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## Getting to the Heart of the Matter

Imaging plays an important role in fighting cardiac disease

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Medical advances, including new imaging techniques, are helping to win the war on cardiovascular disease. Indeed, between 1995 and 2005, the death rate from coronary heart disease declined about 34 percent, according to the American Heart Association. However, while cancer is rapidly overtaking heart disease as public enemy No. 1, heart disease is still the top cause of death for both men and women in the United States.

Although campaigns to raise awareness of heart disease and its risk factors, such as American Heart Month and National Wear Red Day, along with better therapies and earlier detection are helping in the fight against heart disease, there is still a long way to go to defeat this killer. The National Center for Health Statistics reports that over 24 million Americans are living with diagnosed heart disease, and approximately 650,000 people die from this disease each year.

All of the diagnostic imaging modalities have roles to play in detecting and combating heart disease, from radiographic angiography to ultrasound, MRI, CT and nuclear medicine.

In this issue of *ADVANCE*, we look at the role that CT plays in increasing the accuracy of nuclear medicine scans, providing early risk assessment with calcium scoring and giving anatomic information to researchers looking at more targeted cardiac radioisotopes.

And in the *ADVANCE* Extra! supplement, Dennis Atherton, FASE, RDCS, director of non-invasive cardiology at Maine Heart Center, shares advice on performing stress echo exams.

Online at the *ADVANCE* website ([www.advancemag.com/rad](http://www.advancemag.com/rad)), meanwhile, Associate Editor Mark McGraw speaks with experts about how MRI can serve as an alternative or complement to catheter-based angiography and gets their advice on performing quality cardiac MRI exams.

-Joyce Ward, CNMT

### CT: Aiming Beyond Attenuation Correction

When the first fused SPECT/CT and PET/CT systems emerged, there was a great deal of speculation about how these systems might aid in cardiac imaging. At scientific sessions, physicians enthused about how these systems could be used to image cardiac perfusion, function, calcium burden and coronary anatomy (with CT angiography) in a single session.

Today, while the paired systems have proven their value in oncology, the incremental value that they bring to cardiac imaging is less clear. Although CT provides attenuation correction and interest is growing in adding calcium scoring for additional cardiac risk evaluation, there is insufficient evidence to justify adding a diagnostic CT scan to the fused imaging procedure. Once targeted cardiac radioisotopes become clinically available, however, the anatomic information may prove valuable enough to justify performing both diagnostic exams in a single session, some experts believe.

#### Importance of attenuation correction

"Attenuation correction gives a more accurate view of the nuclear medicine signal," said Peter Covitz, vice president of innovation at MDS Nordion, headquartered in Ottawa, Canada. "Different tissues have different effects, and when you have the CT information, you can more precisely define the tissue types and the degree of correction that is required."

Attenuation correction not only helps the radiologist or cardiologist to interpret the images visually, it also improves the precision of quantitative information from the scan, Covitz said.

Attenuation correction is routinely performed in PET imaging and has been available for many years for SPECT systems. Prior to development of the fused systems, attenuation correction was performed with radioactive sources, such as germanium and cesium, which had to be replaced at regular intervals. Attenuation correction with these sources also took considerably longer than it now does with low-dose CT, which takes only a few seconds. The line-sources had one advantage, however. Because they were acquired during slow-breathing, similar to the myocardial scan, rather than during a breath-hold, image fusion was more consistent, said Jack Ziffer, MD, PhD, director of cardiac imaging at the Baptist Cardiac and Vascular Institute in Miami.

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