difficult to take due to uncomfortable skin flushing like a hot flash. (See more about niacin on pages 66-68.)
- We have no proof that lowering lipoprotein (a) levels will improve cardiac outcomes. We have no studies to show it does *not*, but rather simply have incomplete information.
- Risk from lipoprotein (a) can be diminished by lowering your LDL to less than 70.
- We *do* have limited information that shows impressive, improved cardiac outcomes in people who have known coronary artery disease when they take niacin in addition to a statin, like Lipitor or Zocor, regardless of their lipoprotein (a) level.

To summarize, if you have bad enough coronary artery disease, measuring lipoprotein (a) and, if elevated, taking niacin might provide an improvement in your outcome, either from lowering the lipoprotein (a) itself or from other beneficial effects from the niacin.

Seven Kinds of LDL (the bad cholesterol)

We are accustomed to discussing LDL as if there is one type of LDL (the bad cholesterol).

With specialized testing, LDL can be separated into seven component parts. Some are large, fluffy and therefore "good", and others are small, dense and therefore "bad".

Regrettably, the statin class drugs like **Lipitor** and **Zocor** do not improve the LDL subtype to the more favorable type.

Some people have the wrong kind of LDL due to lack of exercise, or, to a lesser extent, not eating heart healthy – most diabetics have the "wrong", "small, dense LDL".

In such cases, exercise especially, and perhaps good diet, may improve the LDL subtype to the more favorable "large buoyant".

Some might have the wrong subtype, not because of poor diet and exercise, but *strictly on a genetic basis*, or they might have a *combination* of genetics and lifestyle. Whenever diet and exercise alone do not result in the right LDL subtype, niacin will be the only currently available excellent remedy. The fibrates like Fenofibrate **(Tricor)** or Gemfibrozil **(Lopid)** can be of limited value as well.

Does treatment help?

Unlike lipoprotein (a), a bit more robust science is available to demonstrate the value of testing and treating LDL subtypes.

There are heart catheterization studies that show the amount of narrowing after treatment of small dense LDL is *less* than it was prior to treatment, as measured by heart catheterization.

This is not nearly the terrific science as that which studies the effect of treatment on death or heart attack; nonetheless, this is pretty good information that rather strongly suggests the value of treating small, dense LDL.

If seven questions, an EBCT/Heartscan or CIMT and C-reactive protein put you on the lower end of the risk scale, then just good diet and exercise and foregoing such testing will be appropriate; but for those who have more of a problem than that, such testing makes sense.

Five Types of HDL (good cholesterol)

Once again, we usually talk about HDL as if there is one type when, in truth, there are five types and you need to have enough of the effective "HDL 2b". This is the one that is most effective at "reverse cholesterol transport" in which cholesterol is actually taken out of arterial plaque and returned to the liver.

While the science that tells us the above is *good science*, we do not have excellent proof that if we manipulate this component of the blood in someone who has arterial disease, that they will have better outcomes.

Once again, it is not a matter of having studies that show it does *not* do good, but rather simply not having studies done, to date, that prove increasing HDL 2b is effective.

Low HDL 2b is improved by aerobic exercise, though some can have a stubborn, genetic component that will only improve with niacin treatment.

The evidence is shaky enough and the treatment difficult enough that, testing and treatment for this factor does not make a lot of sense in those who are on the *lower* end of the risk scale but, for example, might serve as the *only* explanation we might put forth as to why an EBCT/Heartscan might be *so* abnormal or why a second or third EBCT/Heartscan is failing to improve.

Under such a scenario, it can be arguably smart to aggressively conclude that the abnormal HDL 2b is the explanation for the problem and therefore, we will treat it.

I think your common sense can help you see that when we are on this edge of science, the possibility certainly exists that even though we are making a good faith effort to use best available information, we will nonetheless be running some risk of being entirely wrong and offering a treatment that, two decades from now we might find has been less than optimal, or unnecessary.

In a setting of bad disease and no other options, such an endeavor may have value, but one's personal preference can be the superior deciding factor.

Novel Risk Factor Summary

If you don't have a lot of risk, my advice would be that you stay away from novel risk factor testing.

Once you have proven arterial disease by EBCT/Heartscan, CIMT, PET Scan, abnormal heart catheterization or having had a heart attack or stroke, then I believe testing the novel blood risk factors makes sense, but *you* should understand what we do and don't know about these tests, their limitations, the pros and cons of our knowledge regarding treatment and its effect on your outcome.

Armed with a good understanding of these issues, I believe you will make decisions that are in your own best interest.

Do not hesitate to come see me to discuss this important, but subtle and complex, subject.

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Medication Index Listed by Brand Name and Generic Name

Look up and read what little is written about every medicine you are on – the more you know, the better you do.

The index has brand and generic names so you can look for whatever medicine name is on the bottle label. If your medicine is not listed, call us and we will suggest a page number for you**.**

Medication Index Listed by Name and Generic

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Topical Index

This index should help you find the subject you want to read about.

TOPICAL INDEX