THE UNIVERSITY OF ARIZONA®

SARVER HEART CENTER

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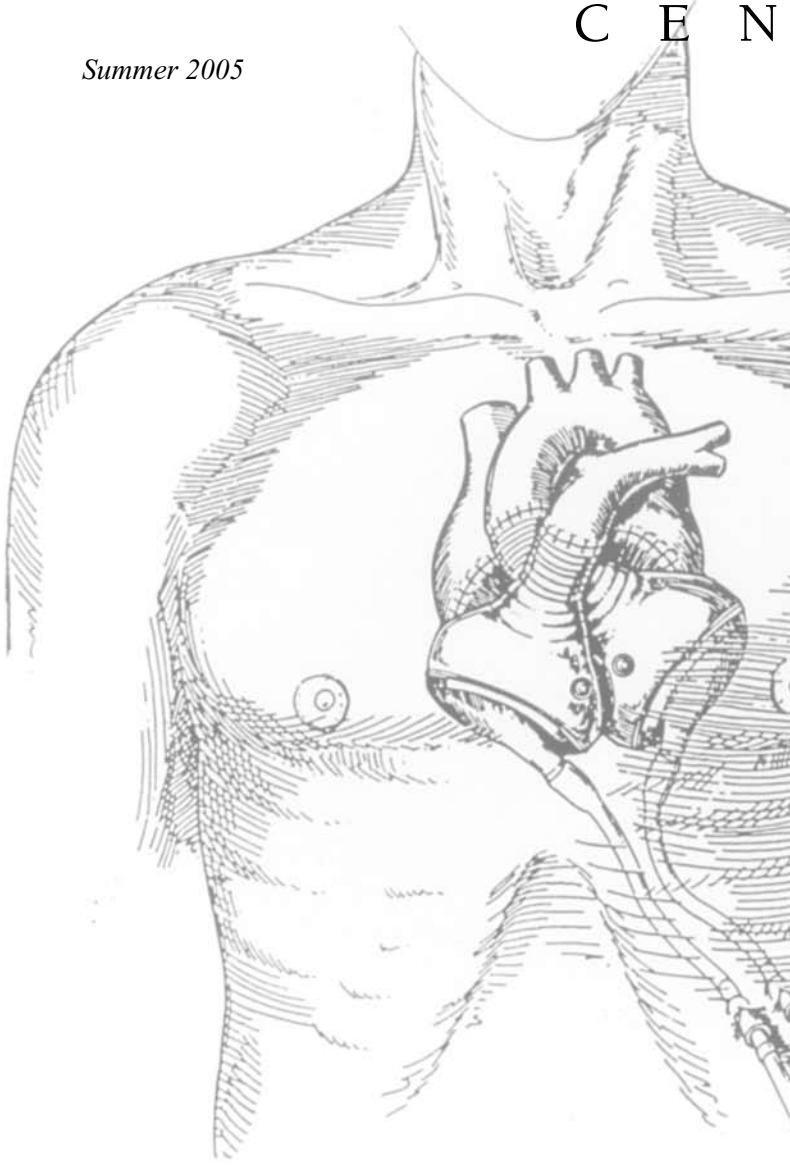


CardioWest: Top Research Advance

The American Heart Association has named the CardioWest™ Temporary Total Artificial Heart, developed by surgeons at The University of Arizona Sarver Heart Center, as the top research advance of the past year.

See story on next page.

Dr. Copeland: Honor Recognizes 'Perseverance'

The CardioWest total artificial heart, developed by University of Arizona researchers and approved for commercial use this fall, was named the top advance of 2004 by the American Heart Association.

The device is the first implantable artificial heart to be approved by the U.S. Food and Drug Administration. As a so-called "bridge to transplant," the CardioWest Temporary Total Artificial Heart (TAH-t)™ keeps heart failure patients alive until they receive a transplant. The air-driven (pneumatic) device is placed in the chest – replacing the ventricles and all four heart valves – and takes over the pumping action of the heart. An external console controls its functions.

"Being included on this list is like frosting on the cake," said Jack G. Copeland, a professor of surgery at the UA College of Medicine and a co-director of the Sarver Heart Center.

"It's a nice recognition for the members of our team who worked hard over several years toward the day when the CardioWest could be used to help the sickest heart failure patients all over the country. Their perseverance paid off," said Dr. Copeland, who is chief of cardiothoracic surgery at University Medical Center (UMC) and a world leader in cardiac transplantation, as well as in the development and use of artificial heart devices. He was the first surgeon in the world to use an artificial heart as a successful bridge to transplant.

The CardioWest Temporary Total Artificial Heart is implanted in the sickest heart failure patients to keep them alive until a donor heart can be found.

Just before the CardioWest was approved, the results of a nine-year study of the device were published in *The New England Journal of Medicine*. Based on the experience of 81 patients at high risk for death due to irreversible biventricular cardiac failure, the rate of survival to transplantation was 79 percent, compared with 46 percent in a group of patients who did not receive the artificial heart. After one year, the survival rate among the CardioWest patients was 70 percent, compared with 31 percent for those who did not receive the device.

The CardioWest technology is owned by SynCardia Systems Inc., which was founded by Dr. Copeland; Marvin J. Slepian, MD, a clinical professor of medicine at the UA College of Medicine and a member of the Sarver Heart Center, and now president and chief executive officer of SynCardia; and Richard G. Smith, director of UMC's Marshall Foundation Artificial Heart Program.

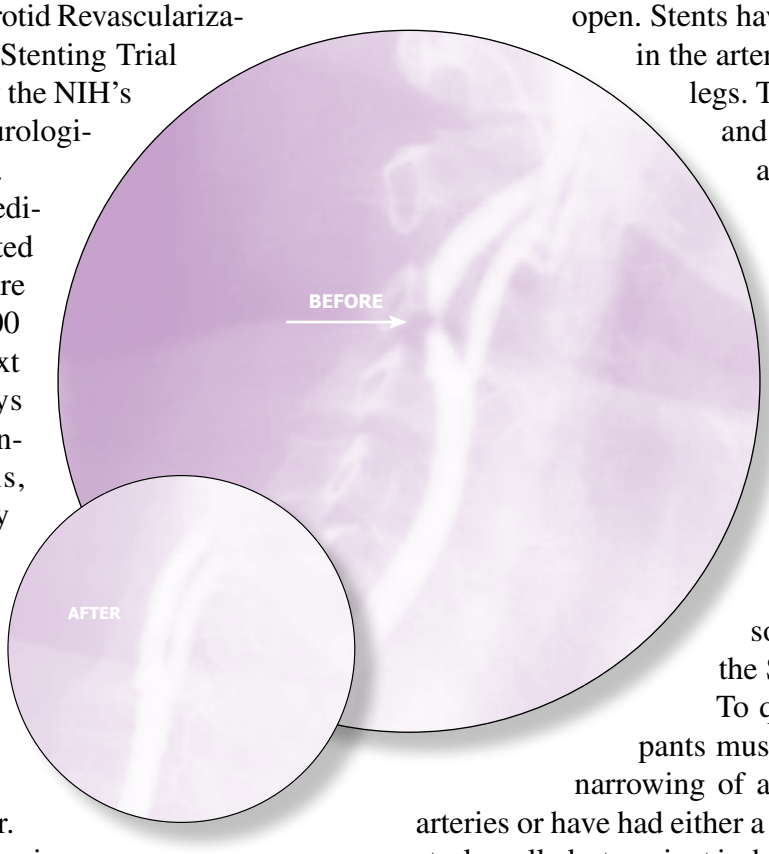
Created in 1996, the American Heart Association's Top 10 list highlights major gains in heart disease and stroke research. Other items on the list were a drug that improves heart failure among African Americans, artificial blood vessels and public defibrillators to re-start the hearts of cardiac arrest victims. *(To see the entire list, visit the AHA online at www.americanheart.org.)*

"We are grateful and honored with the naming of the total artificial heart as an advance for cardiovascular medicine by the AHA. We were particularly excited for being cited as the No. 1 out of 10 on the list," Dr. Slepian said. [a]

Stroke Prevention

UA Studies Stents vs. Surgery

The University of Arizona has been selected as a site for a multicenter National Institutes of Health (NIH) study comparing carotid artery stenting, a minimally invasive procedure recently approved by the U.S. Food and Drug Administration (FDA), to carotid endarterectomy, an operation that is the current standard of care to prevent stroke. The Carotid Revascularization Endarterectomy vs. Stenting Trial (CREST) is supported by the NIH's National Institute of Neurological Disorders and Stroke.



The UA is one of 70 medical centers across the United States and Canada that are enrolling a total of 2,500 participants over the next three to four years, says CREST local principal investigator Joseph Mills, MD, professor of surgery and chief of vascular surgery at the UA College of Medicine.

The study involves half the patients receiving a carotid stent and half having carotid endarterectomy, says Dr. Mills. Guidant Corporation is providing the device, which was approved by the FDA last August only for patients at high risk of complications from surgery. Researchers now are looking at the use of stents for all patients at risk for stroke.

Every 45 seconds someone in the United States has a stroke, according to the American Stroke Association (ASA). Arteries that supply blood to the brain can become clogged from a buildup of arteriosclerosis or plaque. Stroke can occur when carotid arteries become narrowed and when particles of atherosclerotic plaque are dislodged from the carotid artery wall. As these particles travel through the blood stream they can block the vessels in the brain.

Stroke prevention is possible – primarily though controlling blood pressure and cholesterol. But once a blockage has formed, arteries can be unclogged by performing a carotid endarterectomy, an invasive surgical procedure in which doctors clean out and repair the carotid artery, the main artery supplying blood to the brain.

Carotid artery stenting is a procedure in which a metal device called a stent is placed in a narrowed part of the carotid artery to cover the plaque and hold the vessel open. Stents have been implanted for years in the arteries of the heart, kidney and legs. They require a tiny incision and can be inserted with a local anesthetic.

The stenting procedures in CREST are performed by Dr. Mills and the carotid surgeries are performed by both Dr. Mills and John Hughes, MD, associate professor of surgery. UA neurologists also participating in the clinical trial are Bruce Coull, MD, and Rod Anderson, MD. All are members of the Sarver Heart Center.

To qualify for the trial, participants must have at least a 70 percent narrowing of at least one of their carotid arteries or have had either a small stroke or a temporary stroke called a transient ischemic attack. All participants also will receive medical management to reduce their risk factors for stroke. Risk factors include high blood pressure, high cholesterol, obesity, diabetes and smoking.

Since the late 1950s, endarterectomy has been performed in patients with or without symptoms of stroke or impending stroke, says Dr. Mills. According to the American Heart Association and the ASA, approximately 140,000 of these surgical procedures are performed each year. [a]

For further information about the study, please contact Olivia Ullrich, RN, 626-4845.

Biventricular Pacing: A New Therapy for CHF

By Peter Ott, MD

For several years, we have known that between 25 and 40 percent of heart failure patients have a condition called "left bundle branch block." The left bundle (and the corresponding "right bundle") is part of the heart's electrical system, which drives each heartbeat, starting in the upper chambers and then going to the lower chambers. This system does not work properly in patients with "left bundle branch block" and can interfere with the sequence of contraction. Instead of contracting at the same time, the ventricles contract one after the other.

At the same time, the walls of the left ventricle – which normally squeeze toward the center – contract in a disorganized manner, further reducing the effectiveness of the contractions.

A newer therapy called "biventricular pacing" uses a special kind of pacemaker to take over for the left bundle branch and provide the spark at the correct time. The procedure involves placing two leads (wires) – one in the right ventricle and one into the coronary sinus vein, which wraps around the left ventricle. The implantation process is identical to that of a standard pacemaker: all leads are inserted through a small incision into a vein under the collar bone. Very often, a third lead is placed into the right upper chamber to allow proper timing between the upper and lower chambers.

Dr. Ott is an assistant professor of medicine and director of the Electrophysiology Laboratory and Arrhythmia Services at University Medical Center.

Several clinical trials of biventricular pacing systems have produced very exciting results. Many patients experienced significant improvement in symptoms and exercise tolerance, reported an increase in activity level, and some returned to work. The heart size and function frequently improved and often the need for medication decreased.

Especially when combined with an implantable cardioverter-defibrillator (ICD), which shocks the heart in case it goes into a fatal rhythm, biventricular pacing has been shown to reduce the risk of death significantly, compared with optimal medical therapy alone. However, 25 to 30 percent of patients do not respond or respond only minimally. The reasons for this are not fully understood and are being actively investigated. In rare cases, a patient's condition may worsen after implantation of a biventricular pacemaker with an ICD. If so, the device can easily be programmed to not pace the heart, but still be on standby to correct any dangerous rhythms.[a]

Heart Failure At A Glance

Congestive heart failure (CHF) is an epidemic in the Western world, affecting between 4 and 5 million people in the United States alone. Heart failure is due to impaired heart function and can be divided into two main types: systolic heart failure, which affects the heart's ability to contract, and diastolic heart failure, which affects its ability to relax.

Symptoms

- Swelling in ankles
- Shortness of breath
- Fluid in the lungs or abdomen

Traditional Therapies

- Medications, including beta blockers and ACE inhibitors, which work to combat the body's defense systems
- Heart transplantation

ICDs 'listen' to heart, prevent sudden death

By Julia Indik, MD, PhD

Each year, approximately 450,000 Americans die suddenly. The most common cause is a sudden, life-threatening heart rhythm disorder called ventricular fibrillation. In ventricular fibrillation, or "VF," the heart's electrical signals are completely disorganized and chaotic. As a result, the heart wriggles like a bag of worms without any organized beat. Death results within minutes in this form of cardiac arrest unless a life-saving electrical shock can be delivered.

Dr. Indik is an assistant professor of medicine.

Most cases of sudden death due to ventricular fibrillation occur in patients who have heart failure. Specifically, the heart has been drastically weakened in its pumping action, particularly if the person had prior heart attacks. In heart failure, patients often feel tired and short of breath with activity, or may notice swelling in the legs. An echocardiogram is a sound-wave test that can identify whether heart failure exists and whether it is due to a weakness in pumping action. The degree of weakness is measured by the "ejection fraction," which is the fraction of blood that is sent out from the heart with every beat. When the heart pumps, it does not empty completely, but puts out (ejects) about two-thirds of its contents. A normal ejection fraction is 55 percent or greater. In severe heart dysfunction, the ejection fraction is less than 30 percent.

Years ago, we thought we could prevent such dangerous heart rhythms with certain medications, called antiarrhythmic medications. Recent large-scale clinical trials have demonstrated that medications cannot prevent this catastrophic event. However, instead of drugs, lives can be saved with a device called the implantable cardiac defibrillator, or "ICD." Trials have demonstrated that this device can cut the risk of dying suddenly by about 25 percent. First invented more than 20 years ago, the ICD has come a long way. It now is only about 2 inches square in size, less than half an inch thick and weighs just a few ounces. It is placed under the skin, similar to a pacemaker, with a special wire that is threaded through a vein into the heart. The procedure takes about one hour and is done with just a local skin anesthetic and mild sedatives. Patients typically go home the next day from the hospital. The battery typically lasts about five years before needing to be replaced.

How does an ICD work? Its principal job is to "listen." If it detects a fast, dangerous heart rhythm, it determines whether this is due to either ventricular fibrillation, or ventricular tachycardia, which is a fast, but still organized, heart rhythm. Ventricular tachycardia also can be dangerous and either cause a patient to lose consciousness, or worse, can degenerate into ventricular fibrillation. The ICD can detect either of these dangerous rhythms and then deliver therapy. Therapy may consist of either fast pacing for ventricular tachycardia, or a life-saving shock. If a patient receives a shock, we ask them to contact us right away so that we can examine the ICD with a computer to see why the shock was given.

An ICD can cut the risk of dying suddenly by about 25 percent.

Who should be considered for a defibrillator? Patients who have a low ejection fraction and are at risk for sudden death. In particular, patients are at higher risk if they have had prior heart attacks from coronary artery disease, or if they have previously survived a cardiac arrest. The ICD has become an important part of the medical "toolbox" to keep patients with heart failure alive and well. [a]

Expert Answers to Questions about Vioxx, Celebrex

Q: How do Vioxx and Celebrex work and what were the problems with the drugs?

These drugs block an enzyme in the body (Cyclooxygenase II, abbreviated COX2) that is in inflamed tissues. The enzyme produces chemicals that cause pain, swelling and tissue damage. Vioxx and Celebrex block the enzyme so these chemicals are not produced. Unfortunately, the enzyme also is important in producing chemicals that prevent blood clots. When these chemicals are not produced, there is a greater risk of heart attacks.

Q: Why weren't these problems detected when the drugs were being studied?

The drugs were tested in patients for short periods of time, and patients with heart disease were excluded. Only when patients were treated with high doses in long-term studies to see whether they prevent colon cancer (and they do) did the higher incidence of heart attacks become apparent. However, this is not a surprise, and it was found because the U.S. Food and Drug Administration (FDA) suspected there could be a problem and required a safety analysis in this study. The FDA doesn't have the power to require large long-term safety studies after a drug is on the market.

Q: Will replacement drugs be available soon? If not, what are my options?

The FDA has decided that Celebrex will remain on the market, but with a strong warning. It's possible that Vioxx will be back. Both of these drugs should be used only in people who cannot take the older aspirin-like pain medicines (ibuprofen, naproxen, etc.) because of their risk of ulcer disease. They should not be taken by people at high risk of heart disease or for long periods of time. These drugs increase blood pressure in many patients, so I recommend checking blood pressure periodically to see whether it is under control.

Q: If I were taking Vioxx or Celebrex, should I be concerned?

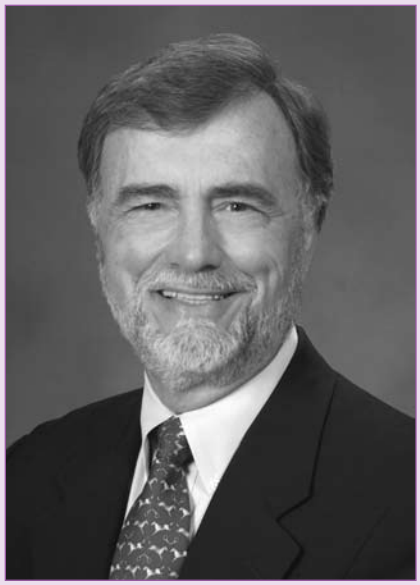
There is no evidence to suggest that the effects of these drugs are long-lasting. Within a few days, the effects should be gone.

Q: It already takes years for drugs to be developed – and even then, we now know that there can be serious problems with the drugs. How can the system be improved ... or can it?

It can definitely be improved. There are ways to speed drug development without taking any safety shortcuts. Rare side effects such as the heart attacks with Vioxx/Celebrex could not have been found prior to marketing. It is only after a drug is on the market that we can find the rare serious problems that have caused drugs to be removed from the market. We badly need an early alert system that can find problems soon after release. For the 15 drugs taken off the market since 1997, it took an average of 5.9 years before the problems were found and the drugs removed from the market. That is too long. We are planning a pilot program in Arizona to develop a community-based system to find problems early and to know the magnitude of the problem. This is one of the programs being planned for The Critical Path Institute, newly formed by the FDA, The University of Arizona and SRI (formerly Stanford Research Institute).

The Expert

Raymond L. Woosley, MD, PhD



Dr. Woosley is director of The University of Arizona's Center for Education and Research on Therapeutics and president of C-Path, The Critical Path to Accelerate Therapies Institute.

Planning a bequest

"In the quiet hours when we are alone and there is nobody to tell us what fine fellows we are, we come sometimes upon a moment in which we wonder, not how much money we are earning, nor how famous we have become, but what good we are doing." – A.A. Milne

A charitable bequest is an esteemed way of doing good. Your estate plan says a great deal about who you are and the values you cherish. A bequest to The University of Arizona Sarver Heart Center confirms that you value the mission of the Center.

Every year, bequests received from alumni and friends of the University make an enormous difference in the lives of students and programs. Last year, bequests totaling more than $12 million benefited The University of Arizona. These gifts were distributed to many different areas of campus according to the donors' wishes.

You, as the donor, choose how the funds from your bequest are to be utilized. *Unrestricted gifts* are extremely valuable as they allow the Sarver Heart Center to apply the funds to the most pressing needs. *Restricted gifts* benefit a particular department or program. *Endowment gifts* provide income in perpetuity for a designated purpose.

Consider making a bequest to your favorite program. Careful planning is essential and will ensure your wishes are followed. For more information, please contact Clint McCall, director of development for the Sarver Heart Center, at (520) 626-4146 or (800) 665-2328.

In 2003:

- *Breast cancer claimed the lives of 40,921 women*
- *Lung cancer claimed 68,200 women*
- *All forms of cancer combined killed 272,810 women*
- *Cardiovascular diseases claimed the lives of 493,623 women (438,825 men died from cardiovascular disease)*

The Women's Heart Health Endowment

The vision of The University of Arizona Sarver Heart Center is "a future free of heart disease and stroke" – for men *and* women. Coronary heart disease is the leading cause of death for American women. Generations of women in the future would benefit from scientific discoveries that contribute to the improved prevention, diagnosis and treatment of heart, vascular disease and stroke.

The more we find out about women and heart disease, the more we realize how much more research is needed.

That's why the Sarver Heart Center Women's Heart Health Endowment was created. Endowments are created by donors to provide long-term sources of funding for investigations that hold promise of scientific discovery. Once fully funded, this endowment will support research at the Sarver Heart Center just for women.

Along the way, we hope to educate women and their families about what they can do to prevent cardiovascular disease.

To learn how you can help, please contact the Sarver Heart Center at 626-4146.

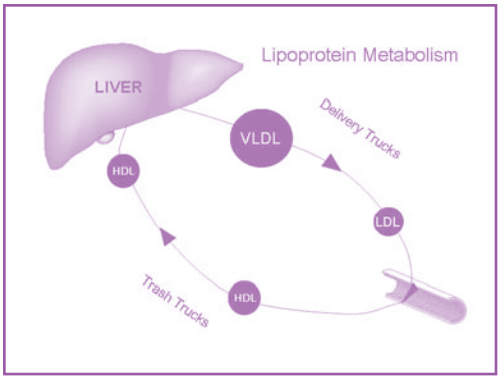
HEART NEWS FOR YOU

C is for Cholesterol

By Gordon A. Ewy, MD
Director, UA Sarver Heart Center

Cholesterol often is portrayed as the bad guy – something to be avoided at all costs. But in truth, we all need it for our bodies to function normally. The problem is when we have an excess: Too much can be deadly. Making things even more complicated is that cholesterol comes in several different packages – some helpful and some harmful.

Cholesterol travels through our bodies in the form of "lipoproteins," which are composed mostly of cholesterol and triglycerides. They got



their name from the fact that they are coated with proteins to make it easier for them to move through the blood (blood is like water while cholesterol and triglycerides are like oil – and oil and water don't mix).

Lipoproteins come in different sizes and have different functions, and the different types get their names based on their densities. The major lipoproteins found in our blood after fasting are very low density lipoproteins (VLDL), low density lipoproteins (LDL) and high density lipoproteins (HDL).

Very Low Density Lipoproteins

This lipoprotein is produced by the liver (see figure at left). Each one is about 80 percent triglycerides and 20 percent cholesterol. As the VLDL lipoproteins circulate throughout the body, an enzyme removes the triglycerides and breaks them down into free fatty acids, which the muscles, especially the heart, use for fuel.

Low Density Lipoproteins

When the triglycerides are removed from the VLDL, the lipoproteins get even smaller and denser, becoming LDL particles (see figure). This is the form that causes and/or contributes to clogged arteries, or atherosclerosis. It does this by getting stuck in artery walls that are damaged or otherwise dysfunctional. That's why we call LDL "bad cholesterol."

High Density Lipoproteins

There's another type of lipoprotein called HDL, which is considered the healthy cholesterol. There are tissues besides the liver that make cholesterol; HDL is like a vehicle that picks up this non-liver cholesterol and delivers it to tissues in the body that need it to do their jobs, such as producing hormones. Most of the HDL, however, is taken to the liver, where the cholesterol is removed from the HDL lipoprotein and excreted into the gut in the form of bile.

Chylomicrons

There is another lipoprotein that is important to note – the chylomicron. It also plays a role in atherosclerosis. The chylomicron is formed when the body digests fats and is therefore present for several hours after we eat.

Like VLDL, these particles have large amounts of triglycerides. As they move through the very small blood vessels (the capillaries), the free fatty acids are removed to be used as fuel for the heart and skeletal muscles. The particles left over are called chylomicrons remnants. These remnants are also cholesterol-rich and contribute to atherosclerosis in the arteries. Unfortunately, these bad particles – while present most of the day – are not measured after a long fast. That is why your physician may on occasion want to obtain a non-fasting blood lipid panel.

Total Cholesterol Score Has Limited Value

Because some of the lipoproteins are good and some are bad, looking at only your total cholesterol score – a combination of the different types – is not very helpful. Someone whose total cholesterol score is 200 mg/dL but who has mostly bad cholesterol is far worse off than someone who has a score of 200 but has lots of good cholesterol.

Determinants of Blood Cholesterol

So what determines how much cholesterol is in our blood? There are three major factors: the amount of cholesterol absorbed from the gut, the amount of cholesterol produced by the liver, and the amount of cholesterol removed from the blood by the liver.

An average person consumes about 300 mg of cholesterol each day. But the liver is delivering about 900 mg during the same time frame and putting it into the gut (in the form of bile).

That means we have 1,200 mg of cholesterol coming into our gastrointestinal system every day. If you go on a low-cholesterol diet and slash your intake to 100 mg, your small intestine (where cholesterol is absorbed) is still getting 1,000 mg of cholesterol.

Cholesterol is removed from the blood by the liver through a process that can be compared to a system of locks and keys. To simplify the process, imagine that lipoproteins are covered by keys in search of their locks. Only those cells with receptors (locks) that match can accept the keys. The liver is covered in locks: When the LDL particles come by, their keys get caught in those locks and the liver pulls them inside. As you can deduce, the number of locks, or receptor cells on the liver, has an impact on how much LDL is in our blood. The number of receptors is determined by heredity (pick your parents carefully!) and age. The older we get, the fewer receptors we have on our livers.

Medications

As you can see, diets are limited in their impact on cholesterol levels. So if diet won't work – and we can't choose our parents or keep ourselves from getting older – what about making the liver produce less cholesterol and also work harder to remove it from the bloodstream? This is where medications come in.

There are several types of drugs that lower total and LDL cholesterol. The most effective are the "statin" drugs, which lower cholesterol by blocking the liver's production of VLDL and increasing the number of LDL receptors (locks) on the liver. There also are some "alternative" agents used to decrease cholesterol, such as red yeast rice extract, which contains lovastatin (one of the many statins on the market). The major concern about alternative "medicines" is that they are not regulated by the Food and Drug Administration and so their purity and the concentrations are not known. And since they are not usually prescribed by physicians, no one is monitoring patients taking them for effects or side effects. It is sad to see a patient who is spending a considerable amount of money, thinking they are doing the correct thing by taking natural products, only to find that the products are not very effective.

For some patients who have optimal LDL levels but low HDL levels, moderate alcohol intake and vigorous exercise can be helpful. Doctors also can prescribe drugs, such as niacin and the fibrates, that increase HDL.

To address the problem of cholesterol-rich chylomicrons, scientists developed a class of drugs called cholesterol absorption blockers (ezetimibe is the first drug of this new class). Ezetimibe blocks about 50 percent of cholesterol absorption in the small intestine, thus decreasing the amount of cholesterol in the chylomicrons.

Combining ezetimibe and statins is particularly effective in lowering LDL cholesterol, without having to use high-dose statins. Evidence from older drug trials indicates that blocking cholesterol absorption by ileal bypass surgery or with drugs that decrease cholesterol absorption by binding the cholesterol in bile also decreases cardiovascular events.

What Should My Cholesterol Be?

A number of studies indicate that the amount of LDL should be less than 70 mg/dL in people with or at very high risk for the complications of coronary disease. HDL should be greater than 40 mg/dL in a man and greater than 50 mg/dL in a woman.

Managing lipid abnormalities – such as LDL that's too high, HDL that's too low or too many cholesterol-rich chylomicrons – is essential if we want to decrease death and disability from cardiovascular disease, America's No. 1 killer.

If you don't know your levels, get them tested. And then talk to your doctor about the best way to maintain a healthy balance.[a]

By the Numbers

- **300 mg**
  The amount of cholesterol the average person consumes each day
- **900 mg**
  The amount of cholesterol an average person's liver delivers each day
- **70 mg**
  The upper limit for LDL cholesterol in people with coronary disease

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The ABCs of Preventing Heart and Vascular Disease is a series of articles examining risk factors for cardiovascular disease.

Previous issues covered **A is for Antiplatelet Therapy/Aspirin** and **B is for Blood Pressure.**

Honoring a Wife and a Best Friend

The Walter and Vinnie Hinz Endowment

Peg Barrett still remembers the first time that she and Walter, or Walt as she called him, met. It was at a social at La Cholla Country Club. Something of a social butterfly, Peg asked her group of friends about the man she had spotted in the corner. There sat Walt, quietly observing people coming and going, not talking to anyone. Not known for her shyness, Peg asked her friends, "Why doesn't someone go and talk to him?" She answered her own question by walking over and starting a conversation.

That fateful meeting would lead to an important and long-lasting friendship that would inspire Walter to create The Walter & Vinnie Hinz Endowment for Cardiovascular Research.

Under the trees of his parents' orchard in Washington state, Walter Hinz dreamed about his future career as an agricultural engineer. He attended Washington State University, where he met his wife, Alvina, or "Vinnie." After serving three years in the U.S. Army Corps of Engineers in Lichfield, England, Walt and Vinnie headed to Tucson in 1949. During his career, he worked on irrigation projects that took him to the Columbia Basin, Jamaica and California. Vinnie, an artist, taught stitchery for Pima Community College and The University of Arizona. Before retiring from the UA's College of Agriculture in 1983, Walt had served as a cooperative extension agent and teacher. He was selected as the college's "Man of the Year" in 1984 for his many contributions.

Walter and Alvina Hinz

Walter lost the love of his life in 1994 when Vinnie lost her battle against cancer. It was nearly two years later that he and Peg would meet. Walter considered Peg to be his best friend, and enjoyed their many years of friendship. When Peg encouraged Walt to consider a gift to the Sarver Heart Center, he was glad to be able to honor both the memory of his late wife and his best friend by creating The Walter & Vinnie Hinz Endowment for Cardiovascular Research.

The Hinzes on vacation

As an engineer, Walt loved to solve problems and look for creative solutions. In that same spirit, the endowment will provide an annual research award to a project that explores a promising new initiative to advance the treatment of heart and vascular disease.

This research award was given for the first time last year to Julia Indik, MD, PhD, an assistant professor of medicine and a member of the Sarver Heart Center. Her research has focused on heart failure and what happens to the electrocardiographic (ECG) waveform during ischemic heart failure. *(See Dr. Indik's article on implantable cardioverter-defibrillators on page 5.)*

Peg hopes that others will be inspired to join the battle against heart disease like her good friend Walt, who passed away in December 2003.

"Walt Hinz was one of the most generous and caring men I have ever met," Mrs. Barrett said. "I was glad to introduce him to the great work of the Sarver Heart Center." a

Conrad Joyner 1931-2005

Conrad Joyner was the man behind the camera and a fixture at most of the Sarver Heart Center's Tucson events. He was the big man crouching and stretching to get photos of the speakers, the participants, the setting.

But before he was our favorite photojournalist, he was one of the state's most passionate politicians and an inspiring professor of political science.

Conrad, who loved debate and politics, began his career here in the 1960s after accepting a political science teaching position with The University of Arizona. His political career spanned more than 20 years and covered a time of growth and change for the city. He served on the City Council, the Pima County Board of Supervisors and ran for a seat in Congress in 1982.

Conrad Joyner

In 1986, Conrad suffered a severe stroke that would forever change his life, robbing him of the ability to speak, read and write. Not one to be daunted, Conrad accepted the challenge of recovery. He wrote about his recovery in an editorial to the *Tucson Citizen* in 1989: "There is no miracle. Everyday life is an adventure and mystery."

He attributed his successful recovery to his neurologists, friends, family and, last but not least, to laughter. He had learned how to laugh at, not become frustrated by, the learning and challenges brought about by stroke recovery.

After three years working to regain his reading, writing and speaking abilities, he returned to teaching political science at the UA and continued to capture life on film as he traveled the world.

He also developed a dedication to the Sarver Heart Center and was an ardent supporter of its doctors and researchers. Wander the halls of the Center and you might just see a few of the gifts he presented to his favorite doctors – photographs that, like Conrad, are filled with color and life.

Dr. J. Allen Ginn Jr. 1920-2005

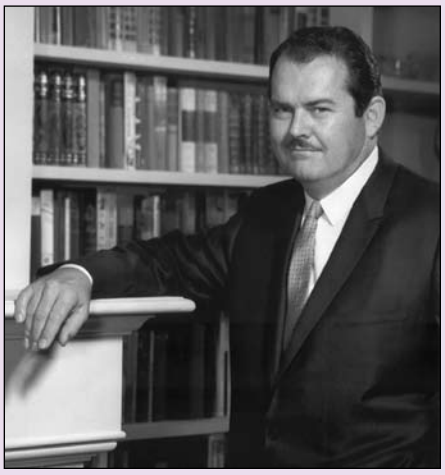
In the last edition of the *Sarver Heart Center Newsletter*, we brought you a story of J. Allen Ginn Jr., MD, one of the pioneers of medicine in Arizona.

Dr. Ginn passed away in February, just a few weeks after being named an Honorary UA Alumnus by The University of Arizona Alumni Association in recognition of his 60 years of practice as a physician in Arizona as well as his decision to establish the Ginn Fellowship in Cardiology through the UA Foundation.

After 82 days in the hospital, Dr. Ginn's wife, Mary Ann, who was at his side nearly every day, experienced firsthand the many challenges of being a caretaker. There were good days and bad days – and she hopes that sharing her experiences will help others be more prepared to deal with the bad and celebrate the good.

Dr. Ginn was a patients' doctor. His focus was on treating each patient with the best care and utmost respect. Mary Ann hopes that those who receive the Ginn Fellowship will understand what it means to *be* that kind of doctor.

She would remind all doctors that at some point they will be patients, and to ask themselves, "What kind of doctor would I want to take care of me?"



Dr. J. Allen Ginn Jr.

Dr. Alpert Named Editor of Medical Journal

Joseph S. Alpert, MD, chairman of the Department of Medicine at The University of Arizona College of Medicine and a member of the Sarver Heart Center, has been appointed editor-in-chief of the *American Journal of Medicine*.

Dr. Alpert is a distinguished medical educator and administrator, as well as an eminent practicing physician in cardiology and general clinical medicine. With 200 original contributions, more than 300 book chapters, review articles and editorials, 44 books and monographs and numerous book reviews and abstracts, Dr. Alpert brings extensive experience in medical publishing.

A graduate of Yale University and the Harvard Medical School, Dr. Alpert is board certified in internal medicine and cardiovascular disease. In 1992, he was appointed the Robert S. and Irene P. Flinn Professor of Medicine and chair of the Department of Medicine at the UA College of Medicine. Prior to that he was assistant professor of medicine and director of the Samuel A. Levine Cardiac Unit, Peter Bent Brigham Hospital in Boston. Among many honors, he received the Distinguished Achievement Award from the Clinical Cardiology Council of the American Heart Association in 2001. In 2004, he was selected as the Gifted Teacher of the Year by the American College of Cardiology "in recognition of his significant contribution to cardiovascular education and the training of professionals in cardiovascular disease."

Dr. Alpert

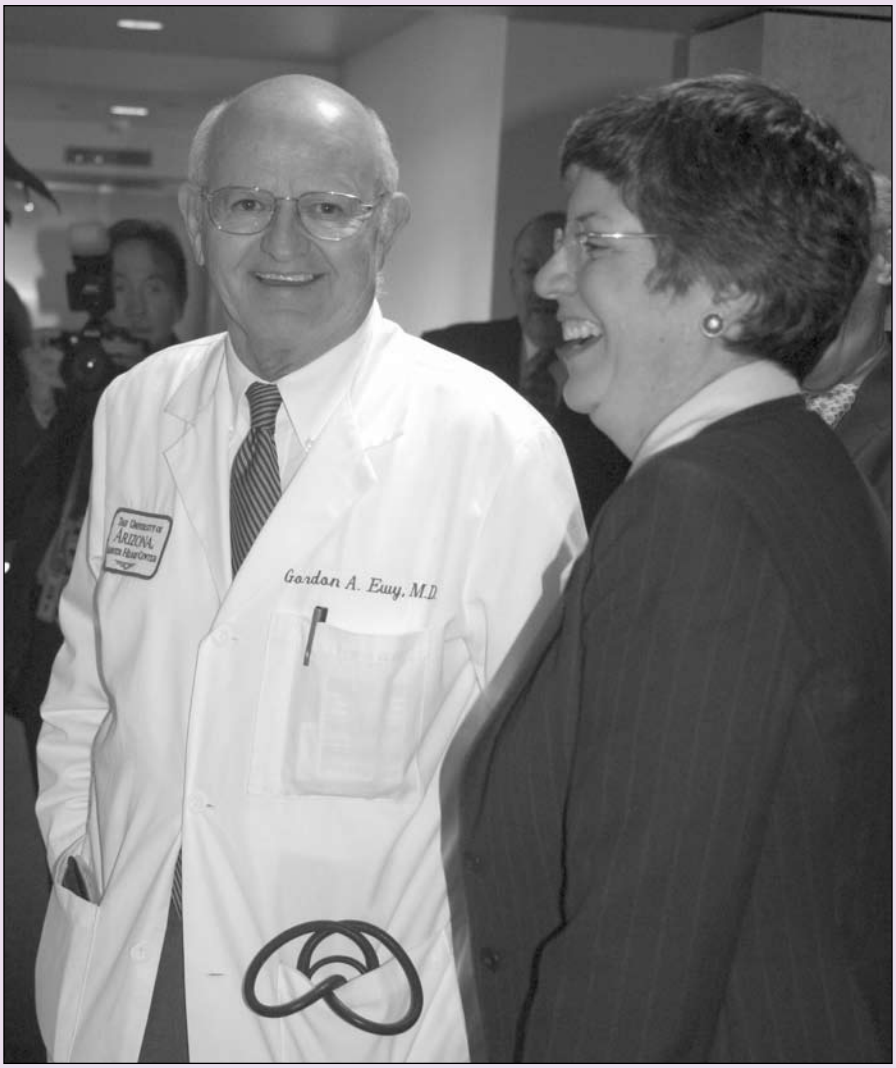
The *American Journal of Medicine*, known as the "Green Journal," is one of the oldest and most prestigious general internal medicine journals published in the United States.

Dr. Marcus Selected as Master Clinician

The American Heart Association has selected Frank I. Marcus, MD, to receive a Master Clinician Award.

The award is given to senior clinicians with "a lifetime of outstanding contributions to teaching and patient care in cardiovascular disease."

Dr. Marcus is the founding chief of cardiology at the University of Arizona College of Medicine and is now an emeritus professor. He is scheduled to receive the award during an AHA conference in Dallas in November.



VIP Tour

Sarver Heart Center Director Gordon A. Ewy, MD, laughs with Gov. Janet Napolitano during her visit to the Heart Center this spring.

Dr. Kern Elected Chief of Staff

Sarver Heart Center member Karl B. Kern, MD, has been elected to a two-year term as Chief of Staff at University Medical Center. The appointment took effect Jan. 1.

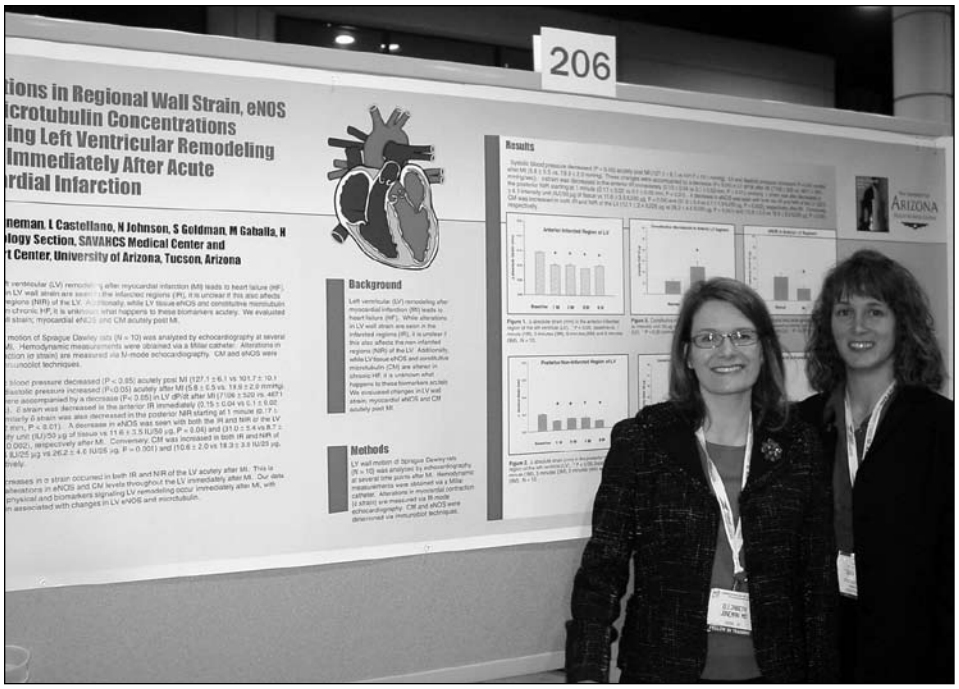
Elected by the hospital's medical staff, Dr. Kern is the chief administrative officer for the more than 600 physicians who practice at UMC. He also serves as chairman of the hospital's Medical Executive Committee while continuing to care for patients as medical director of the hospital's Cardiac Catheterization Lab.

Dr. Kern

Dr. Kern earned his medical degree at Hahnemann Medical College in Philadelphia in 1980. He completed his internal medicine residency and a fellowship in cardiology at The University of Arizona Health Sciences Center. He is board-certified in internal medicine, cardiovascular disease and interventional cardiology.

Dr. Kern is an interventional cardiologist with his clinical practice based at the UA Sarver Heart Center. He also serves as an attending cardiologist in UMC's coronary care unit. His special interests are coronary stents, myocardial infarction, unstable coronary syndromes and valvular heart disease.

In addition to his clinical and teaching duties at UMC and the College of Medicine, Dr. Kern is actively involved in research surrounding cardiopulmonary resuscitation. He is one of the architects of the UA's innovative "Continuous Chest Compression CPR," now being taught in Tucson.



Research Results

Elizabeth Juneman, MD, (left) and Lisa Castellano, MD, both second-year cardiology fellows, presented a poster at the American College of Cardiology Scientific Sessions in March.

Cardiology Fellow Wins Award, Grant for Research on Heart Disease in Women

Second-year cardiology fellow Michelle Dew, MD, has a head start on her future career in academic medicine with a grant from the Food and Drug Administration and an award for her research.

Dr. Dew was awarded a $50,000 grant earlier this year for a research project involving the accuracy of nuclear stress testing of women.

In a nuclear stress test, a radioactive substance is injected into the bloodstream, which makes it easier for a special camera to see how blood flows to the heart muscle. But for women, the results can be obscured by breast tissue. Dr. Dew's research will evaluate a specific computer system that was designed to correct for the effects that breast tissue can have on the images.

In December, she was chosen to receive an AstraZeneca Cardiovascular Scholar Award and was invited to present her research at the American Federation for Medical Research western regional conference. That project looked at which of the following three was most accurate in diagnosing coronary artery disease in women: a Dobutamine stress test; a nuclear stress test; or a doctor's evaluation of a patient.

Dr. Dew

The Dobutamine stress test proved to be the most accurate; to date, too few patients have been studied for the results to be conclusive.

At the Forefront

Several Sarver Heart Center members have been active in national professional conferences in recent months:

Joseph S. Alpert, MD
Chair, Department of Medicine

- Presentation, "Conflict of Interest in Research," American College of Cardiology, March 2005
- Presentation, "Valvular heart disease: Pearls and Pitfalls," American College of Cardiology, March 2005
- Co-chair of sessions on tricuspid valve regurgitation and acute coronary syndromes in the elderly, American College of Cardiology, March 2005

Robert A. Berg, MD
Professor and Chief of Pediatric Critical Care

- Presentation, "Prompt right ventricular overdistention during untreated ventricular fibrillation does not result in left ventricular volume loss," American Heart Association Scientific Sessions, November 2004
- Presentation, "Pediatric defibrillation dose: less effective in prolonged out-of-hospital pediatric cardiac arrest," American Heart Association Scientific Sessions, November 2004
- Lecture, "CPR First Versus AED First and Other Novel Ideas for Treatment of Prolonged VF," 2004 Emergency Cardiovascular Care Update Conference, October 2004
- Panelist, "Ask the International Experts about Science, Education, and Application: Your Opportunity for Input," 2004 Emergency Cardiovascular Care Update Conference, October 2004
- Lecture, "Defibrillation and Waveforms," Society of Critical Care Medicine Congress, January 2005

Jack G. Copeland, MD
Professor and Chief of Cardiothoracic Surgery

- Poster presentation, "Risk factor analysis for bridge to transplantation with the CardioWest TAH," 25th Annual Meeting and Scientific Sessions of the International Society for Heart and Lung Transplantation, April 2005

Frank I. Marcus, MD
Professor Emeritus, Cardiology

- Co-chair, "Diagnosis of Arrhythmogenic Right Ventricular Dysplasia," American College of Cardiology, March 2005

Douglass Morrison, MD, PhD
Professor of Medicine, Professor of Radiology

- Presentation, "Percutaneous Coronary Intervention in Ischemic Cardiomyopathy," American College of Cardiology, March 2005

Paul E. Nolan, PharmD
Professor of Pharmaceutical Sciences
Professor of Pharmacy Practice and Science

- Poster presentation, "Stroke complications following implantation of the CardioWest Total Artificial Heart: University of Arizona experience," 25th Annual Meeting and Scientific Sessions of the International Society for Heart and Lung Transplantation, April 2005

Ronald Ross Watson, PhD
Professor of Public Health

- Presentation, "Treatment of immune dysregulation prevents cardiomyopathy," International Society for Heart Research American Section 27th Annual Meeting, May 2005

Shu-Fen Wung, PhD
Associate Professor of Nursing

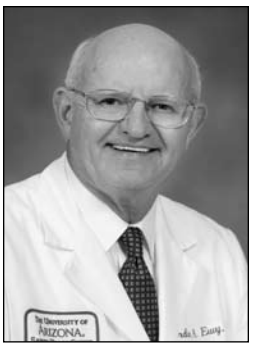
- Moderator, "Genes and Lifestyle: Behavior Change and Personalized Therapy," American Heart Association Scientific Sessions, November 2004
- Moderated poster presentation, "Sex Difference in the Symptom Presentation of Acute Coronary Syndromes," American Heart Association Scientific Sessions, November 2004
- Poster Presentation, "Sex Differences in Pharmacological Management of Acute Coronary Syndrome at Hospital Discharge," American Heart Association Second International Conference on Women, Heart Disease and Stroke, February 2005

Sarver Heart Center Cardiovascular Risk Assessment

RISK FACTOR	YES	NO
AGE and GENDER: Risk increases with increasing age (men over 45 and women over 55).		
FAMILY HISTORY: Father, mother, grandfather, grandmother, brothers or sisters with heart attack, stroke or diabetes. The younger their age at the time of the event, the greater your potential for risk.		
BLOOD PRESSURE: My blood pressure is greater than 140/90 mmHg at the doctor's office or greater than 130/80 mmHg at home. The higher the BP, the greater the risk.		
TOTAL CHOLESTEROL: Note that total cholesterol is an almost worthless number unless it is less than 150 mg/dL. Eighty percent of individuals with and without heart attacks or strokes have the same total cholesterol levels. One needs to know at least the so-called good and bad cholesterol levels.		
BAD OR LDL CHOLESTEROL: My LDL cholesterol is greater than 130 mg/dL and I have other risk factors for heart attack **or** stroke, **or** my LDL cholesterol is greater than 100 mg/dL and I have known heart and/or vascular disease, **or** my LDL cholesterol is greater than 70 mg/dL and I have known cardiovascular disease and other major risk factors, such as diabetes.		
GOOD OR HDL CHOLESTEROL: My HDL is less than 50 mg/dL (women) or less than 40 mg/dL (men). The lower the HDL and the higher the LDL, the greater the risk.		
Lp (a): My lipoprotein (a) is elevated (> 30 mg/dL).		
TOBACCO SMOKE: I smoke (even a little) or live or work with people who smoke regularly.		
DIABETES: I have diabetes (fasting blood glucose over 125 mg/dL not on medications), or take diabetic medications.		
HEMOGLOBIN A1c: My level is above 6 mg/dL. The higher the level, the greater the risk.		
METABOLIC SYNDROME: I have an abdominal circumference of greater than 35 inches if I am a woman, and greater than 40 inches if I am a man. My blood pressure is elevated, and my fasting blood glucose is between 100 and 125 mg/dL, or my random blood glucose is greater than 150 mg/dL.		
PHYSICAL INACTIVITY: I do not walk at least two miles a day or perform an equivalent level of exercise.		
OVERWEIGHT OR OBESE: My body mass index is greater than normal (e.g. 20 to 24.) Overweight is 25 to 29, and obese is 30 or greater. (To calculate your body mass index or BMI, visit the Sarver Heart Center Web site at www.arizona.heart.edu.) The greater your BMI over 25, the greater your risk.		
CAROTID ARTERY BLOCKAGE: My doctor hears a bruit (a sound like rushing water) in my neck, or I have evidence of carotid blockage by Duplex Doppler Scanning.		
TRANSIENT ISCHEMIC ATTACK (TIA): I have had unexplained numbness of one side of my face, difficulty speaking, weakness in one arm or leg that cleared.		
STROKE: I have had a stroke.		
HEART ATTACK: I have had a heart attack (myocardial infarction), which may be a risk factor for recurrent heart attack, stroke, heart failure or sudden death.		
HEAVY ALCOHOL INTAKE: This is a known risk factor for hard-to-control hypertension and can lead to other medical problems, including accidents. For men, it's more than three drinks a day. For women, more than two.		
ALBUMIN IN MY URINE: Proteinuria, albuminuria and microalbuminuria (listed in order of severity, highest to lowest) are all risk factors for cardiovascular disease.		
KIDNEY DYSFUNCTION OR FAILURE: My GFR (a measure of kidney function) is lower than 60 (an indication of kidney dysfunction, which is associated with an increased risk of cardiovascular death). The normal GFR in a 30-year-old is 120, but the level decreases with age.		
HOMOCYSTEINE: My homocysteine level is 10 or higher. The higher the homocysteine level, the greater the risk. In general the level should be less than 10.		
C-REACTIVE PROTEIN (high sensitivity C-reactive protein or hsCRP): My hs-CRP (an indicator of inflammation) is 1 or higher on two separate, consecutive measures. Persistent elevation increases with risk of cardiovascular disease. Less than 1 is low risk, 1 to 3 is intermediate risk, and greater than 3 is high risk.		
HIGH CALCIUM SCORE ON "HEART SCAN": I am younger than 65 and have a calcium score (an indicator of increased risk of coronary artery disease) of 100 or greater.		
STRESS: I have been under a greater than average amount of stress.		

The more "yes" answers, the greater your risk.

FROM THE DIRECTOR



Of the many exciting activities of the Sarver Heart Center, two have garnered significant national attention in recent months.

The first is the CardioWest Total Artificial Heart, which was named by the American Heart Association as the top research advance in 2004. The CardioWest, which recently was approved by the FDA as a "bridge to transplant," keeps patients with severe heart failure alive until they can receive a heart transplant. Patients who receive the CardioWest have a dramatic increase in the chance of survival. The device is manufactured by Tucson-based SynCardia Systems Inc., which was founded by three Sarver Heart Center members: interventional cardiologist Marvin Slepian, MD, now the CEO; cardiothoracic surgeon Jack G. Copeland, MD; and engineer Richard G. Smith. Robert Sarver, whose family is the namesake of this center, also was instrumental in getting the CardioWest approved for commercial use.

The second "project" to earn time in the national spotlight is the Sarver Heart Center's Initiative for Excellence in CPR, which we launched in the fall of 2003. Our CPR research group has found that, in cardiac arrest, calling 911 and performing "continuous chest compression CPR" (CCC-CPR) is much better than calling 911 and doing nothing (which, sadly, is often the case). More recent research has found that CCC-CPR also is better than performing standard CPR, where chest compressions are interrupted for mouth-to-mouth breathing. *(For more information, visit www.heart.arizona.edu and click on Be a Lifesaver.)*

Our early experiences created a ripple effect and soon other emergency medical systems across the country were emulating our approach. We then were invited to describe our efforts in a few national medical journals. That exposure then attracted the national media; this spring, our efforts were profiled on "NBC Nightly News with Brian Williams."

But, unlike in Hollywood, fame is not always followed by riches. We're still hard at work on our primary goal – a future free of heart disease and stroke – and we still have financial needs. Please contact Clint McCall, our director of development, to discuss how you can partner with us in the cardiovascular areas that are most near and dear to your heart.

Sincerely,

Gordon A. Ewy, MD
Director, UA Sarver Heart Center

The *UA Sarver Heart Center Newsletter* is published regularly. News reporters are welcome to quote from newsletter articles and are kindly asked to provide credit. Correspondence or inquiries should be addressed to: UA Sarver Heart Center, Public Affairs, PO Box 245046, Tucson, AZ, 85724-5046.

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