I want to thank the friends of Midwest Research for the invitation and the challenge of participating in this fine series of lectures – the Midcontinent Perspectives. As I have had the benefit of reviewing previous discussions of the Midcontinent Perspectives series, I was struck with the fact that developments in the cardiovascular medical field in the past 20 years have perhaps surpassed those of agriculture, business, and energy. Perhaps only those advances leading to our journeys in space have been of equal magnitude. In fact, many of the electronic outgrowths of the space program have been transferred over to the treatment of heart disease, and even the strongest skeptics of the space program would have to acknowledge the usefulness of these spinoffs for the benefit of mankind.

The task that I have today is one that we often must do; that is, “blue sky,” or think about the future. It is really not an impractical task; for example, those of us at St. Luke’s Hospital who have been involved in the development of a Heart Institute, have to accurately predict what is going to happen to medicine in the future. We have to realize that many of the technological advances and drugs that seem so wonderful to us today, will actually become antiquated by newly acquired knowledge.

In order to predict the nature of medicine, particularly in the field of cardiology, in the year 2001, which is the precept that Dr. Kimball has given to me, I would like first to review what has happened in the past 20 years, and then move on to some predictions.

This is particularly appropriate as my career started in cardiology 20 years ago when I graduated from medical school in 1956, and most of the things that we do in cardiology today have been developed within the last 20 years. They have become a part of my everyday life, and I have literally grown up with them. Not all of the advances that I will discuss with you today were available until the late and mid-60s, and some not until the 1970s. I hope that this will put into perspective for you what has happened so rapidly during the last 20 to 25 years and will lay the groundwork for what we may have to do in terms of predicting or expecting from this day on.

It is especially fitting to note that Dr. Kimball, who is an acknowledged leader in our scientific community, has been personally benefited by modern sciences and technology – an electronic cardiac pacemaker. Charlie’s degree is in electrical engineering. He is a Fellow of the Institute of Electrical Engineers. I can tell you for sure there is nobody in the United States, or anywhere for that matter, who has a pacemaker who is more knowledgeable about it, and more
appreciative of all the nuances and the many isolated scientific/medical research facts that were required in order to develop the device as it is today.

In 1960, for example, half the patients with heart block, that is, the disease in which the heart is unable to deliver an electrical signal to the pumping chambers to cause the heart to beat, would be expected to be dead within 1 year. Today, however, with use of the pacemaker, actuarial studies, such as are done for life insurance statistics, have shown that patients with heart block, treated with a pacemaker, have a yearly survival comparable to that of the general population. In a sense, the patient with a pacemaker may truly be the first Bionic Man.

In my remarks today I feel initially compelled to restrict my comments to the scientific arena. Later, of necessity, we will have to explore socioeconomic and moral aspects of our medical future. As I indicated earlier, in order to predict future developments in medicine in the year 2001, it will be helpful to review the scientific advances that have led to the present state of the art. Further, it is important for us to think a bit about the nature of research, and how various types of research can be integrated to produce the final result that the bedside clinician actually uses.

There is nothing that has been more dramatic in the treatment of cardiac diseases than the development of cardiac surgery, including valve replacement, congenital defects that are repaired, i.e., the “blue baby” who is repaired, and coronary artery bypass surgery. All of these techniques have been developed during the last 20 years. Important advances have also been made in vascular surgery, in the treatment of hardening of the arteries to the brain, the legs, and the kidneys.

Cardiac surgery has been made possible by the development of the “bubble oxygenator” in the late 1950s, or the method of cardiopulmonary bypass in which the heart can be stopped at the time of open-heart surgery. The unoxygenated blood from the body comes into an oxygenator, picks up oxygen, is put back into the body, supplying the brain and the kidneys and other vital organs, allowing the surgeon to work on a quiet nonbeating heart.

With open-heart surgery it is possible to correct the so-called “blue baby” condition in which there is a hole between the two upper or lower chambers of the heart. With the child supported by cardiopulmonary bypass, using a bubble oxygenator the surgeon can open the heart and sew a patch to close the hole between the two heart chambers.

Rheumatic heart disease, a condition which has caused many premature deaths, is now treated very effectively with an artificial valve. After the patient’s own diseased valve is removed, the surgeon can insert a ball-valve prosthesis. The artificial valve requires fine engineering and metal work because the valve is subjected to many stresses and strains as it opens and closes while the heart beats approximately 100,000 times a day, or 40 million times a year. The development of appropriate silastic materials and metals were, of course, crucial to the development of the artificial heart valve.

Coronary artery bypass is becoming the most common operation in the United States today, perhaps even surpassing in number operations for appendicitis. A small segment of vein is taken out of the patient’s leg; one end is then sewn onto the aorta and the other end to a coronary artery, bypassing the obstruction in the artery. The blood can thus flow past a large deposit of cholesterol that had been formed and which blocked the flow of blood to the heart muscle itself.
Other advances have come through electronic developments. The patient who has heart block – has no electrical impulses to trigger his heartbeat – requires a pacemaker. The pacemaker, a small but sophisticated instrument, has a miniature electrocardiographic machine within it which can sense whether or not the patient puts out his own heartbeat; if not, then an electrical stimulation is sent to the heart muscle, causing the heart to contract or beat. The pacemaker includes a power pack which is hooked via a small silastic-coated platinum wire placed in the jugular vein, and then fed into the inside of the heart (or via a wire sewn directly on the surface of the heart). The wire then carries the electrical stimulus from the power pack to cause the heart to beat. The power pack encloses the mercury battery cells and the electronics, i.e., the integrated circuits, the capacitors, and the small transistors (many electronic features which have been developed only in recent years).

A technique to provide an electric shock or defibrillate the heart was developed about 1960. This procedure has saved many lives, and its use has become quite commonplace in coronary care units. Often when a heart attack occurs, the heart begins to fibrillate, i.e., it runs out of control, is uncoordinated, and is ineffective as a pump. Unless the heart is returned to a normal rhythm by defibrillation, the patient will usually die within a few minutes. Because of the need for prompt treatment and because the defibrillation technique is now so commonplace, nurses have been delegated authority to administer the necessary electrical shock in emergency situations in a coronary care unit.

Treadmill exercise testing is another advance. When an electrocardiogram is taken while a patient is resting, it may often be normal even though the patient has serious heart disease. By having the patient walk on a treadmill, and recording the electrocardiogram during exercise, abnormalities can be detected which were not suspected before, a proper diagnosis can be made, and the patient can be treated accordingly. The treadmill is also used for other purposes, including the evaluation of the results of surgery, drug therapy, and exercise programs.

Medical electronics developed in the space program have made possible the monitoring via telemetry EKG signal transmission of a patient’s recovery and progress after being moved out of the intensive care unit into a regular hospital ward. The EKG sensors are attached to the patient’s body, and the readings are then transmitted by a small radio signal to a central monitoring station. The condition of astronauts was monitored in space in this fashion. Likewise, during convalescence in the hospital, the patient’s EKG signal can be transmitted to the nurse’s station where nurses and physicians can watch his progress when he is up to the bathroom, shaving, brushing his teeth, discussing things with his wife, etc. This aids in determining that the patient is going to recover from his heart attack safely, yet allows freedom of movement without being encumbered by other types of monitoring devices. In addition, the EKG signal can be recorded on tape for up to 24 hours continuously. The patient can wear the EKG ambulatory monitoring unit to work; he can wear it wherever he goes, and it will monitor every heartbeat he has for a 24-hour period. The tape can then be examined by a cardiologist, and if there is any evidence that there is a serious problem with the heartbeat, it can be diagnosed, and appropriate treatment can be started.

During the past 4 to 5 years a technique has been developed in which a catheter or tube can be placed through a vein into the inside of the heart. There, pressures can be monitored following a heart attack in order to determine how extensive the heart attack is and how it is affecting the body. Heart failure can be detected before it actually occurs, and treatment can be instituted before serious consequences develop.
Computerized EKG systems are also now available. An EKG can be taken in a small community hospital, such as Greensburg, Kansas or Trenton, Missouri. The signal is then fed into a mini-computer system, after transmission by phone to Kansas City. Within 2 or 3 minutes an analysis of the EKG is sent back via a telephone system to the small hospital. This development then provides the small hospital and its doctors as sophisticated an electrocardiograph interpretation as is available in a large hospital in a metropolitan area.

Echocardiography is an inexpensive, simple method that does not require invasion of the patient much as is necessary in cardiac catheterization. This ultrasound device allows transmission of a sonar beam from a probe placed on the outside of the chest wall, through the wall into one chamber of the heart, then on through the septum of the heart into the other chamber of the heart. The movements and abnormalities of the heart valves can be observed and measurements of the inner chamber of the heart can be made. This technique evolved out of World War II technology, but it has been available for use in cardiology only in the last 4 or 5 years.

Cardiac catheterization and angiography is a technique that allows us to take precise pictures of the arteries of the heart, the heart chambers, and valves and to make an accurate diagnosis. It also permits the kind of anatomic diagnoses that are necessary to guide the surgeon in making precise corrections of cardiac defects, and to determine which patients should or should not have surgery.

Cardiac resuscitation (CPR) is an emergency survival technique that involves a combination of mouth-to-mouth breathing and rhythmic pressing on the sternum of the chest to stimulate the heart. This technique was not applied to humans until about 1961, and yet the concept is so simple. A person who has had a cardiac arrest or standstill often due to a heart attack passes out, is pulseless and does not breathe. He can be kept alive for up to 30 minutes by 2 people using this simple technique while being transported to a hospital where more specific medications and treatment can be given. The Kansas City Heart Association has made a major effort to train some 15,000 people a year in CPR. The school systems are being involved, as well as the Boy Scouts. In addition, it is important for spouses of those who have had heart attacks to learn how to do CPR.

A rescue system has been developed in Kansas City (MARCER). This ambulance rescue system begins when a person has a heart attack and a central dispatch call goes in. The closest ambulance is dispatched, and the vehicle is equipped to record and transmit via radio the individual’s electrocardiogram to an emergency room at one of the major hospitals while en route. Within about 4 to 5 minutes after having a heart attack in our community, the patient can be under continuous physician monitoring. The paramedics can be instructed via radio, what medications and other temporary lifesaving therapy, including countershock, should be given until the patient is transported to a hospital. This is a very major advance because one-fourth of all patients who die of a heart attack die before they reach a hospital, a very, very awesome number of potentially preventable deaths that might be reduce.

There have been a number of advances in drug therapy; antibiotics have essentially eradicated rheumatic fever and syphilitic heart disease. I have not personally seen a case of acute rheumatic fever for about 5 or 6 years. To contrast this with the situation 20 years ago when I graduated from medical school, there was at that time a hospital in Kansas City dedicated
primarily to the care of children with acute rheumatic fever and the associated heart ailments caused by the disease.

Diuretics or fluid pills for the treatment of heart failure have been very important. The one that is commonly used, furosemide, has only been available during the last 6 or 7 years. This year the Lasker Award for scientific development was given to the workers who developed propranolol for the treatment of angina pectoris. When Dr. Michael DeBakey presented the award, he said there was no question that this drug is the most important pharmacological advance in medicine since Weathering discovered digitalis. New drugs have also been available for the treatment of hypertension, a major cause of stroke and heart attack, and these drugs have permitted a 45 percent decrease in the mortality from high blood pressure during the last 15 years of Coronary artery disease is an affliction that many of us will some day develop. Twenty-seven million people are afflicted with it, one million die each year, sixty percent of the deaths of people over the age of 55 are from coronary disease, and coronary disease causes 50 percent of all the deaths in the United States. One-fourth of heart attack victims die before they reach the hospital, and another 15 percent die after reaching the hospital. This then is a serious disease of our society; and we have to realize that this is also a progressive one. The disease imposes a tremendous economic burden on our society. Yearly, $19.7 billion is lost because of patients being hospitalized and disabled from heart attacks; some 52 billion man-days are lost each year.

Now, by the identification of certain risk factors such as smoking and diet, the rate of the most common cause of death in our society can be reduced. Research has indicated that if hypertension is treated, that if one follows a sane, prudent diet, reducing the cholesterol, that if one does not smoke, and that if one gets regular exercise, the chances of developing coronary disease are markedly decreased, by almost 8 to 10 times. Tension is a problem that is always with all of us, and it may play a role in the development of coronary disease. Genetic and hereditary factors are important; alcohol may also have an adverse effect on some patients with heart disease. On the other hand, exercise may be quite effective in reducing the coronary risk. There are data now from various centers around the world, including Germany and Sweden, and two studies in this country, which indicate that there is about a threefold yearly decrease in mortality for the person who has had a heart attack and who subsequently enters into a supervised exercise program. In spite of these statistics, it is interesting that at the present time, we have only 55 men in Greater Kansas City enrolled in our medically supervised exercise program. This fact illustrates that man has got to be motivated to help himself; the programs can be provided, but if man does not enter them, or follow prudent medical advice, we cannot expect to alter the inevitable course of this serious disease.

Interestingly, Finland is the only country which has not shown a decrease in cardiac disease as a result of exercise. This has been explained by the fact that the average Finn drinks a quart of milk a day, eats a lot of cheese and a lot of animal fats and butter; with that kind of diet the epidemiologists say that exercise is not going to override other factors.

A great deal has been learned in the last few years about the cause, prevention, and treatment of coronary disease; we are applying statistical methods and actuarial analyses to determine who will benefit from drug therapy and who will benefit from coronary bypass surgery. For example, it is known now that 50 percent of a group of patients with left main coronary disease will be dead within 3 years, even if they are treated with all the medicines available to us, yet this figure is reduced remarkably if the patient is treated with coronary artery bypass. Recent data from our initial group of over 2000 patients operated with coronary artery
bypass have shown definite improved longevity, and a decrease in symptoms when compared
with similar unoperated patients.

A few years ago we would have been reluctant to subject older people to coronary bypass
surgery. However, a review of our experience at St. Luke’s Hospital of approximately 50 people
who were over the age of 70 at the time of surgery, indicated that those previously thought not to
be candidates for heart surgery because of their advanced age, actually may do very well. The
risk of surgery for the person over 70 is very acceptable and quite low (3 to 4 percent versus
about 1% for all patients). We found that surgery may produce results quite similar to those also
achieved in pacemaker implant surgery, i.e., some of those patients with an anticipated high
yearly mortality and risk of heart attack may expect to live nearly as long as the normal
population.

Before we get into discussing the future, I would like to say that not all prophetic visions
are scientific ones. Plato’s Republic, Mores Utopia, and Karl Marx’s communistic society were
looks into the future. The fantastic prophecies of the science fiction writers, Jules Verne and
H.G. Wells, look old-fashioned when compared with our actual scientific accomplishments,
some of which I have just been reviewing with you. Although achievements in the physical
sciences have surpassed our wildest dreams, the social and economic problems of our society
remain far from solution. Those problems, I think, will pose a greater challenge to us in the year
2001, than the scientific ones. To paraphrase the comments of Arthur Lawson, who was then
Director of World Review of Law at Duke University, “Can man, who has learned to control
many of the forces of nature, also learn to control himself?” It is in this type of context that I
wish to make my remaining comments.

What about 2001? First, I will talk about heart-lung transplantation. My friends, the
cardiac surgeons, say that heart transplantation is one of the easiest operations there is to do; it is
a lot easier than a valve operation, and perhaps easier than some pacemaker operations or
repairing a congenital heart problem. All that is necessary is to take out one heart and sew in
another. The problem however, is rejection, the ability of the body to accept a heart from
someone else and not reject it. Just as we build up antibodies to the swine flu vaccine, our body
rejects a foreign substance, when it comes from a human being, or a pig. I believe firmly that
these rejection problems will be resolved in the next 25 years. We send people home from the
hospital everyday; we have to say, “I’m sorry, we cannot help you.” These patients need a heart
transplantation, or a lung transplant, and I think that will be available because the workers,
particularly those at Stanford University who are working so hard on this, will settle these
problems.

Another equipment advance is the cat-scan, a special device combining x-ray and
computers. The cat-scan is used to detect and precisely locate brain tumors and is a most
valuable aide to the neurosurgeon. To use the cat-scan, the patient lies on a table and is sedated.
Then the special “box-like” x-ray scanning device is placed around his head; the x-ray then
“maps” the brain, and the thousands of bits of information are processed, organized and analyzed
by the computer to produce a three dimensional representation of the brain and the tumor. I
predict that this type of technology will be available in the cardiac area by 2001. Unlike the
brain, however, the heart is in constant motion, and since the heart will not hold still, special
designs are necessary in order for the computer to dampen out motion artifacts. This obviously
will require very sophisticated technology, but I believe it can be done.
I believe that the greatest advances in medicine that will come, particularly in cardiology, will be those at the cellular level, i.e., biochemical and metabolic discoveries. I think that we will discover what is the cause of atherosclerosis – the deposits of cholesterol that occur in the arteries of the heart, and the brain, and the kidneys, and the legs. There are millions of dollars being spent on research today in this area. Once we know why cells in blood vessel walls incorporate cholesterol, why it continues to build up, and why it incorporates calcium; we will then be able to use appropriate medications, diet, etc., to prevent the process.

Medical science discovered the cause of polio and rheumatic fever in the last 25 years, and then, knowing the causes of these diseases, treatments were developed which have essentially eradicated them. I am quite confident that a similar result is possible in regard to atherosclerosis. Similar advances will occur in diabetes and hypertension treatment.

What about aging? There is an old adage, “At first we ripen, then we rot.” In the next 25 years we will begin to understand the genetic, metabolic and cell characteristics of aging; for example, cancer and certain germ cells do not age. By studying cancer cells, we may learn the key to aging and thereby learn how to slow down the process. After all, there is not much point in making the heart work longer if we cannot also preserve the rest of our body.

The electron microscope has permitted us to examine the inner workings of single cells in the heart, and magnifications of over 60,000 times are possible. The mitochondrion (the powerhouse of the cell), can be studied more exactly, and by looking at the inner structure of the heart, and combining these studies with protein chemistry, biochemistry, enzyme and metabolic studies, we should be able to uncover the mysteries of many problems that we are now dealing with.

Computer advances will be very important in diagnosis and therapy. For example, although the doctor uses his natural computer, his brain, to make diagnoses, the brain can fail. Most diagnoses that are missed are missed not because the doctor is not smart enough, but because he doesn’t put the information together properly in order to think of the proper diagnosis. Information concerning the patient’s EKG signal, x-rays, physical characteristics, family history, laboratory tests, etc., will be fed into the computer. The information will be processed and a series of possible diagnoses or further diagnostic avenues to explore will be printed out on request.

There are other ways computers can help; for example, the doctor has an unusual case that is not responding to therapy. There may be 50 doctors around the world working on the same kind of problem; with a consolidated medical data bank, information from each patient would be fed in and quickly one could find out what his colleagues are doing elsewhere, improving our ability to treat and diagnose complex problems.

By 2001 the artificial heart may have been developed, but I will predict that it will not be as important as we now think because of parallel developments in heart transplantation and other metabolic discoveries. A strong national research program is essential in order to accomplish these predictions. It is of note that a recent survey identified 40 percent of the scientific advances that have occurred in cardiology as coming from knowledge derived for the sake of knowledge. On the other hand, Pasteur, then an industrial chemist, was asked by the French government, “Tell us why wine turns to vinegar,” and in the process of doing this, Pasteur discovered bacteria. These are two entirely different approaches to research and both are necessary.
In 2001 new power sources will be available to medicine. The lithium iodide and nuclear power sources will be important in driving artificial pacemakers, heart lung machines, and perhaps the artificial heart. In a totally different dimension I predict that by 2001 we will be taking into account genetic histories in premarriage counseling. I say this because every day we are treating people with serious heart diseases attributable to the genetic characteristics of their parents. Of course, this raises some ethical questions, but the fact is that there are certain pairs of people who just should not mate; their offspring are predestined to be defective.

Cost containment is going to become a very important thing in the future. Doctors will, as a result, use nurse clinicians and paramedics more, both to reduce costs and improve their efficiency. In Kansas City today the cost for a heart operation is about $8 to $10,000; in Los Angeles it is about $20,000. ICU care in Los Angeles is about $400 a day; in Kansas City it is about $100 to $200 a day. We are going to have to begin to share facilities; it just doesn’t make sense for every hospital to have to have a $350,000 angiographic laboratory, isotope imaging or the cat-scan, etc. Physicians are going to have to cooperate with patients, and patients with physicians, in order to do more evaluation and treatment on an outpatient basis similar to the practice at the Mayo Clinic.

What will the physician of tomorrow be like? We are going through a period now in which residents in training may order every lab test that they can think of, many of which are not important but increase the costs to patients. It is going to be a real temptation to become a mechanistic doctor. Yet, earlier I advocated the greater use of computers. I am also hoping that tomorrow’s physician will be more like William Osler, who was the compassionate physician at the bedside. In the future we want physicians who will treat patients individually, yet who will also use modern technology to help arrive at the best diagnosis and treatment.

Government influences obviously are a real problem, and they are going to be with us. We have got to have some kind of legislation or control over the drug producers and the device manufacturers. They now are involved in an advertising race to sell their goods and the doctor is absolutely overwhelmed by their sales maneuvers. It is very difficult for the average busy doctor to determine which one drug or device is best; some kind of regulation will be needed.

Physicians will be certified, and recertified. Their qualifications will be made available to patients so that they can determine, “What are the credentials of the physician?” “What does this doctor really know?” Credentials and certification may eventually come about through a governmental regulatory program, but organized medicine is now actively trying to develop provocative programs on its own initiative.

Hospital practices will change; for example, in England today, the patient with a heart attack will usually go home from the hospital about the 10th or 12th day. In the United States, the patient is dismissed from the hospital usually from the 17th to the 21st day. Approximately 600,000 cases of heart attack occur each year; when one looks at the daily costs of being in the hospital, one can imagine what it costs patients and our society for those extra, and many times unnecessary, days in the hospital. We will have to identify methods of reducing hospital stays and of reducing interhospital competition for expensive equipment.

Improved care has led to increased expectations by patients. The profession has done such a good job in medicine that patients have begun to expect that they will always get well, and that very serious problems have no propensity to serious complications. This fact alone has led to many “malpractice” suits. We in medicine are going to have to face up to these
expectations and do an even better job than we are doing now, if possible; yet the public will have to have reasonable and educated expectations.

Man himself must be more responsible for his health, and I think he will. He will be more educated about medical problems and can do something about them. Children are learning more about health in the schools and what they can do to take care of their bodies. Man will reduce the identified risk factors; he will become more discriminate and more demanding in the selection of medical care, and he will be more careful in the selection of his physician.

How do we cope with the longer life? There has been a 14 percent decrease in cardiovascular deaths per year during the last 10 years due to the advances we have been reviewing. Yet, can man enjoy his longevity? How does a longer life relate to the quality of life? The energy crisis, environmental and agricultural problems, world peace, daily stresses, and aging itself, the problems of self-care and self-reliance in retirement as people get older, and the moral problems of the right to die – all these will have to be solved. And we will solve them.

Specialized care centers will develop because of costs and efficiency. The economics of specialization and high volume operate in the medical world just as they do in government or business.

Kansas City will evolve as a Midcontinent Cardiovascular Center. We have seen the evolution of nonmedical centers of excellence, such as MRI, the Linda Hall Library, the airport, Crown Center, sports complexes, the Convention Center, the Country Club Plaza, etc. All of these have evolved and set Kansas City apart from many other cities of its size. The location is ideal; the population justification is here. When a patient becomes sick in Kansas City he should not have to go to the Mayo Clinic or Houston or Boston for diagnosis and treatment. These facilities should be and will be available here. They are being developed and in many cases, care in Kansas City can approach or equal that of other major medical centers today.

In conclusion, I believe that we are effectively winning the war with heart disease. In the future, our hearts will be stronger; they will last longer, and we will be in a position to enjoy life more. The question is: Can other fields keep pace with medicine? Can we solve the environmental aspects of food and energy issues? Can we solve our socioeconomic burdens, such as the burdens of unemployment and crime, divorce, drug abuse, retirement and aging? Can physicians and patients alike cooperate to reduce costs in medicine and resolve the malpractice problems, and the governmental and legal entanglements of medicine today and the future? Can man learn to control himself and his health by his own self-discipline? I believe that man can make the choice as to what the 2001 man of the future should be like.

Perhaps some of us with a Midcontinent heritage could see the man of 2001 with the clock turned back – the face of the ageless western hero who once roamed the plains, supported by his pacemaker, perhaps with a heart transplant, by advances in vascular surgery, but most important of all, the knowledge that atherosclerosis, the major cause of death today, may no longer be the fate of his heirs.

Lastly, the physician can move ahead to use the sophisticated technology available in 2001, while not forgetting how to use older, less costly techniques and skills when they are appropriate, and most importantly, not forgetting the individuality and the personality of each patient as a dignified human being.
I would like to close my remarks with a quotation from Dr. Paul Dudley White, the forefather of modern cardiology. He wrote in 1930, “The joy of the practice of medicine lies not only in the service to others and in the intellectual pleasure of the work, but also in the realization that we are all still but pioneers.” I think this applies to us in 1976, and will continue to apply in the exciting years ahead of us toward 2001.

**QUESTIONS AND ANSWERS**

**QUESTION:** Are those people who have had heart block and are now on pacemakers as well off as people who do not have heart disease?

**ANSWER:** Yes, in many instances that’s a fact. It was surprising to us when we realized this, but the studies have been validated. The reason for this is that most people who have heart block which requires a pacemaker have a degenerative disease of the electrical system – the specialized conductive system to the heart – which is a series of little cells with an electrical network. It’s a hereditary-type thing, and most of these people have perfectly normal hearts otherwise. They don’t usually have hardening of the arteries or problems with the valves. Therefore, the patient who has an electrical problem, but probably has a very good heart, has a correction of the electrical problem by a pacemaker.

Actually, because of the fact that many of these people selectively do not have other forms of heart disease, like atherosclerosis, we have found that they look a little better on a year-to-year basis, or at least equal to the man in the general population.

**QUESTION:** Are you saying then that this is not a typical heart attack?

**ANSWER:** Heart block can occur as a result of a heart attack. Heart attacks are due to atherosclerosis – the buildup of cholesterol in the arteries. Sometimes the heart attack is so severe that it also destroys the conduction system – the little electrical fibers. But when a man develops heart block which is not associated with a heart attack this has nothing to do with atherosclerosis.

This is a favorite question we like to ask interns and residents, and they never get it right either.

**QUESTION:** Ben, this is kind of a philosophical question, but I once heard someone say, and I thought rather wisely, that our society has an insatiable demand for good health. You eluded to this a little in your talk.

In thinking about priorities, you mentioned that in the past 20 years, and perhaps in the next 25, we will advance faster in medicine than we will in socioeconomic areas. If it’s true that we have an insatiable demand for good health, do you see any way that as a society we can put more balance in the areas that we try to develop in?

**ANSWER:** I have been vitally interested in this, and sometimes it is frustrating. The answer has to be through education, and it’s probably got to start in the school system.

This is a major thrust of the American Heart Association which has realized that somehow we have to get schools to serve proper diets; somehow to have schools teach children that they shouldn’t smoke; teach them to have regular medical check-ups; look for hypertension and identify if they have a high cholesterol.
Many of these children have a high cholesterol when they are in infancy and grade school. If those individuals could be identified early in life, we could do a lot about it.

I don’t know how many of you are aware of the studies that were done during the Korean War, but it was quite frightening because many young 20- to 30-year-old American soldiers who were killed in battle were found at autopsy to have rather severe hardening of the arteries, illustrating that the disease process probably actually begins in childhood.

I would like to mention to the people here who are 65 and older that there are very solid data today from studies that have been done that even though you are 65 or 70, if you have hypertension or a high cholesterol that is treated, or if you’re smoking and you stop, your chances of developing heart disease and heart problems decrease by about 3 or 4 times on a yearly basis.

**QUESTION:** As people grow older and ways of keeping them healthy become more complicated, what is the final trade-off in the cost of that against the cost of other things in our society. Do you finally get to the point where you just can’t afford to provide certain services for the mass population?

Certainly one of the highest costs in society right now is the health cost – the fringe benefits in health.

**ANSWER:** I think what will have to happen is we have to improve the health of the man who is 80. I predict that 25 to 50 years from now, the man who is 80 will be like the man who is 70 today. And the man who is 70 will be like the man who is 60 today. I think we are already seeing this in our society.

Industry is going to have to take a look at mandatory retirement at the age of 65 because we are losing a lot of leaders. There is certainly no reason for them to retire in many instances. They’re bright, they’re active, they’re physically in good shape. Many of them participate in their own exercise programs, and I think that what we will see is a change in what man himself is like.

I agree with you that if all we are doing is keeping people alive to die of strokes and kidney failure and sit around in nursing homes, that wouldn’t be worth doing; we couldn’t afford it. But if, at the same time, people could live longer, if we could somehow retard the aging process, and if these people are healthier, there is no limit to it; this is a thing that people have philosophized about for years. I’m optimistic that maybe when I am 80 years old, that I’ll feel like the man of 70 today.

**QUESTION:** Are there statistics for the bypass operation beyond the 3 years shown on the graph?

**ANSWER:** Yes, in fact, with the help of MRI, our group at St. Luke’s Hospital has put 2000 people into a statistical analysis computer system with follow-up data on treadmill studies, postoperative angiograms and symptoms. We have followed these people now for a 4- and 5-year period, and with the help of MRI, the biostatisticians have shown that 90 percent of the overall group of patients who have had coronary bypass surgery, are alive at their fourth- and fifth-year period, and about 85 to 90 percent are free of symptoms. This compares favorably with the expected mortality rate in the general population. The operation itself has a mortality of 1 percent at St. Luke’s Hospital and in the large centers elsewhere that are doing this kind of work. However, if surgical mortality is 5 to 7 percent, as it is in some hospitals around the country,
then that is unacceptable. One cannot alter the natural history of the disease if one starts out by losing too many patients at surgery.

In properly selected patients for coronary bypass surgery, relief of symptoms of angina can be expected, and statistically man’s life can be prolonged.

QUESTION: What is your stand on your comment about marriage counseling? What types of men and women represent poor genetic risks for the future generation?

ANSWER: I think that there are some obvious cases: The majority of the time, when we see a young man, particularly in his 40s and 50s, who has severe hardening of the arteries, his father will have had it, his two brothers had it, his uncle had it, his grandfather had it, a rather impressive family history. In marriage counseling if that individual is identified as well as similar traits in the wife’s family, putting those genes together will result in a disease-prone or disease-ridden individual. It is hopeful that there may be simpler ways of identifying these problems so that two people when contemplating marriage can obtain genetic counseling.

QUESTION: Are you saying that there are some people who are poor risks together, or there are some people who just should not marry at all?

ANSWER: I think you can expand that as far as you will. If you believe in the survival of the fittest, which I don’t necessarily believe in, there are certain lineages that, obviously, as far as their health is concerned, should not continue to recreate themselves.

QUESTION: I heard of a case recently where a newborn baby was virtually filled with cholesterol for all intents and purposes. Is this probably hereditary? Is it the diet of the mother when she was carrying the child? What would cause this type of situation?

ANSWER: This is a hereditary abnormality in cholesterol metabolism. All cells in the body make and use cholesterol in their everyday production of energy; cholesterol is part of our normal usage and metabolism. But some people are born with an inability to use it sufficiently so it builds up in the arteries and the liver and other places, and leads to hardening of the arteries. Some people develop this earlier in life than others.

There is the time clock concept of the nucleus (the center of the cell). As the cell gets older, something happens. That time clock activates and the cell begins to degenerate. Part of the degenerative process is the development of cholesterol deposits and hardening of the arteries; these are the kinds of cases that may be helped if properly identified early in life.

The child’s case you referred to is very unusual. There are rare cases in which the genes come down so hard and heavy on the little individual that everything matched up perfectly for him to develop this severe problem in infancy rather than at 19 like some of the boys in Korea. But the problem is basically an inability of the body to synthesize and metabolize cholesterol.

QUESTION: Do you want to expand any on what you at St. Luke’s are doing with what you call the Heart Institute now? It seems to me that I heard somewhere that some 33 percent of the open-heart cases in both Missouri and Kansas, including St. Louis, are being done here at St. Luke’s Hospital.

ANSWER: There has been the development of a rather unique group of physicians and ancillary people, including surgeons, cardiologists, anesthesiologists, nurses, etc., at St. Luke’s during the last 6 or 7 years that has led to the development of a specialized care center similar to what I was talking about earlier.
Because of the ability to recruit and continue to bring good people together, the results, for example in heart surgery, are certainly equal to the 4 or 5 other major programs in the country. In fact, St. Luke’s right now is about 15th in the country in the number of heart operations that it does on a daily basis. It does a little over 30 percent of all the open-heart surgical procedures that are done in the states of Kansas and Missouri, including St. Louis. Even though there are 8 hospitals that do heart operations in Kansas City, 62 percent of them are done at St. Luke’s.

We have very specific feelings about this because if you are the patient, you would like to have your operation done by someone who is doing it frequently. You would like to have it done by somebody who will operate at a low risk.

I’ve been somewhat outspoken in the past by saying that I think that when a man chooses to have a heart operation, one of the things he should do is say to the doctor, “What chances do I have of making it?” I further think he should say, “What chances do I have of making it with you as compared to going elsewhere?” I believe patients need to have that information available to them.

But to answer your question about developing a Cardiovascular Institute at St. Luke’s Hospital, we have completed the initial feasibility and financial planning studies. The need has been demonstrated to exist, and the project has been shown to have financial feasibility, as determined by Booze, Allen, Hamilton, a national management consultant firm. We are in the process of obtaining health planning approval.

QUESTION: You have witnessed tremendous developments in diagnosis and care in your 20 years, and normally you would expect for the next 20 years that the graph would go up the same way; that is, unbelievable things will come in 20 years. What is the danger of socialized medicine, and what effect will it have upon proper progress?

ANSWER: Well, that’s the toughest question of all. I think it’s the one that I find very difficult to deal with.

We’ve looked at St. Luke’s Hospital, and what’s happening there as an example of what can be done with private medicine. We have a large clinic building that has some 150 specialists with a hospital across the street. It is very much like the Mayo Clinic in many respects, and we feel that good medicine can be practiced in that environment.

I have practiced in the Army, and have worked in V.A. hospitals; there I discovered the problems with red tape, and the 8:00 to 4:30 days. It is difficult to practice medicine within these restraints.

I think we have got to have the physician totally committed to the patient, and this is difficult in the socialized environment. The patient has to be the very first thing in our priorities with all the decisions we make. I also feel that any decision that has to do with medicine has to be made with the fact that what we are doing is to better patient care. If that fact is used as the final or bottom line to make decisions, the right decisions will be made most of the time in medicine.

I’m fearful of what will happen in socialized medicine because of a decline in the patient/physician relationship. I think that we will have to have more governmental controls because we as physicians have not done enough ourselves. Therefore, we will have to have a mix, more government involvement, but hopefully we can keep the private sector intact.
QUESTION: On the business of certification you mentioned earlier – and now you have sort of come back to one phase of it – if the government is going to certify doctors, they are going to be certified by doctors whom the government hires. Why can’t the American Medical Association do a better job?

ANSWER: In my opinion, this is the way it should be done, and I think it is being done. Most of us now are taking our re-certification examinations. We are doing it because we want to do it.

I think it will become a requirement in order to be a member of the A.M.A. or a staff member in our hospitals for the doctor to have to take re-certification examinations. As to where the government fits in, I don’t know. Let’s hope, however, that we can do it without them, because it is going to cost a lot more if they do it.

QUESTION: Are there any bionic drugs on the market which contain the same ingredients, but differ widely in cost?

ANSWER: Unbelievable, just unbelievably!

QUESTION: Is there any private or public organization which would chemically analyze the differences, if any, of these drugs and place them in some kind of publication which would be useful to physicians?

ANSWER: There is not at the present time on a widespread basis. In fact, the St. Luke’s pharmacy has looked at this, and the pharmacists are saying to us through the newsletters, “You can have penicillin made by Squibb, Wyeth, etc., etc. One costs $4 per 100; another $10 per 100, and it’s all the same thing. We are only going to carry this one because it’s the cheapest.”

Now the FDA has just recently accomplished this with digitalis. There were about 10 digitalis preparations on the market, and if you gave one pill to an individual it might cost twice as much as another, but the same dosage might have two-thirds the effect on the heart. We began to realize this because we found that certain patients didn’t respond. Now the FDA has come down hard on the manufacturers who make digitalis so that at least their biochemical activities are identical. They still don’t cost the same, however.

I think having a publication is a great idea. Maybe this is something for private industry to do.

COMMENT: I know of some concerns in the Washington, D. C. area or New Jersey/New York area that are engaged in that, and one of my friends is a chemist. His wife is also a chemist, and they have a contract with HEW to analyze “X” number of drugs to show the difference in ingredients. It would be very helpful.

ANSWER: The problem is that the average doctor is very busy and has few methods of learning about drugs. A drug salesman comes into his office, knocks on his door, gives him a lot of brochures, and gives him a free pencil. He says, “You know, this drug is really something – it gives you about an initial 1 percent more effect than the other company’s drug – you should prescribe it.” So the next prescription the doctor writes is for that drug. But that isn’t the way it should be.

COMMENT: If there was ever an area where the public funds should be spent – a situation where there could be some kind of an analysis of the ingredients and effects of these drugs – I think it probably would be well worth spending the money.
COMMENT: On the business of drugs that was just being discussed, I was interested in cutting down the cost of medication a number of years ago and prescribed a cheap nitrate. The next day my patient brought this back in and said, “Look what I found in the stool this morning.” Here was my cheap nitrate still perfectly intact; still chemically pure, but it just hadn’t dissolved.

ANSWER: And you got the free pencil too, didn’t you.

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.
DR. BEN D. McCALLISTER is a Staff Cardiologist at St. Luke’s Hospital in Kansas City. St. Luke’s is recognized as a leading center for the diagnosis and treatment of cardiovascular diseases in the Midwest. Dr. McCallister is also an Associate Clinical Professor of Medicine at the UMKC School of Medicine. From 1961 to 1969 he was associated with the Mayo Clinic holding appointments as: Fellow in Internal Medicine and Cardiovascular Diseases; Staff Consultant in Cardiology and Internal Medicine; and he was a Co-director of the Cardiovascular Laboratories. He has also been a postdoctoral Fellow of the National Heart Institute and served four years in the U.S. Army Medical Corps as a staff member at Tipler Army Hospital, Honolulu.

Dr. McCallister’s professional affiliations include Fellow, American College of Cardiology, American College of Physicians, and Clinical Council on Cardiology. He is a member of the Kansas City, the Missouri, and the American Heart Associations, having served as President of the first and Secretary of the second. He has also served on almost every other regional council and association concerned with cardiac matters and related research and has been a consultant to the Veterans Hospital in Leavenworth. He is a member of Sigma Xi and the Central Society for Clinical Research. He is also Co-director of the YMCA-Kansas City Heart Association cardiac rehabilitation program.

He earned both his B.A. and M. D. degrees at the University of Kansas where he was a Phi Beta Kappa. Other honors include the Mayo Clinic’s Nobel Award for Leadership and a Lederle Student Research Fellowship. He is certified as a diplomat of the American Boards of Internal Medicine and Cardiovascular Diseases. Although a practicing clinician, Dr. McCallister has a distinguished research record, is the author of some fifty professional publications, and is active in the teaching and training of medical students, nurses, and residents.