Thank you very much, Charlie, it’s nice to be back again. I guess it’s not quite like winning the U.S. Open for the third time, but at least it is close for a doctor.

What I’d like to do today is to discuss about four or five different areas of cardiovascular medicine: the cholesterol myth, heart attack and new advances in its treatment, new devices in cardiology, especially laser techniques, some aspects of the socioeconomics of medicine, and what we as physicians are trying to do about controlling medical costs.

About the Cholesterol Myth

I have received a number of inquiries about the article in the September 1989 Atlantic Monthly, titled “The Cholesterol Myth,” written by Thomas J. Moore. Moore stated: Before a program, i.e., the National Cholesterol Education Program, costing millions, was launched, it should have been conclusively demonstrated that lowering cholesterol levels would save lives; no such evidence existed.

However, the National Cholesterol Education Program was the result of three years of study by the authorities in the field appointed by the National Institutes of Health and the American Heart Association. A group called the Expert Lipid Panel made recommendations that physicians and the public should be educated about cholesterol. They recommended that we needed to screen the public and, if a high cholesterol level was found, to treat first with an appropriate diet. If a high cholesterol was in association with heart disease, medication may be necessary. It was felt that such treatment would save lives and prevent strokes and heart attacks.

But Thomas J. Moore expressed a different opinion in his article. He stated that diet has hardly any effect on cholesterol levels, that drugs that lower it often have serious side effects (and that’s true, they do), and that there is no evidence at all that lowering your cholesterol level will lengthen your life.

Thomas Moore’s credentials are: He is a newspaper reporter, and not a physician or a scientist. He is the author of Heart Failure, a book that was published by Random House two months after this article. He seemed to use material primarily from letters to the editors, apparently without doing scientific research on the subject. Unfortunately, Moore’s article has caused a very negative reaction nationally among the public by misinterpreting the medical data. Titles of chapters from his book, “Why is the public being misled about the dangers of
cholesterol?” or “When is bypass surgery more dangerous than heart disease?” are more inflammatory than objective.

I cannot help but think of this quote from Winston Churchill: “A lie travels around the world while History is putting on its boots.”

Actually, as I researched this quote further, it dates to C.H. Spurgeon, an English Baptist minister in 1836. In one of Churchill’s addresses during World War II, however, he took credit for it.

Instead of the Moore article, I would like to recommend to you a more authoritative book with the correct facts, Beyond Cholesterol, by Dr. Peter Kwiterovich, the director of the Lipid Clinic at Johns Hopkins Medical School.

There is a scientific basis to indicate that the cholesterol myth is really not a myth; that, indeed, the higher cholesterol level that you have, the more likely it is that you will have a heart attack or die of coronary heart disease. Figure 1 below shows this relationship clearly. The MRFIT study related the level of the serum cholesterol to coronary heart disease death in 361,662 men aged 35-57 who were followed for 6 years.

There have been two additional important epidemiological studies, one in Framingham, Massachusetts, and one in Oslo, Norway, in which large populations of men and women and their serum cholesterols have been followed for up to 20 years. These studies have also shown that the higher the cholesterol, the greater the chance that a person will die from heart disease.

It is true that we don’t understand everything about hardening of the arteries (atherosclerosis). We know that the serum cholesterol is not the only factor involved. Family history, genetics, tobacco abuse, hypertension, and other risk factors also play an important role in some people.

Two recent medical trials were published prior to the release of the National Cholesterol Education Program report: one conducted in Finland and one conducted by the National Institutes of Health. Approximately 10,000 men in one study and approximately 5,000 in the other were randomized, if they had a high cholesterol, to either drug treatment or a placebo. These men were followed for approximately five years. The studies found that if a medicine was taken which lowered the cholesterol that the mortality from heart attack decreased in direct relationship to the degree of the lowering of the serum cholesterol. These are very solid statistical studies from two countries with similar important conclusions.

In addition, there are three studies that impress the medical profession: one is from the National Institutes of Health, the second from UCLA, and the third is called the FAT study from the University of Washington in Seattle. These studies involved patients who already had had bypass surgery or a heart attack. The patients were randomized; half were treated for an elevated cholesterol and the other half were not treated. The patients were followed for periods of three to five years and then had a repeat angiogram (i.e., X-ray pictures of the arteries of the heart).

The researchers found that in the group of people that were treated effectively with lowering of the cholesterol, the incidence of heart attack, the need for a repeat coronary operation, and the yearly mortality were reduced. But equally important was the fact that the coronary angiograms showed prevention of the progression of the atherosclerotic process in many cases. This was the first time that it had been clearly demonstrated that a medical treatment
can block the progression of hardening of the arteries; and, in fact, in some individuals there was
evidence that lesions in the arteries had even regressed.

In another study, 2500 men ages 40 to 69 were followed for 10 years by the National
Institutes of Health. If the LDL cholesterol (the bad cholesterol) was lower than 130, or if the
total cholesterol was lower than 200, and if the HDL cholesterol (the good cholesterol) was
greater than 45, the incidence of developing a heart attack or mortality over this 10-year period
was 5 times less than those men with abnormal levels. Only 3.8 percent of men with good levels
died of heart disease in the 10-year period, whereas 19.6 percent of men with bad levels died.

So I hope that I have been able to put this cholesterol myth into the same category as the
Flat Earth Society. There are people in the United States, believe it or not, that still believe
inarguably that the earth is flat. These may be the same people that still believe that tobacco does
not cause lung cancer or heart disease!

**Heart Attack – Symptoms and Treatment**

Now to the subject of heart attack: Picture a man walking out of a restaurant after having
a heavy meal and a stressful day. He has his briefcase with him, and he is walking out into the
cold and the snow. He has developed chest pain in the central part of his chest, making his teeth
clench. He is perspiring and nauseated; the pain may radiate into his belly, or arms, or neck. He
thinks, What a bad case of indigestion! (That is a very common reaction to the symptoms of a
heart attack).

What our patient is suffering from is an artery (an elastic pipe leading to his heart) that is
obstructed with cholesterol and a thrombus, (or blood clot). The gradual buildup of cholesterol in
the artery has occurred over years. The roughened surface then serves as a nidus for the
development of a blood clot that completely and acutely blocks the flow of blood to the heart.

Fortunately, this man came to our emergency room and had an angiogram that showed a
blood clot sitting right in the artery, with the artery just barely open. The patient was given a
medicine, a thrombolytic agent (streptokinase, in this case). Within an hour of the infusion of
streptokinase directly through a catheter put in from the leg into the coronary artery, the clot
dissolved. His symptoms were relieved; extensive permanent damage to his heart was prevented;
and he left the hospital a few days later.

A left ventricular angiogram taken at the time of the heart attack showed that the heart
was severely stunned and would barely contract. One year later, he had another angiogram. The
obstructed coronary was wide open and essentially normal, and his heart contracted almost
normally. This was the first case at the Heart Institute at St. Luke’s in which we were able to
to completely reverse the process of an acute heart attack, and one of the first in medical history.

Dr. Geoffrey O. Hartzler and some of my other colleagues at St. Luke’s next developed a
technique for treating patients with an acute heart attack and coronary occlusion with balloon
angioplasty, subsequently accumulating the largest experience in the world using this method
successfully.

**Figure 2a** shows the coronary artery of another man who had developed severe chest
pain. He was found to have an artery occluded by a clot or thrombus. A balloon catheter was fed
from his leg into the blocked-off heart artery under fluoroscopy guidance. The balloon was
inflated, and the artery opened (**Figure 2b**).
By using the balloon catheter technique within 30 minutes of the time the patient arrived in the emergency room, his artery was opened and his chest pain was relieved. His electrocardiogram improved, and he no longer showed permanent damage from the heart attack.

It was just 10 years ago that patients were in the hospital as long as 30 days after a routine heart attack and the mortality was 20 percent. Now we are able to dismiss the patient in 5 to 10 days with a mortality of 6 percent, and, of course, back to work soon thereafter.

A key to this remarkable success, however, depends on the patient coming to the hospital emergency room immediately after the heart attack starts in order to avoid permanent injury to the heart muscle. If a patient delays coming to the hospital longer than 6 hours after the beginning of a heart attack, the results will be markedly compromised. We must educate the public that new chest pain is not necessarily indigestion and that an evaluation in an emergency room is indicated immediately. There will be false alarms, but if the patient truly has a heart attack, prompt treatment may save his or her life.

**New Advances in the Treatment of Heart Attack**

Next I wish to discuss with you how we are deciding which drugs work best and how these decisions can affect health care costs and choice of treatment. For example, there are two drugs that are available to dissolve a blood clot in the heart as an alternative treatment to balloon angioplasty. If a patient comes to St. Luke’s Hospital with a heart attack, we will generally prefer balloon angioplasty because in our hands we feel it is quicker, more effective, and safer. However, if you live in rural Kansas or Missouri, facilities for this prompt treatment are not available.

One thrombolytic drug developed through genetic engineering by Genotech is TPA or Tissue Plasminogen Activator. It dissolves a blood clot very much as some potent snake venoms. (The reason people die from some snake bites is the result of lytic chemicals in the venom which prevent blood from clotting, and the victim bleeds to death.) TPA, a similar substance can be used to dissolve clots in the heart.

In a combined European study, researchers decided to develop a medical trial to compare these two drugs, by randomizing 20,000 men with heart attacks to TPA or another older drug, streptokinase. In another similar study in Italy, where they have a National Health Insurance system, 12,000 patients were randomized to the same two drugs. Both studies found no differences in the in-hospital and one-year mortality in patients treated with either of these two drugs.

In the United States, there are 1.5 million patients in a year that have a heart attack. The cost of treatment with TPA is $2328, whereas streptokinase costs $180 and the balloon angioplasty procedure costs approximately $6000. With angioplasty, 94 percent of the blocked arteries can be opened immediately, 75 percent using streptokinase, and 80 percent with TPA. Eighty-two percent will still be open a few months later using angioplasty, as opposed to 60-70 percent after the two drug treatments.

One percent of patients treated with the thrombolytic agents will develop an acute stroke, and in fact 2.7 percent if the patient is over the age of 70; this rarely occurs after angioplasty. Thirty percent of patients treated with streptokinase and TPA will later require balloon angioplasty because even though the blood clot was dissolved, a severe narrowing in the artery due to cholesterol persists. Figure 3 compares these treatment strategies in tabular form.
If we compare the costs of streptokinase and TPA, $3.2 billion a year would be saved if we treated all 1.5 million patients in the United States with streptokinase rather than TPA. Of course, Medicare and other insurance plans will look carefully at differences in the reimbursement of these costly but life-saving alternatives.

The time may come when an insurance company will say that it won’t pay for TPA, or for angioplasty, but only for streptokinase, even though it may not be quite as effective. More trials will be necessary to further define the ultimate outcome and safety of these techniques. Presently the Medicare DRG system pays a hospital a block total fee of approximately $4203 to cover all costs to treat a Medicare patient for a heart attack. This may naturally prompt hospital administrators to attempt to influence their doctors to use the cheaper forms of treatment if possible; in contrast, physicians are concerned primarily with quality of care and achieving the best outcome for their patients.

New Devices in Cardiology

A laser catheter looks like a piece of spaghetti (Figure 4); it can be threaded through another catheter that is put into the vascular system via the femoral artery in the groin and then threaded into the arteries of the heart. The device can emit high energy light waves that can disintegrate or dissolve matter, such as a cholesterol deposit. The energy source for the Excimer laser costs approximately $150,000; the laser catheters cost about $300 to $400 and cannot be reused.

A man with an obstructed coronary artery was having severe chest pain occurring with any normal activity. After the angiogram identified the blockage, a laser catheter was fed into his coronary artery. The laser was turned on, and the obstructing cholesterol plaque was vaporized into small molecules. A balloon catheter was then used to refine the final results. This therapy is very effective and, though new, is most encouraging.

Another device, an atherectomy catheter works like a RotoRooter. Figures 5a, b, and c show the angiogram from a man who had previously had bypass surgery. The bypass vein graft had developed a severe narrowing eight years after his original bypass surgery, and he had recurrent severe chest pain. A balloon angioplasty was attempted but was unsuccessful.

The atherectomy capsule then was fed through the leg, through another catheter. The atherectomy device has a cylindrical knife that slides back and forth inside the capsule and shaves off and collects the cholesterol deposits.

Similar lasers and atherectomy devices can be used effectively in patients who have blocked arteries in the legs.

Another new life-saving electronic device, the automatic internal defibrillator, can be placed in the upper abdomen with two electrodes attached to the heart. If a patient who is subject to cardiac arrest develops ventricular fibrillation, the device automatically shocks him out of the abnormal rhythm and prevents death.

Future Directions in Heart Disease Research

Since there is a 30 percent chance of regrowth of the cholesterol in an artery after a person has had balloon angioplasty, laser, or atherectomy, drugs will need to be developed to prevent this process. I have already mentioned two studies showing that the progression of atherosclerosis can be retarded once it occurs by lowering the serum cholesterol.
There are also two recent preliminary studies from Europe that have shown that a calcium channel blocking agent, similar to the drug Cardizem marketed by Marion Labs, may be able to prevent the development of new cholesterol deposits. This data will need to be confirmed by other studies. The power of large randomized trials, such as I discussed earlier with TPA and streptokinase, will allow medical scientists to verify these types of results.

**Taking a Look at Health Care Costs**

I would like to address some potential ways that health care costs can be reduced or controlled. In 1981, for example, 159,000 coronary bypass operations were performed in the United States, versus 284,000 in 1986. In 1985, the cost to Medicare was 1.5 billion. These costs increased in 1989 to $12 billion, 2 percent of the total U.S. health costs.

But we have to put this into perspective and realize that heart disease is the most common cause of death in the United States; heart disease counts for 50 to 60 percent of all adult deaths in America.

Randomized trials done in VA hospitals have shown that some specific types of patients treated with bypass surgery do no better than patients treated with medication. However, the more severe cases, for example patients with all three arteries to the heart blocked, clearly do better with bypass surgery. These studies have shown that at the end of five years, 87 percent of the patients who had had surgery were alive, and only 59 percent of the patients that were treated with medication alone were alive. A Belgian study and two other U.S. studies have now verified these data. The coronary bypass operation is certainly the most studied procedure ever known to mankind!

There has been a lot of discussion about unnecessary operations. In some groups of patients, surgery is clearly beneficial; in others, it is not. Cardiologists can now make better decisions for their patients based on data from carefully designed scientific studies. Using these types of studies for decision making should have an enormous impact on individual patients survival, as well as on the costs of treatment.

The Mid America Heart Institute of St. Luke’s Hospital has developed as one of the two or three centers in the United States with the greatest experience with balloon angioplasty. In fact, 30 percent of Heart Institute patients come from outside our three- or four-state region and are referred from all over the U.S. and many foreign countries.

However, coronary angioplasty is a complicated procedure with substantial costs for both equipment and personnel. Bypass surgery is also a complicated and costly procedure, requiring experienced surgeons, a heart-lung machine, experienced nurses, and other physicians.

We have just completed one of the first studies to examine costs and outcome in patients treated with balloon angioplasty versus bypass surgery. It is important to realize that what a patient is charged by a hospital is not necessarily what it costs. It may be necessary to charge extra expenses for a heart operation in order to pay for the expenses of the patient who has no insurance (for example, the person with no insurance who comes in with a gunshot wound on Saturday night and costs the hospital $60,000 in blood transfusions!).

In our study, the average 30-day cost for coronary bypass surgery was $31,000 versus $13,000 for coronary balloon angioplasty. These charges included every single charge that the patient had: IV’s, medications, doctors, room charges, etc. We followed these same patients for one year and found that at the end of a year, the same number of patients were alive and the same
number of patients were doing well whether treated by surgery or angioplasty. We concluded that in some patients a comparable mortality and quality of life can be achieved and with considerably less expenditure with angioplasty than with surgery. Doctors will have to continue similar studies in all aspects of medicine in order to compare outcome and costs. Insurance companies, hospital administrators and board members, and the public, in fact, will demand it.

New York State and California have tracked carefully the costs and outcome of every single coronary bypass operation that has been done in their states for the past few years. They have found that the volume done by a hospital per year is directly related to the costs that are charged and to the surgical result and mortality. To a patient having bypass surgery in our own city, there may be a $10,000 to $15,000 difference in charges made by one hospital versus another.

If the patient develops a wound infection, the costs increase. Similarly, costs increase after a respiratory complication if the patient was a smoker. Information such as this allows physicians (and insurance companies) to identify patients that are going to be at higher risk for complications and costs with many procedures.

In New York State, if a surgeon does over 250 cases a year, the surgical mortality for individual patients is less than if the surgeon does fewer cases. This may seem obvious to those of you in business, but now the same principles must be applied to medical care. Should a hospital doing less than 250 to 300 coronary bypass cases a year continue?

In Great Britain, experts are in fact suggesting that 600 cases should be the minimum number a year for cost effectiveness and for outcome. Yet in 1988, the Mid America Heart Institute of St. Luke’s Hospital was the only hospital in our city that performed more than 300 cases. There are probably hospitals in Kansas City that have good results with lower volumes of patients, but certainly in general the hospital and surgeon doing a higher volume can expect better results as is the case in most medical procedures.

Patients and their insurance carriers will ultimately have this kind of outcome data available to them. Patients will begin to ask more frequently: What is the risk to me for you to do this procedure? I don’t care what the risk is for me if I go to the Mayo Clinic or other large institutions, but what is the risk for me at this hospital with this surgeon? And what is the cost?

Total health care costs in 1989 were $600 billion versus $75 billion in 1970, now 11 percent of the gross national product. The average annual increase in medical costs, 17 percent, has exceeded the 11 percent annual increase of the consumer price index (CPI). Yet 22 percent of medical costs are now spent for administration; some of these bureaucratic costs are surely unnecessary.

To put the rising cost of health care into perspective, note that, in 1975, 50 percent of babies who weighed between 2 and 3 pounds at birth died. Now, 90 percent will live because of medical progress. But look at the cost: $160,000 per baby, or a $2.6 billion national expenditure for treating premature infants.

How do you decide whether it’s worth it? A heart transplant costs $50,000 today. A pacemaker can cost from $5,000 to $10,000. The American public likes expensive consumer goods, such as our automobiles and other luxury items. I have been told that the American public spends more money on professional sports than on health care. In fact we spent $1.2 billion on
pleasure boating in the United States alone last year. That was the figure for the total costs for coronary bypass surgery in 1985.

Special devices such as the MRI (magnetic resonance imaging) cost $1.5 million, and the patient is charged $750 to $1,000 for each study. Intensive care unit beds cost up to $1200 dollars a day because of the monitoring and equipment costs, but many lives have been saved because of the expert care received.

For further perspective, we must note that annual deaths from heart disease between 1977 and 1987 have declined by 30 percent in the United States, and there has been a 35 percent decrease in deaths from cerebral vascular disease or strokes. If you came into the hospital with a heart attack in 1970, there was a 20 percent chance of not walking out alive. Today, the mortality is 5 to 7 percent, largely because of some of the advances that we have discussed today.

Sam Harrison just had his fifth anniversary after a heart transplant at St. Luke’s. How do you put a value on a heart transplant operation that costs about $80,000, for Sam would have been dead two or three weeks later without a new heart. Sam was 55 years old at the time of his transplant, and he now lives a nearly normal, active life.

**Other Areas of Concern in Medicine Today**

The American College of Physicians and the AMA have made strong statements that health care should be available for everybody and that programs in the United States must be developed with equal access to health care. Doctors have agreed that they must get into the driver’s seat on this issue. We have to help make these decisions and not let legislators or others not as knowledgeable about health care predominate.

Delays in health care must be addressed. Many HMOs have gate keepers whose job seems primarily to keep people away from seeing doctors or spending health care money; this could lead to severe deterioration in personal care.

The malpractice crisis needs attention and correction.

“Skimming and dumping” can be a serious problem for tertiary hospitals such as St. Luke’s. If a low volume hospital doing bypass surgery, for example, takes the “easy cases” that will have a good result – i.e., a patient that doesn’t smoke and is under the age of 55 – yet sends the more difficult cases into a tertiary center, the average mortality for heart surgery in a tertiary hospital will go up and the personnel and hospital will be excessively compromised because of this adverse case mixture.

We need to avoid redundancy and unnecessary costs. We need to develop centers of excellence and institutes of quality. Insurance companies in the future may designate certain hospitals to direct patients that belong to their insurance plan for certain procedures such as heart surgery, angioplasty, or treatment for heart attack. Medicare does this now for heart transplant patients. If the person chooses to go to another hospital, he may have to pay an additional premium.

We will see more use of outcome data, that is, the comparison of results. Global pricing procedures will become more common, i.e., a hospital may be reimbursed a fixed fee for a certain disease or problem regardless of whether it is an easy or complicated case and regardless of the length of stay and costs. We are going to have to recognize centers that deal with higher risk cases and somehow reimburse them appropriately – as well as centers that do teaching and
education. We need to recognize that we do have limitations of resources and need to look carefully at risks/benefits. Physicians must take a more active role in these considerations.

In the New England Journal of Medicine last week, there were three articles on the rationing of health care. Should we ration health care to people over the age of 70? There are some very powerful arguments from some experts that feel that we should. I do not share this view, but pressure will be upon us to consider even these types of drastic measures to reduce costs.

More About the Mid America Heart Institute of St. Luke’s

We are proud of the fact that our board of directors has been able to raise some $12 million to add five additional floors to the Robert Wilson Wagstaff building. On completion we will have approximately 176 beds in the Heart Institute that will be specifically designed to take care of heart patients. I believe that we will have the best single building designed to care for heart patients in the United States, and perhaps in the world. We now have some 40 board-certified cardiologists, physicians, and cardiac surgeons and some 250 nurses who work at the Heart Institute. We will have approximately 55 ICU beds and seven cardiac catheterization units in order to perform 2200 angioplasties and 900 open heart surgeries a year. This is indeed a big program, and yet it remains an integral part of St. Luke’s Hospital. The efforts of many in this room have made the Heart Institute possible, and it will continue to serve as an asset to the region.

QUESTIONS AND ANSWERS

QUESTION: Did I understand you to say that they are using the laser on the arteries in the calves of the legs?

ANSWER: Yes, in fact, the technique was developed in the legs first because it was safer, and it is now being used in the heart. However, we don’t feel that the laser has replaced standard balloon angioplasty treatment. It is a very effective treatment, but it is still highly experimental. We must be careful not to expect too much prematurely from any new technique.

QUESTION: How does a laser go around corners?

ANSWER: The laser catheter is fairly flexible, but the laser beam is not. The laser beam, however, is very short and controlled. If it were not, the beam could perforate the artery and cause serious bleeding.

QUESTION: So, in effect it can’t turn corners?

ANSWER: Correct, particularly sharp corners, but I am convinced that engineers will eventually solve these drawbacks.

QUESTION: I understand that in England, and perhaps Germany, they are already rationing surgery in certain situations. What technique do they use to make the decision?

ANSWER: I had considered reviewing with you health care systems in Canada and England. America has to continue to look at those systems. There are imperfections in our system, and there are imperfections in those systems. Somehow we have to wed the two. I think that the American system is better, and most doctors and health care authorities agree that for the patient it is the best system in the world today. Indeed, there are many people in Great Britain,
Canada, and Austria, for example, who need to have bypass surgery or angioplasty yet have long delays for treatment; their hospitals are limited by the government to a finite budget. Therefore, we are seeing patients from Germany and other countries come to the Heart Institute and other U.S. institutions for care. Delays of up to 9 months for heart surgery are common in Europe.

QUESTION: Does the gas produced by the laser produce a hazard?
ANSWER: No, the vaporized matter, such as cholesterol, becomes molecular in size. These small particles can not injure the body or cause an embolism.

QUESTION: I have two questions. The first one: Is there any data on the number of bypass patients who will require a second and third bypass operation?
ANSWER: If the surgeon has used a vein for the coronary bypass, by 10 years from the time of the first operation, 40 percent of patients will begin to develop blockage in the bypass grafts from cholesterol with a return of symptoms. A certain significant percentage of these people will require a second operation. If the surgeon originally used an internal mammary artery as the conduit for bypass, the patency rate at 10 years is about 95 percent. This is certainly a superior operation in retrospect.

Now we are seeing many patients who had surgery 10 or 15 years ago coming back with occluded bypass grafts. They will often need laser, angioplasty or another operation. However, with improved prevention of atherosclerosis, such as shown in a recent study from UCLA, those men who have had coronary bypass surgery, who have stopped smoking and followed a low cholesterol diet, and have received medications to reduce their cholesterol below 180, will have less need for a repeat operation.

QUESTION: The second question, can an arrhythmia be corrected or cured?
ANSWER: There are many types of arrhythmias. Most can be treated either with medication or with some device, i.e., pacemakers or automatic defibrillators. However, a large trial completed last year showed that many of the medicines that we use for VPCs, ventricular premature contractions, may have serious side effects and do more harm than good. Therefore, the medical profession has become more conservative in treating some types of arrhythmias.

QUESTION: You mentioned that there are side effects of various cholesterol-lowering drugs.
ANSWER: There are five major drugs that can be used to treat an elevated cholesterol. Niacin is a form of vitamin B complex, nicotinic acid. Its side effects, such as nausea, are relatively minor. Niacin can cause liver injury in some patients, but it is reversible. Unfortunately, niacin is not very powerful; it lowers the cholesterol by only 10 or 15 percent. Cholestyramine binds cholesterol in the gut and keeps it out of the blood stream. It is a more powerful drug and has minimal side effects. It reduces the cholesterol about 20 percent. Lopid or gemfibrozil lowers the cholesterol and elevates the HDL cholesterol by about 15 to 20 percent. It also has few side effects, but it is also not very powerful.

Another drug, probucol or Lorelco, developed by Marion Merrill Dow, has not only cholesterol lowering properties, but also other potential beneficial effects on abnormal cell growth in the arterial walls.

The most powerful drug is lovastatin (Mevacor). We have used Mevacor in over 300 patients in our cholesterol management clinic. It easily reduces an elevated cholesterol to less
than 200. There are now over a million people in the United States taking the drug today. There have been no permanent side effects as of yet, unless there are other major medical problems which can potentiate an adverse drug interaction. Mevacor can cause liver injury, but it has not been permanent. Some of the trials that I discussed today have used these drugs and have shown a subsequent decrease in mortality due to heart disease.

QUESTION: You referenced arrested and possible reversal of atherosclerosis or hardening of the arteries. The question is, How do you identify when the process is starting?

ANSWER: In Canada and in Great Britain health authorities feel they can not afford to screen all people for an elevated cholesterol level. If a person is between the ages of 55 and 65 and male, screening will be reimbursed and permitted, but not for women or for people over 70 or less than 55. These governments feel that they are saving lots of money, but I hope that the data that I showed you today would indicate that theirs is faulty reasoning. The best and most cost effective method of screening is a serum cholesterol and, in some cases, a treadmill exercise test.

QUESTION: Does exercise help prevent heart disease?

ANSWER: It clearly makes a difference in my opinion. A good exercise program for patients who have had a heart attack or heart surgery, provides a new self-image, a new self-confidence. Exercise is the single most powerful stimulus to increase the good cholesterol (HDL). People who exercise tend to reduce their weight to an ideal level; their cholesterol tends to come down; and they often quit smoking. However, it is very difficult to separate out what exercise does by itself and what benefits are due to the secondary effects of an exercise program.

QUESTION: Does colchicine prevent restenosis after balloon angioplasty?

ANSWER: Colchicine is a drug that has been used for gout. It has also been shown to prevent the development of fibrous tissue in patients who have cirrhosis of the liver and in other types of cell growth processes. Data from experimental animal studies suggested that it might be able to block the regrowth of cholesterol deposits after angioplasty (i.e., restenosis). In a recent study at the Mid America Heart Institute, 200 men and women, who have had angioplasty, were randomized to taking colchicine or a placebo. We restudied the patients six months later with angiograms and found that there were no beneficial effects from colchicine. This example of a randomized trial was effective in pointing out to cardiologists that colchicine, although theoretically effective, had no benefit in this condition.
**BEN D. MCCALLISTER, M.D.** a consultant in cardiovascular diseases at the Mid America Heart Institute of St. Luke’s Hospital, was one of the creators of the Heart Institute and a driving force behind its development. He now serves as vice-chairman of the Heart Institute’s advisory committee.

Dr. McCallister is a practicing clinician who also has a distinguished research record. He has authored some fifty publications. He is a past president of the Missouri Heart Association and Clinical Professor of Medicine at the University of Missouri-Kansas City School of Medicine.

Before coming to St. Luke’s in 1969, he was associated with the Mayo Clinic for 10 years as a staff consultant in cardiology and director of the coronary arteriographic laboratory.

A past member of the Board of Directors of Midwest Research Institute, Dr. McCallister has been active in Science Pioneers, St. Luke’s Foundation, and Mill Creek Parks Association. On the national level, he is on the Government Relations Committee of the American College of Cardiology and serves as the American Heart Association’s representative to the AMA delegates assembly. He was elected Phi Beta Kappa at the University of Kansas where he earned both his B.A. and M.D. degrees.

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**MIDCONTINENT PERSPECTIVES** was a lecture series sponsored by the Midwest Research Institute as a public service to the midcontinent region. Its purpose was to present new viewpoints on economic, political, social, and scientific issues that affect the Midwest and the nation.

Midcontinent Perspectives was financed by the Kimball Fund, named for Charles N. Kimball, President of MRI from 1950 to 1975, Chairman of its Board of Trustees from 1975 to 1979, and President Emeritus until his death in 1994. Initiated in 1970, the Fund has been supported by annual contributions from individuals, corporations, and foundations. Today it is the primary source of endowment income for MRI. It provides “front-end” money to start high-quality projects that might generate future research contracts of importance. It also funds public-interest projects focusing on civic or regional matters of interest.

Initiated in 1974 and continuing until 1994, the sessions of the Midcontinent Perspectives were arranged and convened by Dr. Kimball at four- to six-week intervals. Attendance was by invitation, and the audience consisted of leaders in the Kansas City metropolitan area. The lectures, in monograph form, were later distributed to several thousand individuals and institutions throughout the country who were interested in MRI and in the topics addressed.

The **Western Historical Manuscript Collection-Kansas City**, in cooperation with MRI, has reissued the Midcontinent Perspectives Lectures in electronic format in order to make the valuable information which they contain newly accessible and to honor the creator of the series, Dr. Charles N. Kimball.