

S A R V E R  
**H E A R T**  
C E N T E R

Fall 2004

Issue 40

# focus on heart failure

## A Modern Epidemic Caused by Our Successes and Failures

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

**W**ith the 60th anniversary of the Normandy Invasion having been marked this summer, we are reminded that the greatest threat to Americans used to be the possibility of invasion by a foreign nation.

But soon after World War II, it became clear that the greatest threat was not from without – but from within. Cardiovascular disease was endangering lives across the country. Half of all deaths were due to it, while cancer was taking 25 percent and the other deaths were from all other causes combined.

We have made great progress in treating and preventing cardiovascular disease over the past six decades and, as a result, the age-adjusted mortality continues to fall (meaning that people are dying at older ages).

Today, cardiovascular disease is responsible for only 40 percent of deaths in America, and they are hap-

pening later in life. But while the prevalence of cardiovascular disease is decreasing, the incidence of heart failure is increasing. In people over the age of 65, it is the most common reason for hospital stays.

In short, congestive heart failure has become the fastest growing cardiovascular diagnosis in America.

The reason it has been rising is that we are living longer and are more likely these days to survive heart attacks and heart surgeries.

Even though cardiovascular disease isn't as deadly as it once was – because of our successes – we still are dying of cardiovascular disease. Why? Because of our own failures: our failure to be optimally informed about health care matters, our failure to adequately accept responsibility for our own health, and thus our failure to adequately treat known cardiovascular risk factors.

Despite the well-known risks, some people continue to smoke. As far as other known risk factors – such as hypertension, elevated LDL (bad

cholesterol) and low HDL (good cholesterol) – some doctors have inadequately treated them, while some patients have fallen short in their efforts to follow prescribed treatments and live healthy lifestyles.

### The Definition of Heart Failure

Heart failure is a condition in which the heart is unable to meet the demands of the body's activities. Symptoms of heart failure are traced to two causes – a decrease in forward blood flow that results in fatigue, or a backup of blood into the lungs, causing shortness of breath, especially with exertion. The decrease in the heart's ability to pump out enough blood results in a redistribution of blood flow away from the skin and the kidneys to maintain blood flow to the brain, heart and muscles.

Rapid weight gain is a common sign of heart failure. This occurs because the decreased blood flow to the kidneys decreases elimination of salt and water. This results in fluid retention, contributing to shortness of breath

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**B is for 8**  
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## Heart Failure

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when it accumulates in the blood vessels of the lungs and swelling or edema when it accumulates in the legs. In addition to weight gain, fluid retention causes frequent nighttime urination. More blood flows to the kidneys at night because the muscles aren't requiring as much blood, which causes the kidneys to produce more urine.

### The Causes of Heart Failure

There are numerous causes, but one of the more common ones is heart attacks. When part of the heart muscle is damaged by a heart attack, the rest of the heart is stimulated to work harder. This constant stimulation causes the heart muscle to become weaker. The good news is that this process can be slowed or even pre-

vented with medications that block the hormones that the body sends out directing the heart to work harder.

One obvious way to prevent heart failure is to prevent heart attacks by treating all of the known risk factors. *(For more information on risk factors, read past issues online at [www.heart.arizona.edu](http://www.heart.arizona.edu).)*

In addition to heart attacks, viral infections of the heart, toxic agents and inherited conditions can weaken the heart muscle. These conditions are grouped together under the term "cardiomyopathies."

### Detecting Heart Failure

As noted above, heart failure – whether caused by heart attacks or cardiomyopathies – often can be prevented when treated early.

This is an important discovery, even more so because of the relative ease of diagnosing patients at risk of heart failure. The chief way to do this is to measure a patient's "ejection fraction," which is the fraction of the blood ejected from the left ventricle each time the heart contracts. In a normal heart, the left ventricle releases about 60 percent of its contents with each contraction. Anyone with an ejection fraction of 40 percent or less is at risk of developing heart failure and is a candidate for preventive therapy.

Therefore, anyone with a heart attack or symptoms that suggest heart failure should have an echocardiogram to determine their ejection fraction.

Another cause of heart failure is abnormalities of the heart valves. Heart valves can either be narrowed or leaky or both. The result is increased work of the heart muscle, which could lead to heart failure. One of the major reasons for surgical repair or replacement of one or more of the heart valves is to prevent or treat heart failure.

The conditions that cause heart

muscle weakness result in so-called "systolic heart failure." (In systole, the heart contracts. In diastole, it fills.)

In other types of heart failure, the heart muscle contracts normally but the heart does not relax or fill normally. These abnormalities are called diastolic dysfunction, or diastolic heart failure. Hearts with diastolic dysfunction are stiffer and often thicker. Because of this, they require a higher filling pressure to fill the ventricles; this leads to blood backing up into the lungs, causing shortness of breath.

The major causes of diastolic heart failure are long-standing inadequately treated high blood pressure or increased scarring of the heart muscle associated with increasing age.

### Good News, Bad News

The good news is that we have made great progress. Optimal medical therapy for heart failure has resulted in dramatic improvement in survival. In the 1950s to 1980s the one-year mortality of heart failure was over 40 percent. Today, with the use of ACE-inhibitors, beta-adrenergic blockers, aldactone blockers, and when necessary biventricular pacemakers and implantable automatic defibrillators, the one-year mortality has decreased to under 10 percent. However, we cannot be content with this progress, as the five-year mortality is still about 25 percent – an outcome worse than many cancers.

The bad news is that many people do not receive optimal medical therapy to prevent heart failure (by aggressively treating patients with decreased ejection fractions) nor treat heart failure.

This is why the Sarver Heart Center – dedicated to the prevention and treatment of cardiovascular disease through research, education and patient care – has identified heart failure as a major priority. ♥

## Heart Failure Endowment

The Sarver Heart Center's next fund-raising priority is in the area of prevention and treatment of heart failure. A permanent endowed account has been established to receive gifts in support of research and clinical efforts that address this increasingly important and debilitating condition.

As a contributor, you must designate your gift specifically to this endowment. Gifts cannot be designated by staff without written instructions from you, the donor.

Those wishing to contribute to this endowment may send gifts directly to The Office of Development, UA Sarver Heart Center, PO Box 245046, Tucson, AZ, 85724-5046. Checks must be made payable to: **UA Foundation: Heart Failure Endowment.**

If you wish to discuss planned giving tools, bequests, gifts of stock, property, or pledges, please call Brian Bateman at (520) 626-4146 or (800) 665-2328.

# Diagnosing Heart Failure Through Imaging

**By Vincent L. Sorrell, MD**  
*The Allan C. Hudson and Helen Lovaas Endowed Professor of Cardiovascular Imaging*

The history and physical examination is the initial and most critical step in diagnosing heart failure. However, without the use of various lab tests and imaging techniques, patients cannot be optimally diagnosed and managed. This is because the physical examination by itself does not accurately reflect heart function.

Cardiac ultrasound (echocardiography, or “echo”) has become the most commonly

utilized tool to image the heart since its initial development 50 years ago. It is expected that every adult in the United States this year either will receive an echo or know someone



who will. This is because it is painless (noninvasive), portable (able to travel to the patient in the emergency room, the operating room or the intensive care unit), and creates rapid, real-time images allowing an immediate interpretation of the findings. Furthermore, the data obtained with this tool are extremely comprehensive and provide the physician with information on the left and right ventricular function (the heart’s ability to pump), the cardiac valve anatomy and function, the myocardium (heart’s muscular wall), pericardium (membrane surrounding the heart) and the aorta.

When patients experience heart failure symptoms, it is vital to determine the size and function of the left ventricle (the main pumping chamber of the heart). Echocardiography is the most common method used to do this. The parameter most commonly utilized is the ejection fraction (EF) – the fraction of blood ejected during each heart beat. Normally,

this is about 60 percent. When the EF falls below 40 percent (“systolic” heart failure), the managing physician adjusts medications accordingly. If the EF is below 30 percent, other treatment options are considered, such as implanting a defibrillator or biventricular pacemaker.

If a patient has heart failure signs and symptoms and an EF greater than 50 percent (“diastolic” heart failure) – extremely common in patients over 70 years old – the treatment options (and the causes of heart failure) are extremely different. In this situation, the thickness of the LV, the function of the heart valves, and the state of the coronary arteries must be considered. Fortunately, most of this information also is obtained during routine echo, or performing the echo immediately after exercise (or giving intravenous medications in patients who cannot walk on a treadmill).

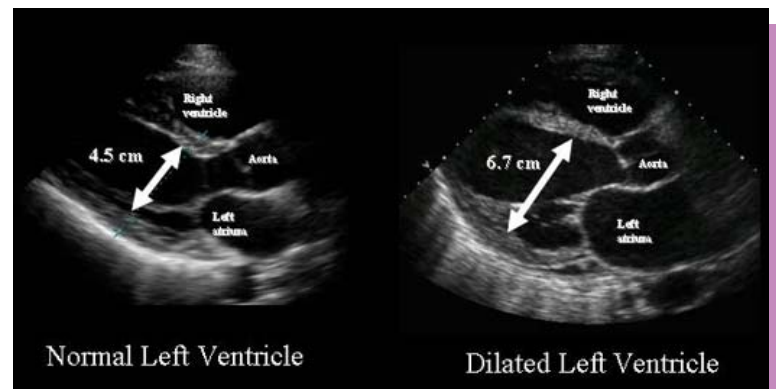
Doppler echo is performed at the same time as traditional echo and provides critical information on the flow through the heart chambers. The direction and speed of blood flow is shown using sound and color displays. With simple mathematical equations, this information is converted to pressures within the heart chambers. Once these chamber pressures are known, physicians can alter their treatment plans accordingly. Prior to this ability of Doppler echo, patients had specialized catheters placed into their vessels and then pushed into their heart cavities to obtain this information. Now this information is obtained every day in the echo lab – painlessly and without risk to the patient.

Traditional echo has utilized two-dimensional images for this information. However, since the heart is a 3-D organ,

multiple images must be acquired (by placing the ultrasound probe on numerous locations on the patient’s chest). The highly skilled, interpreting physician is left to mentally reconstruct these images in his/her “mind’s eye” and provide the critical information listed above. One of the most important advances in echo occurred last year, giving us the ability to perform 3-D echo. It is hoped that this will further improve our ability to manage our patients.

One of the remaining limitations of echo is that despite these professed abilities, some patients (between 10 percent and 20 percent) are just poor candidates for this technique. In these patients, a microbubble (contrast agent) is injected through a vein to improve the quality of the echo information.

More recently, thanks to advances in computer capabilities, we also can perform Magnetic Resonance Imaging (MRI, or Cardiac Magnetic Resonance, CMR)



on the heart. This provides a vast new opportunity for rapid, non-invasive, high-quality images of the heart, similar (but of even higher quality) to what we see with echo.

Never before has the physician had so many opportunities to obtain critical information to better manage their heart-failure patients. And never before has the heart-failure patient had so many opportunities for comprehensive, rapid, and extremely low-risk testing. ♥

# The New CPR

## Initiative Attracting National Attention

The Sarver Heart Center/Tucson Fire Department Initiative for Excellence in CPR, a program to improve survival from out-of-hospital cardiac arrest (witnessed collapse in adults), is attracting worldwide interest.

The program was born out of the Heart Center's discovery that standard CPR (chest compressions and mouth-



*Dr. Ewy wears the honorary fire chief's helmet given to him by Broward County Emergency Medical Services.*

to-mouth breathing) is more harmful than helpful because the brain and organs are deprived of blood flow when would-be rescuers stop chest compressions to perform breathing. Using this knowledge, the Sarver Heart Center worked with the Tucson Fire Department to develop a protocol for paramedics to use when responding to cardiac arrest calls. It emphasizes chest compressions and minimizes interruptions that prevent blood from being circulated during rescue efforts.

The Heart Center also developed a complementary method to be used by

citizen bystanders, called "continuous chest compression CPR" (CCC-CPR), which eliminates the need for mouth-to-mouth and is easier to perform and remember.

Karl B. Kern, MD, and Gordon A. Ewy, MD, have been invited to speak about their CPR research – and the firefighter and citizen methods – in Tucson and throughout the United States at various "grand rounds," regular seminars held at hospitals where experts present the latest medical information to students, residents, staff and faculty.

In May, Dr. Ewy presented at Harvard Medical School (Massachusetts General Hospital) and to the Broward County, Fla., Emergency Medical Services Annual Meeting. More presentations are scheduled for Chicago, New York and Las Vegas.

This approach has even garnered attention from Europe.

But the work isn't done and there are still unanswered questions. The Sarver Heart Center CPR Research Group continues its investigation as well as its quest for the best ways to help people who have to out-of-hospital cardiac arrest.

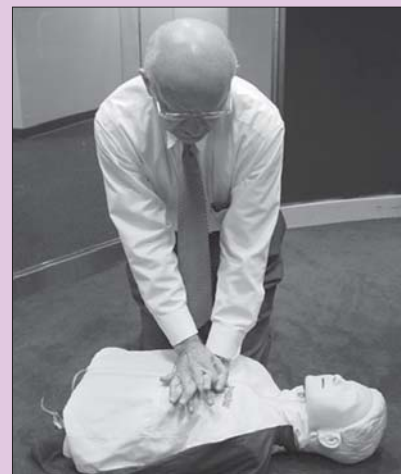
University Medical Center is an important partner in the effort to educate the citizens of Tucson in CCC-CPR through its underwriting of billboards and public service announcements. Those are only a few tools being used in the Sarver Heart Center's "Be a Life-saver" public education campaign to share this exciting research and this method with the rest of the world. Educating as many citizens as possible is the only way to ensure success. ♥

*For more information about the new CPR, please call (520) 626-4083 or visit [www.heart.arizona.edu](http://www.heart.arizona.edu).*

## A Quick How-To



Call 911. Place the victim on his or her back on the floor. Locate the center of the chest.



Place one hand on top of the other with the heel of the bottom hand on the center of the chest. Lock your elbows.



Deliver forceful chest compressions at a rate of 100 per minute until help arrives. Use an automated external defibrillator if available.

# Take Heart!

## Public Education Conference Draws Crowd in Prescott



*From left: Jacquelyn Michelson, Linda Lee and Gordon A. Ewy, MD.*

The Sarver Heart Center continued its public education efforts with a well-attended program held in Prescott in August.

The program was supported by The Ranch at Prescott and coordinated with the help of Linda Lee and Jacquelyn Michelson, both of Prescott.

The speakers were: Gordon A. Ewy, MD; Peter Ott, MD; Raymond L. Woosley, MD, PhD; and Lori Mackstaller, MD. Opening remarks were given by George T. Rizk, MD, of Cedars Cardiovascular in Prescott.

The program, called **Take Heart! ~ How You Can Prevent Heart Disease & Stroke**, is one of several that the Sarver Heart Center holds regularly across the state.



*Above: Conference attendees listen to a presentation. Right: Lori Mackstaller, MD, teaches Continuous Chest Compression CPR to a conference participant.*



## Family Philanthropy: Joseph and Margaret Pruitt

Joseph Pruitt and Margaret Hill may have lived on the same street in Tucson for some time, but it was not until the early 1940s that they became acquainted. Joseph had dated Margaret's older sister, who introduced him to Margaret. For their first date, Margaret produced a written contract requiring him to take her to a formal dance and present her with a corsage for the occasion. He signed the contract – and thus began the relationship that led to their 58-year marriage.

Joseph and Margaret, married in 1943, had five children and were focused on family-centered activities while their children were growing up. The family remains close-knit today.

The eldest, Van, lives in Tucson and is a University of Arizona graduate who works for Raytheon as an engineer. Walter, also a UA engineering graduate, lives and works in San Juan Capistrano, Calif. Jay studied engineering at the UA, lives in Douglas and has managed several maquiladoras in Mexico.

Anne studied optometry at Pima Community College and now lives in Kingman and works in the optometry field. Sallie, who lives in Denver, studied massage therapy and now creates decorative wrought iron pieces.

Margaret graduated from the UA with a degree in business administration – an unusual major for a woman in the 1940s. Joseph also attended the UA, taking classes in engineering to prepare him for a career in tool sales.

After working as a sales manager for two local tool companies, Joseph established his own company in 1965, AriCal Supply, supplying tools to companies such as the copper mines, Davis-Monthan Air Force Base, Hughes and Raytheon. Margaret managed the business end of the company. They sold

the successful enterprise in 1985.

Van described his father as “the breadwinner and very organized.” As one might expect, his garage and toolbench were quite elaborate, with outlined spaces for tools on a big wall-mounted pegboard.

“Mom was devoted to family,” Van recalled. “She was very loving and giving.”

She was active in her children's lives, serving as a Cub Scout den mother and



*Joseph and Margaret Pruitt*

later as a leader in the girls' Brownie and Girl Scout troops.

“For both Mom and Dad, any family gathering was a very special event. Both enjoyed and loved every minute they spent with the kids,” Walter remembers.

Pam Pruitt, Van's daughter, has warm memories of her grandparents. “They cherished family very much. They were there for any major event in my life from graduation, dance recitals, birthdays.”

They also were happy to share their memories with her. One in particular stays with Pam: the story behind a single gold thimble kept with the family's heirlooms. It had belonged to Margaret's grandmother, who had raised her after her parents died.

“When her grandmother passed away, everyone was going through her belong-

ings and deciding who would get what. The only thing that my grandmother asked for was this thimble. She said it was the only item she wanted because it wasn't something that anyone would argue over and it was something she could always keep as a memory of her grandmother.

“This story exemplifies the kind of person she was. She was very selfless and put everyone else's feelings above her own,” Pam said.

Joseph and Margaret's years of hard work and modest living made it possible for them to establish the Joseph and Margaret Pruitt Charitable Remainder Trust. They decided the structure of the trust would be an appropriate instrument to take care of family and support three charitable organizations.

Joseph and Margaret Pruitt died in 2001 and 2003, respectively. He was 81, and suffered from a degenerative neurological disease for several years. Margaret died, also at age 81, of stroke-related causes.

Prior to their deaths, the Pruitts made generous provision for a number of charities through their estate, including the Sarver Heart Center.

Delivering the gift was a family affair.

“This gift was hand-delivered by the oldest son, Van,” recalled Lori Hoby, assistant director for planned giving administration at the University of Arizona Foundation. “However, I learned that the entire Pruitt family wanted to participate in the delivery, but it was impossible to coordinate everyone's schedules.”

Van enthusiastically talked about his family and their strong feelings about the gift.

“It has been very exciting and gratifying to learn about the shared importance of the Pruitt gift with all the family members,” Hoby said. “Indeed, this is a story about family philanthropy!” ♥

# Be Informed Before Selecting Supplements

By **Ronald Ross Watson, PhD**

*Professor of Health Promotion Sciences*

For several decades it has been clear that eating a diet that is high in fruits and vegetables, compared with the typical American's diet, reduced risk of heart disease and cancer. Children can be trained to eat more fruits and vegetables, setting a lifelong habit that is heart healthy. Unfortunately, it is hard to change an adult's diet, especially as we frequently eat fast food and prepared meals. People who eat diets similar to those around the Mediterranean Sea – little meat, lots of vegetables, olive oil – had reduced risk of heart disease. On the other hand, it is clear that very low intake of several micronutrients – selenium, zinc, magnesium and copper – promotes heart disease and premature death.

Long ago, nutritionists recognized such facts and began clinical trials using high doses of single vitamins. Recent evidence suggests that reducing serum homocysteine by vitamin B6 and B12 supplementation reduces a major risk factor for heart disease. As oxidation increases with age and damages heart tissues, a supplement of the powerful antioxidant vitamin E was tested. While some studies were encouraging, most showed no reduction in heart disease. However, the benefits of antioxidants in seniors are significant in other areas of health promotion so that non-vitamin materials from plants are being used and tested. Many adults could therefore benefit from diet and lifestyle changes to reduce risk of heart disease. Advice from a dietician is an excellent starting place.

Among industrialized countries, the great variety of health foods and nutritional supplements found in the United States and readily available without a doctor's prescription is unique. While the U.S. nutritional supplement law has spawned a plethora of new extracts and mixtures, most have little or no scientific testing to validate their benefits. In December 2003, the FDA for the first time removed a nutritional supplement, ephedra, from the market due to cardiac toxicity and vasoconstriction. This action raises the question: What sort of scientific support should the health-conscious consumer obtain prior to use of a supplement?

My lab in the Sarver Heart Center has been developing and researching new extracts to lower heart disease. The ideal approach, which is instructive for the consumer, begins with studies in the test tube to show benefits with limited quantities of a compound. Active ones are thereafter investigated for efficacy and safety in animals and humans. My lab recently has been investigating a number of novel extracts to reduce hypertension and lower cholesterol.

One such well-investigated extract is Pycnogenol (pic-noj-en-all), made from French Maritime pine tree bark. This

supplement has been investigated in the test tube, in animals and subsequently in 31 clinical trials for a variety of conditions. Results from our lab's work were used to obtain a patent for Pycnogenol by showing that it lowered platelet aggregation, reducing a cardiac risk factor. Platelet aggregation – the clumping of cells, which can contribute to blocked arteries and lead to heart attacks and death – can be stimulated through several events, including exposure to tobacco smoke. We also demonstrated that Pycnogenol reduced asthma and hypertension. Other labs have shown that it lowered cholesterol, which should reduce heart disease.

In a comprehensive review written for Evidence-Based Integrative Medicine, I discussed Pycnogenol's possible extensive proven heart health benefits of reducing cardiovascular risk factors. Pycnogenol is an interesting extract that appears to have beneficial effects on a number of cardiovascular risk factors as well as other diseases, based upon 30 placebo-controlled studies involving more than 1,000 subjects. However, this article should not be considered a recommendation to take this supplement as it has not been proven to prevent cardiovascular disease – only some risk factors.

The key principle in selecting a nutritional supplement to prevent or treat heart disease is careful analysis of published scientific animal and human trials. Additionally, it can be helpful to read articles written by researchers who analyze published information on certain studies and then apply their experience to evaluate the studies (one example is *Nutrition and Heart Disease: Causation and Prevention*, Editor Watson RR. and Preedy VR, published by CRC Press).

Using alternative medicines that have not been investigated carries the risk of the unknown. In the interest of patient safety, supplements should be recommended only after their benefits are proven in large-scale, placebo-controlled clinical trials.

*Dr. Watson is a professor of health promotion sciences in the Mel and Enid Zuckerman Arizona College of Public Health and a member of the Sarver Heart Center. He can be contacted at [rwatson@u.arizona.edu](mailto:rwatson@u.arizona.edu). For information on a study to look at Pycnogenol's effectiveness on reducing hypertension in diabetic adults, please call (520) 626-3365.*



*Ronald Watson*

## HEART NEWS FOR YOU

# B is for Blood Pressure



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

The classic “ABCs” of preventing cardiovascular disease or preventing recurrence or complication of cardiovascular disease are aspirin, blood pressure lowering and cholesterol lowering. In the first of this series of articles for “Heart News for You,” I expanded on “A” for aspirin by also commenting on other antiplatelet drugs and anticoagulation. (Visit [www.heart.arizona.edu](http://www.heart.arizona.edu) to see Issue 39.)

“B” is for blood pressure. High blood pressure (hypertension) has for decades been known as the silent killer. The reason is that in the majority of individuals, high blood pressure does not cause symptoms while it is silently damaging the arteries, making them thicker, stiffer and narrower. The result is more strain on the heart, as it must work harder, damage to the delicate lining of the arteries (the endothelium), making them more susceptible to atherosclerosis, and decreasing blood flow (perfusion) to the vital organs such as the brain, heart, kidneys and muscles. The end result of untreated or inadequately treated hypertension is end-organ damage or failure, e.g. strokes, dementia, heart attacks, sudden death, heart failure and kidney (renal) failure.

Some of you might be saying to yourselves, “But I thought you got headaches from hypertension.” It turns out that the prevalence of headache is the same in Americans with or without hypertension. There is a rare but rather specific hypertensive headache – a pain in the back of the head upon awakening. And of course if a blood vessel in your head breaks (ruptures) it causes a severe headache. There

are some individuals who can tell when their blood pressure is elevated by the way they feel, but this is unusual and unreliable. All in all, hypertension is a silent killer!

A l t h o u g h

symptomatically silent, there is an easy and practical way to diagnose hypertension: taking the arm blood pressure with a blood pressure cuff. If you are found to have high blood pressure, or have a family history of hypertension, I recommend that you buy a semi-automated blood pressure cuff to monitor your blood pressure. *Consumer Reports* recommends the Omron for measuring blood pressure at home. There are several other reliable units. It is important that one obtain the arm unit and not the wrist or finger BP units as these are much less reliable.

Home blood pressures are more predictable of complications than office blood pressures (*JAMA* 2004; 291:1342). In a study of office and home blood pressure recordings in nearly 5,000 patients, researchers found that 13 percent of patients have blood pressure readings higher in the office than at home (white-coat hypertension), and 9 percent of patients had higher BP at home than at the office (masked hypertension). The major reason that home blood pressures are more reliable is that they are taken much more often and at various times of the day, not just during “office hours.”

The pressure of the blood inside the arteries is not constant. It goes up with each heart beat, and then gradually decreases until is raised again by the blood pumped out of the left ventricle by the next heart beat. The peak blood pressure is called the “systolic” and the trough the “diastolic” pressure and is written 120/80. The unit of measurement is millimeters of mercury, abbreviated “mm Hg.”

The terms “normal blood pressure” and “high blood pressure” are arbitrary, as the damage to the arteries (and therefore the risk) increases with increased blood pressure, even in the so-called normal range. The blood pressure is a continuum – the higher the blood pressure the greater the risk and the lower the blood pressure, with normal tissue perfusion, the lower the risk.

A blood pressure of 90/70 mm Hg in a patient without symptoms (which would include being near-faint or light-headed upon standing), is probably optimal, even though it is below the so-called normal range. Patients with blood pressure in the high-normal range are at greater risk than those with blood pressure in the low-normal range.

The blood pressure is usually lowest while we are asleep. As part of the waking process, increased adrenalin is pro-

## The ABCs of Preventing Heart and Vascular Disease

A is for Antiplatelet Therapy/Aspirin

**B is for Blood Pressure**

C is for Cholesterol



## HEART NEWS FOR YOU

duced, and in many individuals the blood pressure is the highest first thing in the morning. It varies throughout the day, but decreases after the evening meal and drops even further during sleep. In many patients, the blood pressure increases with stress. With exercise the systolic pressure increases while the diastolic pressure remains unchanged or decreases slightly. In contrast, with “isometric” exercise, e.g. lifting weights, both the systolic and the diastolic blood pressure increases.

It has been shown that weight loss, a low-salt diet and exercise all lower the blood pressure. Unfortunately, all too often, even these are not enough to control the blood pressure.

The history of our understanding of hypertension is interesting.

It wasn't but a few decades ago that it was thought that elevation of the blood pressure was a normal aging process. It was thought that high blood pressure was “essential” to perfuse the brain and other organs as the arteries changed with age. It was thought that the normal systolic (top number) blood pressure was 100 plus your age. Thus at age 70, a blood pressure of 170/90 mm Hg was thought to be normal. Once studies showed that therapy of isolated systolic hypertension improved survival, this concept changed. The normal blood pressure for a 90-year-old is 120/80 mm Hg – the same as for a 30-year-old.

The diastolic blood pressure often increases more than the systolic blood pressure in younger people who develop hypertension. Thus, a younger person might have a blood pressure of 140/100 mm Hg. This led to the concept that diastolic BP was more important than systolic blood pressure. However, with age and increasing stiffness of the arteries, the systolic pressure increases and the diastolic pressure drops, so older individuals are more likely to have isolated systolic hypertension.

The goal of therapy for hypertension is generally to lower the systolic BP to below 140 and the diastolic BP to below 90 mm Hg. The goal is lower in patients at high risk, such as diabetics or patients with renal disease. However, the effort to lower the systolic blood pressure can get the diastolic blood pressure too low!

Because coronary blood flow to the heart muscle occurs during diastole, the relaxation phase of the heart cycle, it should not be too low. When the heart beats, the pressure in the main pumping chamber (left ventricle), the aorta and the coronary arteries is the same. When the heart relaxes, the aortic valve closes, and the pressure in the aorta is higher than that in the coronary arteries and the relaxing left ventricle, so almost

all of the coronary blood flow is during the diastolic or relaxing phase of the cardiac cycle. Recent studies have shown that the mortality of treated hypertension varies with the level of the diastolic blood pressure: In the INVEST study, recently reported at the National Cardiology Scientific Sessions but not yet published, the mortality was 13 percent in treated patients with a diastolic BP above 110 mm Hg; 6 percent with a diastolic BP between 90 and 110 mm Hg; 3 percent with a diastolic BP between 70 and 90 mm Hg; 6 percent with a diastolic BP between 60 and 70 mm Hg; and 14 percent if the diastolic BP was below 60 mm Hg. These risks for diastolic pressures between 70 to 110 mm Hg, are not too different from those reported from the HOT trial (*Lancet* 1998; 351: 1755), which also showed a “U”-shaped curve for mortality and diastolic blood pressures.

Franklin D. Roosevelt died of a stroke on April 12, 1945. One month before, his blood pressure was 240/180 mm Hg. He was not told that he had high blood pressure, as at that time there was no medical therapy. Over the next few decades, as medications to treat hypertension were developed, the incidence of stroke decreased dramatically. Now we can control

anyone's blood pressure – but it is not easy. It takes an average of three different antihypertensive medications to control hypertension. Since several different mechanisms contribute to hypertension, several different acting medications are required for blood pressure control.

The choice of the initial drug therapy depends upon associated conditions, but in general, if a diuretic is not the first drug, it should be the second. Control of blood pressure requires a significant amount of cooperation between the patient and the physician.

For mild hypertension, decreasing salt intake, weight and alcohol and increasing exercise may be all that is needed. These nonpharmacologic approaches should be followed, even when medication is necessary.

Every medical student knows the importance of hypertension to atherosclerosis. At the autopsy table we all witnessed patients with severe atherosclerosis of the aorta, but none in the pulmonary artery – same patients, same diet and exercise, same genes, same cholesterol, same everything except the pressure in the aorta is about four times higher than that in the pulmonary artery.

Each of the ABCs that I will cover in this series is important. However, it is most important that all the risk factors be addressed. It is only by aggressive global risk reduction that we will be able to prevent cardiovascular disease. ♥

A few decades ago, we thought elevation of the blood pressure was a normal aging process

# Frazer Young Investigator Award

## Father's Tribute to Son Will Support Innovative Research

By Walt Frazer

When Frank Frazer's son was diagnosed with heart failure, he looked to the UA Sarver Heart Center for information. That relationship eventually led to his decision to establish an endowment bearing his name and his son's, with the proceeds funding the Frazer Young Investigator Award.

Ellen, returned to Minnesota, where he worked for many years in the hardware business.

The couple traveled extensively. After retiring, they organized the acquisition and endowment of an island park in Northern Wisconsin, where they owned a summer home. Winters were spent in Tucson, where he volunteered at Vesey Elementary School, tutoring fourth- and fifth-graders. Frank and Ellen also were active in the Anglican church they attended, where Frank served as senior warden and lay reader.

It will be awarded annually to researchers with creative and innovative ideas so that they can undertake fledgling research that is not yet developed enough to qualify for outside funding. All of the research is focused on the prevention, treatment and diagnosis of cardiovascular disease and stroke.

Alex, in the meantime, graduated from the University of California at Berkeley, and from medical school at the Universidad Autónoma de Guadalajara in Mexico. Not long after finishing his residency in San Diego, Calif., he moved to Northern California, where he owned a dairy farm and headed the Department of Physical Medicine at the local hospital. He also served as president of the county medical association and hosted a weekly radio program about medicine. His fluency in Spanish was an asset to his dairy, his practice and his administrative duties, and he earned a reputation as a strong advocate for his patients and his department.

In his late 30s, Alex developed heart failure, which led to his heart transplant at Stanford University in 1990. His father, anxious to learn more about heart disease and transplants, contacted cardiologist Gordon A. Ewy, MD, and heart surgeon Jack G. Copeland, MD, at the UA Sarver Heart Center. That contact increased in ensuing years as Frank dealt with his own heart problems, seeking treatment at the Heart Center for himself.

After Alex's passing in 1996, Frank decided to create the endowment which now bears both of their names. Frank passed away in 2000. ♥

Walt Frazer, of Kneeland, Calif., is the brother of Alex Frazer.



Frank Frazer



Alex Frazer

after Frank's grandfather, the doctor born a hundred years earlier. Frank and his wife,

## A Passion for Health Education

Leave it to an accountant to keep track of costs – in this case, the cost of treating heart disease.

“I’ve calculated the costs associated with my heart attack, bypass surgery, cardiac rehabilitation and disability pay at approximately \$300,000,” Mort Zimmerman said. He’s concerned about the skyrocketing costs of heart disease and knows that it’s easier and much more cost effective to prevent heart disease than cure it. That’s why he’s one of the most enthusiastic and involved supporters of the Sarver Heart Center.

Mort knew he had all the risk factors for heart disease. He worked in a stressful corporate position as controller for five buying units at Sears in Chicago for 35 years. Heart disease was a big part of his family history. His mother died from cardiac arrest at age 56 while in the hospital recovering from a heart attack. Her youngest brother died of cardiac arrest at age 40.

It didn’t come as a real surprise to him when, at age 56, he suffered a heart attack. At 57, after bypass surgery, Mort took medical retirement and moved to Green Valley in 1989. His doctor in Chicago referred Mort to Gordon A. Ewy, MD, who arranged for Mort to be seen by Karl B. Kern, MD, a cardiologist at the Sarver Heart Center. Dr. Kern is still Mort’s physician today.

Mort’s first wife passed away shortly after their move to Arizona. Friends from church introduced him to Lorain, who moved to Green Valley from Kansas City in 1987 after her husband died. They married in 1990.

Lorain’s family has a history of heart disease as well. Her father had a heart attack and was forced to retire from his law practice. He died at age 63 after suffering a massive second heart attack.

Mort and Lorain are both active in the community. They are members of the Methodist church in Green Valley, where Mort is chair of the board of trustees. He also served five years on the American Heart Association board in Arizona. He is in his 15th year working as a volunteer uniformed officer with the sheriff’s department in Green Valley. For many years he patrolled the area in a sheriff’s



*Mort and Lorain Zimmerman*

vehicle, and is now a front desk officer. Lorain has volunteered for 14 years at the Titan Missile Museum.

The Zimmermans are committed to a healthy lifestyle. “Changing lifestyle is key,” said Mort. And they certainly follow that principle faithfully. They eat very low-fat foods and Mort exercises one hour every day, Monday through Friday.

Mort has two areas about which he is passionate. The first is helping deserving, low-income young men and women obtain a college education through his involvement with College of the Ozarks in Missouri.

His other passion is health education. Mort has been a volunteer at the Sarver

Heart Center since 1990 and is currently a member of the advisory board. In addition to speaking at Sarver Heart Center public education programs, Mort and Lorain have hosted in-home gatherings to share the work of the Sarver Heart Center with interested Green Valley residents.

Mort believes people must be familiar with and able to recognize the symptoms of heart attack and stroke. “And spouses, in particular, need to know the symptoms, so that they call to get appropriate, timely care,” he says. “Education and prevention are key components in the fight against heart disease. I believe the Sarver Heart Center’s education and prevention programs are unique in this country.”

His goal, along with the physicians and researchers at the Sarver Heart Center, as well as scientists worldwide, is to displace heart disease as the No. 1 cause of death in adults.

“Mort was one of the early leaders for the Heart Center and there was never any doubt that he intended

to step up with charitable support in addition to his sage counsel and dedicated advocacy,” said James Dalen, MD, MPH, former dean of the UA College of Medicine and a cardiologist. “He has kept us focused on what matters, all the while working to bring others into the fold as supporters and friends.”

This year, Mort and Lorain established the Mort Zimmerman and Esther L. (Lorain) Zimmerman Cardiovascular Disease Research Endowment with the University of Arizona Foundation.

“We encourage and enlist other friends and patients of the Sarver Heart Center to join with us in helping defeat America’s No. 1 killer – heart disease,” Zimmerman said. ♥

## Memorial Honors Max McGrath, 1925-2004

**M**ax McGrath was a quiet, insightful, generous and proud man – proud of his 57-year marriage to Darlene, proud of the loving family they raised together, proud of his role as trusted confidante to business colleagues, proud of his Irish heritage and proud of his deep and unwavering faith.

“I always told Max that he should have been a spy,” says Mrs. McGrath. “He offered very little in the way of information or feedback and when asked why, he would reply, ‘I learned early on in my life that it is easier to keep my foot out of my mouth when it is closed.’ ”

When Max died in March following a long illness, his family designated the UA Sarver Heart Center as one of the recipients of memorials to recognize the care Max received. “In addition to the research activity, the Sarver Heart Center is the epitome of an organization whose staff is aligned to provide responsive service and

quality care to patients. We are grateful Max lived longer and had better quality of life because of this center,” says Mrs. McGrath.

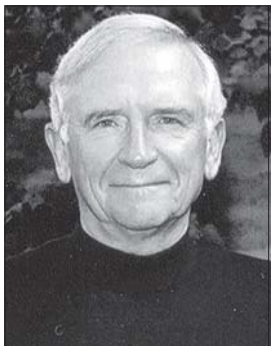
Born in 1925 in Plainview, Minn., Max grew up in Rochester, Minn., and graduated from Lourdes High School. He served in the U.S. Marine Corps in World War II, defending our country in the Pacific Theater aboard a Naval light cruiser. On Sept. 7, 1946, Max married Darlene Murphy at St. Francis Church in Rochester. Max graduated from Saint Mary’s College in Winona, Minn., in 1949 and he and Darlene moved with their family to Michigan, where he worked for General Electric Credit Corporation. When his former boss, Abernathy Brooks, left GE, he called Max to recruit him to the Chicago area to work with Brunswick Corporation, where Max retired 25 years later as vice president of finance and chief financial officer.

The McGraths retired to Tucson 17 years ago and lived at Skyline Country



Max McGrath

Club, where Max was a regular member of the Swingers golf group and where he served as president of the club. His family and friends remember him fondly for his silent strength and resolve, his giving nature and the love he felt for his family, his faith and his fatherland.



This lecture is held in honor of Paul Anthony Baltes, who died unexpectedly in December 2003. A graduate of the U.S. Military Academy in West Point, N.Y., Baltes had served as director of Engineering Professional Development at the UA College of Engineering since retiring from the U.S. Army in 1984.

### THE PAUL BALTES HEART HEALTH LECTURE

Tuesday, Oct. 12, 2004 • 3 p.m. - 5 p.m.  
UA Student Union Memorial Center  
Gallagher Theater

#### Preventing Heart Attacks

Gordon A. Ewy, MD  
Chief and Professor of Cardiology  
Director of the UA Sarver Heart Center

#### Preventing Sudden Cardiac Death

Peter Ott, MD  
Assistant Professor of Medicine  
Director of the UMC Cardiac Electrophysiology Laboratory

Arrive 30 minutes early to participate in free health screenings. For more information, call (520) 626-4083. Event is free and open to the public.

# Kudos



*Brian Bateman*

## Heart Center Research Grants Awarded

Brian Bateman, senior director of development at the UA Sarver Heart Center, has been named Outstanding Fundraising Executive by the Association of Fundraising Professionals.

In his nearly 10 years at the Heart Center, Brian has led fund-raising efforts resulting in about \$31 million in immediate gifts and about \$28 million in planned gifts.

“Needless to say, Brian is most deserving of this recognition for the outstanding job he has done in helping the Sarver Heart Center build relationships and assist donors with a special interest in supporting our efforts to prevent and cure cardiovascular disease,” said Gordon A. Ewy, MD, director of the Sarver Heart Center.

Brian will receive the award on Nov. 19 during the AFP’s National Philanthropy Day luncheon at Westin La Paloma.

Brian’s talent has resulted in an additional achievement, one that is bittersweet news for the Heart Center.

Beginning in December, Brian will join the UA College of Fine Arts as associate dean for development.

“Our loss is the College’s gain. We wish Brian the best in this next step in his career,” Dr. Ewy said.



*Dr. Mackstaller*

## Dr. Mackstaller Wins Patient Award

Congratulations to Lori Mackstaller, MD, who has been awarded a Patients’ Choice Award. The honor, presented by University Medical Center, was given “in recognition of your outstanding commitment to patient care and excellent communication skills.”

Award recipients are determined by patient nominations – the doctors with the most get the awards. Only a few physicians are selected each year.

Dr. Mackstaller, an internist at the Sarver Heart Center, cares for patients with cardiovascular disease. She has a special interest in heart disease in women.

She also recently was awarded membership in The Presidents Club at the University of Arizona Foundation. By conferring membership, the Foundation recognizes Dr. Mackstaller’s financial support of the University.



*Dr. Brody*

## Dr. Brody Named IHS Physician of the Year

Eric A. Brody, MD, has been named the Indian Health Service Physician of the Year.

Dr. Brody “has exhibited extraordinary dedication to national initiatives as well as to outstanding direct patient care, teaching and research as it relates to the provision of care for the Native American patients he serves,” according to the nomination submitted by James M. Galloway, MD, director of the Native American Cardiology Program.

Dr. Brody is associate director of the Native American Cardiology Program and a member of the Sarver Heart Center. He also is a commander in the U.S. Public Health Service.

The Native American Cardiology Program, developed in 1993, is a collaboration among the University of Arizona, University Medical Center, Flagstaff Medical Center, the Southern Arizona VA Healthcare System, Native American tribes and communities. The Program also is affiliated with the Sarver Heart Center.

Dr. Brody’s practice includes caring for patients with acute cardiovascular disease and complex medical issues. He also works with students and has developed programs to promote cultural sensitivity. His research has looked at the delayed time to treatment in Native American patients who suffer heart attacks.

# In Brief

## Dr. Gregorio Recognized for Cardiac Cell Research

Carol C. Gregorio, PhD, associate professor in the UA Department of Cell Biology and Anatomy, recently received the 2004 R.R. Bensley Award and presented an award lecture at the American Association of Anatomists' annual meeting. The award recognizes her research in identifying the molecular components and mechanisms required for the precise assembly and organization of the cytoskeletal components in cardiac and skeletal muscle cells.

Dr. Gregorio is a member of the UA Sarver Heart Center.

## Dr. Berg Accepts Associate Dean Position

Robert Berg, MD, has accepted the position of associate dean for clinical affairs at the UA College of Medicine. Dr. Berg is professor of Pediatrics; associate head, Department of Pediatrics; chief, pediatric critical care medicine; and president, UPI board of directors. He also is an active member of the Sarver Heart Center CPR Research Group.

## ACC Honors Dr. Alpert as 'Gifted Teacher'

Joseph S. Alpert, MD, head of the UA Department of Medicine and the Robert and Irene P. Flinn Professor of Medicine, was selected by the American College of Cardiology to receive its 2004 Gifted Teacher Award. An internationally noted cardiologist, Dr.



Dr. Alpert

Alpert was recognized for his innovative, outstanding teaching characteristics and compassionate qualities. Because of these attributes, he has made major contributions to the field of cardiovascular medicine. Dr. Alpert received this prestigious national award this spring at the American College of Cardiology's 53rd Annual Scientific Session in New Orleans.

## Dr. Lane to head American Psychosomatic Society

Richard D. Lane, MD, PhD, professor of psychiatry, psychology and neuroscience and associate director of the General Clinical Research Center at the UA, has been named president-elect of the American Psychosomatic Society.



Dr. Lane

His yearlong term begins in March 2005. The American Psychosomatic Society is an interdisciplinary research society dedicated to the integration of biological, psychological and social factors in medicine. APS is considered by many scientists to be the leading organization in the area of mind-body medicine ([www.psychosomatic.org](http://www.psychosomatic.org)).

Dr. Lane's research has focused on the brain and bodily mechanisms of emotion and their influence on physical disease. He currently holds grants from the National Institute of Mental Health to study the functional neuroanatomy of emotion in healthy men and women and from the National Heart, Lung and Blood Institute on emotional triggers of cardiac events in patients at genetic risk for sudden cardiac death.

A major career objective for Dr. Lane – a member of the UA Sarver Heart Center – is to help bring the brain into mind-body medicine.

## Dr. Reed is 'Local Legend'

Kathryn Reed, MD, is one of four UA women physicians recognized as "Local Legends" by the University of Arizona National Center of Excellence in Women's Health.

The four were honored this spring at the American Medical



Dr. Reed

Women's Association annual meeting in San Diego, Calif. This prestigious national honor is bestowed upon women physicians who have demonstrated commitment,

originality, innovation or creativity in their fields of medicine, according to the association.

Nationally, 139 women were nominated by a member of Congress – six are from Arizona.

Dr. Reed is professor and acting head of the Department of Obstetrics and Gynecology and director of the UA College of Medicine Section of Maternal-Fetal Medicine. She also is a member of the UA Sarver Heart Center.

The other UA women selected for the honor are:

- \* Tamsen Bassford, MD, head, Department of Family and Community Medicine; associate professor of clinical family medicine and clinical obstetrics and gynecology, UA College of Medicine.

- \* Mindy Fain, MD, program director, Geriatric Medicine Training Program; associate professor of clinical medicine, UA College of Medicine.

- \* Jessica Moreno, MD, assistant professor of clinical obstetrics and gynecology, Division of General Obstetrics and Gynecology, UA College of Medicine.



## UMC Heart Care, Heart Surgery Ranked Among Best in Nation

University Medical Center was ranked 22nd in the nation, and fourth in the West, for heart care and heart surgery in *U.S. News & World Report's* 15th annual guide to "America's Best Hospitals."

The standards for ranking in "Best Hospitals" are rigorous, according to *U.S. News*. Of the 6,012 medical centers in the United States (military and veterans hospitals are not included) only 177 were ranked in even one of the 17 medical specialties measured by the magazine.

Several other UMC areas also were among the best in the nation:

- Cancer – 20th
- Neurology and Neurosurgery – 22nd
- Respiratory Disorders – 26th
- Geriatrics – 31st
- Ear, Nose & Throat – 34th
- Orthopaedics – 35th
- Kidney Disease – 46th
- Gynecology – 48th

## Dr. Pascotto Joins CT Surgery Team



Dr. Pascotto

One of the Sarver Heart Center's newest members is Robert D. Pascotto, MD, a cardiothoracic surgeon who recently joined the Department of Surgery as an assistant professor of clinical surgery.

Dr. Pascotto is a native of New York City and a graduate of the Creighton University School of Medicine. He completed his cardiothoracic surgery training at the UA.

In addition to caring for patients, Dr. Pascotto is looking forward to the teaching and research aspects of his position at the University. He also hopes to work with low-income citizens on the importance of recognizing the signs of heart and lung disease.

## Lost, Found and Donated

### Professor Gives Unclaimed Money to SHC

A funny thing happened when Junetso Ito, PhD, headed into the Life Sciences North Building on the Arizona Health Sciences Center campus one day.

Just as he was about to open the door, he noticed five \$100 bills lying on the ground.

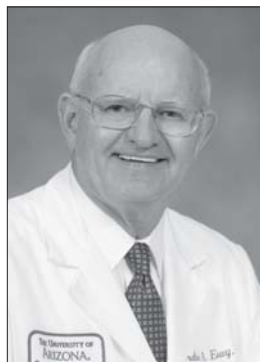
"I thought to myself, this must be 'Candid Camera,' so I gazed quickly all around me to see if there were any cameras filming me," says Dr. Ito, a professor emeritus in the Department of Microbiology and Immunology.

Dr. Ito scooped up the bills and proceeded to his office to call the Security Department. He turned in the cash and assumed the owner would be found. But 100 days later he received a call from Director of Security Harry Kirilin, informing him that, according to procedure, the unclaimed money was his.

"I asked him what he would like us to do with it and he said, 'I want to give it to charity,'" Kirilin said. "When I asked him which one, he said, 'Let's give it to the Sarver Heart Center.'"

"The Sarver Heart Center staff members have been very friendly and helpful to me," says Dr. Ito. "I just thought it would be a good use of the money and a way to say thank you to my colleagues in the Heart Center, especially Steve Nelson in computer support."

## FROM THE DIRECTOR



This issue of the Newsletter emphasizes a major focus area of research, education and patient care of the Sarver Heart Center – success with heart failure. The incidence of heart failure is increasing, making it one of the more common and increasingly important cardiovascular diseases.

The Sarver Heart Center has long been a leader in managing severely ill patients with end-stage heart failure.

Our transplant and artificial heart programs, led by Dr. Jack Copeland, are world renowned. But severely ill patients represent only the tip of a very large iceberg. We are focusing on the entire spectrum: healthy people with risk factors that could lead to cardiovascular disease and later heart failure; the large number of asymptomatic individuals with abnormal heart function who if undetected and untreated will progress to heart failure; people with overt heart failure; and severely ill patients.

The whole “iceberg” represents targets for intense research, education and patient care efforts.

If you’re a regular reader, you know that we are dedicated to “a future free of heart disease and stroke” and believe we can accomplish this through research, education and patient care.

This newsletter is an important tool in our education efforts, including our efforts to address the prevention and treatment of heart failure.

This issue carries three items related to heart failure. The first is our cover story on heart failure. The second is “Heart News For You” (pages 8-9), which is the second installment in a series called “The ABCs of Preventing Heart and Vascular Disease.” This installment is “B is for Blood Pressure” and is

particularly relevant, as uncontrolled or inadequately controlled blood pressure is a major cause not only of heart failure but also of stroke and renal (kidney) failure. The third item is an article by Dr. Vince Sorrell (*see page 3*) that walks us through imaging techniques that are used to detect asymptomatic heart dysfunction and to help diagnose the cause of heart failure and to follow the patient’s improvement.

Future issues not only will continue to emphasize prevention, therapy, and research of heart failure and other important cardiovascular diseases, but also will recognize those who by their financial contributions are critically important partners in our vision of a future free of heart disease.

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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