

# Introduction

This issue of *Breast Disease* is devoted entirely to the topic of breast imaging. Just as the patient's therapeutic options have changed dramatically over the past 40 years, so has the detection of breast cancer and the work-up of patients with suspected breast cancer. These changes are due largely to advances in the technology of imaging. Who could have anticipated the widespread use of screening mammography, along with the adoption of quality assurance standards? Who could have predicted the availability of percutaneous biopsy for both benign and malignant nonpalpable lesions? Who could have suggested the critical role of imaging in the management of women after the diagnosis of breast cancer?

The issue is divided into three parts. The First Section includes eight articles devoted to the "Current State of the Art" as it exists throughout the United States and Canada. The focus is on the direction that we, as a community of researchers and scientists, should take if we are to achieve lower numbers of false positives and negatives in breast cancer screening, and reduced breast cancer mortality. The review by Amy Langer, a breast cancer patient advocate, argues that devotion of efforts to develop techniques for improved early detection does not detract from the efforts to develop methods to prevent breast cancer entirely. Feig and Berry, in a point-counterpoint, argue the controversial issue of mass screening of women in their 40's. Richards, Viadro and Earp describe the research regarding barriers to screening mammography and methods to improve utilization of this test by currently underserved populations. Somkin and Hiatt present the point-of-view of primary care providers in a health maintenance organization setting on issues regarding screening costs. Jackson and Bassett describe the current state of breast sonography, with a discussion of how this method is evolving and may change management of mammographically detected lesions in the near future. DeAngelis and colleagues discuss the use of percutaneous breast biopsy for nonpalpable lesions. McLelland, Braeuning and Burke provide an overview of the political issues underpinning the health care and clinical research in this area.

The Second Section includes seven articles describing technologies that are not widely adopted as yet, but which are likely to become part of the everyday armamentarium at the disposal of health care providers in their efforts to detect and treat breast cancer in the next few years. These articles include a review by Schnall on breast magnetic resonance imaging; Boyd and colleagues describe breast density measurements and risk assessment; Pisano and Yaffe discuss digital mammography; Nishikawa documents the use of mammography image databases to train computer aided diagnosis computers to help radiologists interpret mammograms; Niklason, Kopans and Hamburg review tomosynthesis and digital subtraction angiography; Wahl provides an update on positron emission tomography; and Rice, Khalkhali and Diggles review nuclear scintigraphy. These methods are being used in selected centers for a number of purposes, and all are undergoing clinical testing at present. Their ultimate role in the clinical setting requires further study.

Finally, the Third Section includes four articles on technologies of uncertain future utility in breast imaging; however, these techniques show promise and merit further exploration in laboratory settings, and ultimately, perhaps, clinical testing. These "high risk/high yield" technologies are described in reviews by Wen and Balaban on Hall effect breast imaging; Chapman

and colleagues on diffraction enhanced imaging; Krishna and colleagues on electron paramagnetic resonance imaging; and Pisano and colleagues on the use of augmented reality guidance for percutaneous procedures.

We, the editors, undoubtedly could have included many more emerging technologies in this category. We may have guessed incorrectly regarding those technologies that will undergo further development for use in the field of breast cancer detection and breast lesion characterization. Only time will tell.

With this issue, we hope to forecast a glimpse of what lies in the future, or at least what directions we should explore. We can only hope that the next century brings the complete eradication of this dread disease. Until then, however, imaging will play a crucial role. We hope this issue brings the reader insight into the present role of imaging, and how it might evolve.

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