American Society of Echocardiography Cardiovascular Technology and Research Summit: A Roadmap for 2020

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Dr. Pellikka was the summit chair and Drs. Douglas and Miller were the co-chairs; the rest of the panelists are listed in alphabetical order.

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Abbreviations

ASE = American Society of Echocardiography

DICOM = Digital Imaging and Communications in Medicine

FDA = US Food and Drug Administration

LV = Left ventricular

NIH = National Institutes of Health

TAVR = Transcatheter aortic valve replacement

TEE = Transesophageal echocardiographic

3D = Three-dimensional

TVT = Transcatheter valve therapy

2D = Two-dimensional

VHD = Valvular heart disease

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INTRODUCTION

The promotion of research involving cardiovascular ultrasound is part of the mission of the American Society of Echocardiography (ASE). For years, the ASE has awarded research grants to fund meritorious research by its members. The society's journal, the *Journal of the American Society of Echocardiography*, and the ASE's Annual Scientific Sessions provide venues for the publication and presentation of high-quality research. However, declining availability of federal funding for research has posed challenges for investigators, including those involved with cardiovascular ultrasound. In 2010, Dr. Sanjiv Kaul, then the ASE president, and others believed that a strategic planning session to outline goals and develop an action plan would be valuable to the ASE and its members. Thus, that year, the ASE held the first ASE Technology and Research (as in Technology and Research Summit) Summit in Chicago, preceding the Annual Scientific Sessions of the American Heart Association. To draft a roadmap for cardiovascular ultrasound research, the summit brought together academic echocardiographers, scientists, acoustic physicists, ultrasound engineers from various companies, and a staff member from the National Institutes of Health (NIH). Over the full-day meeting, several research and technology areas of topical interest with a potential for growth in the near future were discussed. These included the assessment of global and regional left ventricular (LV) function, regional myocardial perfusion, molecular imaging, therapeutic ultrasound, peripheral arterial disease, handheld ultrasound, and future technology, including sensor technology, miniaturization, and small-animal imaging systems. Additional emphasis was placed on funding training programs to attract young scientists to the field of echocardiography. A white paper[1] was published in the *Journal of the American Society of Echocardiography* on the basis of the proceedings of that summit. The white paper was shared with the NIH, and a meeting was held to discuss the issues in the report with leadership of the NIH at its Bethesda, Maryland, premises. It was determined at that time that a technology and research summit dedicated to echocardiography would be held every 2 years under the auspices of the ASE.

Additional accomplishments stemming from the 2010 meeting included the partnership with the European Association of Cardiovascular Imaging for the creation of a standardization task force, the Initiative to Standardize Deformation Imaging, consisting of members of the ASE, the European Association of Cardiovascular Imaging, and the Japanese Society of Echocardiography, engineers from various companies, and scientists from academia. This task force was established to respond to the need to create system-independent means for assessing regional and global cardiac function using tissue-based sampling. This task force has been meeting on a regular basis, and considerable progress has been made in its mandated task. Additionally, a guidelines and standards document concerning handheld and point-of-care ultrasound is nearing completion.

The 2012 summit was developed to build on the success of the 2010 event. With the mission of assessing the state of the art of echocardiography and projecting areas of future growth, the summit focused on a vision for the development of cardiovascular ultrasound technology and clinical research by 2020, including the necessary research infrastructure, with a particular emphasis on three-dimensional (3D) echocardiographic imaging, cardiovascular ultrasound in valvular heart disease (VHD), myocardial deformation, and therapeutic ultrasound. Participants were encouraged to describe the current issues and barriers, plan goals, and develop specific recommendations to chart the future of research and technology in cardiovascular ultrasound. The following sections summarize the summit recommendations, and key recommendations are provided in Table 1.

Selected Readings

1. Kaul S, Miller JG, Grayburn PA, Hashimoto S, Hibberd M, Holland MR, et al. A suggested roadmap for cardiovascular ultrasound research for the future. J Am Soc Echocardiogr 2011;24:455-64.

CARDIOVASCULAR ULTRASOUND TECHNOLOGY DEVELOPMENT

The panel discussed three broad goals relating to future ultrasound technology development. These were (1) to use proven technology to improve the quality of patient care, (2) to advance the diagnostic and therapeutic capabilities of ultrasound, and (3) to enhance the future development of cardiovascular ultrasound by increasing collaboration among engineers, scientists, the NIH, the Food and Drug Administration (FDA), and cardiologists.

Goal 1: Use Proven Technology to Improve the Quality of Patient Care

Doppler echocardiography is a highly useful diagnostic test in the evaluation of patients with known or suspected heart disease. The increasing numbers of at-risk cardiac patients in the United States and throughout the world may preclude them from accessing a limited number of centers of excellence for cardiovascular care, but it is reasonable to expect that they can have access to echocardiographic examinations performed with high-quality, affordable echocardiographic instrumentation. Just as advancing electronic technology has enabled handheld or hand-carried echocardiography equipment with satisfactory performance, electronic technology can soon enable the production by many companies of low-cost, highly mobile equipment with two-dimensional (2D) and Doppler echocardiographic