Paul Arthur Grayburn, MD: an interview by Mina Mecheal Benjamin, MD

Paul A. Grayburn, MD, and Mina M. Benjamin, MD

Figure 1. Paul A. Grayburn, MD.

Dr. Paul Grayburn *(Figure 1)* was born in Cincinnati, Ohio, on July 24, 1954. He graduated from Texas A&M University with a bachelor's degree in chemistry in 1976 and The University of Texas (UT) School of Medicine in Galveston, Texas, in 1981. After an internship and residency training in internal medicine at St. Paul Hospital (a UT Southwestern affiliate) in Dallas, he completed his cardiology and interventional cardiology training at the University of Kentucky Medical Center. He worked for 1 year as an instructor in medicine at the University of Kentucky Medical Center before returning to Dallas in 1988, where he practiced interventional cardiology and served as chief of cardiology at the Veterans Affairs Medical Center and was director of the echocardiography laboratories for UT Southwestern Medical Center. In September 2002, he came to Baylor University Medical Center at Dallas (BUMC) as the medical director of cardiology research. Dr. Grayburn has coauthored >270 articles in medical journals and is author/editor of 9 book chapters. He has participated in several multicenter trials that have changed our understanding and management of cardiovascular diseases. Dr. Grayburn is an expert in echocardiography and valvular heart diseases. He has been a visiting professor and lecturer at numerous institutions in the United States and abroad. Dr. Grayburn is the epitome of what an academic physician should be: an outstanding clinician, teacher, researcher, and mentor.

Mina Benjamin, MD (hereafter, Benjamin): *Today is March 21, 2012, and I am seated with Dr. Paul Grayburn at his office in the Baylor Heart and Vascular Hospital. Dr. Grayburn, thank you for the opportunity to have this conversation with you.*

Paul Grayburn, MD (hereafter, Grayburn): My pleasure.

Benjamin: *Dr. Grayburn, let me start with your move to Baylor in 2002. What prompted your move from UT Southwestern to BUMC?*

Grayburn: There were many factors that influenced my decision. I had worked closely with Dr. Bill Roberts since 1997, when he appointed me associate editor of *The American Journal of Cardiology*. He asked me several times if I might be interested in coming to BUMC. He arranged meetings with Mike Emmett and Kevin Wheelan, and I eventually decided to make the move. A major consideration was the enormous patient volume in cardiology, which is a great asset to conducting clinical trials. Another factor was the high quality of the cardiologists here, many of whom I had known when they were residents or fellows at UT Southwestern. Finally, the Paul Thomas Chair in Cardiology Research and Education enabled me to have permanent funding for my research.

Benjamin: *How has cardiovascular research grown since you came to BUMC?*

Grayburn: It has grown exponentially in terms of the number of publications and the number and types of studies that have been done. This increase has been a team effort and not just the result of my coming to BUMC. Dr. Roberts had always done research here and continues to be productive. A lot of other people have played a big role. Dr. Cara East directs the Soltero Cardiovascular Research Institute, and she has done a fantastic job of bringing major drug and device trials to BUMC. All of our electrophysiology physicians are involved in major trials. These include studies of the left atrial appendage closure device, catheter ablation of atrial fibrillation, and resynchronization and defibrillator trials. There are also several important trials in the cardiac catheterization laboratory. Currently, Drs. Robert Stoler and Robert "Rick" Hebeler are doing percutaneous aortic valve replacement with the Medtronic core valve device. Dr. James Choi is doing an important renal sympathectomy trial, among others. Drs. Baron Hamman, Cara East, and Harold Urschel Jr. are doing stem cell work. The Cardiovascular Research Review Committee of the Baylor Foundation allocates research funding for various projects initiated by local investigators, including faculty, staff, fellows, nursing, and cardiac rehabilitation.

Benjamin: *What made you choose to pursue your career in academia?*

Grayburn: I believe that medicine is an academic pursuit because whether you are in pure private practice or in an

From the Division of Cardiology (Grayburn), Department of Internal Medicine (Benjamin), Baylor University Medical Center at Dallas.

Corresponding author: Paul A. Grayburn, MD, Baylor Heart and Vascular Institute, 621 North Hall Street, Dallas, Texas 75226 (e-mail: PaulGr@BaylorHealth.edu).

academic setting, the field of medicine is always advancing. It is always necessary to keep abreast of modern advances and current standards of care. It is easier for me to do that when I am on the front lines actually participating in the cutting edge of new knowledge and new developments.

Benjamin: *When did you publish your first paper?*

Grayburn: In 1986 in the *Annals of Internal Medicine*.

Benjamin: *What was it about?*

Grayburn: It examined the improved accuracy of Doppler detection of aortic regurgitation compared to auscultation.

Benjamin: *What was the first clinical trial you conducted?*

Grayburn: As a cardiology fellow, I was involved in the early Thrombolysis in Myocardial Infarction (TIMI) trials as well as the early beta-blocker trials for acute myocardial infarction. My role was to enroll patients and do the cardiac catheterizations, but I was not listed as an author on any of the articles, since I was a mere fellow. Nevertheless, the experience was great and it stimulated my interest in clinical research.

Benjamin: *You have done much work in contrast-enhanced echocardiography. What is the rationale behind using contrast material with echocardiography?*

Grayburn: Many patients do not image well on echocardiography. Reasons are many and include obesity, chronic lung disease, or chest wall deformities. Often, a patient in the intensive care unit on a ventilator cannot be rolled over into the left lateral decubitus position, which is optimal for getting good images. Using a contrast agent gives us the ability to obtain better image quality and improve the ability to make the correct diagnosis.

Benjamin: *What contrast material is used?*

Grayburn: Currently, two ultrasound contrast agents are approved by the US Food and Drug Administration (FDA). Both of them are composed of perfluoropropane gas surrounded by a shell. Optison has a shell made of human serum albumin. Definity has a phospholipid shell.

Benjamin: *How long does the procedure take? And how is that compared to conventional echocardiography?*

Grayburn: Using a contrast agent may actually shorten the procedure because it is easier and faster for the sonographer to acquire images when they are of high quality. However, contrast injection requires an intravenous line. If the patient already has intravenous access, it is simple to inject a contrast agent. In an outpatient setting, one might have to obtain intravenous access first, and that may slow you down a few minutes.

Benjamin: *Is there a difference in interobserver variability between contrast-enhanced echocardiography and conventional echo?*

Grayburn: It has been shown that contrast improves observer variability and diagnostic accuracy for measuring left ventricular volume and ejection fraction by echocardiography.

Benjamin: *How much more accurate is contrast-enhanced echocardiography than conventional echocardiography for measuring the left ventricular ejection fraction?*

Grayburn: There are a lot of studies on this topic. To briefly summarize them, the 95% confidence intervals for left ventricular ejection fraction with an unenhanced echocardiogram are ±20%. That means that if the ejection fraction is 50%, you can be 95% confident that it is between 30% and 70%. The confidence intervals are ±10% after giving a contrast agent with standard two-dimensional echocardiography. The combination of three-dimensional echocardiography and contrast reduces the confidence intervals to ±5%.

Benjamin: *What are the current recommendations of the American Society of Echocardiography regarding contrast-enhanced echocardiography?*

Grayburn: Currently, both the American Society of Echocardiography and the Intersocietal Commission of Accreditation of Echocardiography Laboratories recommend that contrast be used in all patients in whom a diagnosis is unclear or when at least two contiguous endocardial borders cannot be clearly seen. It is estimated that 10% to 20% of transthoracic echocardiograms and up to 50% of stress echocardiograms should be done with contrast. Some centers use contrast routinely in every stress echocardiogram.

Benjamin: *On October 10, 2007, the FDA announced a new black box warning for the perflutren-containing ultrasound contrast agents, contraindicating the use in patients with acute coronary syndrome, acute myocardial infarction, and worsening of clinically unstable heart failure. They recommended 30 minutes of recording vitals in those patients undergoing transesophageal echocardiography (TEE). On what basis did the FDA post this warning? You called this warning "unjustified" in one of your published papers. On what basis did you formulate your conclusion?*

Grayburn: The FDA based that warning on four reported deaths that occurred within 30 minutes of administration of the contrast agent Definity. However, careful independent review of the cases revealed that the deaths were attributed to the underlying disease process, and not to the contrast agent. So, the FDA modified the black box warning and removed the contraindications. The FDA convened a subsequent cardiorenal advisory panel, which recommended in a close vote that the black box warning be removed altogether.

Benjamin: *Contrast-enhanced echocardiography has also been used to evaluate myocardial perfusion. What is the principle behind myocardial contrast echocardiography (MCE)?*

Grayburn: Because the microbubbles are roughly half the size of a red blood cell, they pass freely through the coronary microcirculation, and this can be seen on ultrasound. So ultrasound contrast agents give you the ability to image myocardial perfusion without the risk of radiation and without the expense associated with nuclear scans.

Benjamin: *Does MCE have an advantage over dobutamine stress echocardiography?*

Grayburn: A contrast agent can certainly improve diagnostic accuracy and allow visualization of wall motion and perfusion simultaneously. That is a potential advantage over dobutamine stress echocardiography, which only evaluates wall motion. This also offers an advantage over nuclear testing in that the axial resolution of ultrasound is about 0.7 mm, which is 10 times better resolution than a nuclear scan. The improved resolution allows visualization of subendocardial perfusion defects, which cannot be identified by nuclear perfusion imaging.

Benjamin: *What is the accuracy of MCE compared to coronary angiography in determining myocardial perfusion?*

Grayburn: In 2006, Dijkmans et al published a metaanalysis of eight studies in which myocardial perfusion was performed by both MCE and nuclear techniques in patients undergoing coronary angiography. The diagnostic accuracy of MCE was statistically significantly better than that of nuclear imaging for detecting coronary artery disease.

Benjamin: *What are the limitations of MCE?*

Grayburn: The main limitation is that MCE requires good-quality echocardiographic images. Another practical limitation is that the contrast agents are not FDA approved for perfusion imaging, nor is there an MCE reimbursement code from the Center for Medicare and Medicaid Services. So, currently MCE is billed as an ordinary stress echocardiogram.

Benjamin: *You have also done much work on the ultrasound-targeted microbubble destruction technique (UTMD). What is the rationale behind this technique?*

Grayburn: The basis for UTMD is that ultrasound contrast agents undergo rapid inertial cavitation when exposed to high-energy ultrasound. The rapid collapse of the microbubbles, also called "bubble destruction," can allow entry of genes, proteins, or drugs into surrounding cells by a process known as sonoporation. So my colleagues and I at UT Southwestern hypothesized that you could load microbubbles with genes or drugs, circulate them throughout the body, and then target delivery of those drugs or genes to a specific organ or tissue by ultrasound. This has now blossomed into a field for which more than 100 papers have been published.

Benjamin: *What are the microbubbles made of?*

Grayburn: The microbubbles have a shell made of phospholipids, albumin, or various polymers encapsulating a gas bubble of air, perfluorocarbon, or sulfur hexafluoride. The shells can be modified to carry genes, drugs, small interfering RNA (siRNA), or other molecular cargo, and there are different chemical methods for doing so.

Benjamin: *How long do the microbubbles stay in the circulation?*

Grayburn: In 15 minutes all the gas in the microbubbles is exhaled in expired air.

Benjamin: *Are there side effects from destruction of the microbubbles by ultrasound waves?*

Grayburn: Yes and no. In vitro experiments and animal experiments reveal dose-dependent side effects due to the fact that microbubble destruction creates very high local temperatures leading to damage to the cell membrane. This is both a blessing and a curse. By opening pores in the cell membrane, you can allow genes or drugs to enter the cells. But obviously if you do that too extensively, you could cause permanent damage to the cells. So like most drugs, there is a therapeutic window. If you give too high an ultrasound energy and too many bubbles, you can actually cause cell damage. If you don't give enough, you don't get the therapeutic benefits. The good news is that there is a safe and therapeutic window.

Benjamin: *Are there other ultrasound parameters associated with side effects?*

Grayburn: The two main variables are acoustic power and transmission frequency. Lower frequencies are associated with more effective microbubble destruction. Higher acoustic power is also more effective.

Benjamin: *What kinds of substances have been delivered by UTMD?*

Grayburn: In 2000, we published the first report of UTMD to deliver adenoviral gene vectors. Since that time, we and other investigators have delivered adenoviral gene therapy, plasmid gene therapy, drugs, proteins, antisense oligonucleotides, peptides, and siRNAs.

Benjamin: *Are there any potential direct therapeutic effects of the technique without delivering a gene or drug?*

Grayburn: Yes. When the microbubbles undergo inertial cavitation, the energy that is generated can actually permeabilize cell membranes. This has been shown to allow entry of chemotherapy into tumors in animal models. You can also use microbubbles in conjunction with high-intensity focused ultrasound to achieve cell death in certain soft-tissue tumors like prostate cancer and uterine fibroids.

Benjamin: *Have the optimal parameters for delivery of these microbubbles to the target tissue been figured out yet?*

Grayburn: No. In fact, I am currently working with ultrasound engineers at GE Global Research to try to develop instrumentation specifically designed for UTMD.

Benjamin: *How useful is targeting the genes or drugs to specific desired locations in the human body?*

Grayburn: It is very important because it potentially allows avoidance of the systemic side effects of gene therapy or chemotherapy.

Benjamin: *Do all tissues show similar uptake rates with the technique?*

Grayburn: No. There are two primary reasons for differing tissue sensitivity. One is tissue vascularity. Since the microbubbles are carried within the vascular space, hypovascular tissues or organs are difficult to target. Second, because ultrasound is needed to destroy the microbubbles, target tissues must be accessible by ultrasound. For example, the brain is difficult to target because it is encapsulated by the cranium, and ultrasound doesn't penetrate bone well.

Benjamin: *Has the UTMD technique been tested in humans yet?*

Grayburn: No.

Benjamin: *What kinds of genes have been targeted to the myocardium?*

Grayburn: Multiple genes have been studied, including SERCA-2 for diastolic dysfunction, vascular endothelial growth factor (VEGF) and fibroblast growth factor (FGF) for angiogenesis, and stem cell factor (SCF) to help enhance stem cell uptake into the myocardium.

Benjamin: *You are also exploring novel therapies for diabetes mellitus using the UTMB technique. What gene do you use to target the pancreatic islet?*

Grayburn: Several transcription factor genes are involved in embryogenesis of the endocrine pancreas. We have tested most of those genes in mouse and rat models and successfully

stimulated islet regeneration. A particular advantage of this technique is that gene expression lasts only a few days, but results in morphologically normal islets with cure of diabetes for several months in a rat. We are currently working on a baboon model with our colleagues at the Texas Biomedical Research Foundation in San Antonio, and preliminary data indicate that islet regeneration is feasible in baboons, which closely resemble humans genetically.

Benjamin: *What is the quality of the new islets?*

Grayburn: The new islets resemble fully formed adult islets under histological examination. Furthermore, with the new islets, blood sugar and C-peptide levels return to normal, as does the glucose tolerance test, so these appear to be completely normal islets.

Benjamin: *How long does the restoration of the activity last in nonhuman animals?*

Grayburn: In rats, the new islets persist for at least 6 months.

Benjamin: *Have you also tried delivering VEGF genes to improve the survival of the transplanted islets?*

Grayburn: Yes, we have taken islets from human donors, injected them into mouse liver, and then treated the recipient livers with VEGF. This improved the vascularity and survival of the implanted islet grafts and increased the percentage of mice who were cured of diabetes.

Benjamin: *Do you have a rough estimate of a timeline for doing a human study using this technique?*

Grayburn: We first need to complete our baboon pilot study and then work with the FDA on a plan to move to first-in-human trials.

Benjamin: *Are there other projects in which you're using the UTMD technique?*

Grayburn: We just started a collaborative project with Drs. Carlos Becerra and Alan Miller in the new oncology center. They have some novel ideas about using microbubbles to treat pancreatic cancer.

Benjamin: *Is the goal to target chemotherapeutic agents to the pancreas?*

Grayburn: We have several broad ideas. One of those is to attach gemcitabine to the bubbles and target it directly to the pancreatic tumor rather than circulating it throughout the entire body. Second, we could use UTMD to disrupt the desmoplastic stroma, which tends to protect the tumor from chemotherapy. Third, we might be able to use the microbubbles to deliver therapy that might improve the immune response to the tumor.

Benjamin: *Let me now shift to another field that you have been working on here at BUMC. Since 2005, you have been on the publications committee for the EVEREST study. What is the object of this study?*

Grayburn: EVEREST II is a randomized trial published last year in the *New England Journal of Medicine* comparing the effectiveness of the MitraClip, which is a percutaneous device for repairing the mitral valve in mitral regurgitation (MR), to surgery. EVEREST II showed that the MitraClip is safer than surgery, as would be expected for a minimally invasive approach, but not quite as effective as surgery at eliminating MR. The MitraClip is currently being used in Europe and other countries primarily in patients who are considered high risk for surgery because of age, prior cardiovascular surgery, and other comorbidities. It is not approved in the US yet.

Benjamin: *Is that technique indicated for all types of MR?*

Grayburn: It is indicated both for degenerative MR, which is the most common type, and also for functional MR, which occurs secondary to left ventricular dysfunction. There are some patients in whom the MitraClip is not likely to be successful.

Benjamin: *Could you describe the device used in the procedure and how it is introduced?*

Grayburn: The device is a cobalt chromium clip with two arms, each of which is 8 mm in length. It has grippers that close the device around each of the mitral leaflets. It is designed to function like an Alfieri stitch, pinning the anterior and posterior mitral leaflets together at the site of the mitral regurgitation jet. It offers an advantage over the Alfieri stitch in that the design of the clip forces 8 mm of coaptation of the leaflet edges. It is placed by going up through the femoral vein into the right atrium, crossing the atrial septum with standard techniques, and then coming down upon the mitral valve from the left atrium.

Benjamin: *How do you ensure the correct positioning of the clip?*

Grayburn: Unlike most cardiac catheterization procedures, the MitraClip is placed under TEE guidance. I perform the TEE. The MitraClip device is deployed by an interventional cardiologist (Drs. Choi or Brown) and a surgeon (Drs. Mack or Hebeler).

Benjamin: *What are the potential complications of the procedure, and what are the rates of this complication?*

Grayburn: The complication rate is low and depends on the nature of the patients being evaluated. In high-risk patients who have been declined for surgery because of extensive risk factors, the 30-day mortality rate is about 5% and the stroke rate is about 2%. The bleeding rate from primarily a groin bleed is about 10%. These complications occur less frequently in low-risk patients. The MitraClip is successful in reducing MR to mild or moderate in about 85% of the patients; another 15% do not have sufficient MR reduction.

Benjamin: *How many patients have undergone the procedure so far?*

Grayburn: We are doing these procedures at both the Baylor Heart and Vascular Hospital in Dallas and The Heart Hospital Baylor Plano. We have done about 30 procedures between the two institutions.

Benjamin: *How many patients have undergone this procedure worldwide?*

Grayburn: There are now over 5000 cases worldwide.

Benjamin: *What about the long-term data on the patients who have the clip?*

Grayburn: The first case was done in South America 9 years ago. The patient still has only mild MR, is feeling well, and has had no complications.

Benjamin: *Since 2002 you have been on the committee for the Surgical Therapy for Ischemic Heart Disease trial, or STICH. What was the objective behind STICH?*

Grayburn: The STICH trial is one of the most important cardiac surgery trials ever done. In the early days of bypass surgery, the CASS trial was done in patients who had mild stable angina, but patients with ejection fractions <35% were excluded. For all the years that we have done bypass surgery, no one has done a randomized controlled trial of patients who have heart failure and an ejection fraction <35% to understand whether revascularization would benefit them or not. That was the primary rationale of the STICH trial. To get into the trial, patients had to have heart failure symptoms, coronary artery disease amenable to coronary artery bypass grafting (CABG), and an ejection fraction ≤35%. This is the first major randomized trial to evaluate the role of revascularization in heart failure patients with ischemic cardiomyopathy.

Benjamin: *What was the endpoint in this trial?*

Grayburn: The major endpoint was all-cause mortality. The major secondary endpoint was cardiovascular mortality and heart failure hospitalization.

Benjamin: *What was your role in the study?*

Grayburn: I was director of the TEE substudy to evaluate the mechanism and severity of MR, which is common in ischemic cardiomyopathy. The first paper on MR in the STICH trial has just been accepted by *Circulation*.

Benjamin: *What did the panel conclude at the end of the study?*

Grayburn: The STICH trial has generated a bit of controversy. The primary endpoint of all-cause mortality trended in favor of bypass surgery, but it was not statistically significant. Therefore, some clinical trialists assert that STICH was a negative trial. A closer look at the data reveals more subtle findings. For example, there were many crossovers—patients who were assigned to CABG but never received it, or patients who were initially assigned to medical therapy but early on crossed over to CABG. When those patients were taken out of the analysis, the results were strongly in favor of CABG. The secondary endpoint, which was combined cardiovascular mortality and heart failure hospitalization, was dramatically improved by bypass surgery versus medical therapy. So I think the overall gestalt of the trial is that it favors revascularization with CABG for heart failure patients with ischemic cardiomyopathy, although this will remain controversial.

Benjamin: *What about long-term follow up of the STICH patients?*

Grayburn: Patients who were enrolled in STICH are being followed out to 10 years. This is called the STICH Extended Study (STICHES).

Benjamin: *Dr. Grayburn, you have been invited to speak at many institutions, including Duke University Medical Center, The John Hopkins University Medical Center, Ohio State University, New York University, Massachusetts General Hospital, and the Mayo Clinic, among others. You have given >100 lectures since 2000. Which topics are you usually asked to lecture on?*

Grayburn: I am usually asked to speak about valvular heart disease, UTMD, or cardiac imaging.

Benjamin: *How many trips do you take a year for presentations or meetings?*

Grayburn: Approximately 10 to 12 per year.

Benjamin: *How would you describe your presentation technique?*

Grayburn: I'm generally known as a good speaker. I don't think there is any secret to it. You need to know the message you want to communicate to the audience, who the audience is, and then communicate in a succinct and concise manner. The other important thing to do is to make it clinically relevant, usually by linking the talk to a real patient's story.

Benjamin: *In your career thus far, what accomplishments are you most proud of?*

Grayburn: I am most proud of innovative discovery. My colleagues and I were the first to describe the use of dobutamine echocardiography for elucidating the physiology of low-gradient aortic stenosis. We were the first to describe the use of dobutamine stress echo for myocardial viability. We wrote one of the first papers on myocardial perfusion imaging with ultrasound contrast agents. We pioneered the use of vena contracta measurement for quantification of MR. We were the first in the world to use UTMD for gene therapy.

Benjamin: *You have received several awards throughout your career. Which one are you most proud of?*

Grayburn: I think awards are overrated. If I had to pick one, it would be the National Institutes of Health K24 Award. It is a grant awarded for having a track record of mentoring junior faculty members. A number of my former trainees now hold faculty positions at famous institutions, and I am proud of them and their accomplishments.

Benjamin: *How much time did you dedicate for teaching at that time?*

Grayburn: The K24 award from the National Institutes of Health protected 50% of my time for teaching and mentoring.

Benjamin: *What are your professional goals from here on?*

Grayburn: I would like to advance UTMD to human studies. I would like to see the MitraClip approved by the FDA for human use, and I would like to help develop percutaneous mitral valve replacement.

Benjamin: *Let me get to know a little bit about your work day and your personal life. What time do you usually get up? What time do you usually go to sleep?*

Grayburn: I usually get up around 6:00 or 6:15 AM and I go to bed early, usually after the evening news, about 10:30 PM.

Benjamin: *Do you have a typical work day?*

Grayburn: Some days I am doing procedures in the cath lab or seeing patients in the valvular heart disease clinic. Other days I am working in the animal lab or sitting at my desk writing papers or doing conference calls or going to meetings. There is a lot of variation, so there is no such thing as a typical day.

Benjamin: *What do you do when you are not working on the weekends?*

Figure 2. Dr. Grayburn after surfing in Kona, Hawaii, with friends, Dr. Jonathan R. Lindner, University of Oregon Health Sciences Center, and Dr. Michael H. Picard, Massachusetts General Hospital. This was taken during the American Society of Echocardiography CME Course, EchoHawaii 2012.

Grayburn: If I am not on call or at a meeting, I try to preserve weekends for my family. I have a wife, four kids, and three grandkids, and we enjoy spending time together.

Benjamin: *How much vacation time do you take annually?*

Grayburn: I typically take 2 to 3 weeks of vacation every year. I usually spend at least 1 week at a beach *(Figure 2)* and another snowboarding in Colorado.

Benjamin: *When did you meet your wife? How long have you been married?*

Grayburn: I met her when I was in medical school and we became best friends. We have been married for 32 years and have been blessed to have a really good relationship.

Benjamin: *What do your four children do?*

Grayburn: I have a daughter who does accounting for an oil and gas servicing company in Fort Worth. She and her husband have three kids. I have a daughter at Belmont University in Nashville, a son at Texas A&M, and a daughter who graduates from First Baptist Academy next year.

Benjamin: *Do you have plans for retirement?*

Grayburn: No. At some point, I might consider slowing down and focusing only on the things I am most interested in doing.

Benjamin: *Is there someone or something that currently inspires you?*

Grayburn: I think that I have really been blessed to have good mentors in my career. I did my cardiology fellowship at the University of Kentucky when Tony DeMaria was chief of cardiology. He is a very famous cardiologist and has been past president of the American College of Cardiology. He is the editor in chief of the *Journal of the American College of Cardiology*. He has been a mentor to me not only during my 3 years of fellowship, but throughout my career. After I left Kentucky, I was recruited to UT Southwestern by Jim Willerson, who has helped my career throughout the years. During my 15 years at UT Southwestern, David Hillis and Sandy Williams were mentors and role models to me. All of them have helped shape my career and inspire me to greater things. I have learned that having good mentors is really a key to success.

Benjamin: *Thank you, Dr. Grayburn. Your fruitful career is quite inspiring.*