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## Position Paper

## Guidelines on the standards for the training of specialised health professionals dealing with breast cancer

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## ABSTRACT

According to EUSOMA position paper 'The requirements of a specialist breast unit', each breast unit should have a core team made up of health professionals who have undergone specialist training in breast cancer.

In this paper, on behalf of EUSOMA, authors have identified the standards of training in breast cancer, to harmonise and foster breast care training in Europe.

The aim of this paper is to contribute to the increase in the level of care in a breast unit, as the input of qualified health professionals increases the quality of breast cancer patient care.

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## 1. Introduction

In May 2000, EUSOMA published a position paper defining the requirements of a specialist breast unit.<sup>1</sup> One of the key mandatory requirements was that each breast unit must have a core team made up of health professionals from various disciplines who have undergone specialist training in breast cancer beyond that given in their general training.

In this regard Eusoma has invited some of the leading European experts in the different disciplines to outline the standards necessary to ensure the best specialist training, which resulted in this extensive and comprehensive document.

The following papers define the standards of training in breast cancer, which may be used for accreditation of specialists in Breast Radiology, Breast Diagnostic Radiography, Breast Care Nursing, Breast Surgery, Breast Pathology, Breast Medical Oncology, Breast Radiotherapy and Breast Medical Physics.

### 1.1. Objectives

These training standards were drawn up with the following immediate objectives:

- To establish the minimal theoretical and practical knowledge required to be certified as a specialist health professional in the field of breast cancer.
- To identify the assessment strategy needed to evaluate the competence of each candidate to the title of Specialist in Breast Cancer.

In the longer term, the objective is to increase the standard of breast care available to all women across Europe.

### 1.2. Content and structure

Each paper defines the entry requirements or ideal profile of a candidate for the title of Breast Specialist. It outlines the theoretical topics the candidate must demonstrate knowledge in, and the required practical element of their training. It also defines the ways in which candidates will be assessed.

The content of these guidelines is partially based on evidence and partially on best practice. The authors wish that, when introduced, these guidelines will greatly contribute to an increase in the level of care in a given breast unit, as the input of qualified health professionals will be of critical importance to increase the current standards of care and to make substantial progress in the clinical research area.

## 2. Breast radiologists

### 2.1. Entry requirements

- Each potential candidate aspiring to the title of Specialist in Breast Cancer Diagnosis should be medically qualified as a radiologist and registered to practise in their country.

### 2.2. Theoretical content

Candidates for accreditation as a Specialist Breast Radiologist will be required to have knowledge of and competence in the following topics (see European Guidelines for Quality Assurance in Mammography Screening, chapter 10: Guidelines for training<sup>2</sup>):

- Physical principles of mammography, quality control and quality assurance (the radiologist is responsible for a high image quality and for ensuring that all the physico-technical and professional quality control processes have been satisfactorily carried out).
- Radiology of the normal breast and variants of normal.
- The radiology and pathology of benign lesions with particular reference to those that simulate malignancy.
- The radiology and pathology of malignant breast disease.
- The differential diagnosis of mass lesions, micro calcifications, parenchyma distortion and asymmetrical density.
- Breast imaging reporting and data system.
- The importance of radiological-pathological correlation in cases where there is an extensive intraductal disease component, and the implication for management and treatment.
- The use and place of ultrasound in the diagnosis and management of breast lesions.
- The epidemiological aspects of breast screening and statistical methods for diagnostic test evaluation.
- Additional imaging techniques including MRI and digital mammography.
- Current issues of breast diagnosis and treatment.

### 2.3. Practical content

- Radiographic positioning, standard and additional views, magnification, coned views, specimen radiography etc.
- Localisation and biopsy techniques for impalpable lesions, fine-needle aspiration cytology and needle core biopsy.
- Involvement in the daily reading of screening and clinical mammograms.
- Self-assessment procedures, review of interval cancers.
- Participation in multidisciplinary pre-operative and post-operative meetings.

### 2.4. Duration

The training programme should have a tutorial structure with direct interaction between the participants and the experts.

An indicative training programme for a radiologist who has basic experience in breast diagnosis could be:

- 3-4 days residential course, which would cover almost all the training subjects, with some practical film reading sessions and mammography test reading.
- 2-4 weeks secondment at a specialist breast diagnostic unit,<sup>3</sup> with direct involvement in the clinical work co-ordinated by a responsible tutor.
- 6 months activity at the base unit, with some interaction and help from the tutor.
- 1-2 days secondment at the tutor's breast unit in order for the tutor to assess the impact of training on the radiologist's performance.
- Attendance at refresher courses and possibility of providing data on the radiologist's performance in the routine work in order to have the certification of competence updated.

Every 3 years both theoretical and practical contents will have to be re-assessed.

### 2.5. Outcome measure

- Have had specific training in breast diagnosis.
- Undertake to read a minimum of 500 (preferably 2000) mammography cases, and a minimum of 5000 for those working in organised screening programmes.
- Dedicate a large part of their professional activity to breast diagnosis.
- Be involved in breast cancer screening and/or diagnostic activity.
- Be fully experienced in the performance of all diagnostic techniques including ultrasound, fine-needle aspiration and core biopsy.
- Be part of a multidisciplinary team including radiographers, pathologists, surgeons and nurses with additional input from oncologists, physicists and epidemiologists as appropriate.
- Be aware of the need for setting of target standards and performance indicators, and take part in both internal and external audit procedures.

### 2.6. Assessment strategy

The qualification of a potential candidate to the title of Specialist in Breast Radiology will be evaluated on the basis of:

- Professional curriculum vitae (to verify that the basic entry requirements are fulfilled).
- Attendance on certified training courses (on the basis of the above-mentioned scheme), as verified by the tutor.

- Diagnostic performance measured on the basis of data provided by the candidate on their routine work or on the basis of the results of a proficiency test.
- A detailed report of the tutor on the radiologist's attitude and competence in breast diagnosis.

The diagnostic accuracy of radiologists is known to be crucially dependent on a high standard of training and extent of clinical experience, measured as years of work, time dedicated to breast diagnosis and number of cases detected or mammograms read per year.<sup>4</sup>

### 3. Breast diagnostic radiographers

#### 3.1. Entry requirements

Potential candidates for accreditation as Specialist Breast Diagnostic Radiographer should already be certified as general radiographers.

#### 3.2. Theoretical content

The theoretical course is meant to develop knowledge and understanding of all aspects of breast care.<sup>2,5</sup> The course may include lectures, tutorials and demonstrations.

Candidates will be required to learn about:

- The normal breast, anatomy and physiology.
- Radiology and pathology of benign and malignant lesions.
- Technical quality control.
- Technical aspects of X-ray equipment, film-screen combination and film processor (conventional/digital).
- Communication and social skills.
- The management of breast cancer and treatment options.
- Health promotion.
- Organisation of a breast screening programme.
- New technology and techniques.
- Breast cancer and family history.
- Breast cancer statistics.
- Patient confidentiality and data protection.

#### 3.3. Practical content

The practical course concentrates on the technical and positioning aspects of mammography, why mammography is performed and how is it interpreted. It should include:

- Positioning techniques for obtaining standard and additional views, and indications for the use of each of the additional views.
- Achieving the correct level of compression.
- Assessing the images performed for the positioning as well as from a technical point of view.
- Carrying out (daily and weekly) technical quality control procedures.
- Communication skills.
- Comparing the mammogram with the previous one in order to achieve an optimum quality.

- Working with the (digital) X-ray equipment, film-screen combination and processor.
- Relevant administrative procedures.
- Additional imaging techniques, e.g. ultrasound and MRI.
- Localisation and biopsy techniques for impalpable lesions.

The practical training programme requires a 1:1 student-trainer ratio.

#### 3.4. Duration

Candidates for accreditation as Specialist Breast Diagnostic Radiographers must have undergone at least 40 h of documented training specific to the radiographic aspects of mammography and must regularly participate in external quality assessment schemes where available, as well as radiographic update courses.<sup>6</sup>

During training, the trainee should perform at least 75 mammograms and, if required for assessment of a possible abnormality in the breast, further mammographic projections under supervision of a recognised training radiographer. Depending on the experience and existing skills of the radiographer, the training will last 2-6 weeks.

Every 3 years both theoretical and practical contents will have to be re-assessed.

#### 3.5. Outcome measures

At the end of the training period the radiographer:

- Will be able to obtain good-quality mammographic images to a high standard: 97% of the images should be adequate for radiological interpretation and <3% should be technically inadequate.
- Will be able to perform additional projections and be aware of the reasons for performing each of the additional projections mentioned.
- Will be able to assess the images with regard to positioning as well as the technical aspects.
- Will have sufficient knowledge and experience of the mammographic equipment (conventional/digital), film-screen combination, film processor.
- Will have an understanding of radiation doses in mammography and how to keep them as low as possible.
- Will understand the correct placement of the automatic exposure control (AEC) detector.
- Will be able to carry out quality control procedures for equipment quality monitoring.
- Will have an understanding of the risks and benefits of mammography.
- Will have an understanding of breast symptoms.
- Will have an understanding of treatment options.
- Will be able to produce the image in a manner that is acceptable to the woman by creating a pleasant, calm and informative atmosphere.

- Will be able to assist in stereotactic localisation procedures and biopsy techniques, e.g. fine-needle aspiration cytology, needle core biopsy, vacuum assisted breast biopsy procedures.
- Will be familiar with other imaging techniques used to aid diagnosis, e.g. ultrasound, MRI.

### 3.6. Assessment strategy

At least 150 mammograms (and possible additional views) must be completed after the training before a certificate can be applied for. The mammograms must be independently performed in the base unit and recorded in a log book by the trainee. The trainee will be assessed on the basis of 50 mediolateral oblique (MLO) and craniocaudal (CC) views (and possible additional views) selected by the trainer from the log book, and evaluated, in the company of the trainee, according to the criteria laid down in Table 1. Additional views may include lateral, extended CC and (spot) -magnification views. There are also less frequently used additional projections.

The mammographic examinations should be adequate for radiological interpretation in >97% of cases. In addition to failing to fulfil the criteria laid down in Table 1, images will be judged to be inadequate for one or more of the following reasons:

- Part of the breast is not imaged.
- There is inadequate compression, leading to poor-quality images.
- The image is blurred.
- Processing is incorrect.
- Exposure is incorrect.
- Artefacts obscure breast tissue.
- Skin folds obscure breast tissue.
- Annotation is inadequate or incorrect.
- Film fogging.

In addition, the trainee will be assessed to establish their level of knowledge with respect to technical issues such as equipment, technical quality of the images, quality control procedures and basic knowledge of anatomy/physiology of the breast and benign and malignant lesions.

**Table 1 – Criteria for assessing images**

#### Craniocaudal view

The craniocaudal view should show as much of the breast as possible.

A correctly performed craniocaudal view will show virtually all the breast except the most lateral and axillary part.

The criteria for the image assessment are:

- The medial border of the breast is shown.
- As much as possible of the lateral aspect of the breast is shown.
- If possible, the pectoral muscle shadow is shown on the posterior edge of the breast.
- The central part of retroglandular fat tissue is imaged.
- The nipple is in the centre and in profile.
- Images are symmetrical.

#### Mediolateral oblique view

The criteria for the image assessment of the mediolateral oblique view are:

- All the breast tissue is clearly shown.
- Pectoral muscle is shown at the correct angle and the lower edge of the pectoral muscle shadow reaches nipple level whenever possible, to ensure that the posterior aspect of the breast is satisfactorily included on the image.
- The nipple is in profile.
- The inframammary angle is clearly demonstrated without overlying or underlying tissue.
- Images are symmetrical.

#### Lateral view (mediolateral, lateromedial)

The criteria for the image assessment of the lateral (mediolateral, lateromedial) view are:

- The majority of the breast tissue is clearly displayed on the image.
- The pectoral muscle is visible.
- The inframammary angle is shown.

#### Extended craniocaudal view

The criteria for the image assessment of the extended craniocaudal view are:

- The most lateral part of the breast including the axillary tail is clearly displayed on the image.
- The pectoral muscle in the lateral part is shown.
- The nipple is in profile.

#### Spot and magnification views

The criteria for the image assessment of the spot (and magnification) view are:

- More detail of a lesion is obtained by using a special small compression device to achieve better compression in the area of interest.

**Table 2 – Core elements demonstrating competency of a Breast Care Nurse in each sub-role**

<p><b>Clinical Practice</b></p> <ul style="list-style-type: none"> <li>• Specific clinical expertise (in-depth knowledge and understanding of breast cancer and treatments).</li> <li>• Carries caseload of patients, providing support and advice for patients and families.</li> <li>• Develops, implements and improves standards of nursing in breast care.</li> <li>• Facilitates informed choice by patients.</li> <li>• Is aware of contributions from MD colleagues and refers as appropriate.</li> </ul> <p><b>Management (leadership/consultation)</b></p> <ul style="list-style-type: none"> <li>• Acts as a role model for colleagues and students.</li> <li>• Understands theory and concepts of mentoring.</li> <li>• Proactive in staff development.</li> <li>• Makes best use of resources.</li> <li>• Motivates and inspires others.</li> <li>• Promotes change at a local level.</li> <li>• Promotes a multidisciplinary approach.</li> </ul>	<p><b>Education</b></p> <ul style="list-style-type: none"> <li>• Contributes to planning and delivering breast care education</li> <li>• Provides effective teaching to staff, students, patients and their families.</li> <li>• Assists in developing educational materials for patients and staff.</li> <li>• Assists in evaluating teaching strategies for patients and staff.</li> </ul> <p><b>Research</b></p> <ul style="list-style-type: none"> <li>• Appreciates significance of evidence-based practice.</li> <li>• Has knowledge of research design and some critical analysis skills.</li> <li>• Participates in activities such as journal clubs.</li> <li>• Contributes to audit and quality initiatives.</li> <li>• Functions as a reflective practitioner.</li> <li>• Maintains an up to date knowledge base.</li> <li>• Participates in Nursing Research Projects and clinical trials.</li> </ul>
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During the training period the trainee should be observed and evaluated by the trainer concerning their communication and social skills.

The results of both the practical and theoretical assessment tests should be satisfactory to become accredited as a Specialist Breast Diagnostic Radiographer.

The training should be given by dedicated radiographers with at least 5 years experience in mammography. These radiographers must have demonstrated professional competence as a member of a Breast Care Team. They must have developed the necessary expertise in communication, training and coaching by attending specialised courses on these subjects.

The aim of the training is to ensure that Specialist Breast Diagnostic Radiographers have the requisite level of knowledge and experience to produce consistently high-quality mammograms, and achieve a good theoretical knowledge of breast imaging, diagnosis and treatment.

## 4. Breast care nurses

### 4.1. Entry requirements

Potential candidates for accreditation as a Breast Care Nurse should possess the core elements as indicated in Table 2 and must, as a mandatory requirement:

- Have a first-level qualification of a nurse.
- Have a minimum of a Bachelor's degree.
- Have a minimum of two years' post-registration experience in cancer care.
- Be currently working in a setting where patients with breast cancer are treated.

### 4.2. Theoretical content

Candidates will need general knowledge about the nature of breast disease, and about treatment approaches, implications and impact as indicated in Table 3. They will also be

required to have an understanding of the experience of breast cancer, and will need to be familiar with particular issues for nurses, as detailed below.

#### 4.2.1. The nature of breast disease

- Epidemiology and risk factors of breast disease.
- Benign breast disease.
- Breast cancer genetics (including strategies for prevention).
- Breast screening and early detection.
- Diagnosis including clinical examination, radiology and cytology.
- Classification and staging.

#### 4.2.2. Treatment approaches, implications and impact

- Surgery.
- Chemotherapy.
- Radiotherapy.
- Endocrine therapy.
- New approaches (including biological therapies).
- Management of advanced breast disease.

#### 4.2.3. The experience of breast cancer

- Reactions to diagnosis.
- Cultural aspects relating to the disease.
- Treatment options.
- Recovery and rehabilitation.
- Follow-up and survivorship.
- Supporting patients with recurrence and advanced disease.
- Altered body image and sexuality.
- Premature menopause and management of oestrogen deficiency symptoms.
- Lymphoedema.
- Prosthetics.
- Treatment-induced fertility issues.
- Malignant wound management.

**Table 3 – Clinical practice associated with breast cancer nursing <sup>7</sup>**

Areas of clinical practice associated with breast cancer nursing

- Family history and genetics, includes prevention and ethics.
- Benign breast disease.
- Breast screening.
- Patients newly diagnosed with cancer.
- Breast surgery and breast reconstruction.
- Chemotherapy (and related side-effects).
- Radiotherapy (and related side-effects).
- Endocrine therapy (and related side-effects).
- Prosthesis fitting.
- Management of menopausal symptoms.
- Management of disease-related symptoms (e.g. lymphoedema, fatigue).
- Management of psychosocial impact.
- Management of fungating wounds.
- Treatment induced infertility issues.
- Metastatic (advanced) disease.
- Recovery, rehabilitation and follow-up (including lifestyle changes).

Extended roles undertaken by experienced breast cancer nurses

- Family history screening and surveillance.
- Diagnostics (palpation, fine-needle aspiration cytology, ultrasound).
- Admitting/discharging.
- Seroma drainage.
- Implant inflation/deflation.
- Nipple tattooing.
- Nurse-led follow-up consultations and examinations.
- Accepting direct referrals (e.g. for breast pain, fatigue, psycho-emotional problems).

#### 4.2.4. Issues for nurses

- Shared decision making.
- Informed consent.
- Principles of clinical trials.
- Principles of research and evidence-based nursing.
- Audit and standards (national and local).
- Accountability with regard to documentation.
- Professional and legal implications of conducting nurse-led clinics and extended role activity.

#### 4.3. Practical content

Candidates for accreditation as a Breast Cancer Nurse should be required to carry out a variety of practical exercises to prepare them for the role. These could include:

- Developing an evidence-based teaching package for his/her own clinical area.
- Identifying potential psychosocial problems for the patient and family coping with a breast cancer diagnosis.
- Assessing the potential information needs of the patient going through one treatment modality of their choice.
- Reflecting on relevant clinical practice (including attendance at multidisciplinary meetings).
- Practice-based clinical learning outcomes.

#### 4.4. Duration

Candidates should have received a total of 200 hours training (equivalent to 20 study points, or one trimester). This time should be divided up as follows:

- Lecturer contact time 50 h (8 days of classroom teaching).
- Self-directed study 70 h (independent learning).

- Reflective practice/completion of clinical learning outcomes 80 h.

Every 3 years both theoretical and practical contents will have to be re-assessed.

#### 4.5. Outcome measures

On completion of training, candidates will be able to:

- Explain the rationale behind early detection of breast cancer.
- Outline the principles, applications and rationale of contemporary treatment modalities used at different stages of breast cancer care and their associated toxicities.
- Describe the nursing interventions that may be employed to minimise both morbidity and mortality in this type of patient.
- Understand the political and professional issues that influence breast cancer care.
- Consider ways in which nurses participate in the development of breast care services in their local area.

#### 4.6. Assessment strategy

Strategies for assessing candidates could include:

- An evidence-based patient profile (case study of the care given to a selected patient) (3000 words).
- A literature review focusing on a specific area of breast cancer care and highlighting the nurse's role in care delivery (3000 words).
- Certificate of attendance/attainment of Level 3 or higher course with breast cancer within the content.

## 5. Breast surgeons

### 5.1. Entry requirements

Candidates for accreditation in Breast Surgery must hold a current licence to practise as a general surgeon, plastic surgeon or gynaecologist.

### 5.2. Theoretical content

- Have a firm grounding in the basic and clinical science aspect of breast anatomy, physiology and pathology.
- Have an understanding of the principles of breast investigations including detailed history, examination, and screening procedures, and understand the indication for and limits of diagnostic imaging procedures in different age groups. The candidate also has to be proficient in pre-operative diagnostic procedures (physical examination and biopsy).
- Have an in-depth knowledge of the principles involved in the following (sufficient direct practical experience would not be expected):<sup>8</sup>
  - Prevention.
  - Breast pathology.
  - Radiotherapy relating to breast cancer (curative, adjuvant or palliative).
  - The use of chemotherapy for breast cancer in the pre-operative and adjuvant setting and for advanced disease.
  - The use of hormonal manipulation or substitution specifically for breast cancer patients or women at high risk.
  - The use of biological agents for breast cancer.
  - Genetics in breast cancer. The candidate should be able to give advice to women with a high-risk family history.

### 5.3. Practical content

#### 5.3.1. Diagnosis

Trainees are required to have a knowledge of diagnostic procedures that has been gained by attending breast clinics for new patients together with the trainers (a surgeon specialising in breast disease and a radiologist specialising in breast disease). Trainees should attend these clinics initially as an observer, later seeing cases and presenting them to the trainers and, finally, when they are judged to be capable, seeing cases and making decisions on diagnosis themselves with the trainer in attendance at the clinic for consultation when required. Part of the specialist year in breast disease should be spent attending at least one of these clinics every week. Where breast cancer screening is carried out they should also attend a number of clinics for women who are recalled for assessment because of abnormalities on the initial mammogram. This will ensure that the trainees know the procedures involved and have examined breasts in women with such tumours.

#### 5.3.2. Management of benign disease

Knowledge of the management of benign disease will in part result from attending and working at the diagnostic clinics. However, trainees should also attend at least two operating lists per week devoted to breast disease during their specialty year. They should have knowledge of operations to deal with inflammatory benign conditions, of which breast lumps falling under the broad diagnosis of 'benign' require excision (e.g. phyllodes tumour), and of the management of gynaecomastia in the male.

#### 5.3.3. Management of primary breast cancer

The trainee should understand which surgical procedures to recommend to each patient, and be clear about the protocols on which these recommendations are based (e.g. they must know the criteria by which tumours are judged suitable or unsuitable for breast conserving surgery). They should have performed such operations in the regular operating lists.

They should also attend lists in which immediate or delayed reconstructive surgery after both partial and total mastectomy reconstruction is carried out (either by oncoplastic breast surgeons or by breast surgeons together with the associated plastic surgeons). Trainees should also work on units where the plastic surgeon has a particular interest in breast disease, and has a link to a designated breast unit and supports the breast surgeon with techniques of tumour-specific immediate reconstruction. Alternatively, they should work with a dedicated oncoplastic breast surgeon.

As well as attending the operating lists, trainees should attend clinics at which the advice as to which surgical procedures are to be used for reconstruction is discussed with the patient.

#### 5.3.4. Oncology

Trainees must have knowledge of the protocols to which the unit works for the purposes of advising women on whether they should receive adjuvant radiotherapy or systemic therapies, and which agents they should receive.

They must have attended at least ten clinics with the radiation (clinical) oncologist at which decisions on adjuvant systemic therapy are made. In units where there is a separate medical oncologist, it is preferable that the radiation oncologist and medical oncologist see the patients together. However, if this is not so, the attendance should be at whichever clinic the full management is discussed.

Trainees must attend a number of follow-up clinics at which the side-effects of surgery and radiation can be assessed.

They must attend at least ten clinics at which women with advanced disease (both locally advanced and distant metastatic disease) are seen.

#### 5.3.5. Multidisciplinary pre- and post-surgical case management meetings

The trainees must be able to show that they have attended regular, preferably weekly, multidisciplinary meetings where specialised breast surgeons, radiation oncologists, clinical oncologists, pathologists and radiologists plan surgery and therapeutic post-surgical treatments.

### 5.3.6. Palliative care

In attending the oncology clinics the trainee should acquire some knowledge in palliative care.

### 5.3.7. Data collection

The trainee must be able to use a data collection system such as the QT EUSOMA Audit System on Breast Cancer Diagnosis and Treatment or equivalent.

## 5.4. Duration

By the end of the training the candidates should be able to show that they have:

- Attended at least 40 diagnostic clinics and have been declared suitable by the trainer for seeing and advising patients by themselves.
- Assisted at 10 and personally performed 20 operations on benign lesions.
- Assisted at 10 and personally performed 15 axillary node sampling procedures (this includes sentinel lymph node biopsy).
- Assisted at 10 and personally performed 10 breast-conserving procedures.
- Assisted at 10 and personally performed 10 total mastectomies.
- Assisted at 10 and personally performed 5 skin-sparing mastectomies.
- Assisted at 10 and personally performed 10 full axillary clearances.
- Observed or assisted at 10 immediate and delayed total breast reconstructions using both implants and autologous tissue.
- Observed or assisted at 10 and personally performed 5 breast remodelling procedures after breast conserving surgery (oncoplastic surgery).
- Attended at least 10 clinics with the radiation (clinical) oncologist at which decisions on adjuvant systemic therapy are made.
- Attended at least 10 follow-up clinics at which the side-effects of surgery and radiation can be assessed.
- Attended at least 10 clinics at which the management of women with advanced disease (both locally advanced and metastatic disease) are seen.
- Attended a regular, preferably weekly, pre- and post-surgical multidisciplinary case management meeting.
- Attended at least one genetic/family history clinic, in which women at risk are advised.

*Note:* the candidates must keep a logbook signed off by their trainer of the operations they have attended as an assistant or operations they have carried out, supervised or unsupervised, and also of the clinics they have attended and the multidisciplinary meetings they have attended.

The trainees should ideally have spent some time working for a general/gynaecological surgeon with a significant interest in breast disease early in their training. However, it is mandatory for them to have spent one of the two final years of training working on breast disease at a designated unit as

defined above, with at least 3 months of this year being full-time. They should also have attended an advanced level training course in breast disease (EUSOMA run or approved) and have attended one of the major European international meetings on breast disease.

Surgeons who have done their initial training in plastic surgery and who wish to be designated Specialist Breast Surgeons will be required to spend 2 years away from plastic surgery, working on breast units, since the intention is not simply to train reconstructive surgeons, but to train Specialist Breast Surgeons who have diagnostic skills in breast disease, who understand the whole range of surgical options available to patients with the diagnosis of breast cancer, and who have knowledge of the oncological management involved and of how patients should be followed up.

Every 3 years both theoretical and practical contents will have to be re-assessed.

## 5.5. Outcome measures

Following training, the candidate should have sufficient knowledge, expertise and skill to enable independent practice within the setting of a multidisciplinary team. In particular the candidate should:

- Be able to communicate the diagnosis to the woman in the most appropriate way, explaining the different treatment options, facilitating decision making, and evaluating and taking into account the patient's preferences.
- Have direct experience of the different surgical techniques for the treatment of benign and malignant lesions and a detailed knowledge of the indications, contra-indications and complications for each technique.
- Have acquired a basic knowledge of breast reconstruction and principles of oncoplastic surgery.<sup>9,10</sup>

He or she should also:

- Have a good knowledge of the literature.
- Have published or co-authored at least one paper on breast disease in a peer-reviewed journal or have presented a paper at one of the major European breast meetings.
- Be able to evaluate literature and write critiques of papers.
- Have visited other cancer centres and attended national and international meetings on breast disease.
- Have some knowledge of the ongoing research in breast cancer treatment.

## 5.6. Assessment strategy

The qualification of the candidate as a Specialist in Breast Surgery will be assessed through a multiple choice paper that will test the candidate's knowledge of the general principles of breast disease management (as detailed above) together with a discussion of some clinical cases.

The surgical section of UEMS (European Union of Medical Specialists) expressed the appreciation for the contents of this chapter.

## 6. Breast pathologists

### 6.1. Entry requirements

Each potential candidate aspiring to the title of Specialist in Breast Pathology will be required to have achieved the level of training required for recognition as a specialist in histopathology. At present there is a lack of homogeneity within the European Union regarding the training of pathologists involved in the diagnosis and treatment of disease, and the level of training required to fulfil this requirement will therefore vary from country to country. In future it would be appropriate to set minimum standards for achievement of specialist status. The general consensus in most European countries centres around a 5-year training programme in histopathology or anatomic pathology; some require an exit examination or submission of a thesis. The European Union of Medical Specialists specifications<sup>11</sup> and UK Royal College of Pathologists core training programme in histopathology<sup>12</sup> provide exemplary models for core training and qualification. These programmes are directed at general histopathology training, which will include aspects of breast pathology, but none at present have specialist programmes in breast pathology.

### 6.2. Theoretical content

Candidates will be required to have knowledge of:

- Molecular biology of breast cancer: main pathways involved in the development and progression of breast cancer.
- Epidemiology and risk factors.
- Prevention of breast cancer and genetic counselling.
- Breast cancer screening.
- Clinical and instrumental diagnosis of breast cancer. Principles of differential diagnosis with other breast diseases.
- Natural history of breast cancer.
- TNM and disease staging.
- Multidisciplinary approach to management of breast disease.
- Principles of breast cancer treatment: surgery, radiotherapy and medical treatment.
- Principles of imaging of breast cancer.
- Translational research in breast cancer: principles and main applications.
- Protocol drafting and editing, writing a scientific manuscript, presenting results at scientific meetings.
- Knowledge of the European guidelines on clinical and translational research: Good Clinical Practice.
- Interpretation of results from scientific papers: reading a scientific report.

### 6.3. Practical content

Candidates will need to be familiar with these practical aspects:

- Needle core biopsy interpretation and classification.
- Breast cytology interpretation and classification.

- X-ray-guided localisation biopsy examination.
- Use of specimen radiography.
- Examination of diagnostic surgical biopsies.
- Examination of cancer treatment surgical resection specimens.
- EU and WHO guidelines for pathological classification of breast disease (working knowledge of).
- Assessment of prognostic factors.
- Pathology of hereditary breast cancer.
- Pathology of breast sarcomas, lymphomas, and rare tumour types.
- Pathology of breast cancer in males.
- Methodology and interpretation of predictive tests, including hormone receptors and HER2 status.

### 6.4. Duration

There are very few designated specialist training programmes in breast pathology in the EU (see Section 6.1). It is expected that a pathologist using the title Specialist Breast Pathologist will have completed a general histopathology training programme, which typically will take 5 years (see above) and undertaken either during this period, or subsequently, specialist training to fulfill the theoretical and practical requirements (see Sections 6.2 and 6.3) and be capable of stratifying the outcome criteria (see Section 6.5).

Every 3 years both theoretical and practical contents will have to be re-assessed.

### 6.5. Outcome

At the end of the training candidates should:

- Have trained and worked in specialist units seeing a minimum of 150 breast cancer cases per year.
- Be responsible for diagnosis and classification of breast disease and breast cancer, including immuno-histochemistry and *in situ* hybridisation for predictive markers.
- Be conversant with techniques for breast pathology specimen evaluation.
- Operate in a multidisciplinary environment (i.e. in collaboration with other specialists in the breast cancer field within the same hospital or collaborative group).
- Have published in the field of breast cancer medicine, in peer-reviewed international journals having an impact factor greater than 1:
  - a minimum of one original article as first author and/or;
  - a minimum of five original articles as co-author.
- Take part in external quality assurance.
- Participate in an audit.
- Teach at symposia/training sessions on breast pathology.
- Participate in continuing professional development.

### 6.6. Assessment strategy

The qualification of a potential candidate aspiring to the title of Specialist in Breast Pathology will be evaluated through a

multiple choice test that will cover all the theoretical topics listed above, and will contain some clinical cases for which a pathological diagnosis is required. The candidate will also have to meet all the entry requirements listed above.

## 7. Breast medical oncologists

### 7.1. Entry requirements

Potential candidates for the training in Breast Medical Oncology must already specialise in either medical oncology or oncology (in some EU countries) or in internal medicine, gynaecology or radiotherapy (in other EU countries). The variation in eligible specialisms arises from the current lack of homogeneity within the European Union in the training of physicians involved in the medical treatment of breast cancer.

### 7.2. Theoretical content

The candidate should be familiar with the following topics:

- Molecular biology of breast cancer: main pathways involved in the development and progression of breast cancer.
- Epidemiology and risk factors.
- Prevention of breast cancer and genetic counselling.
- Breast cancer screening.
- Clinical and instrumental diagnosis of breast cancer. Principles of differential diagnosis with other breast diseases.
- Natural history of breast cancer.
- Principles of breast cancer pathology.
- TNM and disease staging.
- Principles of breast cancer local treatment: surgery and radiotherapy.
- Medical treatment of breast cancer:
  - chemotherapy, hormonotherapy, biological therapies: mechanisms of action and side-effects;
  - treatment of early breast cancer: adjuvant and neo-adjuvant therapies;
  - treatment of locally advanced disease;
  - treatment of advanced disease;
  - treatment of breast cancer-related complications and medical urgencies;
  - treatment of hereditary breast cancer;
  - diagnosis and treatment of breast sarcomas, lymphomas, and rare tumour types;
  - treatment of breast cancer in males;
  - multidisciplinary approaches.
- New drugs in breast cancer: mechanisms of action, side-effects, clinical implications.
- Supportive and palliative care in breast cancer patients.
- Follow-up of breast cancer patients: guidelines, detection of late side-effects, diagnosis of disease relapse.
- Methodology of clinical research
  - new drug development: pharmacodynamics, pharmacology, phase I studies: study activation, conduct, and analysis;

- phase II and III trials: methodology, end-points, principles of statistics, study activation, conduct, and analysis;
- meta-analysis: principles and main methodological issues;
- translational research in breast cancer: principles and main applications;
- protocol drafting and editing, writing a scientific manuscript, presenting results at scientific meetings;
- knowledge of the European norms on clinical research: Good Clinical Practice (GCP);
- interpretation of results from clinical trials: reading a scientific report.

### 7.3. Practical content

The candidate must be familiar with the medical treatment of breast cancer patients. With this in mind, the candidate must provide evidence that he/she has had clinical experience in breast medical oncology for at least 5 years.

### 7.4. Duration

Every 3 years both theoretical and practical contents (points 7.2. and 7.3.) will have to be re-assessed.

### 7.5. Outcome measures

- Have been responsible for medical treatment decisions in early and advanced breast cancer patients for a minimum of five cases per week during the previous 3 years.
- Be responsible for medical treatment decisions, including palliative and supportive care issues, in both out-patient and in-patient settings.
- Operate in a multidisciplinary environment (i.e. in collaboration with other specialists in the field of breast cancer within the same hospital or collaborative unit).
- Have published in the field of breast cancer medicine in peer-reviewed international journals with an impact factor greater than 1:
  - a minimum of one original article as first author, and/or;
  - a minimum of five original articles as co-author.
- Have attended international breast cancer conferences (at least one meeting in the previous 2 years).

### 7.6. Assessment strategy

The qualification of a potential candidate for the title of Specialist in Breast Medical Oncology will be evaluated through a multiple choice test that will cover all the topics listed above, and will contain some clinical cases for which a treatment decision is required. The candidate will also have to meet all the entry requirements as detailed above.

## 8. Breast radiation oncologists

### 8.1. Entry requirements

Each potential candidate for the training in Breast Radiation Oncology must already be a Specialist in Radiation Oncology.

### 8.2. Theoretical content

The candidate must be familiar with general aspects of breast cancer, breast cancer radiotherapy, the principles of surgical treatment of breast cancer, the principles of systemic treatment of breast cancer, and the methodology of clinical research, as detailed below.

#### 8.2.1. General aspects of breast cancer

- Molecular biology of breast cancer: a basic knowledge of the main pathways involved in the development and progression of breast cancer.
- Epidemiology and risk factors.
- Prevention of breast cancer and genetic counselling.
- Breast cancer screening.
- Clinical and instrumental diagnosis of breast cancer, principles of differential diagnosis with other breast diseases.
- Natural history of breast cancer.
- Principles of breast cancer pathology.
- TNM and disease staging.

#### 8.2.2. Breast cancer radiotherapy

- Radiobiological principles of radiotherapy and knowledge of interactions with systemic treatment including chemotherapy and biological modifiers.
- Profound knowledge of dose–volume parameters for critical organ tolerance in breast RT: breast tissue, breast skin, lung, heart, oesophagus, and contralateral breast tissue.
- Breast radiotherapy techniques, including standard field set-ups, match line problems and solutions, IMRT, IORT and available techniques of breast brachytherapy.

#### 8.2.3. Principles of surgical treatment of breast cancer

- Indications to surgical approach in breast cancer.
- Complications of surgery for breast cancer.
- Conservative surgery.
- Demolitive surgery.
- Sentinel lymph node biopsy techniques.
- Reconstructive surgery (prosthesis, tissue expander, flap etc.).

#### 8.2.4. Principles of systemic treatment of breast cancer

- Chemotherapy, endocrine therapy, biological therapies: mechanisms of action and side-effects.
- New drugs in breast cancer: mechanisms of action, side-effects, and clinical implications.
- Treatment of early breast cancer: adjuvant and neo-adjuvant therapies.
- Treatment of locally advanced disease.

- Treatment of breast-cancer-related complications and medical urgencies.
- Treatment of hereditary breast cancer.
- Diagnosis and treatment of breast sarcomas, lymphomas, and other rare tumour types.
- Breast cancer in males.

#### 8.2.5. Methodology of clinical research

- Phase I, II and III clinical studies: methodology, end-points, principles of statistics, study activation, conduct and analysis.
- Meta-analysis: principles and main methodology issues.
- Translational research in breast cancer: principles and main applications.
- Protocol drafting and editing, writing a scientific manuscript, presenting results at scientific meetings.
- Knowledge of the European norms on clinical research: Good Clinical Practice.
- Interpretation of results from clinical trials: reading a scientific report.

### 8.3. Practical content

- Radiotherapy indications in the adjuvant setting and in locally advanced breast cancer.
- Principles of treatment planning.
- Radiotherapy techniques.
  - conventional techniques: external beam and low-, pulse-, and high-dose rate (LDR, PDR and HDR) brachytherapy;
  - innovative techniques (3D conformal radiotherapy, intensity modulation radiotherapy, 3D conformal and intensity modulated brachytherapy, partial breast irradiation, intraoperative radiotherapy).
- Radiotherapy doses in adjuvant therapy and the role of the boost.
- Quality assurance in radiotherapy (importance of an internal written quality assurance manual).
- Combined modality treatment (integration of radiotherapy with surgery and systemic therapies).
- Acute and late radiotherapy complications.
- Assessment of cosmetic outcome in breast conserving treatment.
- Supportive care in breast cancer patients undergoing irradiation.
- Follow-up in the patients who have undergone radiotherapy for breast cancer.

### 8.4. Duration

Every 3 years both theoretical and practical contents will have to be re-assessed.

### 8.5. Outcome measures

By the end of the training a candidate should:

- Have been responsible for treatment decisions in the radiotherapy of early and advanced breast cancer patients for a minimum of five new cases per month for the previous 3 years (in out-patient and/or in-patient settings).
- Operate in a multidisciplinary environment (i.e. in collaboration with other specialists in the breast cancer field within the same hospital or collaborative group).
- Have published in the field of breast cancer medicine, in peer-reviewed international journals preferably having an impact factor greater than 1, a minimum of three original articles as author or co-author.

### 8.6. Assessment strategy

The qualification of a potential candidate to the title of Specialist in Breast Radiation Oncology will be based on the evaluation of his/her curriculum vitae and through a multiple choice test that will cover all the theoretical topics listed above (70% of questions should be specific and 30% general). A practical assessment will also be performed, in which the candidate will be asked to make a treatment decision on sample clinical cases.

The evaluation of the candidate and the validation of the certificate will be based on agreement between scientific societies, universities, etc (at the national and/or international level).

## 9. Breast medical physicists

### 9.1. Entry requirements

The knowledge base and competencies of the lead physicist and other physicists of the team should comply with the European Directives (if relevant)<sup>13,14</sup> and the EFOMP training recommendations<sup>15</sup> for the Medical Physics Expert (MPE) and the Qualified Medical Physicist (QMP) in radiation physics or radiation technology, respectively. For education and training of the QMP, it may be useful to refer also to the TEMPERE recommendations<sup>16</sup> and the EMERALD training course.<sup>17</sup> In particular, competencies addressed in EMERALD are based on EFOMP recommendations. In addition the lead physicist and other physics team members should have specialist training in mammography physics and/or breast radiotherapy physics as described in Sections 9.2 and 9.3.

### 9.2. Theoretical content

Medical physicists provide scientific support to the imaging and radiotherapy services.

This paper addresses the standards for the training of lead physicists and physics team members in mammography physics and breast radiotherapy physics beyond that given in general medical physics.

We recommend that a Medical Physics Expert, as defined by the European Federation of Organisations for Medical Physics (EFOMP),<sup>15,18</sup> will manage the service. This lead physicist will supervise a physics team comprising other physicists (Qualified Medical Physicists following the EFOMP definition) and technical staff.

Note that the breast unit may also need support from physicists specialising in other areas (for example, QC of equipment in imaging modalities such as ultrasound, MRI or nuclear medicine). Any additional training for such physicists is outside the scope of this paper and should be considered on an individual basis.

#### 9.2.1. Training in the physics of mammography

Physicists embarking on specialised training in mammography are encouraged to attend international and national mammography physics conferences, seminars and courses such as those given by the American Association of Physicists in Medicine (AAPM)<sup>19</sup> and the Institute of Physics and Engineering in Medicine (IPEM)<sup>20</sup>. Page: 2 Theoretical training must be supplemented by practical training and experience; if necessary by visiting an appropriate training centre.

Particular emphasis must be put on:

- Physics of mammography, mammography X-ray sources, mammography equipment, screen-film image receptors and film processing.
- Breast screening: radiographic breast anatomy, physiology, pathology, epidemiology of breast cancer, radiographic positioning, radiographic signs of cancer, e.g. breast imaging reporting and data system (BI-RADS).
- Quality assurance: organisation, QC measurements
  - QC of film processor and image receptor;
  - QC of mammography unit: analogue and digital;
  - QC of stereotactic equipment;
  - QC of film viewing equipment;
  - QC of ultrasound equipment (if relevant).
- Measurement of image quality.
- Recognition and correction of artefacts.
- Radiation dose and risk assessment.
- Digital mammography.
- Image processing.
- Computer-aided diagnosis (CAD).
- MRI of the breast: sequence optimisation and validation studies (if relevant).
- Radionuclide examinations (if relevant).

#### 9.2.2. Training in the physics of breast radiotherapy

Trainees are encouraged to attend international and national conferences, seminars and courses dedicated to breast treatment.

### 9.3. Practical content

#### 9.3.1. Training in the physics of mammography

The trainee must have substantial training in all aspects of the operation and QA of mammography units and associated equipment. She/he must perform routine QA procedures on ten mammography X-ray units under supervision and at least five units on her/his own.

### 9.3.2. Training in the physics of breast radiotherapy

The trainee must have substantial training in all radiotherapy techniques related to breast cancer. She/he must be familiar with dose calculation in breast radiotherapy, treatment planning and routine QA procedures in treatment as well as evaluation of the delivery of treatment.

## 9.4. Duration

### 9.4.1. Training in physics of mammography

Trainees should attend about 20 h of formal lectures or equivalent theoretical training, supplemented by 20 h of personal study about the topics of the formal lectures and at least 4 weeks of practical training. We recommend that physicists should visit at least two different appropriate training centres.

### 9.4.2. Training in physics of breast radiotherapy

No duration is proposed, as the training is the same as the basic training of the Qualified Medical Physicist (EFOMP training and EMERALD syllabus). We recommend that physicists should visit at least two different radiotherapy departments recognised for their excellence in breast treatment.

Every 3 years both theoretical and practical contents will have to be re-assessed.

## 9.5. Outcome measures

A member of the Specialist Breast Care Physics team:

- Will have received basic training in radiation physics or radiation technology and will be identified as a Qualified Medical Physicist, or the equivalent for technical staff
- Will have received theoretical training in mammography physics and/or breast radiotherapy physics that fulfils the requirements specified in Section 9.2.
- Will have received appropriate practical training that fulfils the requirements specified in Section 9.3.
- Will have participated in an appropriate Continuing Professional Development (CPD) scheme.<sup>21,22</sup>

In addition, a lead physicist specialising in breast care:

- Will have substantial experience in mammography physics and/or breast radiotherapy physics and will be identified as a Medical Physics Expert.<sup>13</sup>

## 9.6. Assessment strategy

All types of evidence of the training and of the competencies addressed should be collected for assessment if required. All physics team members should maintain their competencies by participating in an appropriate CPD scheme.<sup>21,22</sup> At least 10% of CPD credit points gained per annum should be relevant to their work for the breast unit.

In addition, lead physicists should maintain and develop their experience and expertise in their specialist area as follows.

### 9.6.1. Mammography physics

- Supervise the QA of at least five mammography units.
- Participate in a review of the QA data from a wide range of different mammography units at least once a year and have access to such data when necessary.
- Liaise with other mammography physicists.
- Attend meetings on mammography physics.
- Periodically make visits to other centres in mammography physics to compare techniques, especially when new equipment or techniques are introduced.

### 9.6.2. Breast radiotherapy physics

- Supervise at least 25 treatment plans.
- Participate in QA of the equipment.
- Liaise with other radiotherapy physicists.
- Attend meetings on radiotherapy; 10% of that time should be devoted to breast radiotherapy physics.
- Periodically make visits to other radiotherapy centres to compare techniques, especially when new equipment or techniques are introduced.

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## Conflict of interest statement

None declared.

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### REFERENCES

1. EUSOMA. The requirements of a specialist breast unit: position paper. *Eur J Cancer* 2002; 36: 2288-93. Revised version published in N. Perry, M. Broeders et al. *European guidelines for quality assurance in breast cancer screening and diagnosis.*, 4th ed. Luxembourg, Office for Official Publications of the European Communities 2006.
2. Rijken H, Caseldine J. Radiographical guideline. In: Perry N, Broeders M, et al., editors. *European guidelines for quality assurance in breast cancer screening and diagnosis.* 4th ed. Luxembourg: Office for Official Publications of the European Communities; 2006.
3. Holland R. Guidelines for training. In: Perry N, Broeders M, et al., editors. *European guidelines for quality assurance in breast cancer screening and diagnosis.* 4th ed. Luxembourg: Office for Official Publications of the European Communities; 2006.
4. Nodine CF, Kundel HL, Mello-Thoms C, et al. How experience and training influence mammography expertise. *Acad Radiol* 1999;6:575-85.
5. NHS Breast Screening Programme Radiographers Quality Assurance Coordination Committee. Quality assurance guidelines for radiographers. NHSBSP Publication No. 30, 2nd rev. ed. Sheffield, NHSBSP, 2000.
6. The EUREF Certification Protocol. European Reference Organisation for Quality Assured Breast Screening and Diagnostic Services, 2001.
7. Pennery E. The differing roles of specialist nurses. In: Harmer V, editor. *Breast cancer nursing care and management.* London: Whurr Publishers Ltd; 2003. p. 334-51.
8. BASO. The training of a general surgeon with an interest in Breast Disease. *Eur J Surg Oncol* 1996;22. Suppl A.
9. Skillman JM, Humzah MD. The future of breast surgery; a new subspecialty of oncoplastic breast surgeons? *Breast* 2003;12:161-2.
10. Baum M. Is it time for a paradigm shift in the training of breast surgeons as a sub-specialty? *Breast* 2003;12:159-60.
11. European Union of Medical Specialists. <http://www.europathol.org>.
12. UK Royal College of Pathologists core training programme in histopathology. <http://www.rcpath.org/index.asp?PageID=116>.
13. Council Directive 96/29/EURATOM. Basic Safety Standards.
14. Council Directive 97/43/EURATOM. Medical Exposures.
15. EFOMP. Radiation protection of the patient in Europe: the training of the medical physics expert in radiation physics or radiation technology. Policy statement no. 9. *Phys Med* 1999;15(3).
16. TEMPERE. Recommendations on education, training and accreditation in medical physics and biomedical engineering. European Commission, DG XXII, 1999.
17. EMERALD: European Medical Radiation Learning Development. Training modules in medical radiation physics: training module on physics of diagnostic radiology and training module on physics of radiotherapy. [www.emerald2.net](http://www.emerald2.net).
18. EFOMP. Departments of Medical Physics: advantages, organisation and management. Policy statement no. 5. *Phys Med* 1995;11(3).
19. Haus AG, Yaffe MJ, editors. *Syllabus. A categorical course in physics: technical aspects of breast imaging.* 3rd ed. Presented at the 80th Scientific Assembly and Annual Meeting of the

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- Radiological Society of North America. November 27–December 2, 1994.
20. NHS Breast Screening Programme. *Quality assurance guidelines for medical physics services*. NHSBSP publication no. 33 (under revision). Sheffield: NHSBSP publications; 1995.
21. EFOMP. Continuing professional development for the Medical Physicist. Policy statement no. 8. *Phys Med* 1998;14(2).
22. EFOMP. Recommended guidelines on national schemes for continuing professional development of Medical Physicists. Policy statement no. 10. *Phys Med* 2001;7(2).