



Siemens newest and tiniest portable ACUSON P10 ultrasound system offers physicians a brand-new screening tool that has the power to transform today's physical examinations.

Small is the New Big

Since the days of Hippocrates, the relationship between patient and physician has played a critical role in medical treatment and healing. Yet the reality of today's often-hurried managed health-care environment is that physicians and patients have limited face time with each other. Hand-held ultrasound addresses this challenge by combining technology and touch – the best of both worlds. Until recently, ultrasound was used primarily for diagnosis. But now, miniaturized hand-held devices offer vast potential for screening applications. Siemens new ultrasound system is designed to enhance the physical exam by providing visual information to support clinicians in early care decisions. The ACUSON P10™ ultrasound system will make its worldwide debut this summer. This innovative tool may well redefine the standard of care.

Portable Technology for Rapid Diagnosis

"The advent of hand-held ultrasound devices is putting the power back into the physical exam," says Bruce J. Kimura, MD, FACC, Director of Noninvasive Cardiology at Scripps Mercy Hospital in San Diego and Associate Professor at the University of California San Diego (UCSD). He explains that physical examination techniques have been virtually unchanged since the invention of the stethoscope nearly two centuries ago. "Now," he says, "among the modern imaging techniques

that could enhance the 'hands-on' art of physical examination, ultrasound has been proven safe, is portable and provides immediate data." The portable technology can help physicians rapidly diagnose and prescribe treatment for patients right at the bedside, whereas previously they might have been sent for inconvenient, time-consuming, and expensive tests. The first portable ultrasound device was the ACUSON Cypress™ echocardiography system, introduced nearly a decade ago. Since then, a number of other 'portable ultrasound' systems have entered the market. Most are the size of a laptop computer, and include a trolley. They are used for the same basic diagnostic procedures for which larger, more expensive systems are used, but offer lower costs and improved portability. However, the size, form factor, and cost of today's portable systems are liabilities which limit their use in screening applications. The portable ACUSON P10 system enables a new use case: Never before has an ultrasound system been so small, making it instantly available, and yet powerful. The device is one-fifth the size of a laptop, and is the smallest ultrasound system in the world, sized to fit in a lab coat pocket and at a mere 1.6 pounds, is light enough to be carried by physicians during rounds, much like a stethoscope. The ACUSON P10 system will not replace traditional cart-based ultrasound, but will be used wherever instant information is needed – at the bedside or in the field –

to enable earlier, faster, and more accurate screening and triage decisions. The ACUSON P10 system delivers information via a flip-up LCD display that measures 3.7 inches diagonally. The user interface is optimized for 'thumbing' – using only the thumbs to navigate, similar to a PDA. Ambidextrous function buttons and a circle pad provide an intelligent user interface that is quick and easy to learn. Image quality is comparable to larger systems billed as 'portable ultrasound' currently on the market.

Immediate Results Can Save Lives

According to Dr. Kimura, a longtime advocate and research pioneer in the field, portable ultrasound offers a distinct advantage in bedside examinations because it produces immediate results. He also adds, "limited ultrasound screening can be used in routine in-office exams of asymptomatic patients, to detect conditions that are clinically significant but have previously required expensive or invasive diagnostic examinations." In the cardiovascular area, for example, carotid atherosclerosis, left-ventricular systolic dysfunction, and abdominal aortic aneurysms can lead to heart disease, stroke or a ruptured aneurysm. "Unfortunately, these conditions often elude routine physical examinations," Kimura explains. "With portable ultrasound, it is feasible to detect these conditions using a hand-



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held device, which can be used during a typical outpatient visit. Immediate results can mean the difference between a prolonged life and a shortened one.” Portable ultrasound can also be used to obtain more information before ordering other diagnostic tests. Reducing the number of unnecessary diagnostic tests results in decreased anxiety and better outcomes for patients, as well as increased workflow efficiency and system utilization in imaging departments. Dr. Kimura is planning a study in a clinical outpatient setting. While the study is forming, end-points would evaluate early detection of disease, early intervention and increased efficiency. But that’s just the beginning, says Kimura: “Portable ultrasound offers plenty of new options for other applications, such as trauma or intensive care settings, when the only other recourse to get imaging was to move or reposition a seriously ill patient. Portable ultrasound also can be used for obstetric, surgical and primary care patients.”

Seeing is Believing

One of the most valuable benefits of hand-held ultrasound is the real-time data it provides for physicians and patients, according to Dr. Kimura. An avid proponent of portable technology, he is developing groundbreaking ultrasound-based study protocols to improve quality of care while reducing costs. On a typical day, Dr. Kimura may use the device in his office, on rounds at Scripps Mercy Hospital, and in the Scripps outpatient clinic. Portable

ultrasound allows Dr. Kimura to have visual reinforcement when informing a patient about their health status. It can relieve anxiety in a way that words cannot. During the exams, patients consistently and positively respond to seeing their exam results. Patients can literally see the manifestation of arterial disease, which can occur years before an actual cardiac event. “Previously, cholesterol was just a number. Weight was just a number,” says Kimura. “When patients are presented with an image of arterial buildup right in front of them, it has an emotional impact. Seeing the disease in their own body, and knowing that this is what we are talking about, will typically improve adherence to treatment.”

An Educational Tool for Patients and Students

Patient satisfaction surveys consistently rank interaction between physician and patient as very important. Education is an important component of patient satisfaction, says Kimura, adding that portable ultrasound optimizes interaction and education for his patients. “In terms of the cardiovascular assessment, a brief ultrasound of three sites adds less than ten minutes to an examination and provides screening for conditions that lead to heart disease, stroke or ‘triple A’ (abdominal aortic aneurysm). Besides the obvious benefit of early detection, patients appreciate the opportunity to see real-time results, focus on education, and have the interaction with their physician,” he says.

“It’s a very powerful thing – face-to-face with patients.”

Portable ultrasound is also proving to be a valuable teaching tool for medical students. Instruction of fourth-year medical students on the use of hand-carried ultrasound is feasible and results in significantly more accurate bedside diagnoses, according to a study reported in the *Journal of the American Society of Echocardiography* (March 2005). As a major teaching hospital with 700 beds and two campuses, Scripps Mercy Hospital is the largest hospital in San Diego and among the ten largest in California. The hospital serves as a primary site for the clinical education of more than 50 medical residents per year, as well as a secondary training center for residents from the University of California, San Diego and the Naval Medical Center, San Diego. “First year medical students routinely learn to listen by using a stethoscope when assessing their patients,” says Dr. Kimura. “Hearing is difficult even in ideal situations, but it is arduous and almost an impossibility in a busy trauma center or even an intensive care unit when various monitors and equipment are buzzing.” The ACUSON P10 system can overcome traditional obstacles in ultrasound and help medical residents achieve a new level of performance and understanding of their patients’ status. “It’s like having a visual stethoscope,” Dr. Kimura explains. In a number of studies at the hospital, medical residents who had received initial training with portable ultrasound were able to significantly improve their ability

to identify abnormalities, such as heart failure, valve disease, or pulmonary edema, versus listening with a stethoscope alone.

Return on Investment

Dr. Kimura became interested in portable ultrasound technology some years ago when he was trying to improve efficiency in the hospital's echocardiography department. "I began doing research on the utilization and found that echocardiograms are frequently ordered based on indications related to the patient's main complaint, history, or initial ancillary testing. The use of hand-held ultrasound has the potential to detect cardiovascular disease at an earlier stage, improve triage and subspecialty referral, and therefore eliminate unnecessary testing."

He suggests that portable ultrasound can identify heart disease earlier and will enable physicians to know more accurately when to order a full diagnostic ultrasound exam, as well as finding previously undetected conditions that warrant diagnostic evaluation. Kimura predicts that the technology could help achieve a significant reduction in unnecessary orders, a figure derived from a 2004 study he performed with Anthony DeMaria, MD, Director of the UCSD Cardiovascular Center. Additionally, portable ultrasound can "change management of patients," says Kimura. Patients who do not fall into traditional risk groups can be easily tested with hand-held ultrasound. Obviously, there is a tremendous economic advantage when disease is detected early and intervention begins before a patient suffers cardiac arrest or stroke.

The Right Tool, Right Now

Portable ultrasound and hand-held medical devices in particular, represent major progress and potential to improve the quality of the physical examination, which has been virtually unchanged for 200 years. Patients in any clinical environment – the physician's office, intensive care unit, surgical postoperative area, delivery room, or even in an ambulance – can benefit from hand-held ultrasound, says Kimura. Advantages include faster diagnosis, faster intervention, improved patient-physician communication, and the potential elimination of unnecessary testing. Patients and physicians alike have praised the breakthrough technology.



At numerous conferences, starting with the 2006 Radiological Society of North America Annual Meeting held last fall in Chicago, the ACUSON P10 system is being previewed and has received unprecedented acclaim from physicians. Ultrasound professionals from around the world gathered to see the images and clips on the tiny unit and hear about the new standard of care the ACUSON P10 system provides. Dr. Kimura concludes, "portable ultrasound gives us a great opportunity to provide the latest in technology while increasing the satisfaction of the patient exam. The hand-held system allows physicians to screen patients in any setting, plus heighten the healing power of touch." Will this be beneficial to patients? Could it be economically advantageous? Kimura notes, "it's our future."

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ACUSON P10 Features at a Glance

- Hand-held personal imaging tool
- Fits in a lab coat pocket
- Visual reinforcement of exam findings improves patient communication
- Optimized form factor, functionality, and price to complement the physical exam
- 1.6 lbs total weight
- ~ 5-second power-up
- Excellent image quality
- Easy to use – simple, intuitive user interface
- Stores images and video clips for permanent record-keeping
- Improved interaction with patients
- 4-2 MHz phased array transducer ideal for trauma and cardiac applications