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Theoretical and practical knowledge curriculum for European Breast Surgeons

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EXECUTIVE SUMMARY

The Breast Surgery theoretical and practical knowledge curriculum comprehensively describes the knowledge and skills expected of a fully trained breast surgeon practicing in the European Union and European Economic Area (EEA). It forms part of a range of factors that contribute to the delivery of high quality cancer care. It has been developed by a panel of experts from across Europe and has been validated by professional breast surgery societies in Europe. The curriculum maps closely to the syllabus of the Union of European Medical Specialists (UEMS) Breast Surgery Exam, the UK FRCS (breast specialist interest) curriculum and other professional standards across Europe and globally (USA Society of Surgical Oncology, SSO). It is envisioned that this will serve as the basis for breast surgery training, examination and accreditation across Europe to harmonise and raise standards as breast surgery develops as a separate discipline from its parent specialties (general surgery, gynaecology, surgical oncology and plastic surgery).

The curriculum is not static but will be revised and updated by the curriculum development group of the European Breast Surgical Oncology Certification group (BRESO) every 2 years.

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1. BRESO mission statement

1.1. Training

Currently training across Europe in Breast Surgery is very heterogeneous with training hosted by general surgeons, gynaecologists and plastic surgeons. In general, training certification is achieved after 4–6 years of residency training, which is usually of mixed content, so for general surgery, residents will rotate through colorectal, upper GI, endocrine, breast and often vascular surgery with a substantial emergency surgery component. For gynaecology, rotation will include urogynaecology, breast, oncology, obstetrics etc as well as emergency work. Similarly for plastic surgery (rotations will include trauma, breast reconstruction, skin cancer, soft tissue sarcoma etc). Consequently at the time of certification, many surgeons will have spent very little time doing breast surgery. In some instances only a few months of residency training will be spent in breast surgery but the surgeon will be able to undertake breast surgery once certified.

Historically (40 years ago) breast surgery was quite simple, with all women treated with mastectomy and axillary clearance with no reconstruction and simple adjuvant therapy regimes. Modern breast surgery is now highly complex from both a surgical and oncological stand point and such limited training is not adequate for modern breast practice. Ideally, breast surgery training for those declaring a special interest during residency would be integrated at a high level into the 4–6 years of residency. Residency training programmes across Europe therefore need to recognise this need and move towards this model, as has happened in the UK already. However, this will take time and in the interim, BRESO proposes that all surgeons practicing breast surgery in Europe should be certified in breast surgery, by means of undertaking high level training either within their residency (if available) or by means of approved specialist fellowships. Certification will be based on the following (see Fig. 1):

1. Acquistion of knowledge as demonstrated by passing approved examinations.
2. Acquistion of practical skills as demonstrated by a certified period of training in an approved breast unit and by review of a signed log book.
3. Following completion of training and certification (as above) all breast surgeons should engage with on going continuous professional development (CPD) and apply for re-certification at

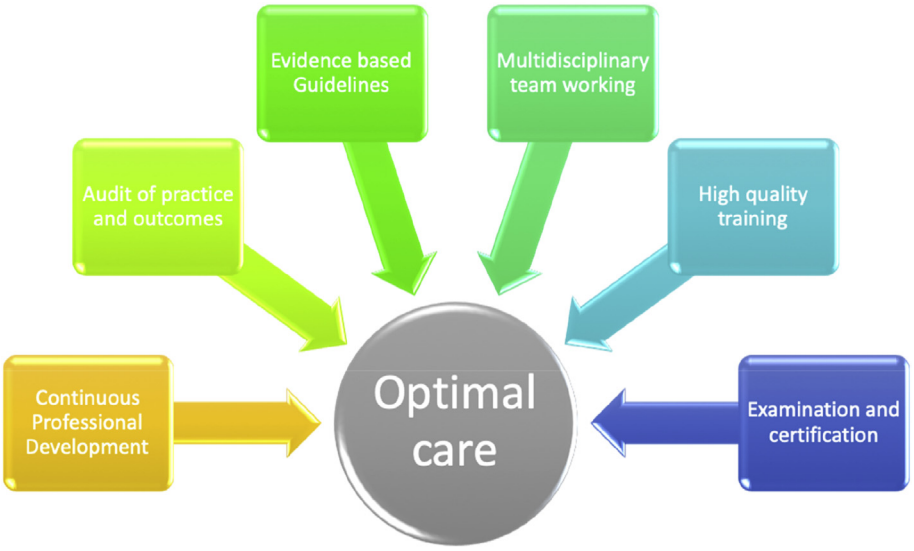

Fig. 1. Summary of measures to ensure high quality clinical practice for health care professionals.

intervals of 5 years by submission of proof of approved course attendance. Such courses should be evidence based, free from commercial bias and of high quality.

By these means BRESO will enhance and harmonise breast surgery training and practice across Europe, improving standards from the current very variable levels. Patients will also have a means by which to reassure themselves about the provenance and skills of their breast surgeon by using the BRESO searchable directory of certified breast surgeons.

To do so, it is proposed that breast surgeons should have undertaken a minimum of 2 years training in breast surgery (see Table 1 in the section below 'Proposed temporal patterns of breast training'). Twelve to 18 months of this may be in a breast unit practicing intermediate level care, exposing trainees to wide local excision (WLE), sentinel lymph node biopsy (SLNB), axillary clearance and mastectomy, with good MDT working (tier 1 training centres, basic training). This will enable trainees to develop basic skills and a broad understanding of the subject. This may either be during or after residency (certification) or a mixture of the 2. However in addition, a period of high quality training in a specialist breast center is required where higher level skills will be attained such as oncoplastics, reconstruction (although not necessarily practical expertise in all countries), research literacy, oncology and genetics. These latter centres (tier 2 training centres, advanced level skills) will need to be quality assured (for example EUSOMA certified). This training may be post-residency (certification) in most countries to allow full immersion in breast surgery without the distraction of emergency surgery and other specialist subject areas, unless such a specific post can be arranged during standard residency training (as in the UK where Oncoplastic training is a routine part of training for breast specialists). As a result, surgeons will be expected to have acquired a minimum number of procedures to the level required for post-residency practice, certified by a recognised trainer.

Tier 2 training centres should be nominated and approved as such by BRESO. Tier 2 will be similar in standard to EUSOMA certification but less proscriptive and we envisage that these will be large teaching hospitals with a minimum of 250 cancers per year, at least 3 specialist breast surgeons, a fully constituted MDT, access to training in genetics, pathology, imaging and reconstruction. Tier 1 centres will be smaller centres, with at least 150 cancers per year, access to MDT working but may not have access to all reconstruction options or genetics clinics. It is hoped that tier 2 centres will offer specific breast surgery fellowships to offer such training and the BRESO website will maintain a database of such fellowships, searchable by country and language.

The candidate will have to demonstrate their practical skills by means of a certified log book and evidence of ability to undertake key procedures to a good standard (axillary clearance (ANC), level 1 and 2 oncoplastic surgery (OCBS), wide local excision (WLE), mastectomy (Mx) and skin and nipple sparing mastectomy (SSM/NSM) for example). They will also be expected to demonstrate they have attained knowledge in breast cancer management and more in depth expertise in surgical management, as set out in the knowledge curriculum (which will be attested to by the passing of the UEMS European Board of Surgery Qualification (EBSQ) in Breast Surgery exam or holding an approved higher degree or certificate of competence, in addition to attendance at certified/approved courses and attendance at a minimum of 1 international breast congress).

There are 3 elements contributing to the acquisition of training. Theoretical knowledge acquisition, practical skills acquisition (and certification processes relating to the above) and accreditation of tier 2 centres/fellowships which provide training of adequate quality to meet the above needs. In the post-certification period, maintaining skills and knowledge is important and systems must be in place to mandate and certify that breast surgeons keep up to date in this rapidly progressing field.

1.2. Theoretical knowledge

The knowledge curriculum contained in this document has been developed to set out the required levels of theoretical knowledge a certified surgeon must possess. This will include both knowledge of facts, the ability to critically apply this knowledge in the clinical setting and the ability to assimilate and critically appraise new knowledge as it is produced by new trials. The knowledge curriculum will serve as the basis for courses, training programmes and examinations linked to certification and will be updated every 2 years.

The knowledge curriculum will be described in terms of 3 levels, a basic level, likely to be acquired during the tier 1 training period

(Basic level: B)/(Advanced level: A) which will be acquired during tier 2 training and optional specialist knowledge (Specialist: S) for example detailed knowledge of technical aspects of reconstruction).

All residents/fellows will be required to demonstrate detailed knowledge of the basic (B) and advanced (A) curriculum but the specialist knowledge (S) requirements may be used to tailor training to variations in national requirements where some countries do not require breast surgeons to be able to reconstruct, whereas others do. This will allow EU member states to engage fully with the programme with some ability to tailor requirements. Similarly the practical skills requirements may be tailored depending on national and speciality specific requirements (for example whilst all surgeons will be expected to be competent in axillary clearance, and level 1 and 2 oncoplastic surgery, whole breast reconstruction and pedicled, free and perforator flaps may only be appropriate for some countries or for plastic surgeons).

The knowledge curriculum will be provided within training and by attending courses and congresses and tested by examination. The curriculum is based on the UEMS EBSQ in Breast Surgery Exam syllabus and the passing of the UEMS exam will confirm adequate knowledge for the purpose of certification. Other breast examinations may also apply to serve a similar purpose, such as the University of East Anglia (UEA) MSc in Breast Surgery, the ESO CCB Certificate of Competence in Breast Cancer and the FRCS (Breast subspeciality interest) in the UK. Courses which provide the knowledge curriculum will include a requirement to attend at least 2 International evidence based congresses, focussed on breast diseases (such as San Antonio, St. Gallen, EBCC or similar).

There will also be a requirement to attend training courses, which may apply to be BRESO certified for this purpose, such as the ESSO Breast courses (advanced, oncoplastic), the ESO certificate course or masterclass, the University of East Anglia (UEA) Masters course and others. A small administration fee will be charged to course providers for approval ('approved by BRESO') after which they will be listed on the searchable BRESO website. Courses may be in English or other languages.

1.3. Practical skills

Acquisition of skills during training needs to be both numerically and qualitatively adequate for certification. It is envisaged that development of basic skills will be acquired during time spent in a tier 1 center (core biopsy, mammography interpretation, communication skills, diagnostic biopsy, simple mastectomy, level 1 oncoplastic WLE, SLNB and ALND).

Level 2 skills will include skin and nipple sparing mastectomy, level 2 oncoplastic skills, lipomodelling, implant management and reconstruction decision making, selection criteria and risks and benefits and complex oncological and genetic decision making and management. For those in National systems where reconstruction is not the role of the breast surgeon, but performed in conjunction with plastic surgery colleagues, observation of reconstruction of various types must be demonstrated but need not be performed personally.

All breast surgeons must have a theoretical understanding of breast reconstruction in order to be able to offer women appropriate treatment options. For those from national systems where reconstruction is a core role of the breast surgeon, operative numbers and quality assessments must be demonstrated. In this way the skills set may be tailored to national requirements/systems.

Training requirements will therefore be designated as Tier 1, Tier 2 or Specialised (determined by National agreement). Systems for certification of practical competencies will be developed by the BRESO skills working group and may involve designated trainers signing off cases or an on line system of log book validation.

1.4. Tier 2 centre/fellowship approval

An integral part of this process will be certification of centres as tier 2 training centres. Again, a small fee (varied according to the income of the host country to ensure it is affordable) will be charged to cover the cost of accreditation and centres will be listed in a searchable list on the website. In addition, formal tier 2 and specialist fellowships will be listed on the BRESO website if available.

1.5. Proposed temporal patterns of breast training

Table 1
Proposed temporal patterns of breast training.

Residency (usually 4–6 years in most European Countries)					Post residency	
Year 1	2	3	4	5	6	7
General training	General training	General training	General training	Br1	Br2	
General training	Br1	General training	General training	General training	Br2	
Br1	General training	General training	General training	Br2		
General training	General training	General training	General training	General training	Br1	Br2

Tier 1 breast training for 12 months could take place at any time during standard general training (from years 1–5) and may even be split into smaller blocks. If not present during standard training it must be part of a fellowship after completion of general training. It is shown as in years 1, 2 or 5 in the examples above but this is not exclusive and other permutations are possible.
Tier 2 breast training should take place towards the end of training, either as part of standard training in year 5 or as a fellowship after completion of general training.
General Training relates to standard residency in either general surgery, gynaecology or plastic surgery.
Br1: Basic Training in a Tier 1 unit.
Br2: Advanced (+/-specialist) fellowship training in a Tier 2 unit.

1.6. Continuing professional development

BRESO also proposes that for all practicing breast surgeons there should be some form of light touch re-certification at intervals of 5 years. This will include providing documentation that they have attended high quality oncology and oncoplastic courses that are free from commercial bias and have evidence based content.

2. Knowledge curriculum

The speciality of Breast Surgery requires different levels of knowledge at different stages during surgical training. Basic level knowledge (B) is appropriate for surgeons during their general training in general surgery, gynaecology or plastic surgery and is

the expected level of knowledge and skill for all surgeons within this discipline. Breast surgery is regarded as a specialist discipline within general surgery or gynaecology and all surgeons treating breast cancer should have advanced level skills and knowledge (A). It is recognised that some specialist-level knowledge and skills will only be provided by specialists in tertiary centres or by plastic surgeons (S). Throughout this curriculum knowledge is categorised into these 3 levels to guide training provision. Examinations approved by BRESO will test knowledge to advanced level with some specialist level knowledge. The knowledge curriculum is the responsibility of the BRESO theoretical knowledge working group and will be updated every 2 years.

3. Basic science

3.1. Physiology and development of the breast

- Development of the breast (A), proliferation during pregnancy (B), involution after lactation (B), involution during menopause and the hormonal stimuli that trigger these changes and how these may be affected by drugs, diseases, physiological variation (B).
- Abnormalities in breast development including hypoplasia (A) (including Poland's anomaly), hyperplasia, tubular breast, accessory breasts and nipples (A).
- The physiology of the male breast, its developmental stages, hormonal regulation and developmental variation (gynaecomastia) (A).
- Investigative work-up and management strategies for developmental and physiological abnormalities must be understood (A)

3.2. Surgical anatomy of the breast and axilla

- Muscles and fascia of the thoracic wall and axillary region (B)
- Blood supply to the breast, overlying skin and nipple-areola complex as well as the vascular anatomy of the axilla (B)
- Neural anatomy of the breast, thoracic wall, axillary area and upper arm (B)
- Lymphatic drainage patterns to the ipsilateral axilla, sub- and supraclavicular nodal basins, internal mammary nodal basin and contralateral axilla (B)
- Relevant surgical and vascular anatomy of common flaps used in breast reconstructive surgery (A,S)
- Anatomic variants and variants induced by treatments (such as the impact on vascular perfusion following radiotherapy, previous surgery and surgical scars) and how these may be managed clinically (A)

3.3. Pharmacology relevant to breast disease

- The endocrinology of the breast: influences of oestrogen (the oral contraceptive or menopausal hormone therapy (MHT)), progesterone, testosterone, oxytocin and prolactin (B)
- Impact of a range of drugs on breast function: drugs causing gynaecomastia, hypertrophy, secretion (A). Drugs causing breast development in gender reassignment (S).
- Drugs relevant to breast cancer: SERMS (B), aromatase inhibitors (B), fulvestrant (A), oestrogen (B), progestogens (B), GnRH agonists (A), chemotherapy agents (A) and GCSF (A), biological agents (trastuzumab, pertuzumab, lapatinib, neratinib TDM-1, CD4/6 inhibitors, PARP inhibitors, denosumab) (A), bisphosphonates (B), immune modulators (S).
- Drugs relevant to the treatment of breast pain: tamoxifen (A), danazol (B), GnRH agonists (A).
- Other: Analgesics for use in acute and chronic pain settings (B), antiemetics for the management of post-surgical nausea (B), antibiotics for use in the prophylactic setting in surgery and for the treatment of infections (B), low molecular weight heparins for DVT prevention in the perioperative period (B), local anaesthetic agents for use in the perioperative period for local and regional blocks (B).

3.4. Microbiology

- Common microorganisms causing breast pathology (B)
- Preferred antibiotics for common breast infections (B)
- Aetiology of breast sepsis (B)
- Management of breast sepsis (B)
- Signs and symptoms of severe sepsis (B)
- Management of severe sepsis including septic shock(B)

3.5. Epidemiology of breast pathologies

- Influence of age of menarche, pregnancies, lactation, menopause, hormonal treatments on disease risk (B)
- Family history (assess pedigrees, document and assess breast cancer risk factors and BRCA gene carrier risk status) (A)
- Genetics of breast cancer (high and moderate risk genes, single nucleotide polymorphisms SNPs) (A)
- Risk of previous breast conditions and procedures (B)
- Impacts of age, co-morbidities, medications, frailty on prognosis and risks of over and under treatment (B)
- Lifestyle risk factors for breast disease (e.g. smoking and risk of periductal mastitis; obesity, alcohol, exercise, oral contraceptives, menopausal hormone therapy (MHT), immunosuppressive therapy as risk factors for breast cancer) (B)

4. Diagnostic methods

4.1. Clinical examination

- Symptoms of benign or malignant breast diseases or conditions (B)
- Symptoms suggestive of nodal or distant metastases (B). Ability to perform an adequate examination of the breasts, axillary and other regional nodal basins (B)
- Understanding of the common signs and examination findings suggesting a range of breast pathologies and how these should be further investigated (B).
- Understanding the other clinical findings which may be linked to breast pathologies (evidence of metastatic disease, development of secondary sex characteristics (or lack thereof), physical signs that may link to gynaecomastia in the male (testicular abnormalities, hepatic dysfunction, obesity) (B)
- How to examine and assess a woman with breast augmentation, cosmetic or reconstructive breast surgery (A).

4.2. Breast (and related) imaging techniques

4.2.1. Mammography

- Age appropriate indications for mammography (B)
- Sensitivity and specificity and factors influencing these (A)

- ❖ Difference between analogue, digital, tomosynthesis and contrast enhanced mammographic techniques (A).
- ❖ Different views (craniocaudal and mediolateral oblique) and the role of compression views (A).
- ❖ Understanding of how to interpret standard mammographic abnormalities and the imaging features typical of benign or malignant pathology (B, A).
- ❖ Mammographic limitations in certain groups such as young females, females with dense breasts, lobular cancer and in the presence of implants (A)
- ❖ Eklund technique (Eklund GW et al. Improved imaging of the augmented breast. AJR Am J Roentgenol. 1988; 151 (3): 469–73) to optimise mammography in the presence of implants (A).
- ❖ Role of mammography in screening programmes (B)
- ❖ Role of mammography in stereotactic biopsies and different localization techniques (B)
- ❖ BI-RADS classification of malignancy (BI-RADS M1-5) and breast density (BI-RADS A-D) (A)
- ❖ Role of mammographic examination of operative specimens (A)

4.2.2. Breast ultrasound

- ❖ Age appropriate indications (B)
- ❖ Intraoperative localization techniques (B)
- ❖ Sensitivity and specificity, factors influencing sensitivity and specificity (A)
- ❖ Ultrasound guided breast biopsies, how performed, indications and contraindications (B)
- ❖ Understanding how to interpret standard ultrasound abnormalities and the imaging features typical of benign or malignant pathology (B, A)
- ❖ Role of Automated Breast Ultrasound (ABUS) (A)
- ❖ Stavros' criteria [Stavros AT et al. Radiology.1995 Jul; 196(1):123–34] for benign lesions (A)

4.2.3. MRI

- ❖ How performed, indications, limitations and contraindications, sensitivity and specificity, factors influencing sensitivity and specificity in invasive cancer and in DCIS (A,B)
- ❖ Role in surveillance of high risk women (A)
- ❖ Role when contradictory findings in triple assessment (A)
- ❖ Role in determining response in patients with neoadjuvant treatment (A)
- ❖ Role in detecting contralateral cancer (A)
- ❖ Role in the assessment of lobular cancer, multifocal cancer and dense breasts (A)
- ❖ Role when planning breast conserving surgery (B, A)
- ❖ The limited influence of pre-op. MRI on local recurrence rates (A)
- ❖ Management of lesions detected only on MRI (MRI localised biopsy) (A)
- ❖ Role in management of the occult breast primary (A)
- ❖ The benefits and risks of MRI: highly sensitive but risk of 'unnecessary' biopsies/mastectomies (A)
- ❖ Role in assessment of operability in locally advanced or recurrent disease of the breast and axilla (A)
- ❖ Use of MRI of areas outside the breast in the further evaluation of equivocal staging test results to diagnose liver, bone, CNS/spine metastases (A)
- ❖ Ability to interpret MRI imaging (obvious malignancy, obvious nodal disease, implant rupture (intra and extra capsular rupture) (A)

4.2.4. Staging CT

- ❖ Indications and contraindication for CT staging (B)
- ❖ Able to interpret simple CT abnormalities (liver, lung or obvious bone metastases) (A)
- ❖ Value of and indications and contraindications for the use of IV contrast (B)
- ❖ Use of CT angiography in planning free flaps (A)
- ❖ Indications for and value of PET CT (B)

4.2.5. Isotope bone scan

- ❖ Understanding how isotope bone scan works (B)
- ❖ Indications and contraindications for scanning (B)
- ❖ Able to interpret simple abnormalities (A)
- ❖ Follow on investigation in equivocal cases (e.g. CT scan or MRI of the bone when needed and rarely, use of bone biopsy) (A)

4.2.6. Dual emission X ray absorptiometry (DEXA) bone density scan

- ❖ Use in monitoring bone density in women on aromatase inhibitor (AI) therapy (B)
- ❖ Indications for DEXA scanning (B)
- ❖ Technical aspects of how this type of scan works and how it differs from an isotope bone scan (B)
- ❖ Understanding interpretation of bone density reports and scoring (B)
- ❖ Understanding of management of women with osteopenia and osteoporosis induced by ovarian function suppression, oophorectomy or in the presence of AI therapy (A)

4.2.7. PET_CT

- ❖ Use in staging in advanced breast cancer and in the investigation of axillary nodal disease of unknown primary (A)

4.2.8. Percutaneous needle biopsies

- ❖ Fine needle aspiration cytology – how performed, indications and contraindications, sensitivity and specificity, factors influencing sensitivity and specificity. Awareness that it is less sensitive and specific than core biopsy for the breast primary but has value in the assessment of lymph nodes (B)
- ❖ Core needle biopsy-how performed, indications and contraindications, sensitivity and specificity, factors influencing sensitivity and specificity (B)
- ❖ Vacuum assisted biopsy and vacuum assisted excision-how performed, indications and contraindications, sensitivity and specificity, factors influencing sensitivity and specificity (A)

4.3. Breast (and related) pathology

- ❖ The morphologic spectrum of normal breast tissue (juvenile/prepubertal breast, lactating breast, normal premenopausal breast, involution patterns, aberrations of normal development and involution (ANDIs), minimal changes, fibrocystic changes (B)
- ❖ Interpretation of preoperative diagnostic categories by fine-needle aspiration or discharge cytology (C1–C5) and core needle biopsy (B1–B5) (B)

- ❖ Radio-pathological correlations of major radiological features: circumscribed masses, spiculate masses, parenchymal asymmetry, microcalcification; Lack of correlation or correlations requiring further surgery (A)
- ❖ Subgross morphology of breast tumours, including the extent (measure of the tumour involved breast area/volume), the focality/distribution (unifocal, multifocal, diffuse), the size (invasive/prognostic tumour size) of the lesions (Tot T et al. The subgross morphology of breast carcinomas: a single-institution series of 2033 consecutive cases documented in large-format histology slides. Virchows Arch. 2019 Aug 13). (A)
- ❖ Specimen fixation, cold ischaemic time, pre-analytic conditions with influence on histopathological assessment prognostic and predictive markers; specimen of collection for tumour banking (A)
- ❖ Value of specimen mammography, both intraoperatively to ensure specimen identification and margin optimisation but also by the pathologist in disease localization and extent assessment (A)

5. Breast cancer epidemiology and natural history

5.1. Epidemiology

5.1.1. Incidence and mortality

- ❖ Rising incidence in the western world (B)
- ❖ Impact of aging populations (B)
- ❖ Impact of screening (B)
- ❖ Mortality trends and effect of earlier diagnosis, treatment impact (B)

5.1.2. Breast cancer risk factors: non-hereditary

- ❖ Age (B)
- ❖ Ethnic Group (B)
- ❖ Gender (B)
- ❖ Alcohol (B)
- ❖ Obesity (B)
- ❖ Dietary factors (B)
- ❖ Exogenous oestrogen use (menopausal hormone replacement therapy, oral contraceptive, IVF drugs, antioestrogens/SERMs and AIs) (B)
- ❖ Sedentary lifestyle (B)
- ❖ Mantle radiotherapy (B)
- ❖ Proliferative, non-high risk lesions of the breast (fibroadenoma, sclerosing adenosis, intaductal papilloma etc) (B)
- ❖ High risk lesions (lobular neoplasia in situ, radial scar (risk of concomitant cancer), atypical ductal hyperplasia, columnar cell hyperplasia) (B)

5.1.3. Genetic predisposition: breast cancer risk and risk of other malignancies

- ❖ High risk hereditary breast cancer risk syndromes: BRCA1 (B), BRCA 2 (B), tp53 mutation (Li-Fraumeni syndrome) (A), Cowden's syndrome (A), Peutz-Jegher's syndrome (A), Hereditary diffuse gastric cancer syndrome, (A), PALB2 (A).
- ❖ Risk counselling and risk management strategies for the unaffected (non-cancer) gene carrier and cancer management strategies for the gene carriers already diagnosed with cancer (A).
- ❖ Indications for gene testing and pre-test counselling (A).
- ❖ Moderate risk, germ line mutations: Ataxia-telangiectasia mutated (ATM) (A), CHEK-2 (A), PALB2 (A) and awareness of rapid rise in number of more recently identified clinically important mutations (A).
- ❖ Weaker hereditary factors such as low penetrance genes and single nucleotide polymorphisms (S).
- ❖ Genetic consortia programmes to accrue large cohorts globally to refine risk prediction for these newer genetic factors (A).
- ❖ The rise of commercial polygene arrays to risk assess and the potential risks and benefits of their use (A).
- ❖ Variants of unknown significance and how to manage these individuals (S)

5.1.4. Breast cancer risk estimation for healthy women with a family history

- ❖ Pedigree assessment (A, B)
- ❖ Tyrer-Cuzick (IBIS II) on line risk assessment tool (A)
- ❖ BOADICEA risk assessment tool (A, S)

5.1.5. Management of high and moderate familial breast cancer risk women

- ❖ Surveillance with breast imaging: age appropriate strategies and evidence of efficacy (MRI, MMG, US) (A)
- ❖ Risk reducing surgery: breast and ovary (A). Magnitude of risk reduction (A), impact on survival in bilateral non-cancer cases (A) and unilateral contralateral RRM in women with cancer (A), psychological impacts (A), techniques (skin or nipple sparing) (A), risk of occult malignancy (A).
- ❖ Chemoprevention (A): SERMS (tamoxifen, raloxifene), aromatase inhibitors (exemestane and anastrozole), trial evidence of benefit, indications for and contraindications to, age of use, duration of use. Adverse events.

5.2. Breast cancer screening

- ❖ Theoretical underpinnings of all screening programmes (WHO Principles, 1968, updated in 2008) (B)
- ❖ Quality requirements (EUSOMA), EU standards and own National specific quality measures and provision (B)
- ❖ Compliance rates for effective screening (A)
- ❖ Positive and negative influences of screening on breast cancer incidence, mortality, morbidity and survival rates (A)
- ❖ Factors influencing sensitivity and specificity (A)
- ❖ Validated screening tools (analogue and digital mammography, MRI) (B)
- ❖ Newer screening modalities (ABUS, tomosynthesis) (A)
- ❖ Targeted screening/surveillance in higher risk subgroups: familial risk, genomic risk, previous disease and treatment such as mantle radiotherapy (A)
- ❖ False positive findings and over diagnosis and their adverse impacts (B)
- ❖ Surgical and diagnostic techniques relevant to screening (vacuum assisted biopsy, localization techniques for surgery) (B, A)
- ❖ Management of screen detected borderline and premalignant lesions (radial scar, DCIS, atypias etc) (A)
- ❖ Screening age ranges and their justification (B)

5.3. Breast cancer: biology, natural history and prognosis

5.3.1. Basic concepts in cancer biology

- Cell kinetics, proliferation, apoptosis and the balance between cell death and cell proliferation (A)
- Angiogenesis and lymphangiogenesis (A)
- Knowledge of key molecular pathways in breast cancer of therapeutic significance (Her-2, ER) (A)
- Genome maintenance mechanisms to prevent cancer (A)
- Intercellular and intermolecular adhesion mechanisms and signalling pathways (A)
- Immunological mechanisms that either prevent or promote cancer growth and dissemination (A)
- Potential effects of surgery and surgery-related events on cancer biology (e.g. angiogenesis) (A)

5.3.2. Natural history, prognosis, prognostic and predictive factors

- Patterns and incidence rates of local, regional and distant dissemination (B)
- Differences in dissemination patterns due to biological tumour subtypes (A)
- Tumour and nodal stages (TNM Classification, version 8, January 2018) (B)
- Tumour grade (Elston and Ellis classification) (B)
- Ki-67 expression (A)
- Histological (morphological) subtypes of invasive cancer (B)
- Array based classification of Sorlie and Perou (luminal A, B, basal etc) (A)
- Oestrogen and progesterone receptor expression (Allred, H score) and clinical relevance (B)
- HER-2 (c-erb-b2) over-expression and clinical impact (B), Intermediate cases (2+) by IHC and HER-2 expression by FISH, CISH (A)
- The role of "conventional" breast pathology (tumour diagnosis, prognosis, specimen analysis, node analysis, neoadjuvant response assessment) (B)
- Intraoperative assessment techniques (frozen section, OSNA, imprint cytology for nodal staging, frozen section for margins) (A)
- The role of Multi-Gene Assays in both prognostic and predictive settings (costs, benefits and limitations) (A)
- Differences and similarities in tumour biology between sporadic and hereditary breast cancer (A)
- The influence of circulating tumour cells on prognosis and the new technique of 'liquid biopsy' (S)
- The risk of and risk factors for synchronous and metachronous breast cancer (A)
- Prognostic Tools: For example: Nottingham Prognostic Index, NHS PREDICT, MSKCC nomograms. Differences and applicability (A)
- The role of the immune system in tumour development, progression and regression; immune system related predictors of the response to treatment (adjuvant, neoadjuvant, immune-oncologic) – tumour infiltrating lymphocytes (A)

5.4. Breast cancer: staging

- Clinical staging of the primary tumour and the axilla and its accuracy (B)
- Preoperative axillary staging by ultrasound (sensitivity and specificity) (B)
- Surgical staging of the axilla - indications, methods, sensitivity, advantages, disadvantages (B)
- CT-scan: how performed, the indications, sensitivity and specificity (B)
- PET- CT scan: how performed, the indications, sensitivity and specificity (B)
- Isotope bone-scan: how performed, indications, sensitivity and specificity (B)
- Clinical and pathological TNM-classification (version 8) including post-neoadjuvant designation (B)
- Stage migration due to improved staging accuracy, (e.g. detecting micrometastases in sentinel lymph node biopsy) (A)
- Post neoadjuvant response categorisation systems such as residual cancer burden (A)

5.5. The role of the multidisciplinary team (MDT) in breast cancer

- Multimodality treatment of breast cancer (B)
- Ideal composition of the MDT (B)
- Responsibilities and tasks distribution among the MDT members
- Defining local protocols and workflows
- Understanding the role of the MDT in data flow
- Educational and training role of the MDT (B)
- Audit and governance role of the MDT (B)
- Costs of the MDT (A)
- EUSOMA guidelines regarding multidisciplinary teams and meetings (A)

6. Breast cancer surgery

6.1. Conservation surgery for breast Cancer/DCIS

6.1.1. Localization of impalpable lesions (benign, borderline or malignant)

- Guide wire (B)
- ROLL (radioguided occult lesion localization) (A)
- RSL (radioguided seed localization) (A)
- Magnetic seed or tracer localization (A)
- Guidance by intraoperative ultrasound (A)
- Advantages and disadvantages of various localization methods (A)
- The role of specimen radiography (B)
- Role and value of variety of margin assessment devices and techniques (A)

6.1.2. Conservative surgical treatment of (DCIS and invasive) disease within the breast

- Indications and contraindications for breast conservation (A, B)
- The location, size and the multifocality/multicentricity of the tumour (A)
- The size and the shape of the breast, including assessment of degree of ptosis (A)
- The predicted aesthetic outcome after breast conservation (A)
- The role of neoadjuvant systemic treatment in facilitating breast conservation, including indications and contraindications as well as predicting and evaluating the response (A)
- Patient preference (B)
- Medical contraindications for radiotherapy: previous RT, heavy smoker/COPD, dementia, confusion and agitation, positioning limitations (B)

6.1.3. Oncoplastic conservation surgery

- Volume displacement versus volume replacement: techniques and indications, risks (A)
- Level I and level II oncoplastic techniques in breast conservation. Aware of contraindication and indications for oncoplasty, different techniques by disease quadrant (atlas of technique by K Clough), risks of oncoplastic surgery (A)
- Management of cavity (marking with clips), pathological documentation and specimen marking (B)
- The need for contralateral surgery for symmetry: techniques, indications, contraindication, timing, impact of radiotherapy (A)

6.1.4. Breast conservation

- The influence of margin width on local recurrences (B)
- The role of cavity shavings to ensure sufficient margins (A)
- Risk of local recurrence and patient and tumour stage, margin assessment and biology related risk factors for local recurrence after breast conservation (A)
- The influence of breast radiotherapy on local recurrences (B)
- Role of boost radiotherapy and need to enable radiotherapy targeting including impact on local recurrence rates, indications, cosmetic impacts (A)
- The influence of adjuvant systemic treatment on local recurrences (A)
- Treatment of local recurrences after breast conservation including indications for re-do conservation surgery (A)
- The influence of local recurrences on survival (A)
- Nodal staging in patients with local recurrence after breast conservation and negative sentinel node biopsy (A)

6.1.5. Methods to correct poor aesthetic outcome after breast conservation

- Free fat grafting (S)
- Partial reconstruction (pedicle and perforator flaps) (S)
- The aesthetic outcomes after such procedures (S)
- Oncological safety of these techniques (S)

6.2. Mastectomy

6.2.1. Mastectomy indications and types

- Indications for mastectomy (absolute and relative) (B)
- Immediate and delayed reconstruction-indications and contraindications (A).
- Nipple-areola complex sparing mastectomy, indications, contraindications. Risk of and risk factors for complications (A)
- The risk of nipple involvement, the role of frozen section from central ducts (A)
- Evidence from trials comparing mastectomy and breast conservation (A)
- Psychological impacts of mastectomy (A, S)
- Bilateral risk reducing mastectomy (A)
- Contralateral risk reducing mastectomy (indications, outcomes) (A)
- Surgical complications of mastectomy and how to manage them (B).

6.2.2. Local recurrence after mastectomy

- The risk of and risk factors for local recurrences (A)
- The influence of radiotherapy on local recurrences (B)
- Presentations of local recurrence (B)
- The influence of adjuvant systemic treatment on local recurrences (A)
- Treatment of local recurrences after mastectomy including reconstructive methods in extensive recurrences (A)
- The influence of local recurrences on survival (A)

6.2.3. Breast reconstruction

- Implant reconstructions – indications, contraindications, complications, costs (A)
- Long-term sequelae of implant reconstruction: need for revision surgery (A), capsule formation (A), extrusion (B), infection (B), leakage (B), rupture (B), BIA-ALCL (A).
- Interactions and potential interactions of reconstructive surgery and oncology treatments (chemotherapy, radiotherapy, trastuzumab) (A)
- Acellular dermal matrices and synthetic meshes—biology, indications, contraindications, complications (A)
- Pedicle and perforator flap reconstructions (latissimus dorsi, LICAP, TDAP etc)—their indications, contraindications, complications, costs (S)
- Micro-vascular flaps – (DIEP, TRAM, SGAP, IGAP, TUG), their indications, contraindications, complications, costs (S).
- Factors influencing aesthetic outcome after breast reconstruction (S)
- Oncological safety of immediate and delayed reconstruction (A)
- Influence of reconstruction on quality of life (A)
- Surgical complications of reconstructive surgery (short, medium and long term), (A)

7. Axillary surgery

7.1. Sentinel node biopsy (SNB) in invasive cancer, DCIS and Paget's disease of the breast

- The sentinel node concept (B)
- The indications and contraindications for SNB (B)
- Sensitivity of SNB and factors influencing the sensitivity, (B)
- The role and outcome of SNB in patients with local recurrence and previous axillary surgery (A)
- The advantages, disadvantages and outcome of SNB before neoadjuvant systemic treatment (A)
- The advantages, disadvantages and outcome of SNB after neoadjuvant systemic treatment (A)
- The role of SNB outside the axilla, like in the internal mammary nodal basin (A)
- Radioisotope localization-advantages and disadvantages (B)
- Other localization methods (magnetic, indocyanine green) (A)
- Blue dye - advantages and disadvantages (B)
- The role of preoperative lymphoscintigraphy (conventional and SPECT) (A)
- The role of and methods for intraoperative assessment of sentinel node metastases (A)
- The histopathological methods in assessment of the sentinel node metastases (A)
- Other methods (such as OSNA) in assessment of the sentinel node metastases (A)
- Classification of tumour positive sentinel node findings (A)

- ❖ Management of patients with positive sentinel nodes (observation, axillary radiotherapy, axillary lymph node dissection) (B, A)
- ❖ The advantages and limitations of nomograms predicting further nodal involvement (B,A)
- ❖ Morbidity after sole SNB, and after further treatment of axilla with axillary radiotherapy and axillary lymph node dissection (B)
- ❖ Impact of isolated tumour cells, micro and macrometastases in prognosis and further axillary management (B)

7.2. Axillary lymph node dissection (ALND) in invasive cancer

- ❖ The indications and contraindications of ALND (B)
- ❖ Anatomy of the axilla (B)
- ❖ Advantages and morbidity of ALND in patients with axillary metastases (early, intermediate and late) (B)
- ❖ Alternative to ALND in low volume/low risk axillary disease (B)
- ❖ The role of preserving intercostobrachial nerves (A)
- ❖ Berg levels of the extent of ALND (B)
- ❖ Risk of lymphoedema, its classification and management (A)

7.3. Regional recurrences after axillary surgery (SNB, ALND)

- ❖ The risk of and risk factors for regional recurrences (B)
- ❖ The influence of radiotherapy on regional recurrences (B)
- ❖ The influence of adjuvant systemic treatment on regional recurrences (A)
- ❖ Treatment of regional recurrences after SNB and ALND (A)
- ❖ The influence of regional recurrences on survival (A)
- ❖ Assessment of operability (US/CT/MRI scan) and indicators for inoperability (A)

7.4. Axillary metastases with unknown primary

- ❖ Differential diagnosis and how to distinguish between axillary metastases from breast cancer and other malignancies (for example melanoma) (A)
- ❖ The role of imaging modalities, such as breast MRI (B)
- ❖ The role of pathology (A)
- ❖ The role of CT and PET-CT scans to rule out distant disease or other malignancy than breast cancer (B)
- ❖ Treatment (surgery, radiotherapy, systemic) (A)

7.5. Axillary management in the neoadjuvant setting

- ❖ Targeted axillary dissection (techniques, sensitivity, specificity, trials) (A)
- ❖ Use of different TAD markers (clips, iodine seeds, magnetic marker systems, ink marking) (A)
- ❖ Upfront SLND for the clinically negative axillary versus post NAC SLND (accuracy, sensitivity and specificity, trials) (A)

8. Adjuvant systemic therapies in breast cancer

8.1. Systemic chemotherapy

- ❖ Agents and regimens used in the adjuvant setting, including common side effects and contraindications (e.g. hair loss, myelosuppression, cardiac toxicity with some regimes) (A)
- ❖ Indications and contraindications (B)
- ❖ Internet based tools used to help in decision making (such as PREDICT), advantages, disadvantages of each (A)
- ❖ Multigene assays used to help for prognosis and decision-making (such as OncotypeDX, Mammaprint, PAM-50, Endopredict etc.) (A)
- ❖ Influence on local and regional recurrences and survival (B)
- ❖ Emerging data about adjuvant therapies after neoadjuvant therapy poor response (A)
- ❖ Cellular/molecular targets for chemotherapy, endocrine and targeted treatments, and their mechanisms (A)
- ❖ Common side effects and their management (A)
- ❖ Interaction with surgery, for example effect on wound healing, surgical delay before chemotherapy starts if surgical complications, risk of infections, risk of thrombosis (B)
- ❖ Local and regional recurrences and survival after adjuvant systemic chemotherapy (A)
- ❖ Agents in trials pipelines (S)

8.2. Systemic hormonal therapy

- ❖ Agents used (tamoxifen, aromatase inhibitors), duration of use (5 years, 10 years), strategies of AIs use (upfront, switching, late extended) (A)
- ❖ Indications and contraindications (B)
- ❖ Tools used to help in decision making (such as PREDICT), (A)
- ❖ Influence on local and regional recurrences and survival (B)
- ❖ Cellular/molecular targets for agents (the ER, aromatase enzymes) (A)
- ❖ Common side effects and their management (acute and long term) (A)
- ❖ Interaction with surgery, for example risk of thrombosis with tamoxifen (B)
- ❖ Bone density monitoring protocols and management in women on AIs (B)
- ❖ Use of ovarian suppression therapy to augment hormone blockage in certain subgroups: indications, evidence and adverse effects (e.g SOFT and TEXT trials). (A)

8.3. Adjuvant bisphosphonates

- ❖ Agents used, including route of administration and duration, indications and contraindications (A).
- ❖ Common and rare but significant (e.g. jaw necrosis) side effects (A)
- ❖ Evidence for benefit in the adjuvant setting (A)
- ❖ Impact on survival and rates of metastatic recurrence (A)

8.4. Adjuvant molecular targeted therapies

- ❖ Mechanism of action and receptor pathway and interactions (A)
- ❖ Agents: trastuzumab, pertuzumab, lapatinib, TDM-1, neratinib (A)
- ❖ Biology of Her-2 positive breast cancer (A)
- ❖ Regime, interval and duration of therapy and key supporting trials (A)
- ❖ Common adverse effects (A)
- ❖ Evidence of benefit on survival and local, regional and distant recurrence rates (B)
- ❖ CD4/6 inhibitors in adjuvant trials (A)
- ❖ mTOR inhibitors in adjuvant trials (S)
- ❖ PARP inhibitors in adjuvant trials (S)
- ❖ Immunotherapies in adjuvant trials (S)

- ❖ Denosumab in adjuvant trials (S)

9. Radiation therapy

9.1. Radiation therapy to the breast

- ❖ Indications and contraindications (B)
- ❖ Influence on local and regional recurrences on survival (B)
- ❖ Most common side effects and their management (early and late, including risk of second cancers including angiosarcoma) (B)
- ❖ Partial breast radiation therapy: techniques, indications, contraindications, advantages, disadvantages (A)
- ❖ Interaction with surgery including the effect on wound healing, breast fibrosis and shrinkage, breast lymphoedema (A)
- ❖ Radiation therapy and breast reconstruction (A)
- ❖ Indications for and impact of boost to the primary tumour bed (A)
- ❖ Use of marker clips to identify primary tumour bed for boost volume localization (B)
- ❖ Impact of Oncoplastic surgery on identification and size estimation for the target volume for radiotherapy boost (A)
- ❖ Modern fractionation regimes (B)
- ❖ Modern and alternative irradiation techniques to reduce the toxicity (IMRT, DIBH, IPRT, prone, lateral)
- ❖ Awareness of the current research interest in neoadjuvant radiotherapy in current trials (A)

9.2. Radiation therapy to the axilla

- ❖ Indications and contraindications (B)
- ❖ Adverse effects in the short and longer term including rates of lymphoedema (A)
- ❖ Interaction with surgery (pedicle fibrosis for subsequent axillary based pedicle reconstruction), fibrosis (A)
- ❖ Trial data comparing axillary RT with axillary surgery (A)
- ❖ Lymphoedema rates (B)

9.3. Radiation therapy to the chest wall

- ❖ Indications and contraindications (B)
- ❖ Adverse effects in the short and longer term (A)
- ❖ Interaction with reconstructive surgery (A)
- ❖ Trial data comparing RT with no RT in terms of local recurrence rates and survival (A)

9.4. Radiation therapy for palliation of locally advanced and metastatic disease

- ❖ Indications and contraindications for local and regional radiation therapy (B)
- ❖ Indications and contraindications for radiation therapy for distant metastases (B)
- ❖ Oligometastatic disease: definition; role of locoregional and metastases-directed radiation therapy (B)
- ❖ Role of primary radiotherapy in patients who are unfit for surgery (A)

10. Breast cancer in special groups

10.1. Breast cancer in young women

- ❖ Need for and indications for genetic counselling/testing (B)
- ❖ Imaging limitations in younger women (poor mammographic sensitivity) (B)
- ❖ Variation in tumour subtype, stage and biological behaviour (A)
- ❖ Local, regional and systemic treatment and how these may need to be modified in younger women (e.g. use of RT boost) (A)
- ❖ Local, regional and distant recurrence rates in younger women (A)
- ❖ Survival variance with age (A)
- ❖ Fertility, pregnancy and contraception during and after breast cancer (A)
- ❖ Breast cancer in pregnancy and how to manage disease in all 3 trimesters (A)
- ❖ Premature menopause due to breast cancer treatment and how to manage this, (B)
- ❖ BRCA associated cancers: presentation, type and management (A)
- ❖ Psychological impact (A)

10.2. Breast cancer in the elderly

- ❖ Tailoring local, regional and systemic treatments according to co-morbidities, frailty, cognitive impairment, polypharmacy and patient preference (A)
- ❖ Local, regional and distant recurrence rates in older women (A)
- ❖ Survival (overall and breast cancer specific) in older women (A)
- ❖ Treatment morbidity in older age groups (A)
- ❖ Adapted techniques and fractionation schemes to age and PS

10.3. Male breast cancer

- ❖ Risk factors for male breast cancer (A)
- ❖ Incidence, age specific incidence and prognosis (A)
- ❖ Need for genetic counselling/testing (A)
- ❖ Surgical treatment and how this may differ in males (B)
- ❖ Adjuvant treatment and how this may differ in males (B)
- ❖ Local, regional and distant recurrence rates (A)
- ❖ Survival (A)
- ❖ Psychological impact (A)

10.4. Other breast malignancies-incidence, diagnosis and treatment modalities

- ❖ Malignant and borderline phyllodes tumour (A)
- ❖ Sarcomas: primary and secondary (radiation induced) (A)
- ❖ Metastases from other malignancies (A)
- ❖ Lymphoma in the breast or axilla (A)
- ❖ Breast Implant Associated Anaplastic Large Cell Lymphoma (BIA-ALCL) (A)

11. Atypias and in situ disease

11.1. Atypias (B3 lesions)

- ❖ Atypical ductal hyperplasia, atypical lobular hyperplasia, classical lobular neoplasia in situ (cLCIS), pleomorphic lobular neoplasia in situ (pLCIS), columnar cell hyperplasia, papilloma, radial scar: awareness of pathological appearance, diagnostic

criteria, mode of presentation and risk of malignant transformation (B)
- ❖ The prevalence of associated in situ or invasive cancer when risk lesions detected in core needle/vacuum assisted biopsy (B)
- ❖ Role of vacuum assisted excision (A)
- ❖ Appropriate indications for surgery in the management of atypias (B)
- ❖ Concomitant and later breast cancer risk of these lesions (B)
- ❖ Role of chemoprevention and enhanced screening in risk management (A)
- ❖ Risk reducing surgery indications (A)

11.2. DCIS

- ❖ Epidemiology: incidence, risk factors, prognosis (B)
- ❖ Classification of DCIS (encysted papillary, low, intermediate and high grade, Paget's) (B)
- ❖ Pathological criteria for the diagnosis of DCIS (B)
- ❖ Biological characteristics (ER positive, Her-2 positive, array based) (A)
- ❖ Incidence and role of screening. Screen detected versus symptomatic disease characteristics and prognosis (A)
- ❖ Treatment and prognosis of DCIS (see below in various treatment sections) including surgery, radiotherapy rates of recurrence and prognosis (B)
- ❖ Appropriate margins of resection (B)
- ❖ Rates of invasive and in situ recurrence and risk factors of recurrence (B)
- ❖ DCIS prognostic/risk scores (Van Nuy's, genetic arrays, on line algorithms) (A)
- ❖ Debate about over treatment and over-diagnosis in the screening setting and in the older women. Aware of ongoing trials (LORIS, LORD, COMET) (A)

12. Psychosocial issues and follow-up care. 'Survivorship' issues

- ❖ The need of psychological or social support in women with newly diagnosed breast cancer and during the entire course of disease (B)
- ❖ The role of follow-up care in breast cancer survivors: detecting recurrences, influence on survival, follow up protocols and methods (B)
- ❖ Methods of follow-up and the frequency of follow-up (B)
- ❖ Conservative and surgical management of lymphoedema (B, A)
- ❖ Chronic pain and sensory disorders after breast cancer treatment (A)
- ❖ Endocrine issues in breast cancer survivors, e.g. menopause symptoms and bone health, especially in the very young patient, including hot flushes, genitourinary syndrome of the menopause, premature osteoporosis (A). Role of menopausal hormone replacement therapy (systemic or topical vaginal creams) including risks and benefits (A). Role of menopausal hormone replacement therapy after risk reducing oophorectomy in BRCA gene carriers (A)
- ❖ Depression, anxiety and fear of recurrences (A)
- ❖ Cognitive disorders (A)
- ❖ Sexuality including psychosexual and physical issues such as early menopause/antioestrogen induced loss of libido, depression, anxiety, loss of confidence due to body image changes, genitourinary syndrome of the menopause. Awareness of the above, how to diagnose and manage (A)
- ❖ Fertility issues and how to manage them (A)

13. Benign breast diseases and conditions

13.1. Gynaecomastia

- ❖ Aetiology (pubertal, obesity, hormonal, alcohol and liver disease, therapeutic or recreational drug induced, genetic etc) (B)
- ❖ Assessment of diagnosis and severity (A)
- ❖ Management (reassurance, removal of underlying cause if possible, surgery for symmetry, surgery to reduce, liposuction, en bloc resection techniques, role of drug therapy) (A)

13.2. Nipple discharge

- ❖ Aetiology and presentation (B)
- ❖ Investigation and assessment (imaging and cytology – accuracy, sensitivity and specificity) (B)
- ❖ Role of microdochectomy or total duct excision (B)

13.3. Fibrocystic change

- ❖ Aetiology and presentation (B)
- ❖ Management (B)

13.4. Cyclical and non-cyclical mastalgia

- ❖ Aetiology and presentation (B)
- ❖ Management (B)

13.5. Breast hypertrophy

- ❖ Aetiology and incidence (A)
- ❖ Management strategies (A)

13.6. Puerperal and periductal mastitis

- ❖ Aetiology (B)
- ❖ Microbiology and antimicrobial therapy (B)
- ❖ Management (B)

13.7. Breast fistula

- ❖ Aetiology and incidence (B)
- ❖ Management strategies (B)

13.8. Other rare forms of mastitis

- ❖ Granulomatous mastitis role of clinical history, laboratory tests, cultures, microscopy in diagnosing the aetiology (B)
- ❖ Mondor's disease (A)
- ❖ Lymphocytic lobulitis (A)
- ❖ Tuberculosis (B)
- ❖ Plasma cell mastitis (A)
- ❖ Non-puerperal chronic periductal mastitis and fistula

13.9. Fibroadenoma

- Clinical and radiological features (e.g. Stavros' criteria), indications for biopsy (B)
- Natural history variant (tubular adenoma, juvenile fibroadenoma, lactating adenoma, myxoid fibroadenoma) and analogue (benign lesions with similar clinical and/or imaging features: nodular pseudoangiomatous hyperplasia, hamartoma) lesions; differences from (benign) phyllodes tumour (A)
- Management (A)

13.10. Benign phyllodes tumour

- Clinical, pathological and radiological features (B)
- Natural history (B)
- Management (B)

13.11. Macrocysts (simple, complicated, and complex)

- Aetiology, incidence and presentation (B)
- Management of simple cysts and risk factors for underlying malignant pathology (B)

13.12. Papilloma

- Multiple papilloma: association with nipple bleeding and discharge, increased risk of malignancy (A)
- Single papilloma: symptoms and signs, management (B)
- Papillary lesions (the morphologic spectrum and main differential diagnostic features: papillomas vs encapsulated papillary carcinoma, solid papillary carcinoma) (A)

14. Aesthetic breast surgery, breast implants and other medical implantable devices/materials

14.1. Breast implants

- Implant types: silicone, saline, polyurethane, surface (smooth or textured), round or anatomic shape, expandable or fixed volume (A)
- Capsule formation: presentation, rates with time, risk factors, classification (Baker), investigation, management (A)
- Rupture: presentation, rates with time, variation by implant type, causes, classification (intracapsular, extracapsular), adverse effects, investigation, management (A)
- Extrusion: presentation, rates with time, risk factors, management (A)
- Malposition: Assessment, management strategies. (A)
- Breast Implant Associated Anaplastic Large Cell Lymphoma (BIALCL): risk factors, incidence, presentation, diagnostic evaluation, management and prognosis (A)
- Implant surgery: indications, contraindications, preparatory work up, choice of incision, choice of implant type, choice of implant position. (A)
- Outcomes: short, medium and long term adverse events and patient satisfaction (A)
- Psychological issues related to breast aesthetics and augmentation (A)

14.2. Breast reduction and mammoplasty

- Indications, contraindications and risk factors for adverse outcomes (A)
- Techniques (pros and cons, specific indications for different techniques (A)
- Technical aspects of surgery and aftercare (A)
- Outcomes: short medium and long term complications and patient satisfaction (A)
- Impact on breast feeding and nipple sensation (A)

14.3. Acellular dermal matrices and implantable meshes

- Different types of material properties and handling characteristics: plastic mesh versus biological material (xenograpft, allograft) (A)
- Indications, contraindications (A)
- Safety and approvals. (A)
- Complications: rates and risk factors. Long term outcomes (A)
- Technical aspects of use: selection of technique, risks associated with individual techniques, risk factors for adverse outcomes (A)
- Placement (sub-pectoral sling versus pre-pectoral pocket). (A)
- Revision surgery techniques (A)
- Interaction with radiotherapy (A)

14.4. Autologous fat grafting

- Techniques and theoretical basis (A)
- Oncological and medical safety (A)
- Donor site and recipient site morbidity (A)
- Indications and contraindications (A)
- Pre-operative preparation and counselling (A)
- Aftercare (A)

15. Advanced breast cancer

15.1. Locally advanced

- The definition of locally advanced breast cancer (B)
- Primary systemic treatment in locally advanced breast cancer (endocrine, chemotherapy and targeted treatments) (A)
- Management of neoadjuvant (baseline scans and monitoring response, MRI), use of marker clips (A)
- Timing of axillary surgery (A)
- Inflammatory breast cancer (diagnosis, prognosis, management) (B)
- Surgery in patients with locally advanced breast cancer (A)
- The role of radiotherapy in locally advanced breast cancer (A)
- Response rates after primary chemotherapy (NAC) by tumour subtype (A)
- Extent of surgery after partial or complete pathological response (A)
- Pathological classification of response (A)
- Local recurrence rates after conservation surgery post NAC (A)
- Survival rates comparing primary chemotherapy (NAC) and adjuvant chemotherapy (A)

15.2. Treatment of disseminated (stage IV) breast cancer

- Palliative surgical procedures in disseminated (stage IV) cancer, for example palliative mastectomy, treatment and prevention of

pathological fractures, spinal cord stabilisation, recent research into liver resection in oligometastatic disease. (A)
- ❖ Removal of primary tumour in disseminated breast cancer-influence on survival (A)
- ❖ The oligometastatic disease – cure intent (A)
- ❖ Removal of liver or pulmonary metastases-influence on survival (A)
- ❖ The role palliative radiotherapy in disseminated breast cancer (B)
- ❖ Palliative treatments to relieve symptoms like pain and nausea (B)
- ❖ Social, psychological and spiritual support in patients with disseminated breast cancer (B)
- ❖ Management of cerebral metastatic disease: steroids, stereotactic radiosurgery, gamma knife, surgery, whole brain RT, systemic therapies (S).

15.3. Systemic agents used in the advanced setting

- ❖ Chemotherapy (A)
- ❖ Antioestrogens (A) (SERMs, aromatase inhibitors)
- ❖ CD4/6 inhibitors (A),
- ❖ Fulvestrant (A)
- ❖ Denosumab (A)
- ❖ GCSF (A)
- ❖ Immunotherapy (A)
- ❖ PARP inhibitors (A)
- ❖ mTOR inhibitors (A)
- ❖ Her-2 targeted agents (A)
- ❖ Analgesia, anti-emesis (B)

16. Research and evidence based medicine

- ❖ The p-value and the use of confidence intervals and their relation to the sample size; the importance of power analysis and sample size calculation in trials (B)
- ❖ The difference between statistical and clinical significance (B)
- ❖ Types of bias and how to avoid them (B)
- ❖ Prospective and retrospective study setting (B)
- ❖ Study settings (randomized, prospective non-randomized, case-control, retrospective etc) (B)
- ❖ Definitions of phase I, phase II, phase III and phase IV trials (B)
- ❖ Definitions of absolute and relative risk reduction or advantage (B)
- ❖ Levels of evidence and how these influence treatment recommendations (B)

17. Practical knowledge and skills curriculum

The following is a list of the practical skills that are required of a fully trained breast surgeon. Acquisition of these skills is estimated to take 2 years of full time training (for someone with basic general, gynaecological or plastic surgery competencies) and is divided into a number of discrete subject areas. Ideally candidates should spend time within multidisciplinary specialist disciplines (such as radiology, pathology, oncology) to achieve a full range of competencies but it is accepted that this may not be possible.

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.

17.1. Radiology

Candidates should spend some time observing and learning about a range of procedures listed below:

- ❖ Breast imaging and percutaneous needle biopsies:
- ❖ Counsel patients regarding breast imaging methods and percutaneous needle biopsies: Indications, limitations and how these are performed
- ❖ Evaluate mammograms, ultrasound imaging and breast MRIs
- ❖ Perform core needle biopsy and punch biopsy (Fine needle biopsy is rarely used but may also be of value in some settings and centres)
- ❖ Knowledge regarding preoperative and postoperative staging by imaging:
- ❖ Indications, limitations and how these are performed
- ❖ Knowledge of axillary staging, US imaging of nodes and indications for biopsy
- ❖ Understand diagnostic staging: indications for CT imaging, bone scans, CT-PET in different breast cancer stages. Ability to interpret images at a basic level.

LOG BOOK:
Manage cases and review:
8 screening mammograms.
20 diagnostic/symptomatic mammograms.
10 breast MRIs.
Breast ultrasound: 15 (hands on) or 30 (observation only).
Percutaneous procedures: 30 including cyst aspiration, percutaneous core needle sampling, palpation or image guided, seroma aspiration with/without drain placement, percutaneous abscess drainage with/without drain placement.

17.2. Pathology

Candidates should follow specimens through pathology to understand specimen marking, cut up and processing to optimise their collaboration with pathology.

- ❖ Understand handling and different techniques for breast pathologic analysis (Frozen section, routine staining, immunohistochemistry)
- ❖ Knowledge about tumour margin assessment
- ❖ Nodal evaluation
- ❖ Sentinel lymph node
  - o Nodal dissection specimens
- ❖ Pathologic staging of tumours
- ❖ Intraoperative analysis

LOG BOOK: Observe or discuss with a pathologist.
8 cancer case sign outs.
(8 frozen or intraoperative evaluations, may not be applicable in all units).
8 benign and/or high risk lesions.

17.3. Clinical session types

- ❖ Participate in results clinics including 'breaking bad news' and initial therapy decision-making
- ❖ Participate in preoperative clinics including oncoplastic/reconstructive clinics
- ❖ Participate in breast cancer–specific operating lists
- ❖ Participate in diagnostic clinics for both benign and malignant diseases
- ❖ Participate in screening clinics

- ❖ Participate in breast oncoplastic and reconstructive clinics, ideally jointly with plastic surgeons or surgeons who undertake primary reconstruction
- ❖ Participate in familial risk assessment clinics
- ❖ Participate in postoperative clinics (assessing wound healing, primary aesthetic outcome and recovery from surgery, is further surgery required, or follow-up etc)
- ❖ Note: it is not expected that special clinics will exist for all of the above, but the clinics attended should offer the above as part of their remit (i.e. may be a generic breast clinic at which results are given or diagnostic tests performed etc).

17.4. Surgical management of the breast and axilla

- ❖ Diagnostic excisional biopsy, with/without wire/seed/ultrasound localization
- ❖ Central/Major/Terminal duct exploration and excision
- ❖ Breast conservative surgery with/without image-guided localization (wire/seed/ultrasound/magnetic)
- ❖ Oncoplastic breast conservative surgery-level I and II techniques
- ❖ Mastectomy:
  - Total mastectomy
  - Skin-sparing mastectomy
  - Nipple/areolar sparing mastectomy
    (Candidates should understand the techniques to ensure skin viability: careful plane dissection, careful tissue handling, high risk individuals where extra care is required such as smokers, diabetics and the obese, novel techniques for skin viability assessment, use of PICO/vac dressings in high risk cases)
- ❖ Lymph Node excision
- ❖ Axillary sentinel node biopsy using a recognised technique such as:
  - Blue dye
  - Radioisotope
  - Both
  - Other techniques for SLN (magnetic, iodine seed, US localization, indocyanine green)
- ❖ Axillary node dissection
- ❖ Breast asymmetry after breast conservation
- ❖ Awareness of the management techniques for repair of chest wall defects following resection of locally advanced breast cancer (it is accepted that these procedures are rare and direct experience may be difficult to obtain).
- ❖ Lymphoedema prevention and treatment

17.5. Surgical management after neoadjuvant treatments

- ❖ Indications for neoadjuvant systemic therapy, specifically with regards to optimisation of breast conserving therapy
- ❖ Breast conservative surgery with/without imaging guided support
- ❖ Targeted excision of axillary clipped node (guided by seed, wire, ultrasound, magnetic marker)

17.6. Surgical management/counselling for genetic syndromes

- ❖ Family history clinic attendance and skills in performing risk assessment (use of risk assessment tools such as IBIS II etc) and counselling
- ❖ Understanding of the surgical, screening and other risk management options for:
- ❖ BRCA 1
- ❖ BRCA 2
- ❖ P53 mutations (Li Fraumeni)
- ❖ Cowden's syndrome
- ❖ PALB2
- ❖ CHEK 2
- ❖ Knowledge of other panels

LOG BOOK

1. Must have attended at least 5 genetic/familial risk assessment clinics
2. Must have followed through at least 5 risk reduction cases as they undergo counselling and surgery (and be signed off as such by their trainer).

17.7. Reconstruction techniques

- ❖ Tissue expander placement
- ❖ Use of acellular dermal matrices or other biological or non biological meshes
- ❖ Permanent silicone implant placement
- ❖ Pedicle flaps for breast reconstruction:
  - Latissimus dorsi
  - TRAM
- ❖ Mastopexy for symmetry
- ❖ Therapeutic mammoplasty
- ❖ Fat grafting and lipofilling
- ❖ Nipple grafting
- ❖ Nipple reconstruction
- ❖ Autologous free flaps (observation only)
- ❖ Revision procedures following on from the above

LOG BOOK:

1. Attended at least 40 regular, at least weekly, pre- and post-surgical multidisciplinary case management meetings
2. Attended at least 70 outpatient clinics during a regular 1–2 year work on a surgical unit with at least 150 primary breast cancer cases a year, according to the local organization practise, including:
   A. Diagnostic, preoperative and postoperative clinics
   B. Clinics with the radiation/medical/clinical oncologist at which the decisions on adjuvant and neoadjuvant therapy are made.
   C. Follow-up clinics at which the side-effects of surgery and radiation can be assessed
   D. Clinics at which the management of women with advanced disease (both locally advanced and metastatic) takes place
   E. Genetic/family historic clinics, in which women at risk are advised
   F. Clinics at with oncoplastic and reconstructive counselling and planning are made
3. Personally performed or assisted as follows

Personally performed

- at least 40 operations on benign or borderline lesions
- at least 80 full axillary lymph node dissections or sentinel node biopsies, including
  - at least 30 full ALND
  - at least 30 SNB
- at least 100 breast cancer operations, including:

- at least 40 breast conserving surgeries, including at least 5 oncoplastic level I - II breast remodelling procedures
- at least 40 mastectomies, including at least 10 NAC- or skin-sparing mastectomies

Assisted or observed:

- at least 5 observed or assisted oncoplastic level II breast remodelling procedures
- observed or assisted at 10 immediate and delayed total breast reconstructions using both implants and autologous tissue.

17.8. Medical oncology

Candidates should attend some medical oncology clinics during their training to gain insight into the following:

- ❖ Management of common complications of chemotherapy administration
- ❖ Use of gene signatures to direct systemic treatment recommendations
- ❖ Management of hormone receptor positive breast cancers (early and late stage)
- ❖ Management of hormone receptor negative breast cancers
- ❖ Management of Her2 positive breast cancers
- ❖ Management of cancers by stage:
  - T stage
  - Node negative
  - Node positive
- ❖ Systemic treatment for the de novo stage 4 patient

LOG BOOK

Observe: 5 new adjuvant chemotherapy for early breast cancer consultations by oncologists.

Observe: 5 new adjuvant radiotherapy for early breast cancer consultations by oncologists.

Observe: 5 new recurrent or metastatic disease consultations by oncologists.

Observe: 5 Follow up visits during oncology treatment.

Observe: 2 new consultations relating to fertility preservation in women about to commence breast cancer therapy.

Manage secondary effects of breast cancer therapy including:

Lymphoedema, acute radiation dermatitis, genitourinary syndrome of the menopause, depression, hot flushes.

17.9. Radiation oncology

Candidates should attend some radiation oncology clinics and radiotherapy planning sessions to give them insight into the following:

- ❖ Radiation biology principles
- ❖ Radiotherapy indications and contraindications:
  - Breast conservation: Whole breast radiation (hypofractionated)
  - Post-mastectomy radiation
  - Regional radiotherapy
  - Primary radiotherapy
- ❖ Management of common radiation complications
  - Acute radiation dermatitis, including use of steroid creams and routine skin health measures
  - Lymphoedema
  - Chronic fibrosis
  - Interaction with implants
  - Secondary cancers (lung, angiosarcoma)
  - Poor wound healing
- ❖ Partial breast radiation techniques:
  - Interstitial brachytherapy
  - External beam partial breast
  - Intraoperative radiation therapy
- ❖ Radiation therapy for metastatic disease:
  - Distant Treatment
  - Palliation

LOG BOOK

15 new breast cancer consultations to discuss RT.

5 observations of radiotherapy administration and planning sessions.

15 f/u visits after radiotherapy treatment.

(10 partial breast irradiation (brachytherapy and or intra-operative RDT) if available).

18. Research

Candidates must have a basic ability to critically appraise evidence based research so they may incorporate new findings into clinical practice and keep up to date. BRESO is aware that undertaking primary research is not possible for all surgeons but a basic level of knowledge is required to keep skills and practices up to date. The following is a recommended knowledge and skills base:

- ❖ Protection of Human Subjects: understanding of the ethical and legislative framework relevant to the conduct of research
- ❖ Inclusion of diverse study populations
- ❖ Basic Statistical Analysis such as understanding means, medians, standard deviation, and simple comparative statistics.
- ❖ Institutional Review (Ethics committee) Board process and application
- ❖ Critical Evaluation of Study Design
- ❖ Assessment of Clinical Trial, Defining levels of Evidence/meta-analysis
- ❖ Defining study populations, sample size, power
- ❖ Basic Survival Analysis
- ❖ Assessment of Health Related QOL
- ❖ Fundamentals of Health Outcomes Studies

CV requirements: To have presented an audit or other piece or research or service evaluation at a local, national or international meeting as evidence of research engagement.

19. Communication skills

Good communication using lay terminology and expressed with empathy and sensitivity is key to good breast care. Candidates should understand the concept of shared decision making and have the skills to be able to support this in their practice.

Formal attendance at a communication skills workshop is best practice but may not be readily available.

- ❖ Communication with and education of the non-medical community (patients and patient groups, managers, students, other professional colleagues)
- ❖ Communication and interaction with patients, in particular breaking bad news, treatment counselling, risk counselling and skills in identification of anxiety and depression
- ❖ Communication and interaction with cancer support groups
- ❖ Communication with and education of non-oncologic physicians

- ❖ Understand and be able to explain the risks and benefits of screening, diagnostic tests, and treatments of cancer
- ❖ Able to identify patients who may benefit from formal psychological support and where this may be accessed locally

20. Optional module-autologous tissue transfer-aesthetic breast surgery

- ❖ Free or pedicled or perforator flaps for breast reconstruction:
  - o DIEP
  - o Gluteal
  - o TUG
  - o LD
  - o Perforator flaps or various types
- ❖ Cosmetic breast surgery
  - o Breast augmentation
  - o Cosmetic breast reduction (benign)
  - o Revision augmentation
  - o Counselling for cosmetic procedures

21. Additional training

Requirements include:

1. Attend two international breast cancer congress during training
2. Attend 2 international breast cancer educational courses
3. Work in a Unit with a properly constituted MDT

22. Approval criteria for tier 2 training centres

The training process for highly specialised breast cancer professionals, in particular breast cancer surgeons, equipped with the mandatory multidisciplinary knowledge and skills for modern breast cancer care, must be carried out in high quality, certified breast cancer centres.

Many hospitals claim to have specialist breast cancer services but it is known that only a few are well organized into Multidisciplinary Specialised Breast Cancer Units and the quality of each individual service remains often uncertain.

For this reasons training institutions to be in line with the BRESO project should fulfill the following minimal requirements in order to enable fellows to acquire advanced knowledge and skills in the surgical and multidisciplinary management of breast cancer:

1. Being accredited as a Certified Breast Center by an International **Quality Certification** process such as the EUSOMA or equivalent (e.g. German DKG/DGS); considering the inhomogeneous distribution of quality assurance initiatives across European territories, as an alternative some form of Quality Certification at national level can be accepted provided that is characterized by a process of accreditation based on fulfillments of mandatory requirements and continuing audit by third parties.
   Such National Certification systems, to be considered in line with the project, must include mandatory requirements in terms of:
   - Critical mass of at least 150 new cases/year per 250.000 inhabitants.
   - Core team, which should meet specific requirements in terms of composition and specialist training of its members
   - Clinical lead
   - Multidisciplinary case managements meetings
   - Protocols
   - Data management and quality assurance
   - Internal and external auditing
   - Facilities/services/clinics
   - Screening program
   - Associated services and personnel
   - Information to patients and waiting time
   - Collaboration with patient's representatives
   - Research activity
   - Continuing education program
   - Teaching

   Once a unified quality certification program, according to international standards for certification bodies, will be set in place across Europe, this will become the only mandatory certification required for an Institution to be accredited as Breast Surgery Training Center.
2. Being based on **multidisciplinary training and multidisciplinary care.**
   The role of the breast surgeon has changed and requires a clear understanding of the complex interactions among the different specialties involved in multidisciplinary approach to breast cancer management.
   The core team members of an accredited training centres for BC specialists, besides reaching the minimum standards in terms of number of treatments provided and time spent in the field of breast cancer, must also demonstrate to have gone through a dedicated specialist multidisciplinary training and multidisciplinary working experience.
   Multidisciplinary team working requires complex interactions and collaborations between specialists, who not only have to work with a common purpose but must have gone through specific training that goes beyond that of the specialty of origin, ensuring an overlap of knowledge. Each specialist must be aware of the working field of his/her colleagues and the most important aspects of the scientific evidence in those fields. Only this way he/she will be able to sit at the multidisciplinary table contributing with informed opinions to make aware therapeutic indications through a critical discussion.
   An accredited breast surgery training center must organize rotations for the trainees in all fields of breast cancer care, in order to allow the development of the necessary across-the-board knowledge and acquisition of all the management strategies to ensure optimal patient care.
3. Be **part of an international network** of referral clinical centres exclusively dedicated to the diagnosis and treatment of breast cancer (e.g. Breast Center Network).
   Such networking promotes interactions, collaborations and benchmarking activities improving breast cancer care and allowing connections among specialist working in the field.
   An accredited training center must offer the trainees opportunities for further international working experiences and collaborations.
   A directory of specialist breast units offers relevant information on centres with specific expertise in diagnosis, state-of-the-art treatment, and care of breast cancer in an attempt to broadcast international standards for multidisciplinary breast cancer care and to allow breast cancer patients to get easier access to fully equipped, quality assured, competent and comprehensive care.
4. **Academic endorsement:**
   Either as a University Hospital or through an academic affiliation the accredited training center must be recognised academically and issue a certificate at the end of the training module.

The working environment within the training institution should be such that students' rotations are in place, giving the breast surgery trainee the opportunity for practical and theoretical teaching activity.

5. Demonstrate to contribute to the continuous education of staff members through the implementation of **research and educational programs.**

   During the attendance of a practical module, the trainee must have the opportunity to participate in multiple teaching conferences internally organized throughout the year at the training Institution, some examples of which are listed here

   - Breast Education Conferences
   - Multidisciplinary Care Conferences
   - Breast Cancer Clinical Research Update/Journal Clubs
   - Yearly Institutional breast cancer meeting with national or international relevance

When we try to define the minimal requirements for standardized level of training, expertise and practice across Europe, we must keep in mind we are aiming at defining a program that can be undertaken all across Europe and must be suitable for different realities.

The course should be organized in **modules that can be completed over time,** not necessarily in one single center, but even in different accredited institution across Europe.

This should ease the attendance of those professionals who have been practicing for a long time and are caught up in everyday clinical practice (probably not capable to undergo a true fellowship program with the duration of 1 or 2 years) minimizing working leaves, expenditures and travelling.

We are not trying to develop the Breast-SUPER-surgeon, who is capable of everything and stands alone in the O.R., but the aim should rather be to obtain **solid basic knowledge** in all fields of breast cancer care and develop good practice in fundamental **surgical techniques** (conventional and oncoplastic). The breast surgeon should demonstrate an **"across the board" preparation** and capacity to sit at the MDM table, having the required **multidisciplinary** knowledge and skills.

23. Recommended further reading

Breast Cancer Management for Surgeons. A European Multidisciplinary Textbook

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Global Curriculum in Research Literacy for the Surgical Oncologist. Are C, Yanala U, Malhotra G, Hall B, Smith L, Wyld L, Cummings C, Lecoq C, Audisio RA, Berman RS. EJSO and Annals of Surgical Oncology. 2017 (e pub).

St Gallen consensus statements for 2019, 2017 and 2015.

UK National Institute for Clinical Excellence (NICE) Guidelines relevant to Breast Practice.

Familial breast cancer
Pertuzumab
Herceptin
Early and locally advanced breast cancer
Bisphosphonates

National Comprehensive Cancer Network Guidelines (NCCN) for Breast Cancer, 2019. NCCN.Org.

Transforming Breast Cancer Together: European elections manifesto 2019 seizing the opportunities for breast cancer patients. Cardoso F, Bușoi CS, Cattaneo I, Decise D, Cardone A, Filicevas A, Gentile E, Wierinck L, Knox S, Sebastiani S, Terrasanta C, Ujupan S, Ventura R, Wilson B, Rubio IT. Breast. 2019 Dec; 48:54–57. https://doi.org/10.1016/j.breast.2019.09.003.

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Appendix

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Partner Societies

European Society for Radiotherapy and Oncology (**ESTRO**)

European Society for Medical Oncology (**ESMO**)

European Society of Breast Imaging (**EUSOBI**)

European Society of Pathology (**ESP**)

The European Working Group for Breast Screening Pathology (**EWGBSP**)