What is Breast Cancer?

Breast cancer develops from cells in the lobules or ducts of the breast. Invasive cancers (C50), which have invaded through the basement membrane surrounding lobules or ducts, are the most important category of this cancer. They account for approximately 94% of all diagnosed breast tumours in the South West*. 90% of invasive cancers are ductal carcinomas or of No Special Type and around 8% are lobular carcinomas. The remaining rarer cancers are of several special types, but tend to have better prognoses.

The UK has a higher incidence of breast cancer compared to other European countries.

Cancer cells which have not spread beyond the confines of the duct or lobule are non invasive in situ tumours (D05) and account for the remaining 6%. Roughly 90-95% of in situ disease is ductal carcinoma in situ (DCIS) and this has a very high chance of turning into invasive breast cancer if left alone. The rarer type is lobular carcinoma in situ which is less likely to turn into invasive cancer.

Benign breast lumps are common and include benign thickening of normal breast tissue, fibroadenomas, cysts, lipomas, fat necrosis, haematomas, abscesses and galactoceles.

*South West Cancer Intelligence Service registry data, 1996-1998 figures.
**Diagnosis**

The diagnosis of breast cancer is made by *triple assessment*. This consists of 1. clinical examination by a specialist, 2. imaging and 3. needle biopsy. The reason for using three methods is that the cancer may not be detectable by one or more of the modalities so the sensitivity of detection is thus increased. The main method of imaging is mammography, but 10-15% of cancers don’t show on mammograms. These are mainly lobular cancers or cancers in young women. Ultrasound is used more and more both for diagnosis and for guiding biopsy needles, it probably has a higher sensitivity than mammography. The needle biopsy method used may be a *fine needle aspiration* for cytology or, increasingly now, a *core biopsy*, which gives more information and may be more accurate. Occasionally a surgical biopsy has to be performed to make the diagnosis.

**Stage**

The stage of a cancer describes the extent of disease. The widely used TNM staging system (Tumour Nodes Metastases) divides breast cancer into stages 0 to IV. This is a fairly crude system which divides cancer into bands, but is very useful for studying the epidemiology of breast cancer. When deciding which treatments to recommend to a patient with early breast cancer, there are several prognostic factors which are taken into account. The most important of these are the tumour grade (a measure of histological differentiation, the Bloom and Richardson system which gives a grade between I and III), the tumour size and whether the axillary nodes are involved with tumour cells. Other factors include age, lympho-vascular invasion (cancer cells in small surrounding vessels), the presence of extensive *in situ* disease around the cancer, the oestrogen receptor status and the levels of other markers such as Cerb-B2 or Her 2.

A commonly used overall indicator of prognosis in clinical practice is the *Nottingham Prognostic Index* which combines the grade of differentiation, the axillary node involvement and the size of the cancer in a formula. This gives a weighting to each of these three factors to produce a number which can be used to divide patients into prognostic groups, usually five, from excellent through to poor. This information can then be used in conjunction with the woman’s age and the other prognostic factors to decide on further treatments.

**Treatment**

*Carcinoma in situ* (stage 0) - Close observation is the preferred option for patients with lobular carcinoma *in situ* (LCIS), which is usually found by chance in a biopsy. It can probably be regarded as a risk factor for the subsequent development of invasive breast cancer in either breast and there is evidence that tamoxifen can reduce this risk (there are ongoing trials to confirm this). Radical surgery is rarely used. The treatment of ductal carcinoma *in situ* (DCIS) if it is limited in size, is by conservative surgery (local excision) without excision of the axillary lymph nodes. If more extensive or if involving more than one quadrant of the breast, then mastectomy with or without reconstruction is recommended. After surgery, radiotherapy or tamoxifen may be recommended as evidence is emerging that these may reduce recurrence in certain types of DCIS.

**Stage I and II cancer** – These stages are referred to as *early breast cancer* (mobile tumour less than 5 cm and no fixed nodes). The preferred method of treatment is by conservative surgery to remove the cancer with a reasonable margin along with some of the axillary lymph nodes for staging purposes. Trials are taking place into just removing the sentinel node (the first node through which lymphatic fluid flows from the cancer) to try to reduce problems in the axilla and arm post operatively. A mastectomy may be required if there is for example a large cancer in a small breast or it is sited just behind the nipple. Reconstruction of the breast can be carried at the time of mastectomy or delayed until after radiotherapy. There are then three forms of *adjuvant* therapy which may be recommended to reduce the risk: *chemotherapy* which is given to the women with worse prognosis or to younger women; *radiotherapy* which is given to all women who have had conservative surgery and *hormonal therapy* (usually tamoxifen) which is offered to all women who have oestrogen receptors on their cancer cells. The basis of the decisions for these therapies is the multi-disciplinary team meeting which is attended by surgeons, clinicians, oncologists, pathologists, radiologists and breast care nurses.

**Stage III and IV cancer** – These stages are known as *advanced breast cancer* (tumour greater than 5 cm or involvement of the skin or chest wall or with fixed nodes). Treatment is mainly directed against the cancer cells which have probably spread to other parts of the body. These systemic treatments are chemotherapy and hormonal therapy. These may be used alone or more commonly used to decrease the size of the cancer prior to surgery (neo-adjuvant therapy). Radiotherapy may then be given. Treatment for advanced breast cancer is even more individualised and the multi-disciplinary team meeting is very important in deciding the best form and order of treatment.
The UK National Breast Screening Programme was set up by the Department of Health in 1988 in response to the recommendations of a working group chaired by Professor Sir Patrick Forrest. The aim of the programme is to reduce the number of women who die from breast cancer.

Screening aims to detect breast cancers when they are at an early stage and therefore more responsive to treatment. Non-invasive (D05) and smaller tumours are more likely to be detected through the screening programme. At present women aged between 50 and 64 are routinely invited for breast screening every three years, and preparations are in hand to extend the programme to women up to and including the age of 70 by 2004. By 2003 all women will have two views of the breast taken at every screening attendance instead of just at the first attendance as at present. Research has shown that this could increase small cancer detection rates by 43 per cent. Around one-and-a-half million females are now screened in the UK each year, and in 2000-01, 8345 cases of cancer were diagnosed in women through screening. There are eight breast screening units in the South West, and in 2000-01, 78% of the eligible population (aged 50-64) attended their screening invitation. Of those screened in the South West, 1 in 167 women were detected with cancer, of which approximately 25% were non invasive in situ cancers (D05).

The participation of the target population, the adequacy of follow-up of those with ‘abnormal’ mammograms and the effectiveness of treatment are important factors in assuring the success of a breast cancer screening programme, combined with the sensitivity and specificity of the screening test and the frequency of routine screening. Mammography can detect tumours as small as 5mm in diameter, and is the only breast cancer screening method that has been demonstrated to reduce mortality, however there is an ongoing debate about how significant this reduction is. It is highly specific (90%) and sensitive (90%) in the detection of breast cancer in postmenopausal women.

It is estimated that the screening programme is on course to save 1,250 lives per year (25% reduction in mortality) by the year 2010. However, with invasive breast cancer mortality already declining, probably as a result of earlier diagnosis and more effective treatment, it may be difficult to discern the precise effect attributable to breast screening.

Incidence - in situ cancers (D05)

The first round of screening the age standardised incidence rates rose substantially due to the detection of pre-symptomatic tumours. By providing early diagnosis, the programme has also identified a higher percentage of in situ carcinomas in the screening population (50-64 year age band) than was possible previously, as shown by the above graphs.

Note: South West male rates are too low to be shown graphically

Source: South West Cancer Intelligence Service Registry Data (County Areas as in 1996)
For England and Wales the 1997 national age standardised rate for breast cancer in males is 0.7 per 100,000 population, and 107.0 per 100,000 in females. In the South West the comparative breast cancer figures are 1.2 per 100,000 male population and 112.3 per 100,000 female population, slightly above the national average. The incidence rate for breast cancer starts to increase in females from around the age of 25 years. Nationally the incidence rate is below 2 per 100,000 population in females under 25. The South West figures are just above the national average.

For England and Wales the 1990-2000 average national age standardised rate for breast cancer mortality in males is 0.29 per 100,000 population, and 35.8 per 100,000 in females. In the South West comparative breast cancer mortality figures are 0.4 per 100,000 male population and 39.6 per 100,000 female population. This is just above the national average. For patients diagnosed in the South West region between 1992 and 1994 the average 1 year survival rate for males with breast cancer was 83%, and 68% for male 5 year survival. Female survival rates across the South West are just below England and Wales national figures.

Source: South West Cancer Intelligence Service Registry Data, England & Wales Life Tables from Government Actuary’s Department.