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978-0-521-51950-2 - Breast Cancer  
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**Breast Cancer**

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**Contemporary Issues in Cancer Imaging**

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CAMBRIDGE UNIVERSITY PRESS  
Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo, Delhi, Dubai, Tokyo  
Cambridge University Press  
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

[www.cambridge.org](http://www.cambridge.org)  
Information on this title: [www.cambridge.org/9780521519502](http://www.cambridge.org/9780521519502)

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First published 2010

Printed in the United Kingdom at the University Press, Cambridge

*A catalogue record for this publication is available from the British Library*

*Library of Congress Cataloguing in Publication Data*

Breast cancer / edited by Michael Michell.

p. ; cm. – (Contemporary issues in cancer imaging)

Includes bibliographical references and index.

ISBN 978-0-521-51950-2 (hardback)

1. Breast – Cancer – Imaging. I. Michell, Michael. II. Series: Contemporary issues in cancer imaging.

[DNLM: 1. Breast Neoplasms – diagnosis. 2. Breast Neoplasms. 3. Diagnostic Imaging – methods.

WP 870 B821139 2010]

RC280.B8B6655625 2010

616.99/449075–dc22

2009054029

ISBN 978-0-521-51950-2 Hardback

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# Series Foreword

Imaging has become pivotal in all aspects of the management of patients with cancer. At the same time it is acknowledged that optimal patient care is best achieved by a multidisciplinary team approach. The explosion of technological developments in imaging over the past years has meant that all members of the multidisciplinary team should understand the potential applications, limitations, and advantages of all the evolving and exciting imaging techniques. Equally, to understand the significance of the imaging findings and to contribute actively to management decisions and to the development of new clinical applications for imaging, it is critical that the radiologist should have sufficient background knowledge of different tumors. Thus the radiologist should understand the pathology, the clinical background, the therapeutic options, and prognostic indicators of malignancy.

*Contemporary Issues in Cancer Imaging* aims to meet the growing requirement for radiologists to have detailed knowledge of the individual tumors in which they are involved in making management decisions. A series of single subject issues, each of which will be dedicated to a single tumor site, edited by recognized expert guest editors, will include contributions from basic scientists, pathologists, surgeons, oncologists, radiologists, and others.

While the series is written predominantly for the radiologist, it is hoped that individual issues will contain sufficient, varied information so as to be of interest to all medical disciplines and to other health professionals managing patients with cancer. As with imaging, advances have occurred in all these disciplines related to cancer management, and it is our fervent hope that this series, bringing together expertise from such a range of related specialties, will not only promote the understanding and rational application of modern imaging but also help to achieve the ultimate goal of improving outcomes of patients with cancer.

**Rodney H. Reznek**  
London

# Foreword

## Contemporary Issues in Cancer Imaging: Breast Cancer

Breast imaging was a relatively rare activity before the advent of the National Health Service Breast Screening Programme (NHSBSP) in 1988. A few centers had developed expertise, and this had been put to use in the UK Trial of the Early Detection of Breast Cancer, which completed as the screening program began. A major task for the new screening program was to equip embryonic breast screening units with state-of-the-art mammography sets, to train the radiographers to use them and the radiologists to interpret the films. Over 20 years later, many of the lessons learned from the screening program are being widely applied.

Training of experienced staff in new skills proved challenging in the time available, but the existence of specialist training centers proved invaluable as the screening service matured. As the use of high quality mammography and ultrasound spread from the screening program into symptomatic practice, many staff attended courses in breast imaging and breast cancer management, taking advantage of the specialist expertise that had built up.

Audit and quality assurance were new issues then and ones that the new service took to its heart. As questions of policy and practice arose, the databases were searched and national analyses undertaken to find answers. Links were shown between technical standards and clinical outcomes as the multidisciplinary approach really took hold. Quality gradually improved as the learning curve was worked through and all units reached a standard shown by trials to be necessary for the screening program to be effective.

Equipment purchased was closely monitored. Beginning with conversations at meetings over lunch, a database of all equipment in use in the program was later developed and all the various faults were centrally recorded. This still exists and has proved tremendously powerful in conversations with manufacturers and suppliers.

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Breast imaging today is much more complex than in the early days of the screening program, and is an expected part of breast symptom investigation. Several modalities are now available and the interpretation abilities and skills of radiologists are tremendously advanced. Within breast units, radiographers are not only carrying out the imaging but also reading mammograms, carrying out ultrasound examinations, and performing biopsies. Biopsy techniques have moved from cytology to tissue sampling – the use of core biopsy and vacuum biopsy techniques can give definitive information and allow prognostic factors such as steroid receptors and HER2 to be assessed on the sample, so information is available earlier for multidisciplinary team discussions. This is important with the increasing use of neoadjuvant chemotherapy.

Imaging of the axilla and preoperative sampling of the nodes is becoming common and is now considered the required standard of care. New imaging techniques for the breast are very much on the horizon with advanced applications of mammography such as contrast enhancement and tomosynthesis, and looking ahead to positron emission tomography/computerized tomography and possible wider use of Magnetic resonance imaging (MRI). The use of MRI for screening women at high risk of breast cancer is currently being implemented, led by the NHSBSP. We expect to see a degree of standardization and an increase in quality assurance and audit as a result of this. This should benefit all breast MRI and lay down firm foundations for future applications.

There is one disappointing cloud on the horizon, and this is the slow conversion to digital mammography of the breast screening program. For good reasons, mammography was one of the last areas of imaging to change from analogue to digital. These reasons are now in the past. Most symptomatic units have moved to digital, but in breast screening, where often several X-ray sets are involved, it is an altogether larger financial undertaking and one that many trusts are finding difficult.

Having said that, the last twenty years are a period of constant progress in breast imaging. There is, still, a great deal of capacity and curiosity to explore new techniques and refine current ones among the professionals working in the field. Breast cancer survival is improving, the beneficiary of a greater degree of accuracy in diagnostic techniques. The difficult path women have to cross to get to their diagnosis has also become a lot easier owing to improved practices, skills, and equipment.

**Professor Julietta Patnick CBE, BA(Hons), FFPH, Hon MRCP**  
Director, NHS Cancer Screening Programmes

# Preface to Breast Cancer

Advances in breast imaging over the last two decades have led to a dramatic improvement in the quality of care offered to patients with breast disease.

The decrease in the number of deaths in the UK due to breast cancer is because of several factors – the diagnosis of tumors at an early stage using screening mammography, earlier presentation following improved public awareness of the signs of breast disease, more accurate local staging using advanced imaging and image-guided biopsy techniques, and ever more sophisticated treatments involving increased use of systemic therapy. The improvements in diagnosis and treatment have been accompanied by a great deal of work to expand our understanding of the epidemiology, pathology, and natural history of breast disease – crucial to planning future service developments.

In this volume, experts who are actively involved in research into screening, diagnosis, and treatment of breast cancer discuss state-of-the-art knowledge and future priorities for work in their respective fields of expertise. It is hoped that this volume will be of interest to all members of the multidisciplinary team, as well as hospital managers and those who are in charge of commissioning breast services.

**Michael Michell**