N. IRELAND Cancer Registry

Monitoring care for female breast cancer patients in Northern Ireland diagnosed 2012 (with comparisons to 1996, 2001 and 2006)

Queen's University Belfast

GAIN
GUIDELINES AND AUDIT IMPLEMENTATION NETWORK

The Regulation and Quality Improvement Authority

HSC Public Health Agency

Monitoring care of female breast cancer patients in Northern Ireland diagnosed 2012 with comparisons 1996, 2001 and 2006

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FOREWORD

"Cancer services in Northern Ireland have improved in recent years. Developments have spanned prevention, early detection and screening, diagnosis, management and palliative care. The N. Ireland Cancer Registry has played an important role in monitoring this progress.

This third report on breast cancer is very welcome. It is the eighteenth in a series of reports on a wide range of cancers that examine in detail the pathways of care for patients. This report provides a detailed insight into the diagnosis and care received by breast cancer patients in 2012. By comparing with previous years, the report illustrates significant improvement in services with evidence of greater concentration of specialist expertise, more patients included in clinical trials, better access for most patients to a clinical nurse specialist, and better targeting of treatments to yield most benefit for the patient.

Further improvement is possible particularly in ensuring equitable access to breast reconstruction services.

This work confirms the value of undertaking regular reports to monitor the changing process of diagnosis and treatment for cancer patients in Northern Ireland."

Dr Carolyn Harper
Director of Public Health for Northern Ireland
October 2015

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The quality of data in this project is a result of the work of Bernadette Anderson and Clare Marks (Tumour Verification Officers) who meticulously extracted detailed information from clinical records for analysis and presentation in this report. Data abstraction was facilitated by Colin Fox of the Registry's IT team. The data analysis was undertaken by Dr Victoria Cairnduff.

The work of the N. Ireland Cancer Registry, including the production of this report, is the result of the work of the Registry team. I wish also to record my thanks to the Steering Group and Council of the Registry who guide that work.

Anna Gavin
Director, NICR
2015

1. INTRODUCTION

1.1 Overview

This Report is one of a series which examines in detail the pathway of care for cancer patients in Northern Ireland. Over recent years there have been considerable changes in the services provided to cancer patients. Starting almost 20 years ago the Campbell Report 'Cancer Services: Investing for the future' 1996, - resulted in a major reorganisation of cancer services introducing:

- Management of patients by multidisciplinary teams
- Establishment of a single Cancer Centre and four other Cancer Units
- Centralisation of radiotherapy services to the Cancer Centre, with chemotherapy to be made available in each Cancer Unit
- Review of palliative services
- Investment in oncology services

This was followed in 2008 by the introduction of targets to reduce cancer waiting times and the development of an electronic Cancer Patient Pathway System (CaPPS) to facilitate the work and management of the multidisciplinary teams.

Specifically for breast cancer, the most common cancer in women after non-melanoma skin cancer, various guidelines have been produced over the years to enhance services and outcomes. The main guidelines relating to breast cancer care are listed below and a summary of the key recommendations from these documents are contained in appendix A.

- In 1997 the NHS produced guidance on commissioning cancer services: 'Improving outcomes in Breast Cancer'. This was updated in 2002 by the National Institute for Health and Clinical Excellence (NICE) with five key recommendations.
- The British Association of Surgical Oncologists (BASO) produced nine recommendations in 'Guidelines for Surgeons in the Management of Symptomatic Breast Disease in the United Kingdom'. (1995 updated in 2009).The referral guidelines for suspected cancer published by NICE in 2005 containing 15 recommendations (4 general and 11 specific) regarding urgent referral for patients with suspected breast cancer.
- In 2009 NICE published clinical guideline number 80 'Early and locally advanced breast cancer: diagnosis and treatment' and clinical guideline number 81 'Advanced breast cancer: diagnosis and treatment'.
- In 2010 Breakthrough Breast Cancer published 'Best practice diagnostic guidelines for patients presenting with breast symptoms'.
- In 2011 the Department of Health London published 'Improving outcomes: strategy for cancer'.
- In 2011 NICE published the Breast cancer quality standard which contains 13 quality standard standards of the management of early (invasive and in situ ductal carcinomas) and advanced breast cancer.

1.2 Audit Aim

To document the presentation, treatment and outcomes for female breast cancer patients diagnosed in 2012 and compare with similar data collected in 1996, 2001 and 2006.

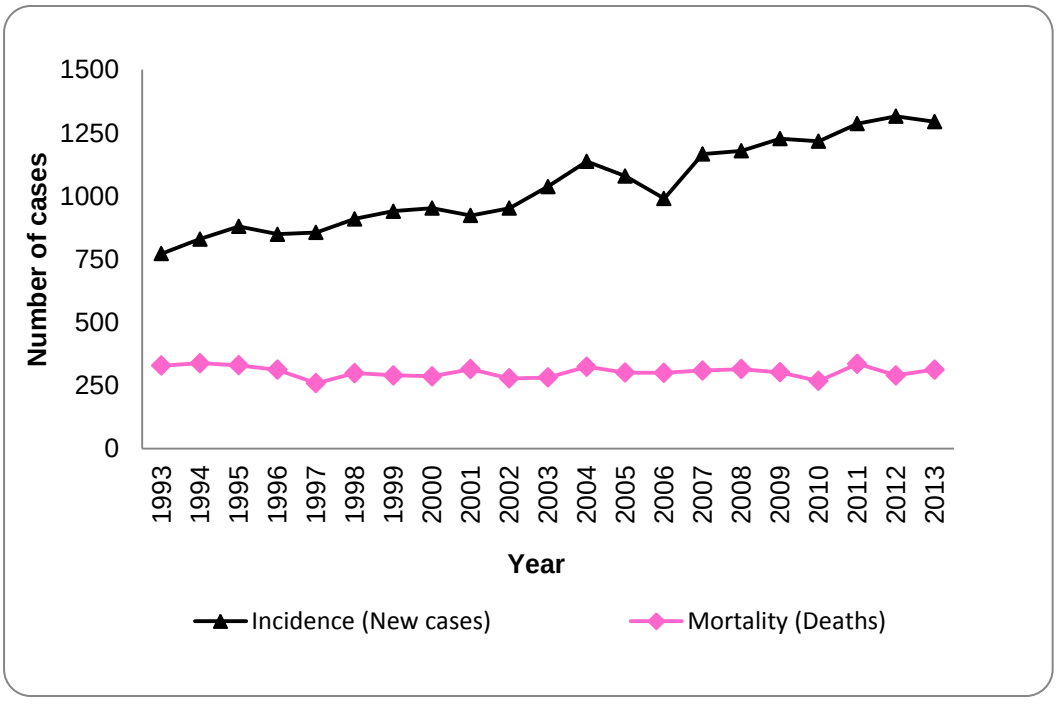
Areas the Audit will include:

1. Referral and presentation
2. Patient factors- lifestyle, family history, co morbidities and symptoms
3. Investigations, in particular pre-operative investigation techniques and tumour stage
4. Treatments
5. Patient survival
6. Multidisciplinary team meetings
7. Timelines from referral to presentation, investigations, and treatment
8. Surgeon case volumes
9. Patient information and follow up care

1.3 Breast Cancer Epidemiology and rates

Breast cancer is the most common cancer in women (excluding the less serious non melanomas skin cancer). The number of patients diagnosed with breast cancer increased from an average of 827 cases per year in 1993-1995 to an average of 1,268 cases per year in 2009-2013. See figure 1.

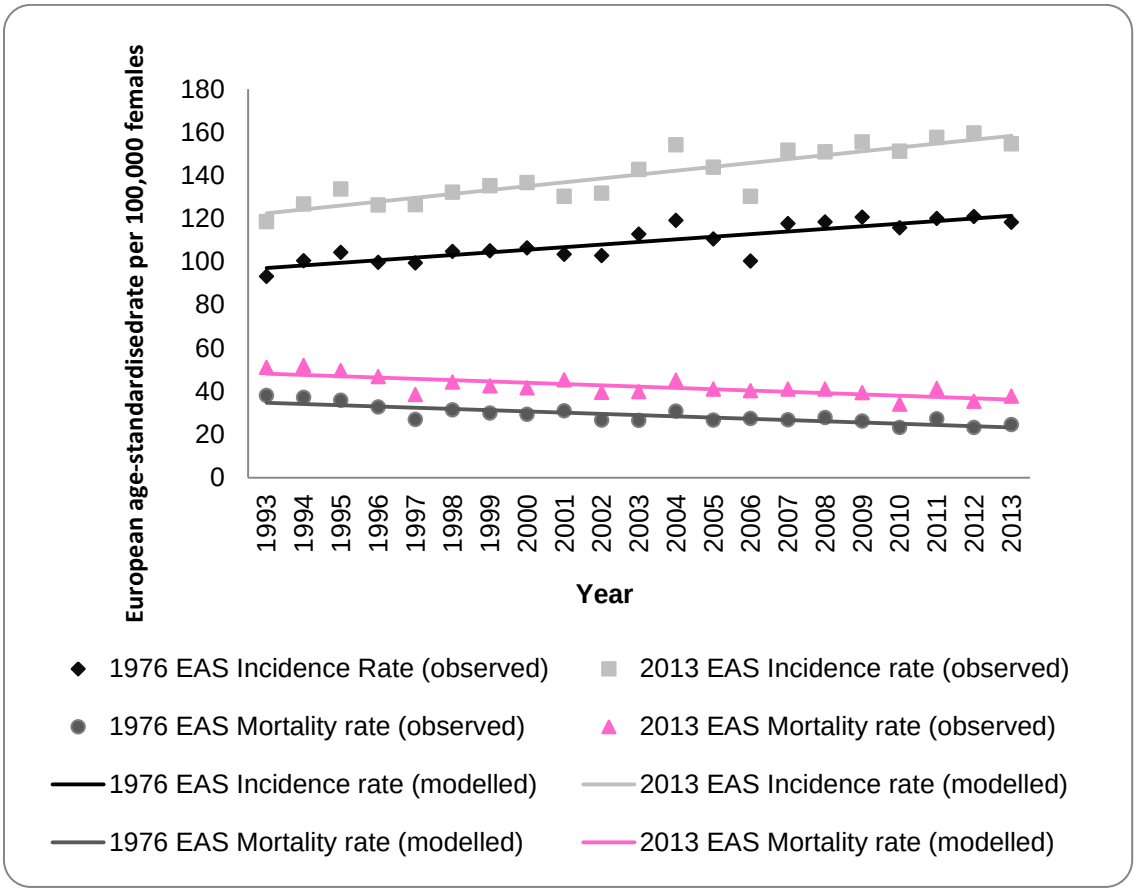
Figure 1: Number of new breast cancer cases and deaths in Northern Ireland: 1993-2013



After accounting for the ageing population in Northern Ireland, an increase in breast cancer incidence rates of an average of +1.3% per year between 1993 and 2013 was observed. See figure 2.

During 2009-2013 there were 302 female deaths from breast cancer each year. It was the second most common cause of death in women after lung cancer. Over the last ten years the number of breast cancer deaths has not changed from 324 among women in 2004 to 313 among women in 2013. See figure 1. However when adjusted for age and population change female breast cancer mortality rates decreased by -1.4% per year between 1993-2013. See figure 2.

Figure 2: European age-standardised (EAS) incidence and mortality rates of breast cancer in Northern Ireland: 1993-2013 using (1) 1976 European Standard population and (2) 2013 European Standard population



NOTE: *Recently (2013) there was a change in the European Standard population against which age-standardised rates are measured. This change was to take account of the increasing age of the population and results in higher rates than with the previous standard population (1976). The diagram above illustrates the differences. However both show a steady increase in breast cancer incidence rates and a steady decrease in mortality rates.*

The lifetime risk of developing breast cancer in Northern Ireland is 1 in 11 and the risk is higher in older than younger women. Overall the risk of developing breast cancer by the age of 55 is 1 in 32 and before the age of 65 is 1 in 17 whilst the risk of developing breast cancer before the age of 85 is 1 in 9.

Figure 3: Age distribution of patients diagnosed with breast cancer in Northern Ireland: Number and age-specific rates: 2009-2013

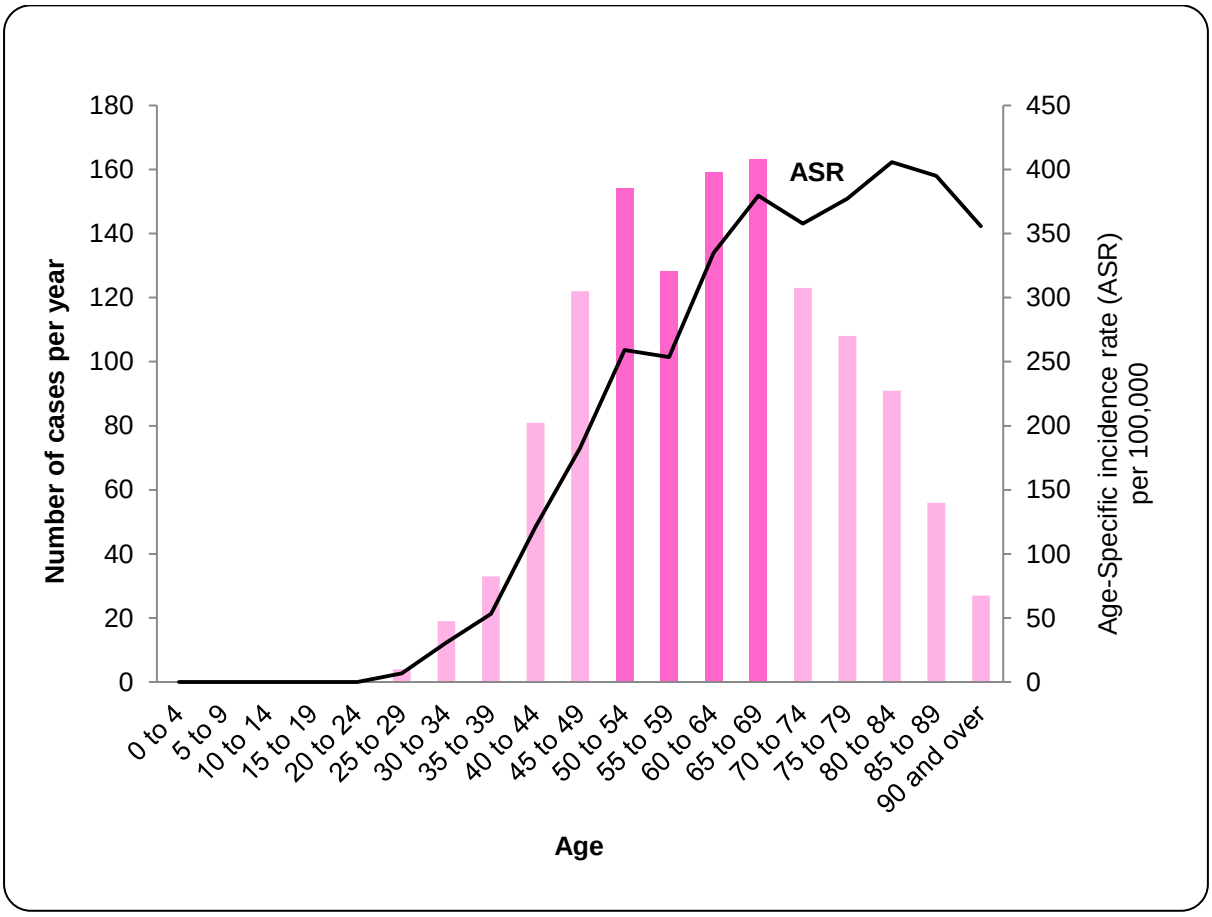
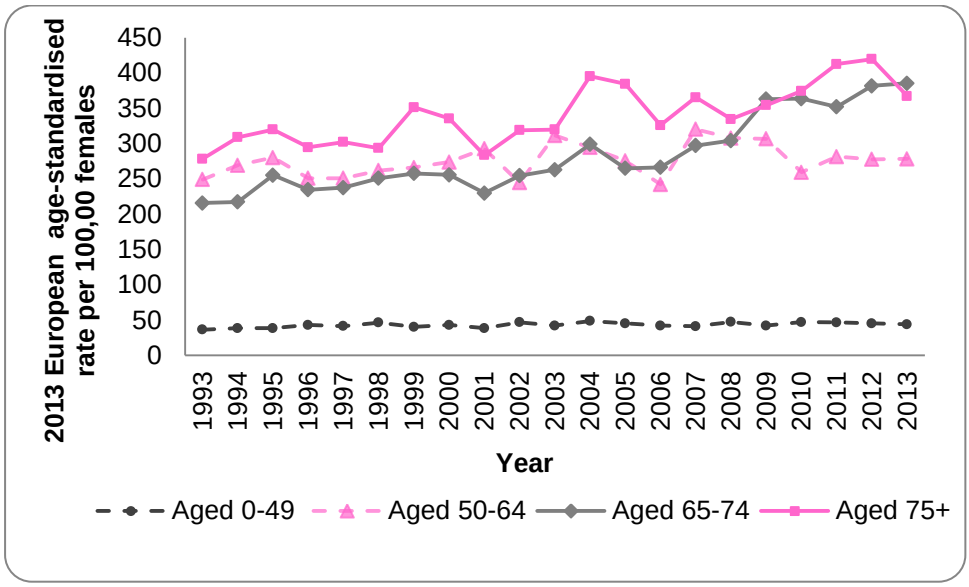
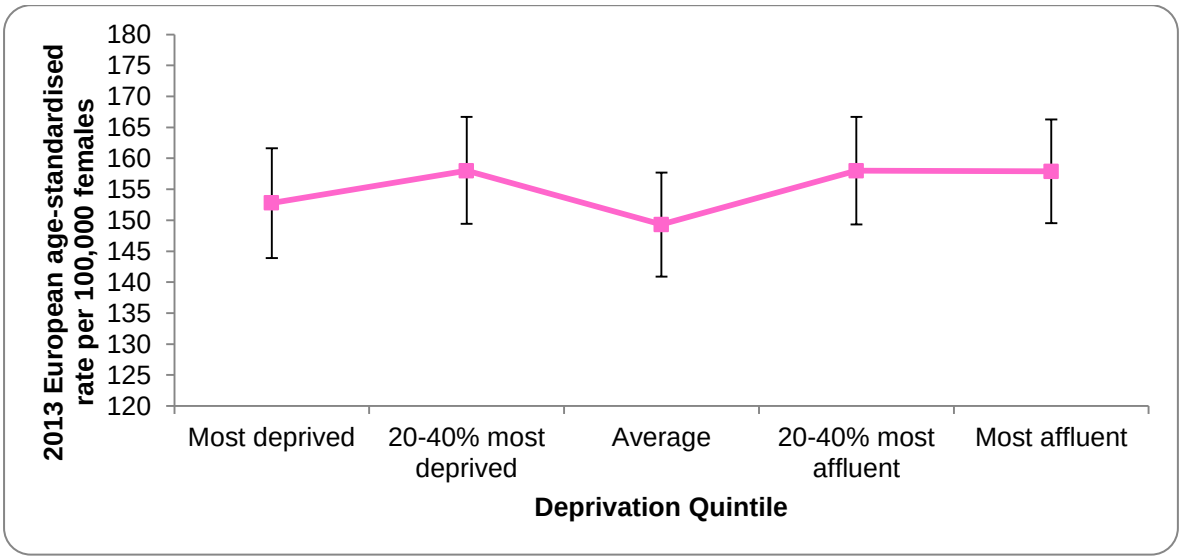


Figure 4: European age-standardised (2013) incidence rates of breast cancer in Northern Ireland by age of diagnosis: 1993-2013



1.3.2 Socioeconomic Factors

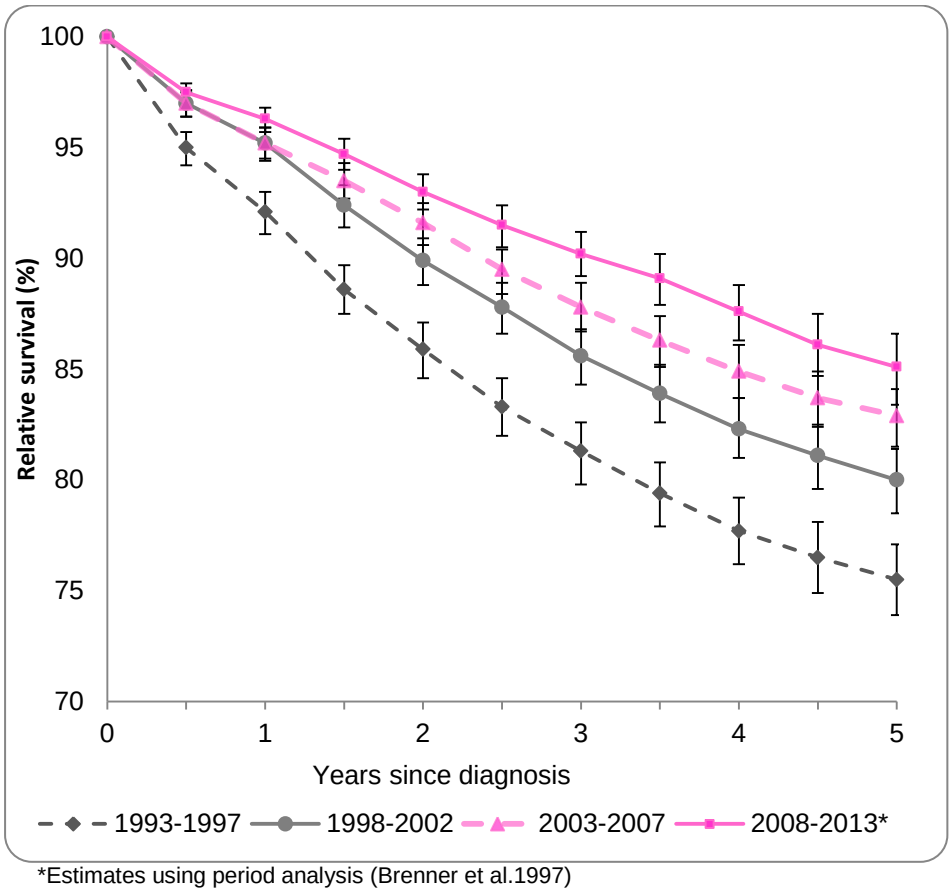
Figure 5: European age-standardised incidence rates of breast cancer in Northern Ireland by deprivation quintile: 2009-2013



There were no significant differences in age-standardised rates by socio-economic groups in NI 2009-2013. However with larger numbers of women, higher levels of breast cancer are generally observed in more affluent groups.

1.3.3 Survival

Figure 6: Relative Survival from breast cancer in Northern Ireland by period of diagnosis 1993-2013



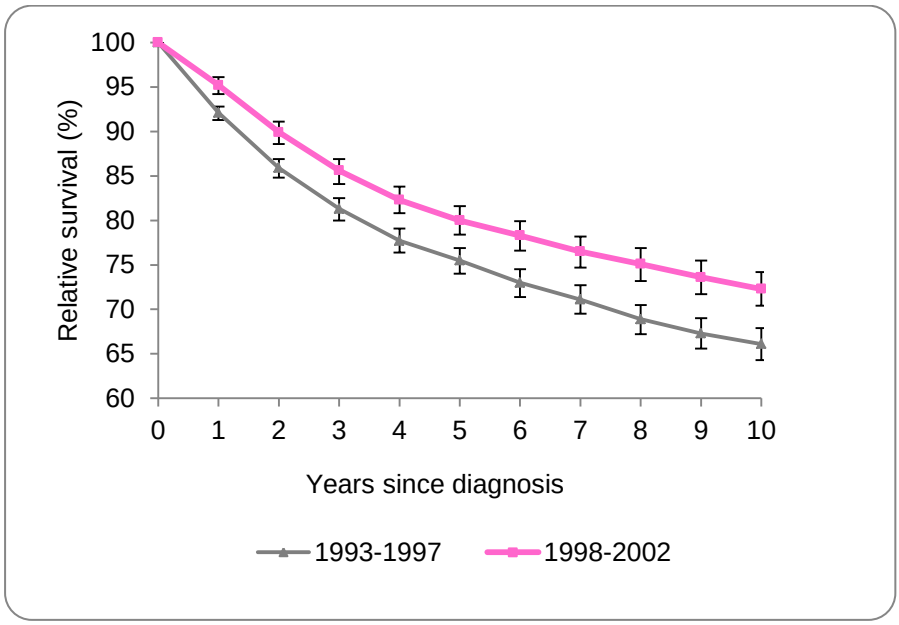
*Estimates using period analysis (Brenner et al.1997)

- Five-year relative survival following a diagnosis of invasive breast cancer has improved considerably over the last sixteen years with a 4.5% improvement for patients diagnosed in 1998-2002 (80.5%) compared to patients diagnosed in 1993-1997 (75.5%). Further increases of 2.9% between 1998-2002 (80%) and 2003-2007 (82.9%) and 2.2% between 2003-2007 (82.9%) and 2013 (85.1%) have been observed. Overall a 9.6% improvement in five-year survival has been estimated for patients diagnosed in 2008-2013 when compared with those diagnosed 1993-1997.

1.3.3.1 Ten year relative survival for patients diagnosed with Invasive Breast cancer (C50) 1993-1997 and 1998-2002

Time from diagnosis (years)	1993-1997	1998-2002
1	92.1%	95.2%
2	85.9%	89.9%
3	81.3%	85.6%
4	77.7%	82.3%
5	75.5%	80.0%
6	73.0%	78.3%
7	71.1%	76.5%
8	68.9%	75.1%
9	67.3%	73.6%
10	66.1%	72.3%

Figure 7: Ten year relative survival for patients diagnosed with Invasive Breast cancer (C50) 1993-1997 and 1998-2002

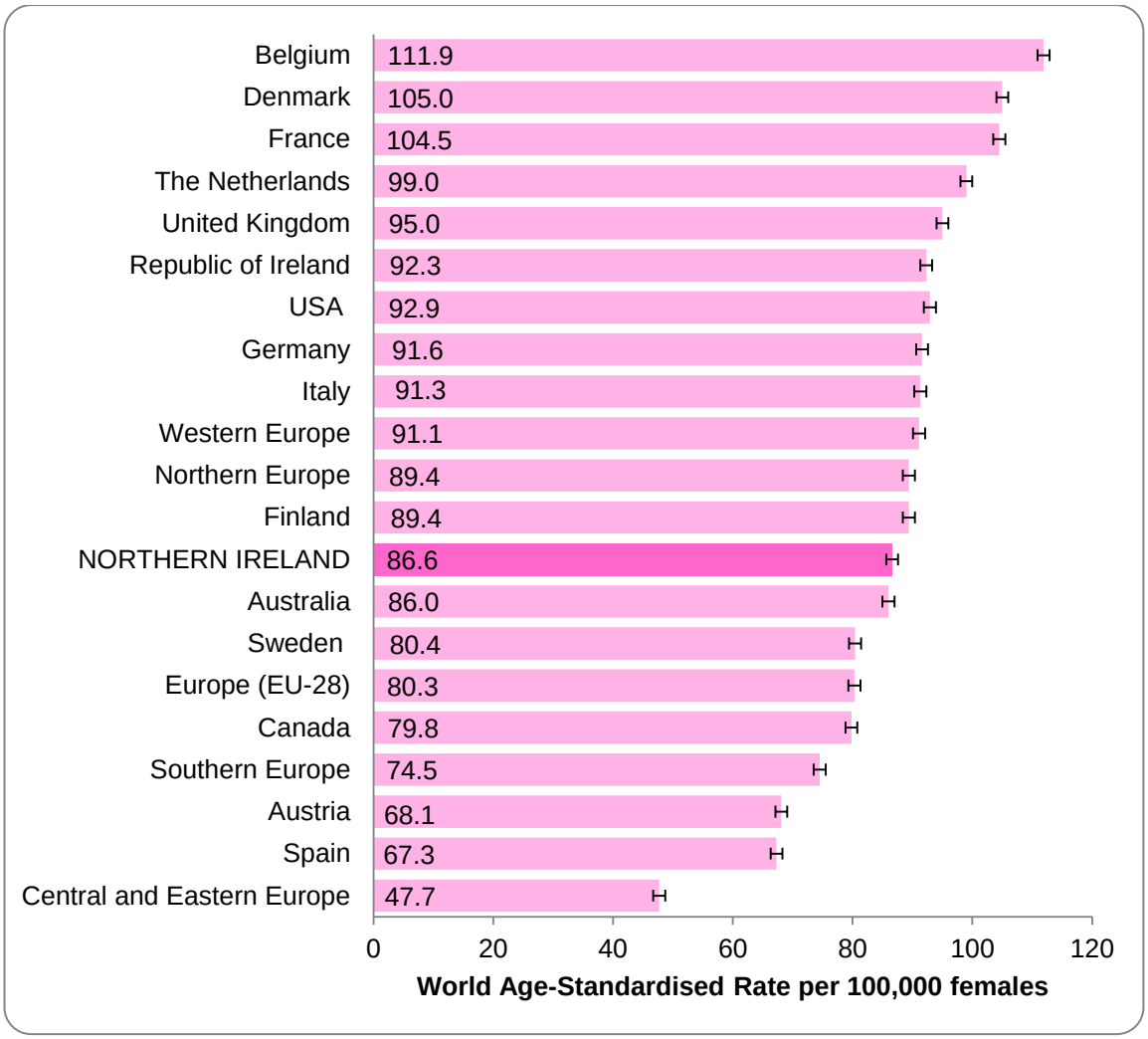


- Survival at ten years following a diagnosis of invasive breast cancer between 1993 and 1997 is 64.6% and between 1998 and 2002 is 71.5%.

1.3.4 International Comparisons

The world age-standardised incidence rate of 86.6 for Northern Ireland in 2012 is higher than the European average of 80.3 but is lower than many countries in Europe (including the Republic of Ireland and the UK) and the USA (Figure 8).

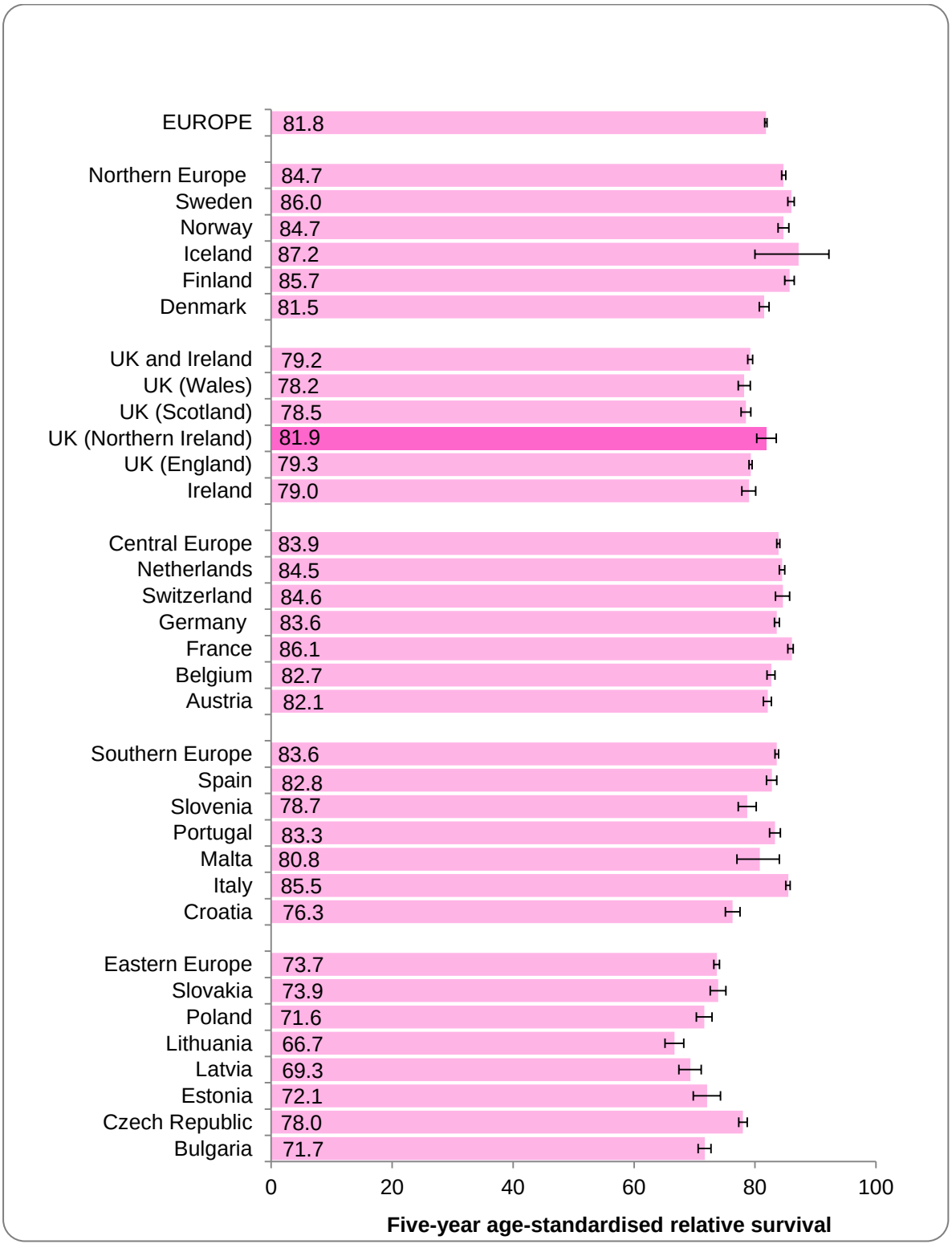
Figure 8: International comparisons of world age-standardised incidence rates for female breast cancer: 2012



Source: GLOBOCAN, except for Northern Ireland data which is from NICR data for the 2009-2013 period.

In relation to survival of breast cancer patients, five year relative survival for breast cancer patients diagnosed between 1999 and 2007 in Northern Ireland (81.9%) was similar to the European average (81.8%) and higher than that observed in England, Wales and Scotland (Figure 9).

Figure 9: European comparisons of five-year age-standardised relative survival for female breast cancer patients: 1999-2007



Source: EUROCARE-5.

1.4 Background

Risk Factors

It is reported that over a quarter (27%) of breast cancer cases in the UK each year are associated with lifestyle factors (Parkin et al. 2011).

- **Reproductive Factors**

The findings of a systematic review and meta-analyses investigating the relationship between parity and breast cancer have shown a 7% reduction in breast cancer risk with each live birth (Collaborative Group on Hormonal factors in Breast cancer, 2002, Ewertz et al. 1990, Ma et al., 2006 and Kim et al. 2012).

A further meta-analysis has suggested that this association may be only for ER/PR positive tumours and has highlighted a possible association between increasing parity and ER/PR negative tumours. However a recent study has shown that this increased risk may be counterbalanced by breastfeeding and singleton rather than multiple pregnancies (Work et al. 2014)

Overall parous women have been shown to have a 30% lower risk of developing breast cancer when compared to nulliparous women (Ewertz et al. 1990).

A meta-analysis investigating the association between age at giving birth to first child and breast cancer risk has shown a 3% increase in risk with each year increase in age at delivery (Collaborative Group on Hormonal factors in Breast cancer, 2002).

Associations between early menarche (first menstrual period) and late menopause and breast cancer risk have been observed with each year decrease in age at menarche associated with a 5% increase in risk of developing breast cancer and each year later that menopause occurs associated with a 3% increased risk (Collaborative Group on Hormonal factors in Breast cancer, 2002). Findings of a recent study investigating timing of puberty found that for women whose breast development started at a younger age show that breast cancer risk may be higher (Bodicoat et al., 2014).

- **Oral Contraceptive Use**

The International Agency for Research on Cancer (IARC) have recognised the use of combined oestrogen-progestogen oral contraceptives and hormone replacement therapies as being carcinogenic in humans with sufficient evidence showing an association with increased breast cancer (IARC Monographs, 2005). Within the UK population it has been suggested that up to 1% of female breast cancers may be associated with oral contraceptives and 3% with hormone replacement therapy (Parkin, 2011).

- **Overweight and Obesity**

The World Cancer Research Fund (WCRF) and the American Institute for Cancer Research (AICR) have recognised overweight and obesity as a risk factor the development of breast cancer in post-menopausal women. The findings of two meta-analyses investigating body fatness in relation to breast cancer risk have shown a 9-13% increased risk of developing breast cancer per 5kg/m^2 increment in BMI in post-menopausal women (Van den Brandt et al., 2000 and Renehan et al., 2008).

- **Alcohol**

Alcohol consumption is also linked with breast cancer risk with the International Agency for Research on cancer (IARC) recognising alcoholic beverages as a cause of breast cancer (IARC, 2015).It has been suggested that up to 6% of female breast cancers in the UK are associated with the consumption of alcohol (Parkin et al. 2011) The findings of meta-analyses of studies investigating alcohol consumption and breast cancer risk have shown an increase of 7-12% in the risk of developing breast cancer with each one unit/day increase in alcohol consumption (Collaborative group on hormonal factors in breast cancer, 2002, Key et al., 2006, Allen et al. 2009). A further meta-analysis carried out by Bagnardi et al. 2012 has shown that has shown a 5% increase in breast cancer risk in women who consume up to 1.5 units of alcohol per day when compared with those who do not consume alcohol. It has been suggested that the increased levels of sex hormones linked with alcohol consumption may in part explain the association between alcohol and breast cancer risk (Rinaldi et 2006).

Symptoms

The presence of a lump in the breast or axilla (armpit) is the most common symptom of breast cancer. However in the majority of cases, the lumps that are detected not malignant. Other symptoms can include a change in the shape or appearance of the breast or nipple, pain, nipple tenderness and bloody discharge from the nipple (CRUK, 2015).

Screening

Screening for breast cancer can detect a tumour at an earlier stage of disease than it would normally be detected through the presentation of symptoms. Most commonly, breast cancer screening takes the form of a mammogram. Although mammography is not 100% sensitive it has been shown to reveal breast tumours before they become symptomatically apparent. In Northern Ireland, a three yearly population based call and recall of women aged 50-65 has been in place since 1993. In March 2009 the screening age was extended to 50-70 years and in 2012/2013 74.2% of women aged 70 years who received an invitation, attended breast screening (PHA, 2013).

There has been debate about the risk of overdiagnosis of breast cancers by breast cancer screening. An expert group (Marmot, 2012) reviewed the evidence and concluded that there was a risk of over diagnosis and quantified that for each life saved three women would have unnecessary treatment.

Diagnosis

When the presence of symptoms or the results of a screening investigation suggest cancer, further investigations are carried out to establish whether it is in fact cancer or whether the symptoms/screening results have occurred as the result of another condition. These investigations are now completed at a one stop clinic and are called a triple assessment with imaging and Fine Needle Aspirations (FNA) cytology results available immediately.

Imaging procedures may include diagnostic mammograms, ultrasounds of the breast, and magnetic resonance imaging (MRI) scans.

Biopsies – involve the removal of tissue or cells from the breast using a variety of techniques to investigate the suspected tumour and test for the presence of cancer. Biopsies and can take the form of a Fine Needle Aspiration (FNA), core biopsy or in a small number of cases an excision biopsy to surgically remove the entire lump under investigation. If the patient is consequently diagnosed with cancer further information about the type and stage of the cancer including human epidermal growth factor (HER2) status, oestrogen receptor status is required for the accurate planning of treatment.

Depending of stage of disease and nodal involvement, further investigations, such as liver ultrasound, chest x-rays, bone or brain scans, may be carried out to determine whether the cancer has spread beyond the breast.

Treatment

There are several treatment options and combinations available for women with breast cancer depending on the type of tumour and stage of disease.

- **Surgery** There are several surgical procedures used in the treatment of breast cancer and they can be separated into two main types:
  1. Breast conserving surgery which involves the removal of the cancer but not the breast through techniques including wide local excision, lumpectomy, excision biopsy, quadrantectomy, segementectomy or an oncoplastic breast conserving procedure.
  2. Mastectomy which involves the removal of the whole breast.

- In order to investigate the involvement of the lymphatic system, a sentinel node biopsy is commonly carried out to test for presence of disease and if the sentinel node is positive, further surgery in the form of an axillary node clearance may be performed.

- **Radiotherapy** The application of radiation to either destroy or reduce the size of malignant tumours. Radiotherapy is given following breast conserving surgery in the majority of cases and may also be given following a mastectomy depending of stage of cancer.

- **Chemotherapy** The treatment of cancer through the use of drugs to kill cancer cells. Chemotherapy can be given alone (Primary chemotherapy) or in combination with other treatments. There are several chemotherapy agents that can be used depending on stage of disease, hormone receptor status and Human Epidermal Factor2 (HER2) and menopausal status.

- **Endocrine Therapy** In some cases breast cancer tumour growth is stimulated by presence of oestrogen and progesterone. Hormone therapy can be used in the treatment of oestrogen/progesterone receptor positive cancers by reducing the effect of oestrogen within the body which in turn can slow tumour growth and reduce the risk of recurrence. The two most common types of endocrine therapy used in the treatment of breast cancer are: Tamoxifen, which directly interacts with the Oestrogen receptor on the breast cancer cell and inhibits its activity, and Aromatase inhibitors (Anastrozole and Letrozole) which reduce the production of oestrogen in post-menopausal women (Burstein et al; 2010). It has been widely reported that use of aromatase inhibitors can result in clinically significant bone dimineralization which in turn can lead to increased rates of osteopenia, osteoporosis and fractures (Goss et al, 2005, Jakesz et al. 2005, Buzdar et al. 2006, Coates et al. 2007, Coombes et al. 2007, Jakesz et al. 2007, Forbes et al., 2008).Therefore it has been recommended that women receiving endocrine therapy in the form of aromatase inhibitors should receive a Dual energy X-ray absorptiometry (DEXA) scan to assess bone mineral density (BMD) before commencing treatment and every two years whilst receiving aromatase inhibitors if the initial DEXA showed bone mineral density outside normal range (Hadji et al. 2008).

- **Monoclonal Antibodies (Herceptin)** The monoclonal antibody (Herceptin) is a targeted biological treatment which triggers the immune system to target and kill cancer cells. It is used for cancers that have large amounts of a protein called HER2. Some breast cancers and stomach cancers have large amounts of HER2 and they are called HER2 positive cancers. HER2 makes the cancer cells grow and divide. When Herceptin attaches to HER2 it can make the cells stop growing and die.

2. Audit Methodology

Invasive breast cancer was identified using the ICD10 (WHO,1990) code ‘C50’; this selection excludes in situ tumours (ICD10 code ‘D05’), which have an excellent prognosis.

Data Collection

Data on all breast cancers diagnosed in 2012 were available from the NICR database, we sought additional clinical information on patients diagnosed between September to December 2012 (Audit subset (n=411) from the Cancer Patient Pathway System (CaPPS) and the Clinical Oncology Information system (COIS). These data were extracted by Tumour Verification Officers (TVOs) for resolution and validation. Statistical analysis was carried out in SPSS. For geographic and socio-economic information, the 2011 central postcode directory was used to assign patients to a census output area (COA) upon their postcode of usual residence. The COA was then used to assign a Health and Social Trust of residence and a deprivation quintile from the income domain of the 2010 multiple deprivation measure (NISRA, 2010) with the latter used to provide an approximate socio-economic classification for each patient.

Exclusions

Patients were excluded from the audit if their records lacked sufficient information (n=7) or if information was available only from a death certificate (DCO) (n=1).

Private Patients

In this study private patients are defined as patients who presented via the private sector. Although, these patients may enter the NHS later for investigations and treatment, they are not included in timeline analysis but are included for any care in the NHS.

Patients referred through Breast Screening

In this study screening patients are defined as those who were referred through the NHS Breast Screening programme or non-NHS breast screening programmes e.g. Action Cancer. Screening patients are not included in timeline analysis but are included for any analysis relating to aspects of care unless otherwise specified.

Data analysis

The chi-square test was used to test for statistically significant differences in the distribution of categorical variables between two groups (e.g. by age group). A t-test is used to test for statistically significant differences in continuous variables between two groups. In all tests a 95% confidence level was applied.

The Kaplan-Meier method was used to calculate the observed survival with the Mantel-Cox log-rank test used to test differences in survival between groups. All patients diagnosed in 2012 have been followed up until the end of 2014.

3. Results

3.1 Study Patients

Patients	1996	2001	2006	2012
Total number of breast cancer patients	912	1012	1088	1420
Exclusions- Insitu breast cancer (D05*)	63	85	104	133
Total number of invasive breast cancer (C50*) patients	849	927	984	1287
Exclusions- Death Certificate Only	5	1	2	1
Exclusions- Insufficient information	80	45	31	7
Total exclusions	85	46	33	8
Total reported on (% of malignant breast cancer patients)	764 (90.0%)	881 (95.0%)	951 (96.6%)	1279 (99.4%)
Average age of diagnosis	61	60	62	63
Median age of diagnosis	60	59	61	63

***ICD 10 code**

- The increased numbers over time reflect population growth and ageing of population as evidenced by higher average age for patients diagnosed in later years along with possible effect of lifestyle.

3.2 Referral and presentation

3.2.1 Source of referral to specialist care

Source of referral	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 Audit Subset (n=411)
GP (General Practitioner)	541 (70.8%)	594 (67.4%)	694 (73.0%)	230 (56.0%)
Breast Screening Programme (BSP)	106 (13.9%)	180 (20.4%)	148 (15.6%)	123 (29.9%)
Action Cancer	15 (2.0%)	26 (3.0%)	19 (2.0%)	3 (0.7%)
Other*	51 (6.7%)	60 (6.8%)	85 (8.9%)	49 (11.9%)
Not Recorded	51 (6.7%)	21 (2.4%)	5 (0.5%)	6 (1.5%)

* 'other' includes referrals from consultants, family planning clinics, family history/breast clinics and accident and emergency

- The recording of referral source has improved over time from 6.7% of patients with no referral source recorded in 1996 to 0.5% in 2006 and 1.5% in 2012.

- Over half (56%) of patients diagnosed in 2012 came from GP referrals. This is a decrease from 2006 when almost three quarters (73%) of patients diagnosed came from GP referrals (p<0.001).

- Almost a third (29.9%) of audit patients in 2012 were referred through the Breast Screening programme (BSP). This is more than double the referrals from BSP recorded in 2006 (15.6%).

3.2.2 Referral Priority: 2012

Referral Priority	2012 Non-Audit (n=868)	2012 Audit subset (n=411)	Total 2012 (n=1279)
GP red flag	261 (30.1%)	154 (37.6%)	415 (32.4%)
Consultant Upgrade to 'red flag'	144 (16.6%)	61 (14.9%)	205 (16.0%)
Other, routine	108 (12.4%)	37 (9.0%)	145 (11.3%)
Other, urgent	60 (6.9%)	23 (5.6%)	83 (6.5%)
Screening, routine*	182 (21.0%)	81 (19.7%)	263 (20.6%)
Screening, urgent*	62 (7.1%)	45 (10.9%)	107 (8.4%)
Not recorded	51 (5.9%)	10 (2.4%)	61 (4.8%)

*Includes screening (NHS and non-NHS)

- Almost a third (32.4%) of patients had a GP red flag referral priority recorded in 2012 with 16% having Consultant upgrade to red flag.
- 11.3% had routine referral priority from another source and 6.5% had an urgent referral from another source.
- 20.6% had a routine referral from the breast screening programme and 8.4% had an urgent referral.
- No differences in referral priority for all patients in 2012 and those within the audit subset were observed.

3.2.3 Source of referral for patients by age at presentation (non-screening patients)

	2012 (n=818)		
	0-49 years	50-70 years	71+ years
Consultant Upgrade to 'Red Flag'	68 (30.4%)	63 (25.4%)	70 (20.2%)
GP Red Flag	92 (41.1%)	129 (52.0%)	185 (53.5%)
Other, Routine	46 (20.5%)	35 (14.1%)	51 (13.9%)
Other, Urgent	16 (7.1%)	17 (6.9%)	43 (11.8%)
Not Recorded	2 (0.9%)	4 (1.6%)	2 (0.6%)
Total	224	248	346

- After exclusion of patients referred through the breast screening, no differences in the proportion of patients with Consultant upgrade to 'Red Flag'/GP 'Red Flag' referrals across age groups were observed (p>0.05).

3.2.4 Trust of Presentation

Trust	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 (n=1279)
Belfast HSCT	204 (26.7%)	231 (26.2%)	237 (24.9%)	284 (22.2%)
Northern HSCT	118 (15.4%)	125 (14.2%)	126 (13.2%)	167 (13.1%)
South-Eastern HSCT	132 (17.3%)	119 (13.5%)	119 (12.5%)	167 (13.1%)
Southern HSCT	89 (11.6%)	110 (12.5%)	118 (12.4%)	153 (12.0%)
Western HSCT	88 (11.5%)	86 (9.8%)	105 (11.0%)	124 (9.7%)
Private Sector	7 (0.9%)	20 (2.3%)	96 (10.1%)	11 (0.9%)
Not recorded	20 (2.6%)	10 (1.1%)	2 (0.2%)	3 (0.2%)
Breast Screening *	106 (13.9%)	180 (20.4%)	148 (15.6%)	370 (28.9%)

* includes routine and urgent (NHS and Non NHS breast screening)

- A higher proportion of patients presented to private hospitals (10.1%) in 2006 than any other audit years (p<0.001).
- A higher proportion of patients presented through breast screening (NHS and Non NHS) in 2012 when compared to the previous audit years (p<0.001).

3.3 Family History

3.3.1 Family history of breast cancer

First Degree Relative	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 Audit subset (n=411)
Yes	124 (16.2%)	129 (14.6%)	180 (18.9%)	87 (21.2%)
No/Not recorded	640 (83.8%)	752 (85.4%)	771 (81.1%)	324 (78.8%)
Any Relative	**1996 (n=764)**	**2001 (n=881)**	**2006 (n=951)**	**2012 Audit subset (n=411)**
Yes	195 (25.5%)	247 (28.0%)	315 (33.1%)	162 (39.4%)
No/not recorded	569 (74.5%)	634 (72.0%)	636 (66.9%)	249 (60.6%)

- Approximately 1 in 5 women (21.2%) in 2012 had a positive family history of breast cancer in a first degree relative recorded with 2 in 5 women (39.4%) recorded as having a positive family history of breast cancer in any relative. This is higher than the proportions of women having positive family history of breast cancer recorded in previous audit years and possibly reflects better data recording.

3.4 Co-morbidities

Co-morbidity	2006 (n=951)	2012 Audit subset (n=411)
Hypertension	324 (34.1%)	107 (26.0%)
Chronic Pulmonary Disease*	38 (4.0%)	57 (13.9%)
Psychiatric Disorder	30 (3.2%)	-------
Anxiety/depression	N/A	38 (9.2%)
Schizophrenia	N/A	7 (1.7%)
Valvular heart disease/Atrial Fibrillation	N/A	30 (7.3%)
Ischaemic Heart Disease	87 (9.1%)	23 (5.6%)
Diabetes	71 (7.5%)	26 (6.3%)
Cerebrovascular disease	18 (1.9%)	18 (4.4%)
Other Malignancy (excluding breast cancer)	40 (4.5%)	20 (4.9%)
Dementia	35 (3.7%)	10 (2.4%)
History of previous Breast Cancer	17 (1.8%)	10 (2.4%)
C50 (Right or left)	N/A**	6 (1.5%)
In situ	N/A**	4 (1.0%)
Parkinson's Disease	6 (0.5%)	0 (0.0%)
No comorbidity recorded	341 (35.9%)	193 (47.0%)

* Defined as Chronic Obstructive Pulmonary disease in 2006 and Chronic Pulmonary disease including asthma in 2012 ** N/A = not collected

- Around 3% of breast cancer patients had a record of dementia, 2% schizophrenia and 9% anxiety or depression at diagnosis, while 1.5% had a history of previous breast cancer, 1% a history of insitu breast cancer and 4.9% another cancer excluding Non-Melanoma Skin.
- The differences observed between co-morbidities recorded in the 2006 and 2012 audit years may be due to differences in methodology for data collection.

3.5 Lifestyle Factors

3.5.1 Oral Contraceptive history and duration: 2012 Audit subset

	2012 Audit Subset (n=409)			
Oral contraceptive history	**Aged 0-49 years**	**Aged 50-70 years**	**Aged 71+ years**	**All Ages**
No, never	15 (17.6%)	34 (16.7%)	18 (15.0%)	67 (16.9%)
Yes, current	8 (9.4%)	5 (2.5%)	0 (0.0%)	13 (3.3%)
Yes, past	36 (42.4%)	52 (25.5%)	<3	90 (22.7%)
Not known	26 (30.6%)	113 (49.5%)	100 (83.3%)	227 (57.2%)
Total	85	204	120	397

	2012 Audit Subset (n=103)			
Oral contraceptive duration	**Aged 0-49 years**	**Aged 50-70 years**	**Aged 71+ years**	**All Ages**
< 1 year	11 (25.0%)	10 (17.5%)	0 (0.0%)	21 (20.4%)
1-5 years	9 (20.5%)	17 (29.8%)	<3	28 (27.2%)
> 5 years	18 (41.0%)	16 (28.1%)	0 (0.0%)	34 (33.0%)
Not known	6 (13.6%)	14 (24.6%)	0 (0.0%)	20 (19.4%)
Total	44	57	2	103

- Oral Contraceptive history was recorded for 42.8% of breast cancer patients in 2012 with 22.7% reporting past use and 3% reporting current oral contraceptive use.
- For those patients with oral contraceptive use recorded almost a third (33%) of patients reported duration of use of >5 years with 27.2% of patients having duration of use between one to five years and 20.4% of less than a year.

3.5.2 Hormone Replacement Therapy (HRT) history and duration: 2012 Audit subset

Hormone Replacement Therapy (HRT) history	2012 Audit Subset (n=409) Aged 0-49 years	Aged 50-70 years	Aged 71+ years	All Ages
No, never	58 (68.2%)	72 (35.3%)	28 (23.3%)	158 (38.7%)
Yes, current	<3	12 (5.9%)	0 (0.0%)	3%
Yes, past	3 (3.5%)	48 (23.5%)	13 (10.8%)	64 (15.6%)
Not known	23 (27.1%)	72 (35.3%)	79 (65.8%)	174 (42.5%)
Total	85	204	120	409
Hormone Replacement Therapy (HRT) duration	**2012 Audit Subset (n=154) Aged 0-49 years**	**Aged 50-70 years**	**Aged 71+ years**	**All Ages**
< 1 year	< 3	5 (8.3%)	0 (0.0%)	8%
1-5 years	< 3	21 (35.0%)	<3	24 (31.2%)
> 5 years	< 3	25 (41.7%)	9 (69.2%)	34 (44.2%)
Not known	< 3	9 (15.0%)	<3	13 (16.9%)
Total	4	60	13	77

- Hormone Replacement Therapy (HRT) history was recorded for 57.5% of breast cancer patients in 2012 with 19% of women over age 50 reporting past use and 4% overall reporting current use of HRT.
- For those patients with HRT use recorded 44.2% of patients reported duration of use of >5 years with 31.2% of patients having duration of use between one to five years and 8% of less than a year.

3.6 Symptoms

3.6.1 Proportion (%) of patients presenting with symptoms by audit year

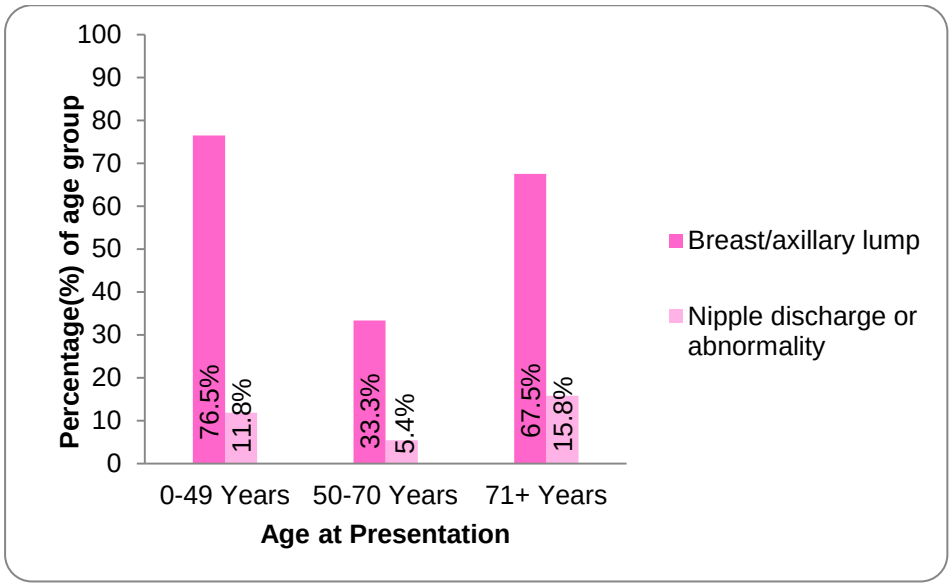
	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 Audit Subset (n=411)
Breast/axillary lump	600 (78.5%)	576 (65.4%)	625 (65.7%)	214 (52.1%)
Asymptomatic	92 (12.0%)	193 (21.9%)	225 (23.7%)	138 (33.6%)
Breast Pain	120 (15.7%)	163 (18.5%)	165 (17.4%)	41 (10.0%)
Nipple discharge/abnormality	100 (13.1%)	123 (14.0%)	125 (13.1%)	40 (9.7%)
Skin Changes	125 (16.4%)	164 (18.6%)	103 (10.8%)	34 (8.3%)
Weight loss	31 (4.1%)	38 (4.3%)	22 (2.3%)	6 (1.5%)
Abscess	12 (1.6%)	20 (2.3%)	15 (1.6%)	4 (1.0%)
Deformity	46 (6.0%)	69 (7.8%)	56 (5.9%)	4 (1.0%)
Other*	199 (26.0%)	147 (16.7%)	138 (14.5%)	35 (8.5%)

* this includes patients presenting with secondary symptoms
NB. Symptom information for 2012 Audit subset was collected from electronic sources compared to in previous years were note review was carried out and electronic sources may underestimate symptoms

- Over half of patients (52.1%) presented with a breast or axillary lump in 2012. This is a decrease from 2001 and 2006 when 65.4% and 65.7% presented with a breast or axillary lump respectively ($p<0.001$).
- The proportion of patients presenting with no symptoms was higher in 2012 audit subset than observed in earlier audit years, with a third of patients (33.6%) asymptomatic at presentation ($p<0.001$). This may be due the extended age for breast screening.
- There was little change in the proportion of women presenting with breast skin changes ($p=0.150$), weight loss ($p=0.308$) or an abscess ($p=0.383$) between 2006 and 2012.

- Although there was a decrease in the proportion of women presenting with nipple discharge/abnormality between 2006 (13.1%) and 2012 (9.7%) this did not reach statistical significance (p=0.077).

3.6.2 Percentage of patients within the 2012 audit subset presenting with breast/axillary lumps as a percentage of total patients in each age group (n=400)



- A lower proportion of women in the screened age group aged 50-70 years (33.3%) presented with a breast/axillary lump when compared with women aged under 50 years (76.5%) and 71 years or over (67.5%; p<0.001).
- A higher proportion of women aged 71 years or over (15.8%) presented with nipple discharge or abnormality when compared to women in younger age groups (11.8% and 5.4%; p=0.007.
- 83.3% of asymptomatic patients were referred through the NHS (n=112) or non-NHS breast (n=3) screening programmes.

3.6.3 Symptoms and duration: 2012

Symptom		1 month or less	2-5 months	6-11 months	12 or more months	Not recorded	Total
Breast/axillary lump	1996	266 (44.3%)	87 (14.5%)	25 (4.2%)	56 (9.3%)	166 (27.7%)	600
	2001	342 (59.4%)	80 (13.9%)	29 (5.0%)	31 (5.4%)	94 (16.3%)	576
	2006	336 (53.8%)	120 (19.2%)	24 (3.8%)	29 (4.6%)	116 (18.6%)	625
(Audit subset)	2012	96 (44.9%)	35 (16.4%)	7 (3.3%)	3 (1.4%)	73 (34.1%)	214
Breast Pain	1996	41 (34.2%)	23 (19.2%)	7 (5.8%)	13 (10.8%)	36 (30.0%)	120
	2001	59 (36.2%)	16 (9.8%)	3 (1.8%)	6 (3.7%)	79 (48.5%)	163
	2006	65 (39.4%)	35 (21.2%)	4 (2.4%)	6 (3.6%)	55 (33.3%)	165
(Audit subset)	2012	12 (29.3%)	14 (34.1%)	4 (9.8%)	<3	10 (24.4%)	41
Nipple discharge/ Abnormality	1996	17 (17.0%)	11 (11.0%)	9 (9.0%)	7 (7.0%)	56 (56.0%)	100
	2001	35 (28.5%)	13 (10.6%)	3 (2.4%)	10 (8.1%)	62 (50.4%)	123
	2006	42 (33.6%)	28 (22.4%)	12 (9.6%)	11 (8.8%)	32 (25.6%)	125
(Audit subset)	2012	8 (20.0%)	7 (17.5%)	**3 (7.5%)**	3 (7.5%)	19 (47.5%)	40

- Recording of duration of:
  - Breast/axillary lump (65.9%) and nipple discharge/abnormality (52.5%) symptoms was lower in electronic sources in 2012 when compared to clinical notes for 2006 diagnosed patients and therefore comparisons between previous audit years and 2012 is not possible.
- Overall, at least 5% of patients who presented with a breast/axillary lump in 2012 audit subset had a record of waiting for at least 6 months before presentation.

3.7 Diagnosis and Staging work up

3.7.1 Type of investigations

Investigations Recorded	All Patients			
	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 Audit subset (n=411)
Mammography	655(85.7%)	823 (93.4%)	868 (91.3%)	393 (95.6%)
Fine Needle Aspiration (FNA)	653 (85.5%)	748(84.9%)	865 (91.0%)	351 (85.4%)
FNA lymph Node	N/A	N/A	N/A	140 (34.1%)
Core Biopsy	54(7.1%)	370 (42.0%)	479(50.4%)	388 (94.4%)
Ultrasound-Breast	207(27.1%)	627(71.2%)	739(77.7%)	397 (96.6%)
Chest X-Ray	375 (49.1%)	520 (59.0%)	591(62.1%)	184 (44.8%)
CT scan	18 (2.4%)	45(5.1%)	209(22.0%)	153 (37.2%)
Brain Scan	19 (2.5%)	15 (1.7%)	34 (3.6%)	<3
Bone Scan	165 (21.6%)	356(40.4%)	421 (44.3%)	89 (21.7%)
Excision Biopsy	179(23.4%)	54 (6.1%)	25(2.6%)	< 3
Other*	56(7.3%)	45(5.1%)	119 (12.5%)	57 (13.9%)

Note: Patients may have more than one type of investigation
*Other includes MRI scans, X-Rays and Ultrasounds of other parts of the body

- Investigation methods have changed over time. In particular:
  - Core biopsies have increased steadily from 7.1% in 1996 to 94.4% of patients in 2012 audit subset while excision biopsies have decreased over the same period of time ($p<0.001$).
  - Ultrasound of the breast has increased from 77.7% in 2006 to 96.6% in 2012 audit subset ($p<0.001$).
  - There has been a significant increase in the use of CT scans to detect metastatic disease from 2.4% and 5.1% in 1996 and 2001 ($p=0.004$) respectively to 22% in 2006 and 37% in 2012 ($p<0.001$).

3.7.2 Proportion of patients (%) undergoing CT scan, Bone scan and Chest x-ray by Stage of disease (2012 Audit Subset)

Stage	CT Scan		Bone Scan		Chest X-ray	
	Yes (n=153)	No (n=258)	Yes (n=89)	No (n=322)	Yes (n=184)	No (n=227)
Stage I (n=166)	21 (12.7%)	145 (87.3%)	9 (5.4%)	157 (94.6%)	79 (47.6%)	87 (51.5%)
Stage II (n=155)	66 (42.6%)	89 (57.4%)	32 (19.6%)	123 (79.4%)	86 (55.4%)	69 (44.5%)
Stage III (n=62)	49 (79.0%)	13 (20.9%)	37 (59.7%)	25 (40.3%)	14 (22.6%)	48 (77.4%)
Stage IV (n=16)	16 (100.0%)	0 (0.0%)	11 (68.8%)	5 (31.2%)	3 (18.8%)	13 (81.2%)

Note: Due to cell counts less than three the proportion of patients with unknown stage of disease could not be presented to avoid potentially identifiable patient data.

- In the 2012 audit subset there was increased recording of use of CT and Bone scans with advancing stage of disease from 12.7% of patients with stage I disease having a CT scan compared with all stage IV patients (91.7%; p<0.001) disease. Also 5.4% of patients with stage I disease had a bone scan recorded compared with over two thirds of patients (66.7%; p<0.001) with stage IV disease.

3.7.3 Histopathological type

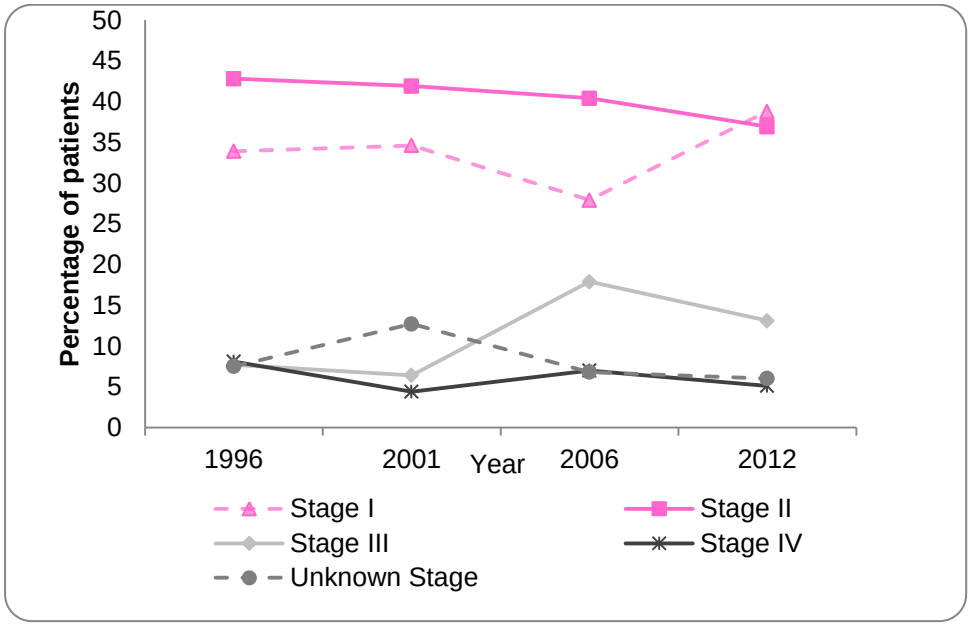
Type	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 (n=1279)
Infiltrating ductal	465 (60.9%)	663 (75.3%)	756 (79.5%)	975 (76.2%)
Infiltrating lobular	89 (11.6%)	96 (10.9%)	99 (10.4%)	148 (11.6%)
Other	147 (19.2%)	87 (9.9%)	82 (8.6%)	139 (10.9%)
Paget's disease of breast*	5 (0.7%)	23 (2.6%)	10 (1.1%)	9 (0.7%)
Malignancy not otherwise specified	58 (7.6%)	12 (1.4%)	4 (0.4%)	8 (0.6%)

* includes paget's disease and infiltrating duct carcinoma and paget's disease and Intraductal carcinoma

- The majority of tumours in all four audit years were infiltrating ductal carcinomas.
- A decrease in the recording of malignancy not otherwise specified between 1996 and following audit years was observed (p<0.001).

3.7.4 TNM stage of disease

Stage at presentation	All patients			
	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 (n=1279)
Stage I	259 (33.9%)	305 (34.6%)	265 (27.9%)	498 (38.9%)
Stage II	327 (42.8%)	369 (41.9%)	384 (40.4%)	471 (36.8%)
Stage III	59 (7.7%)	56 (6.4%)	170 (17.9%)	168 (13.1%)
Stage IV	62 (8.1%)	39 (4.4%)	67 (7.0%)	65 (5.1%)
Unknown	57 (7.5%)	112 (12.7%)	65 (6.8%)	77 (6.0%)



In 2012 6% of patients did not have a stage recorded in CaPPS. In general, patients in 2012 were diagnosed at an earlier stage than 2006:

- The proportion of stage I or II patients was 75.7% in 2012 compared with 68.3% in 2006.
- Overall there was a decrease in the proportion diagnosed with Stage III disease from 17.9% in 2006 to 13.1% in 2012 ($p<0.001$).

The proportion of Stage IV patients decreased from 7% in 2006 to 5.1% in 2012.

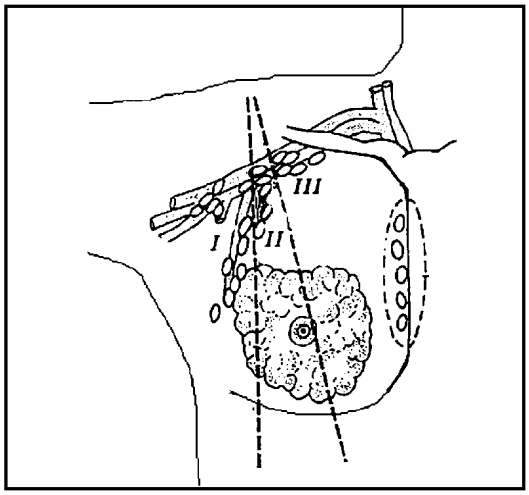
3.7.5 Stage of Disease by age at presentation

Stage by age at presentation	2012 (n=1202)			
	0-49 years (n=237)	50-70 years (n=606)	71+ years (n=359)	Total
Stage I	71 (30.0%)	308 (50.8%)	86 (24.0%)	465 (38.7%)
Stage II	114 (48.1%)	203 (33.5%)	134 (37.3%)	451 (37.5%)
Stage III	39 (16.5%)	64 (10.6%)	60 (16.7%)	163 (13.6%)
Stage IV	13 (5.5%)	21 (3.5%)	23 (6.4%)	57 (4.7%)
Unknown	0 (0.0%)	10 (1.7%)	56 (15.6%)	66 (5.5%)

- Two thirds of patients (67.8%) diagnosed at Stage I were of screening age (50-70 years).
- Over 4 in 5 patients (84.8%) with an unknown Stage at diagnosis were aged 71 years or over.
- A higher proportion of patients aged 50-70 years (50.8%; p<0.001) were diagnosed at Stage I and a higher proportion of patients aged 0-49 years (48.1%; p<0.001) were diagnosed at Stage II when compared to other age groups.
- Patients of screening age were less likely to be diagnosed at Stage III or Stage IV disease compared to those aged less than 50 or more than 71 years p<0.001).

3.7.6 Axillary Surgery

Breast tissue is drained by three lymphatic vessels that lead to one of three sets of lymph nodes: axillary (in the armpit), internal mammary (located along each side of the breast bone) and supraclavicular (located above the collar bone). As breast cancer spreads the axillary lymph nodes often become involved. The axillary lymph nodes are divided into 3 levels (I, II & III) depending on their position in relation to the pectoralis minor muscle. Level I axillary lymph nodes (low-axillary) usually become involved before level II or III axillary lymph nodes. In 2002 NICE published guidelines that state that an examination of the sentinel node (sentinel node biopsy) can be used as alternative to axillary node clearance.



3.7.6.1 Axillary Surgery: Procedure Type: 2012 Audit subset

Procedure *(ANC= Axillary Node Clearance)*	**1996 (n=542)**	**2001 (n=804)**	**2006 (n=862)**
Level I ANC	135 (19.9%)	43 (5.3%)	27 (3.1%)
Level II ANC	311 (45.9%)	162 (20.1%)	66 (7.7%)
Level III ANC	108 (16.0%)	490 (60.9%)	529 (61.4%)
Sentinel Lymph Node Biopsy*	-	-	183 (21.2%)
Not recorded	123 (18.2%)	109 (13.6%)	57 (6.6%)

Axillary Surgery 2012: Procedure Type (% of surgery patients-2012 Audit subset)	Number (%)
Sentinel lymph node biopsy only	206 (55.4%)
Completion axillary clearance procedures following sentinel lymph node biopsy	53 (14.2%)
Axillary node clearance as 1st procedure	100 (26.9%)
Other axillary node surgery (sample/dissection) + sentinel node biopsy	4 (1.1%)
No axillary surgery recorded	9 (2.4%)
Total Sentinel lymph node biopsy	262 (70.4%)

- 70.4% of surgery patients in 2012 had a sentinel lymph node biopsy (SLNB) as a 1st procedure which is an increase from 2006 when sentinel lymph node biopsy had been introduced as an alternative to axillary clearance in Altnagelvin and Ulster hospitals.
- Overall half of patients (55.4%) had SLNB alone, 14.2% of patients had completion axillary clearance procedures following SLNB and 26.9% had axillary node clearance as a 1st procedure. Following the introduction of SNLB the proportion of patients undergoing axillary clearance procedures had decreased from 81.8% in 1996 and 86.3% in 2001 to 72.2% in 2006, when SLNB was carried in some HSC Trusts to 45.1% ($p<0.001$) in 2012 when SLNB was carried out in all HSC Trusts. Of the patients who had an axillary clearance procedure as a 1st procedure (n=100), 77.6% had this following an initial investigation of fine needle aspiration of the lymph node.

3.7.6.2 Lymph node yield: 2006 and 2012 Audit subset

In previous years BASO guidelines for surgeons stated that at least four lymph nodes should be removed and examined. However this guidance was updated in 2002 by the publication of NICE guidelines which stated that this may not be required when the sentinel node is examined.

Number of Lymph Nodes	2006 All Axillary Node Clearance surgery patients (n=739)	2012 Audit subset All Axillary Node Clearance surgery patients (n=153)
<5	9 (1.2%)	3 (2.0%)
5-10	64 (8.7%)	23 (15.0%)
11-20	405 (54.8%)	80 (52.3%)
21-40	261 (35.3%)	45 (29.4%
Not recorded	0 (0.0%)	2 (1.3%)

- In 2012, 81.5% of patients undergoing axillary node clearance surgery had lymph node yield of more than 10 nodes with over half (58.5%) having 11-20 lymph nodes removed and 23% having 21-40 lymph nodes removed. This is lower than the proportion of patients (90.1%) having 10 or more lymph nodes removed in 2006.

3.7.7 Nottingham Prognostic Index

The Nottingham Prognostic Index (NPI) is a clinical indicator which gives a measure of the likelihood of survival from breast cancer. It is based upon histological grade, tumour size and number of nodes involved. It is used as an alternative to TNM (Sobin et al., 2009) to determine stage for treatment and outcome monitoring, however TNM is more commonly used for international comparisons. (See Appendix B for further information)

NPI	1996 (n=667)	2001 (n=804)	2006 (n=862)	2012 2012 Audit Subset n=372
Excellent	N/A*	N/A*	N/A*	27 (7.3%)
Good (<3.4)	237 (35.0%)	286 (35.6%)	232 (26.9%)	93 (25.0%)
Moderate (3.4-5.4)	259 (38.3%)	313 (38.9%)	412 (47.8%)	161 (43.3%)
Poor (>5.4)	87 (12.9%)	130 (16.2%)	201 (23.3%)	69 (18.5%)
Not possible	94 (13.9%)	75 (9.3%)	17 (2.0%)	22 (5.9%)

*N/A = not recorded

- Almost a third (32.3%) of patients in the 2012 Audit subset had an NPI <3.4 (good/ excellent) which although higher than that observed in 2006 (p=0.006) is similar to that observed in 2001 and 1996.
- A lower proportion of patients in the 2012 Audit subset (18.5%) had NPI >5.4 (poor) when compared to 2006 (23.3%; p=0.006).

3.7.8 Multidisciplinary Team Meetings

The effective management of breast cancer patients requires input from a range of experts. Multidisciplinary team meetings (MDTs) involve a group of healthcare professionals meeting to discuss the diagnosis and treatment of patients.

Multidisciplinary team meeting	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 Audit subset (n=411)
Yes	30 (3.9%)	230 (26.1%)	527 (55.4%)	410 (99.8%)

- Improvements in the proportions of breast cancer patients being discussed at multidisciplinary team meeting have been observed over the four audit years from a quarter of patients (26.1%) in 2001 and half of patients in 2006 (55.4%) to almost all patients within the audit cohort in 2012.

3.8 Treatment Modality

3.8.1 Treatment types for breast cancer patients 1996-2012

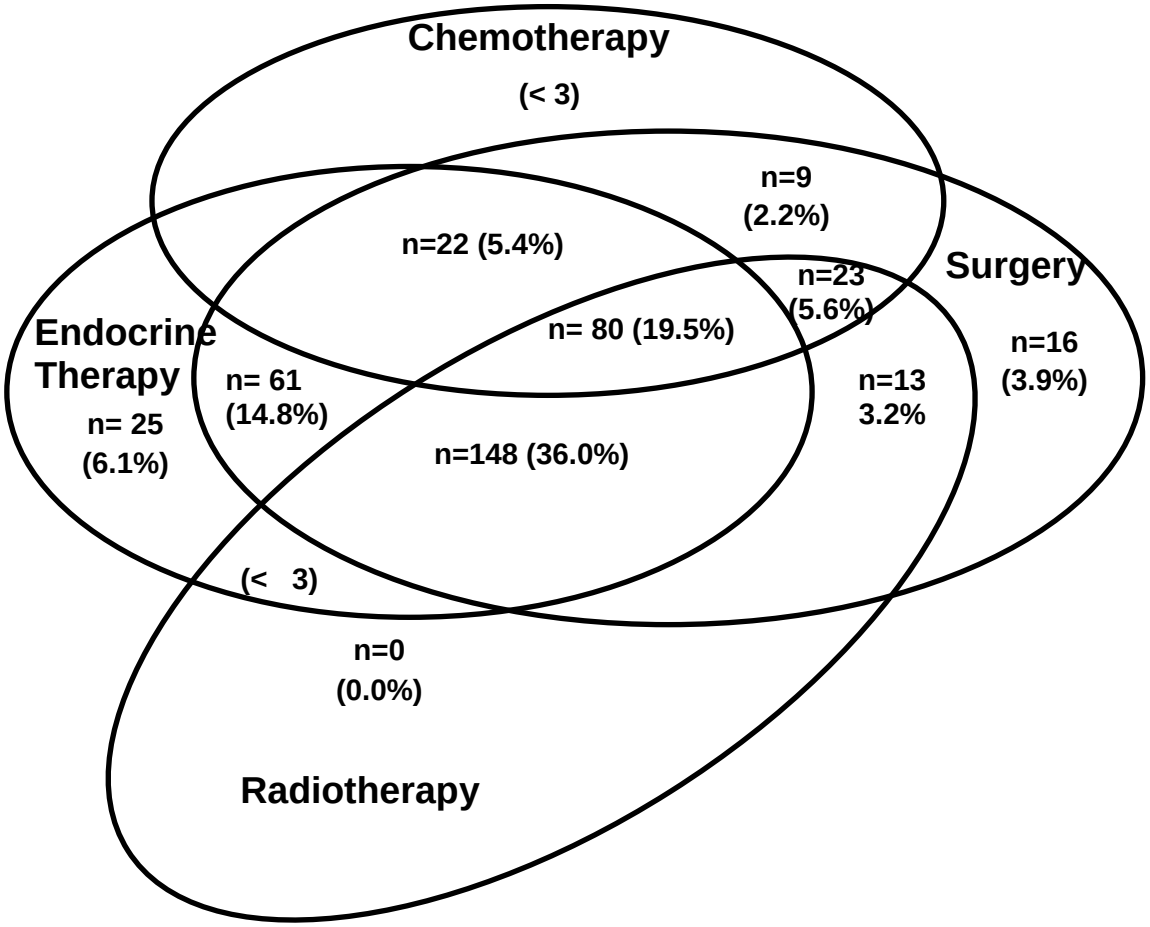
Treatment Type	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 Audit subset (n=411)
Surgery	677 (88.6%)	804 (91.3%)	862 (90.6%)	372 (90.5%)
Chemotherapy	196 (25.7%)	344 (39.0%)	434 (45.6%)	138 (33.6%)
Radiotherapy	431 (56.4%)	648 (73.6%)	637 (67.0%)	269 (65.5%)
Endocrine Therapy	719 (94.1%)	703 (79.8%)	746 (78.4%)	344 (83.7%)
Herceptin*	-	-	94 (9.9%)	34 (8.3%)
No treatment	6 (0.8%)	9 (1.0%)	18 (1.9%)	6 (1.5%)

Note: Patients may receive more than one type of treatment * Herceptin receipt collected from 2006

- 90.5% of patients within the 2012 audit subset had surgery, which is similar to the proportions of patients having surgery in previous audit years (p=0.314).
- A third of patients (33.6%) in 2012 had chemotherapy which is a decrease from 2006 when 45.6% of patients received chemotherapy (p<0.001).
- Following a decrease in the use radiotherapy between 2001 (73.6%) and 2006 (67%), no differences in the proportions of patients receiving radiotherapy were observed between 2006 (67%) and 2012 (65.5%; p=0.582).

- The use of endocrine therapy increased between 2006 (78.4%) and 2012 (83.7%; p=0.026) after staying stable between 2001 (79.8%) and 2006 (78.4%).
- The proportion of women receiving Herceptin remained relatively stable between 2006 (9.9%) and 2012 (8.3%; p=0.680).

Figure 10. Treatment Combinations: 2012 Audit Subset



*1% of patients received chemotherapy and endocrine therapy ± radiotherapy and 1.5% did not receive active treatment

3.8.2 Treatment modality: 2012 Audit Subset

- The most common treatment combination in all four audit years was the combination of surgery, radiotherapy and endocrine therapy with or without chemotherapy with over 1 in 3 of patients (36%) in 2012 receiving surgery, radiotherapy and endocrine therapy and a further 19.5% this treatment combination with the addition of chemotherapy.
- Between 2006 and 2012 there was an increase in the use of the surgery, radiotherapy and endocrine therapy combination (36% vs 26.8%) and a decrease in the use of surgery, radiotherapy, endocrine therapy and chemotherapy combination (19.5% vs 25.6%). This is due to overall decrease in use of chemotherapy which may

be due associated with the increase in the proportion of patients diagnosed at stages I and II in 2012 when compared to 2006.

- Less than 2% of patients in all four audit years did not have any form of active treatment including surgery, radiotherapy, chemotherapy or endocrine therapy.

3.8.3 Patient seen by a breast cancer nurse during diagnosis/treatment

	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 Audit subset (n=411)
Yes	298 (39.0%)	596 (67.7%)	692 (72.8%)	320* (77.9%)
No/Not recorded	466 (61.0%)	285 (32.3%)	259 (27.2%)	91 (22.1%)

- An increase in the reporting of whether a patient was seen by a breast cancer nurse was observed over the four audit years from just over a third of patients (39%) in 1996 to over three quarters of patients (77.9%) in the 2012 audit subset.
- However this latest figure may be an underestimation of the actual proportion of patients seen by breast care nurse in 2012 as the information for the 2012 Audit subset was collected from electronic sources only.

3.8.4 Proportion of patients receiving chemotherapy by stage of disease

	1996	2001	2006	2012 Audit Subset
Stage I	19/259 (7.3%)	55/305 (18.0%)	60/265 (22.6%)	16/166 (9.6%)
Stage II	126/327 (38.5%)	220/369 (59.6%)	221/384 (57.6%)	78/155 (50.3%)
Stage III	24/59 (40.7%)	32/56 (57.1%)	124/170 (72.9%)	34/62 (54.8%)
Stage IV	22/62 (35.5%)	17/39 (43.6%)	25/67 (37.3%)	10/16 (62.5%)
Unknown Stage	5/57 (8.8%)	20/112 (17.9%)	4/65 (6.2%)	0/12 (0.0%)
Total	196/764 (25.7%)	344/881 (39.0%)	434/951 (45.6%)	138/411 (33.6%)

- There has been a decrease in the proportion patients in 2012 Audit subset with stage I (9.6%) , II (50.3%) and III (54.8%) disease receiving chemotherapy when compared with patients diagnosed in 2006 (22.6% stage I, 57.6% stage II and 54.8% stage III).
- There has also been an increase in the proportion of patients with stage IV disease receiving chemotherapy in 2012 Audit subset (62.5%) when compared with patients diagnosed in 2006 (37.3%; $p<0.001$). However there was an overall decrease in the proportion of patients with stage IV disease in 2012 audit subset (3.9%) when compared with 2006 (7%).

3.8.5 Neo-Adjuvant Therapy (hormone or chemotherapy that takes place before surgery)

Hormone Therapy	n (%)
Neo-Adjuvant	20 (4.9%)
Adjuvant	208 (50.6%)
Commencement date not recorded	93 (22.6%)
No hormone therapy and/or surgery recorded	90 (21.9%)
Total	411

- 8.8% (n=20) of patients with a commencement date for hormone therapy recorded (n=228) received hormone therapy neo-adjuvantly.
- 85% of neo-adjuvant hormone therapy recorded was for patients presenting in the Belfast HSC trust.

Chemotherapy	n (%)
Neo-Adjuvant	8 (1.9%)
Adjuvant	123 (29.9%)
Commencement date not recorded	7 (1.7%)
No hormone therapy and/or surgery recorded	273 (66.4%)
Total	411

3.9 Surgery

3.9.1 Main Surgery for breast cancer

Surgery is separated into two main types: total mastectomy and the breast conserving procedures (which involves removal of the tumour but not the breast): including quadrantectomy, segmentectomy and wide local excision. The tables below report on the main surgical procedure that a patient received. A patient may have received more than one type of surgical procedure (e.g. a patient may have received a mastectomy after a wide local excision). This differs from the table in the 1996-2001 audit report which reported on the first operation received which may not always be the main operation received.

Surgery Type	Patients (% of surgery patients)			
	1996 (n=677)	2001 (n=804)	2006 (n=862)	2012 Audit subset (n=372)
Total mastectomy	350 (51.7%)	410 (51.0%)	500 (58.0%)	182 (48.9%)
Breast conserving surgery	306 (45.2%)	394 (49.0%)	361 (41.9%)	190 (51.1%)
Not recorded	21 (3.1%)	0 (0.0%)	1 (0.1%)	0 (0.0%)

- In 2012 audit subset, 48.9% of patients had a mastectomy. This is lower than the proportion of patients receiving a mastectomy in 2006 (58%; p=0.003).
- The proportion of patients receiving a mastectomy is higher in 2012 audit subset (48.9%) than previously observed in France (19.4%), Germany (30.7%) and Japan and lower than that observed in The Netherlands (55.5%) and Greece (55.6%) (Van Nes et al., 2010).

3.9.2 Breast Cancer surgery 2012: Procedure Type

Breast surgery procedure type	Number (%)
Mastectomy as 1st procedure	156 (41.9%)
Completion mastectomy	26 (7.0%)
Final mastectomy rate	182 (48.9%)
Final Breast conserving rate	190 (51.1%)

- 96.5% of patients who had breast conserving surgery also received adjuvant radiotherapy.
- 3.8% (n=14) of patients receiving surgery had bilateral mastectomies recorded and in 42.9% (n=5) of these cases this surgery was prophylactic.

3.9.3 Mastectomy by age at presentation: 2012 Audit Subset

Age at Presentation	2012	
	Total mastectomy (% of surgery patients in age group)	Breast conserving surgery
0-49	48/81 (59.3%)	33/81 (40.7%)
50-70 (screening age)	75/197 (38.1%)	122/197 (61.9%)
71 and over	58/92 (63.0%)	34/92 (37.0%)
Unknown age	1 (50.0%)	1 (50.0%)
Total	**182**	**190**

Note: Due to cell counts less than three the proportion of patients with unknown stage of disease could not be presented to avoid potentially identifiable patient data

- Almost two thirds (63%) of patients aged 71 years or over had a mastectomy. This is higher than the proportion of patients aged 0-49 years (59.3%) or 50-70 years (38.1%) who had a mastectomy.
- A higher proportion of women (61.9%) of breast screening age (50-70 years) had breast conserving surgery when compared to younger (40.7%) or older women (37%).

3.9.4 Mastectomy by stage

Stage	Patients (% of surgery patients within stage group)			
	1996 (n=677)	2001 (n=804)	2006 (n=862)	2012 Audit Subset (n=182)
Stage I	98 (37.8%)	96 (31.5%)	93 (35.1%)	45 (28.0%)
Stage II	188 (57.5%)	222 (60.2%)	236 (61.5%)	84 (58.7%)
Stage III	43 (72.9%)	44 (78.6%)	140 (82.4%)	44 (75.9%)
Stage IV	12 (19.4%)	13 (33.3%)	22 (32.8%)	6 (85.7%)
Unknown	10 (17.5%)	35 (31.3%)	9 (13.8%)	3 (100.0%)
Total	351 (45.9%)	410 (46.5%)	500 (52.6%)	182 (48.9%)

- The proportions of patients diagnosed with stage I, II or III breast cancer who had a mastectomy in 2012 were lower than observed in 2006 and 2001.
- A higher proportion (83.3%) of patients diagnosed with stage IV disease in 2012 had a mastectomy compared with 2001 (33.3%) and 2006 (32.8%).

3.9.5 Primary reconstruction (mastectomy patients only) by Trust of Surgery and Trust of Residence: 1996, 2001, 2006 and 2012 Audit subset

Trust of Surgery	Primary Reconstruction (% of mastectomies within Trust)				Trust of Residence	Primary Reconstruction (% mastectomies within Trust)	
	1996	2001	2006	2012		2006	2012
Belfast HSCT	3 (2.5%)	12 (11.0%)	27 (16.7%)	11/58 (19.0%)	**Belfast HSCT**	16 (15.7%)	8/39 (20.5%)
Northern HSCT	2 (3.3%)	4 (4.9%)	7 (8.6%)	0/36 (0.0%)	**Northern HSCT**	22 (15.7%)	5/53 (9.4%)
South-Eastern HSCT	4 (7.3%)	21 (23.9%)	31 (31.3%)	8/27 (29.6%)	**South-Eastern HSCT**	20 (21.1%)	7/35 (20.0%)
Southern HSCT	0 (0.0%)	0 (0.0%)	2 (3.1%)	3/23 (13.0%)	**Southern HSCT**	16 (16.7%)	3/26 (11.5%)
Western HSCT	0 (0.0%)	3 (5.5%)	3 (4.3%)	0/30 (0.0%)	**Western HSCT**	4 (6.0%)	1/26 (3.8%)
Private Sector	0 (0.0%)	0 (0.0%)	7 (30.4%)	3/8 (37.5%)			
Other/not recorded*	0 (0.0%)	0 (0.0%)	1 (100.0%)		**Other/not recorded***	0 (0.0%)	1/3 (33.3%)
Northern Ireland	0 (0.0%)	40 (9.8%)	78 (15.6%)	25/182 (13.7%)	**Northern Ireland**	78 (15.6%)	25/182 (13.7%)

- The proportion of patients having a primary reconstruction following a mastectomy remained similar between 2006 (15.6%) and 2012 (13.7%), however there remain differences by Trust with the Belfast and South Eastern trust patients having higher levels than other Trusts.

3.9.6 Surgery Type by Trust of Presentation: 2012 Audit subset

Trust of Presentation	2012 Audit subset		
	Mastectomy	Breast conserving surgery	Total
Belfast HSCT	60 (50.8%)	58 (49.2%)	118
Northern HSCT	36 (55.4%)	29 (44.6%)	65
South-Eastern HSCT	28 (41.8%)	39 (58.2%)	67
Southern HSCT	24 (48.0%)	26 (52.0%)	50
Western HSCT	31 (48.4%)	33 (51.6%)	64
Private Sector	3 (37.5%)	5 (62.5%)	8
Total	182 (48.9%)	190 (51.1%)	372

- There was no significant difference in receipt of breast conserving surgery by Trust. (A trend towards a higher proportion of patients (58.2%) who presented in the South-Eastern trust receiving breast conserving surgery when compared to the Northern Ireland average (51.8%) was observed but did not reach statistical significance (p=0.632).

3.9.7 Surgeon case volumes- Number of patients by main operation

Number of patients treated	Number of surgeons (% of patients)			
	Sept-Dec 1996	Sept-Dec 2001	Sept-Dec 2006	Audit subset Sept-Dec 2012
40 or more	1 (4.2%)	0 (0.0%)	0 (0.0%)	2 (11.8%)
21 to 39	2 (8.3%)	3 (17.6%)	7 (46.7%)	6 (35.3%)
11-20	5 (20.8%)	8 (47.1%)	6 (40.0%)	6 (35.3%)
2-10	13 (54.2%)	5 (29.4%)	2 (13.3%)	3 (17.6%)
1 patient	3 (12.5%)	1 (5.9%)	0 (0.0%)	0 (0.0%)
Consultants in charge	24	17	15	17
Total patients	**256**	**266**	**354**	**372**

- There was a definite trend of service centralisation with a decrease in the number of operators from 1996 to 2001. An increase in the proportion of surgeons that operated on at least forty patients in the four month period studied in 2012 was observed when compared with the same four month period in previous audit years. Similar proportions of surgeons operated on at least 21 patients in the four month period in 2006 (46.7%) and 2012 (47.1%).

3.10 Endocrine Therapy

3.10.1 Oestrogen, Progesterone and HER2 status

Oestrogen Receptor (ER) status of the tumour is a good predictive factor for response to hormonal therapy such as Tamoxifen and Anastrazole which improves overall survival especially in post-menopausal women. A test on a sample of tumour cells will reveal if the cancer has oestrogen receptors i.e. if it is oestrogen positive or negative. If a tumour is oestrogen receptor positive, then drugs such as Tamoxifen and Anastrazole can be used to block the receptor on the tumour cell and prevent growth of the cancer.

3.10.1.1 Oestrogen Receptor Status by Year

Oestrogen Receptor Status	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 Non-Audit (n=868)	2012 Audit Subset (n=411)	2012 Total (n=1279)
Positive	43 (5.6%)	596 (67.7%)	734 (77.2%)	650 (74.9%)	340 (82.7%)	990 (77.4%)
Negative	126 (16.5%	199 (22.6%)	194 (20.4%)	98 (11.3%)	53 (12.9%)	151 (11.8%)
Not recorded	595 (77.9%)	86 (9.8%)	23 (2.4%)	120 (13.8%)	18 (4.4%)	138 (10.8%)

- The proportion of patients with ER status recorded electronically was lower in 2012 (86.5%) than observed from medical notes in 2006 (97.6%).
- 86% of patients with ER status recorded had an oestrogen receptor positive tumour in 2012.

3.10.1.2 Oestrogen Receptor status by age: 2012 Audit subset

Oestrogen Receptor status	0-49 years (n=85)	50-70 years (n=204)	71+ years (n=120)
Positive	70 (82.4%)	173 (77.1%)	96 (80.0%)
Negative	14 (16.5%)	25 (12.3%)	13 (10.8%)
Not known	1 (1.2%)	6 (2.9%)	11 (9.2%)

- The proportion of patients with unknown oestrogen receptor status recorded increases with age from 1.2% in patients aged 0-49 years to 9.3% in patients aged 71 years or over (p=0.036).

3.10.1.3 Oestrogen Receptor status by Trust of presentation: 2012 Audit Subset

Oestrogen Receptor Status	Belfast (n=127)	Northern (n=70)	South Eastern (n=82)	Southern (n=54)	Western (n=69)	Private Sector (n=9)
Negative	13 (10.2%)	15 (21.4%)	7 (8.5%)	11 (20.4%)	7 (10.1%)	0 (0.0%)
Positive	106 (83.5%)	53 (75.7%)	69 (84.1%)	43 (79.6%)	60 (87.0%)	9 (100.0%)
Not known	8 (6.3%)	2 (2.9%)	6 (7.3%)	0 (0.0%)	2 (2.9%)	0 (0.0%)

- No significant differences in the proportion of patients with known oestrogen receptor status by Trust of presentation were observed

3.10.1.4 Progesterone Receptor Status

Progesterone Receptor Status	2012 Non-Audit (n=868)	2012 Audit Subset (n=411)	Total n=1279
Positive	429 (49.4%)	227 (55.2%)	656 (51.2%)
Negative	186 (21.4%)	96 (23.4%)	282 (22.1%)
Not recorded	253 (29.1%)	88 (21.4%)	341 (26.7%)

3.10.1.5 Progesterone Receptor status by age: 2012 Audit Subset

Progesterone Receptor status	0-49 years (n=85)	50-70 years (n=204)	71+ years (n=120)
Positive	**57 (67.1%)**	**108 (52.9%)**	**61 (50.8%)**
Negative	**17 (20.0%)**	**54 (26.5%)**	**24 (20.0%)**
Not recorded	**11 (12.9%)**	**42 (20.6%)**	**35 (29.2%)**

- The proportion of patients with unknown progesterone receptor status recorded increases with age from 12.9% in patients aged 0-49 years to 29.2% in patients aged 71 years or over (p=0.030).

3.10.1.6 Progesterone Receptor status by Trust of presentation: 2012 Audit Subset

Progesterone Receptor Status*	Belfast (n=127)	Northern (n=70)	South Eastern (n=82)	Southern (n=54)	Western (n=69)	Private Sector (n=9)
Negative	38 (29.9%)	14 (20.0%)	21 (25.6%)	7 (13.0%)	13 (18.8%)	3 (33.3%)
Positive	77 (60.6%)	0 (0.0%)	49 (59.8%)	46 (85.2%)	49 (71.0%)	6 (66.7%)

* Unknown Progesterone status is not presented by trust of presentation to avoid disclosure of potentially identifiable information.

- A higher proportion of patients (80%) presenting in the Northern trust did not have progesterone status recorded when compared with those presenting in other trusts.

3.10.1.7 Human Epidermal Growth Factor Receptor 2 (HER2) Status

HER2 Status	2006	2012 Non-Audit n=868	2012 Audit n=411	2012 Total n=1279
Positive	161 (16.9%)	85 (8.8%)	45 (10.9%)	130 (10.2%)
Negative	690 (72.6%)	678 (78.1%)	310 (75.4%)	988 (77.2%)
Not recorded	100 (10.5%)	105 (12.1%)	56 (13.6%)	161 (12.6%)

- Of the 45 patients who had HER2 receptor positive status recorded in 2012 audit subset, 68.9% (n=31) were prescribed Herceptin.

3.10.1.8 HER2 Receptor status by age: 2012 Audit Subset

HER2 status	0-49 years (n=85)	50-70 years (n=204)	71+ years (n=120)
Positive	19 (22.4%)	17 (8.3%)	8 (6.7%)
Negative	56 (65.9%)	162 (79.4%)	91 (75.8%)
Not known	10 (11.8%)	58 (12.3%)	21 (17.5%)

- The proportion of patients with unknown HER2 receptor status increases with age from 6.3% in patients aged 0-49 years to 13.4% in patients aged 71 years or over (p=0.002).

3.10.1.9 HER2 Receptor status by Trust of presentation: 2012 Audit Subset

HER2 status	Belfast (n=127)	Northern (n=70)	South Eastern (n=82)	Southern (n=54)	Western (n=69)	Private Sector (n=9)
Negative	103 (81.1%)	52 (74.3%)	62 (75.6%)	38 (70.4%)	50 (72.5%)	5 (55.6%)
Positive	14 (11.0%)	4 (5.7%)	4 (4.9%)	14 (25.9%)	5 (7.2%)	4 (44.4%)
Not known	10 (7.9%)	14 (20.0%)	16 (19.5%)	2 (3.7%)	14 (20.3%)	0 (0.0%)

- Recording of HER2 status was highest in Belfast (92.1%) and Southern (96.3%) Trusts.

3.10.2 Patients receiving endocrine therapy: 2012 Audit subset

Endocrine Drugs	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 (n=411)
Tamoxifen*	696 (91.1%)	673 (76.4%)	457 (48.1%)	170 (41.3%)
Anastrazole*	3 (0.4%)	25 (2.8%)	271 (28.5%)	143 (34.8%)
Letrozole	N/A	N/A	N/A	28 (6.8%)
Other**	20 (2.6%)	5 (0.6%)	18 (1.9%)	3 (0.7%)
None Recorded	45 (5.9%)	178 (20.2%)	205 (1.6%)	67 (16.3%)

includes tamoxifen or anastrazole in combination with zoladex Includes Arimadex and Zoladex n=1, other n=1, tamoxifen & zoladex n=3, Zoladex n=2, Goserlin

- 83.7% of patients received hormonal therapy in 2012 which is higher than observed in 2006 (78.4%).
- The proportion of patients receiving Tamoxifen decreased from 91.1% in 1996 to 41.3% and over the same time there has been an increase in the proportion of patients receiving Anastrazole from 0.4% in 1996 to 34.8% in 2012. In 2012 6.8% of patients received Letrozole.
- Overall 50.3% of patients who received endocrine therapy in the form of an aromatase inhibitor (Anastrozole or Letrozole) had a DEXA scan recorded before commencing therapy with 54.9% of patients starting on Anastrozole and 28.6% starting on Letrozole having a DEXA scan recorded.

3.10.2.1 Patients receiving endocrine therapy by age: 2012 Audit Subset

Endocrine Therapy	0-49 years n=85	50-70 years n=204	71+ years n=120
Tamoxifen	61 (71.8%)	80 (39.2%)	25 (20.8%)
Anastrozole	4 (4.7%)	78 (38.2%)	60 (50.0%)
Letrozole	3 (3.5%)	11 (5.4%)	14 (11.7%)
Other*/Not Recorded	17 (20.0%)	33 (16.2%)	21 (17.5%)

Note: Other and Not Recorded are presented together due to small cell counts and to avoid disclosure of potentially identifiable information * Other n=5 or less

- The use of Tamoxifen decreased with age and aromatase inhibitor use increased as age increased, with 75.3% of patients aged under 50 years commencing on Tamoxifen and 61.7% of patients aged 71+ years commencing on Anastrozole or Letrozole. This is as expected due to clinical indications.

3.10.2.2 Tamoxifen or Anastrazole prescription and ER status of patients

Tamoxifen/ Anastrazole prescribed	1996		2001		2006		2012 Audit subset	
	ER status		ER status		ER status		ER status	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Yes	37 (86.0%)	114 (90.5%)	578 (97.0%)	53 (26.6%)	705 (96.0%)	10 (5.2%)	297 (98.3%)	5 (1.7%)
No	6 (14.0%)	12 (9.5%)	18 (3.0%)	146 (73.4%)	29 (4.0%)	184 (94.8%)	16 (25.0%)	48 (75.0%)
Prescribed Letrozole	N/A	N/A	N/A	N/A	N/A	N/A	27 (100.0%)	0 (0.0%)
Patients*	43	126	596	199	734	194	340	53

- Over time and since 2006 there has been better targeting of endocrine therapies to ER status positive patients.

3.10.2.3 Tamoxifen or Aromatase Inhibitor prescription by HER2 status: 2012 Audit Subset

HER2 status	Arimidex (anastrazole)	Femara (letrozole)	Tamoxifen	Other*/None Recorded/Missing	Total
Positive	6 (13.3%)	3 (6.7%)	24 (53.3%)	12 (26.6%)	45
Negative	116 (37.4%)	22 (7.1%)	125 (40.3%)	47 (15.2%)	310
Not known/not recorded	20 (35.7%)	3 (5.4%)	18 (32.1%)	15 (26.8%)	56
Total	142 (34.5%)	28(6.8%)	167 (40.6%)	74 (18.0%)	411

* including zoldex alone and in combination

3.10.2.4 Tamoxifen or Aromatase Inhibitor prescription by ER status: 2012 Audit Subset

ER status	n	Arimidex (anastrazole)	Femara (letrozole)	Tamoxifen	Any Endocrine Therapy (including Zoldex alone and in combination)	None Recorded/Missing
Positive	340	132 (38.8%)	27 (96.4%)	161 (47.4%)	326 (95.9%)	14 (4.1%)
Negative	53	/ *	/ *	3 (5.7%)	5 (10.4%)	48 (90.6%)
Not known	18	/ *	/ *	3 (5.7%)	13 (72.2%)	5 (27.8%)
Total	411	142 (34.5%)	28 (6.8%)	167 (40.6%)	344 (83.7%)	67 (16.3%)

* Cannot be presented due to cell counts less than 3

3.11 Timelines

3.11.1 First seen at hospital to diagnosis- All patients by age (excluding patients under regular outpatient review)

Time (days)	1996 (n=764)			2001 (n=881)			2006 (n=951)			2012 (n=1201)		
	Under 60 years	60 years and over	Total	Under 60 years	60 years and over	Total	Under 60 years	60 years and over	Total	Under 60 years	60 years and over	Total
Not Recorded	7 (1.8%)	4 (1.0%)	11 (1.4%)	11 (2.4%)	9 (2.1%)	20 (2.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Percentage of patients with timeline recorded											
Day 1	200 (53.5%)	221 (58.3%)	421 (55.9%)	361 (82.0%)	339 (80.5%)	700 (81.3%)	354 (78.8%)	423 (84.3%)	777 (81.7%)	464 (93.7%)	671 (95.0%)	1135 (94.5%)
Day 14	304 (81.3%)	326 (86.0%)	630 (83.7%)	411 (93.4%)	393 (93.3%)	804 (93.4%)	407 (90.6%)	483 (96.2%)	890 (93.6%)	478 (95.6%)	692 (98.0%)	1170 (97.4%)
Day 31	334 (89.3%)	365 (96.3%)	699 (92.8%)	429 (97.5%)	407 (96.7%)	836 (97.1%)	423 (94.2%)	492 (98.0%)	915 (96.2%)	487 (98.4%)	703 (99.6%)	1190 (99.1%)
Day 62	358 (95.7%)	374 (98.7%)	732 (97.2%)	433 (98.4%)	412 (97.9%)	845 (98.1%)	441 (98.2%)	497 (99.0%)	938 (98.6%)	490 (99.0%)	705 (99.9%)	1195 (99.5%)

- In 2012, 94.5% of patients were diagnosed on day of presentation. This is an increase from 81.7% in 2006 and 81.3% in 2001
- Only 0.5% of patients waited more than 62 days to be diagnosed in 2012.
- No significant differences in time to diagnosis by age at presentation were observed with 96% of patients aged under 60 years diagnosed with 14 days of presentation compared with 98% of patients aged over 60 years ($p>0.05$). This is in contrast to that observed 2006 when an association with age at presentation and time to diagnosis was observed with a higher proportion of patients aged 60 years and over (96%) diagnosed within 14 days of presentation than those aged under 60 years (91%; $P<0.001$).

3.11.2 Time from presentation to diagnosis by referral type – 2012 (Excluding patients presenting in the private sector or through breast screening programme)

	Consultant Upgrade to 'Red Flag'	GP 'Red Flag'	Other, Routine	Other, Urgent	No referral priority recorded	Total
Day 1	190 (94.5%)	394 (97.5%)	112 (88.9%)	69 (93.2%)	6 (85.7%)	771 (95.1%)
Day 14	196 (98.5%)	399 (98.8%)	124 (98.4%)	73 (98.6%)	7 (100.0%)	799 (98.6%)
Day 31	199 (100.0%)	402 (99.5%)	125 (99.2%)	74 (100.0%)	7 (100.0%)	807 (99.6%)
Day 62	199 (100.0%)	404 (100.0%)	126 (100.0%)	74 (100.0%)	7 (100.0%)	810 (100.0%)

After the exclusion of patients who presented via the private sector and those referred through the breast screening programme:

- In 2012, 603 (74.4%) of patients were on the 'Red Flag' pathway, 69 patients (8.5%) had an urgent referral from another and 13.8% had a routine referral from another source.
- The proportion of patients diagnosed on day of presentation were highest for those patients referred through the GP 'Red Flag' pathway (97.5%) and consultant upgrade to 'Red Flag' (94.5%).
- A higher proportion of patients with GP 'Red Flag' (97.5%), consultant upgrade (94.5%) to 'Red Flag' and urgent referral (93.2%) from another source were diagnosed on day of presentation for investigation than those with a routine referral from another source.
- No significant differences in the proportion of patients diagnosed with 14 days of presentation were observed by referral type.

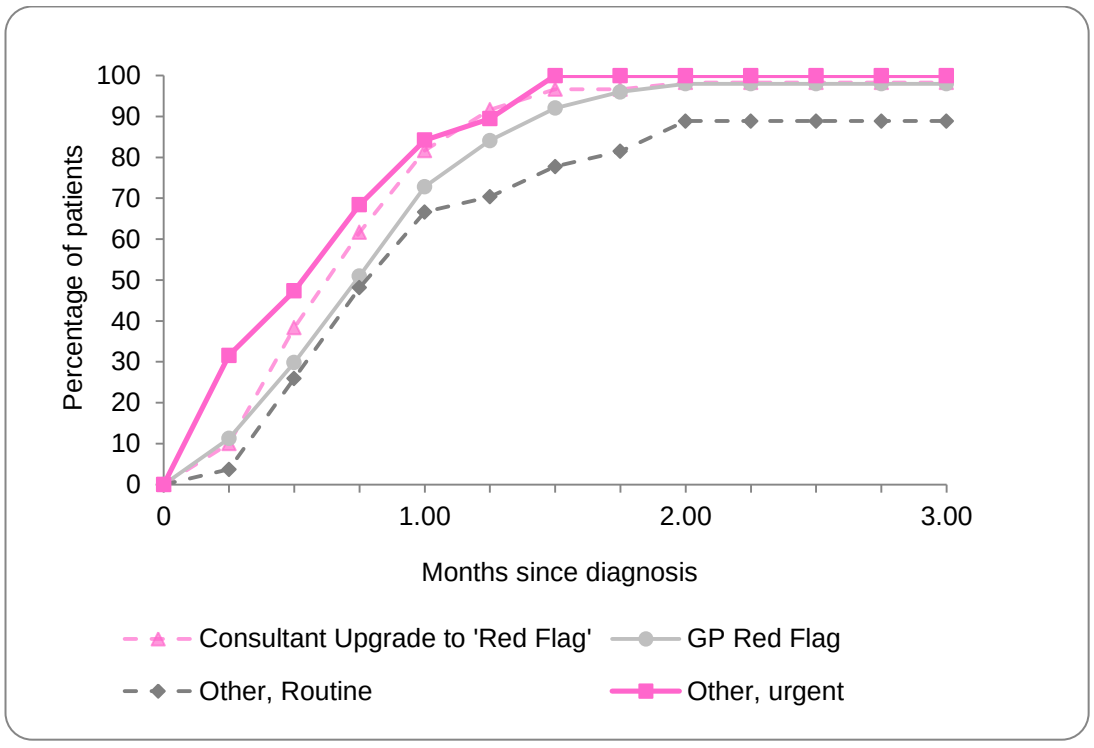
3.11.3 Diagnosis to surgery by age: 2012 Audit subset (% of surgery patients excluding patients presenting in the private sector or through breast screening programme)

Time (days)	1996 (n=764)			2001 (n=881)			2006 (n=951)			2012		
	Under 60 years	60 years and over	Total	Under 60 years	60 years and over	Total	Under 60 years	60 years and over	Total	Under 60 years (n=104)	60 years and over (n=124)	Total
Not Recorded	9 (2.4%)	14 (4.6%)	23 (3.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Percentage of patients with timeline recorded											
Day 1	35 (9.7%)	54 (18.5%)	89 (13.6%)	20 (4.5%)	21 (5.8%)	41 (5.1%)	21 (4.8%)	7 (1.7%)	28 (3.2%)	3 (2.9%)	2 (1.6%)	5 (2.2%)
Day 14	205 (56.6%)	190 (65.1%)	395 (60.4%)	236 (53.3%)	204 (56.5%)	440 (54.7%)	187 (42.4%)	198 (47.1%)	385 (44.7%)	25 (24.0%)	33 (26.6%)	58 (25.4%)
Day 31	323 (89.2%)	261 (89.4%)	584 (89.3%)	396 (89.4%)	328 (90.9%)	724 (90.0%)	356 (80.7%)	363 (86.4%)	719 (83.5%)	71 (68.3%)	89 (71.8%)	160 (70.2%)
Day 62	346 (95.6%)	277 (94.9%)	623 (95.3%)	422 (95.3%)	351 (97.2%)	773 (96.1%)	417 (94.6%)	406 (96.7%)	823 (95.6%)	95 (91.3%)	117 (94.4%)	212 (93.0%)

- In 2012, 25.4% of patients had surgery within 14 days of diagnosis. This is significantly lower than the proportion (44.7%; $p<0.001$) of patients that received surgery by day 14 in 2006.
- In 2012 93% of patients had surgery within 62 days of diagnosis and 70.2% of patients had surgery within 31 days of diagnosis. Again this was significantly lower than the proportion (83.5%; $p<0.001$) of patients within 31 days of diagnosis in 2006 but to a lesser extent than observed at day 14.

3.11.4 Time from diagnosis to 1st surgery by referral type – 2012 Audit subset (Excluding patients presenting in the private sector or through breast screening programme)

	Consultant Upgrade to 'Red Flag' (n=56)	GP 'Red Flag' (n=134)	Other, Routine (n=21)	Other, Urgent (n=13)	No referral priority recorded (n=5)	Total (n=229)
Day 14	21 (37.5%)	30 (22.4%)	8 (38.1%)	<3	<3	63 (27.5%)
Day 31	45 (80.4%)	88 (65.7%)	15 (71.4%)	8 (61.5%)	4 (80.0%)	160 (69.9%)
Day 62	53 (94.6%)	124 (92.5%)	20 (95.2%)	11 (84.6%)	5 (100.0%)	213 (93.0%)



- A higher proportion of patients in 2012 audit subset with consultant upgrade to 'Red Flag' received surgery within 14 days (37.5%) and 31 days (80.4%) of diagnosis compared with patients other referral priorities.
- No significant differences in the proportion patients receiving surgery within 62 days of diagnosis were observed by referral source in 2012 audit subset.

3.11.5 Diagnosis to 1st treatment (including surgery, radiotherapy, chemotherapy or endocrine therapy) - 2012 Audit subset

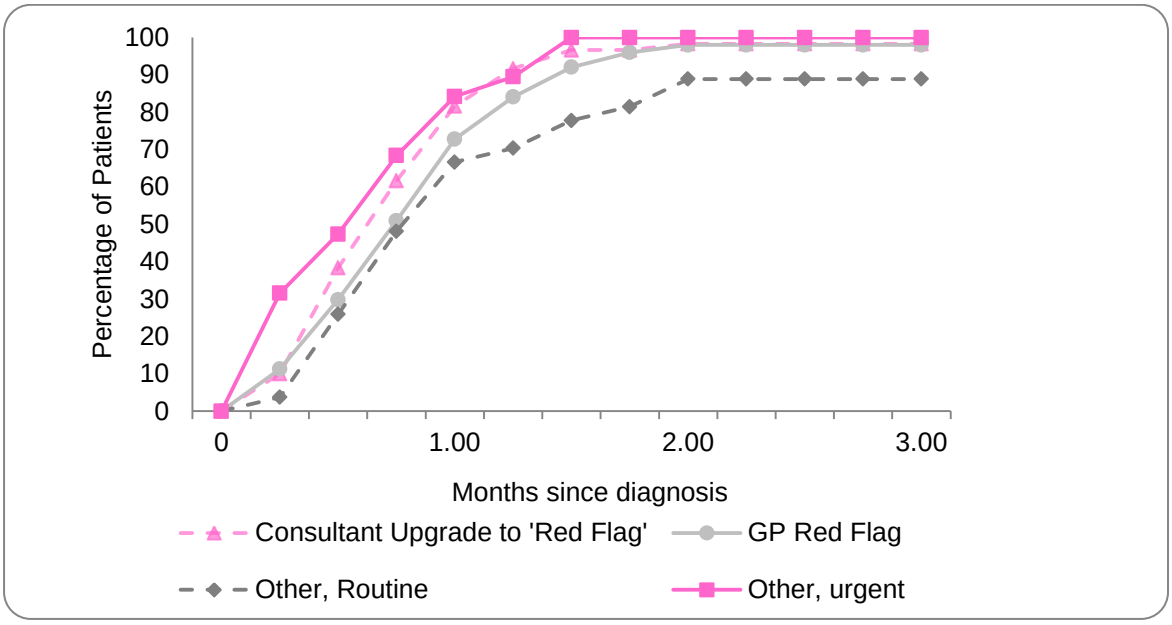
Time (days)	2012 (n=403) Under 60 years n=170	60 years and over n=233	Total
	Percentage of patients with timeline recorded		
Day 1	7 (4.1%)	6 (2.6%)	13 (3.2%)
Day 14	57 (33.5%)	89 (38.2%)	146 (36.2%)
Day 31	133 (78.2%)	194 (83.2%)	327 (81.1%)
Day 62	169 (99.4%)	231 (99.1%)	400 (99.3%)

- Over a third of patients (36.2%) in the 2012 audit subset received 1st treatment within 14 days of diagnosis with 8 out of 10 patients (81.1%) receiving 1st treatment within first month of diagnosis.

3.11.6 Time from diagnosis to 1st treatment by referral type – 2012 Audit subset (Excluding patients presenting in the private sector or through breast screening programme)

	Consultant Upgrade to 'Red Flag' (n=60)	GP 'Red Flag' (n=151)	Other, Routine (n=27)	Other, Urgent (n=19)	No referral priority recorded (n=6)	Total (n=263)
Day 14	25 (41.7%)	49 (32.4%)	11 (40.7%)	9 (47.3%)	<3	96 (36.5%)
Day 31	50 (83.3%)	112 (74.1%)	20 (74.1%)	16 (84.2%)	4 (66.7%)	202 (76.8%)
Day 62	60 (100.0%)	151 (100.0%)	26 (96.7%)	19 (100.0%)	6 (100.0%)	262 (99.6%)

- A higher proportion of patients in 2012 audit subset with consultant upgrade to 'Red Flag' or urgent referral from another source received 1st treatment within 14 days (41.7% and 47.3% respectively) and 31 days (83.3% and 84.2% respectively) of diagnosis compared with patients other referral priorities.
- No significant differences in the proportion patients receiving treatment within 62 days of diagnosis were observed by referral source in 2012 audit subset.



3.12 Information and Follow up care

3.12.1 Information recorded in medical notes/electronic sources

Information recorded in notes	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 Audit subset (n=411)
Diagnosis discussed with patient	156 (20.4%)	842 (95.6%)	891 (93.7%)	377 (91.7%)
Diagnosis discussed with relatives	N/A	N/A	N/A	215 (52.3%)
Prognosis discussed with patient	N/A	N/A	N/A	217 (52.8%)
Treatment plan discussed with patient	159 (20.8%)	841 (95.5%)	850 (89.4%)	393 (95.6%)
Record of information given (written information given)	22 (2.9%)	324 (36.8%)	176 (18.5%)	172 (41.8%)
Referred to oncology centre	534 (69.9%)	768 (87.2%)	883 (92.8%)	334 (81.3%)
Entered into clinical trial	29 (3.8%)	133 (15.1%)	5 (0.5%)	56 (14.0%)

- A higher proportion of patients in 2012 had a record of treatment plan being discussed (95.6%) and written information given (41.8%) when compared to 2006.
- Recording of discussions around diagnosis with the patient were similar in 2012 (91.7%) and 2006 (93.7%) In 2012, there was a record that the prognosis was discussed with over half of patients (52.8%).
- Although not recorded in the electronic sources used to collect data for the audit, 56 patients (14%) within the audit subset in 2012 were entered on a clinical trial. The Clinical trials included the Poetic study, SUPREMO study, and Lymphoedema study.

3.12.2 Further care details

Further care after treatment	1996 (n=764)	2001 (n=881)	2006 (n=951)	2012 Audit subset (n=411)
Community Nurse	169 (22.1%)	382 (43.4%)	278 (29.2%)	38 (9.2%)
MacMillan Nurse	27 (3.5%)	25 (2.8%)	32 (3.4%)	8 (1.9%)
Hospice	28 (3.7%)	19 (2.2%)	18 (1.9%)	4 (1.0%)
Marie Curie Nurse	10 (1.3%)	4 (0.5%)	4 (0.4%)	0 (0.0%)
Palliative Care Specialist	14 (1.8%)	25 (2.8%)	39 (4.1%)	20 (4.9%)
Psychologist	12 (1.6%)	20 (2.3%)	15 (1.6%)	5 (1.2%)
Physiotherapist	N/A	N/A	N/A	35 (8.5%)
Breast Care Nurse	75 (9.8%)	227 (25.8%)	51 (5.4%)	320 (78%)
Information on support groups/education	68 (8.9%)	130 (14.8%)	30 (3.2%)	3 (0.7%)
Review Plan	572 (74.9%)	826 (93.8%)	859 (90.3%)	N/A**
Other*	44 (5.8%)	200 (22.7%)	129 (13.6%)	49 (11.9%)
Genetic Referral offered	N/A**	N/A**	N/A**	55 (13.4%)
No onward referral recorded	125 (16.4%)	12 (1.4%)	12 (1.3%)	69 (16.8%)

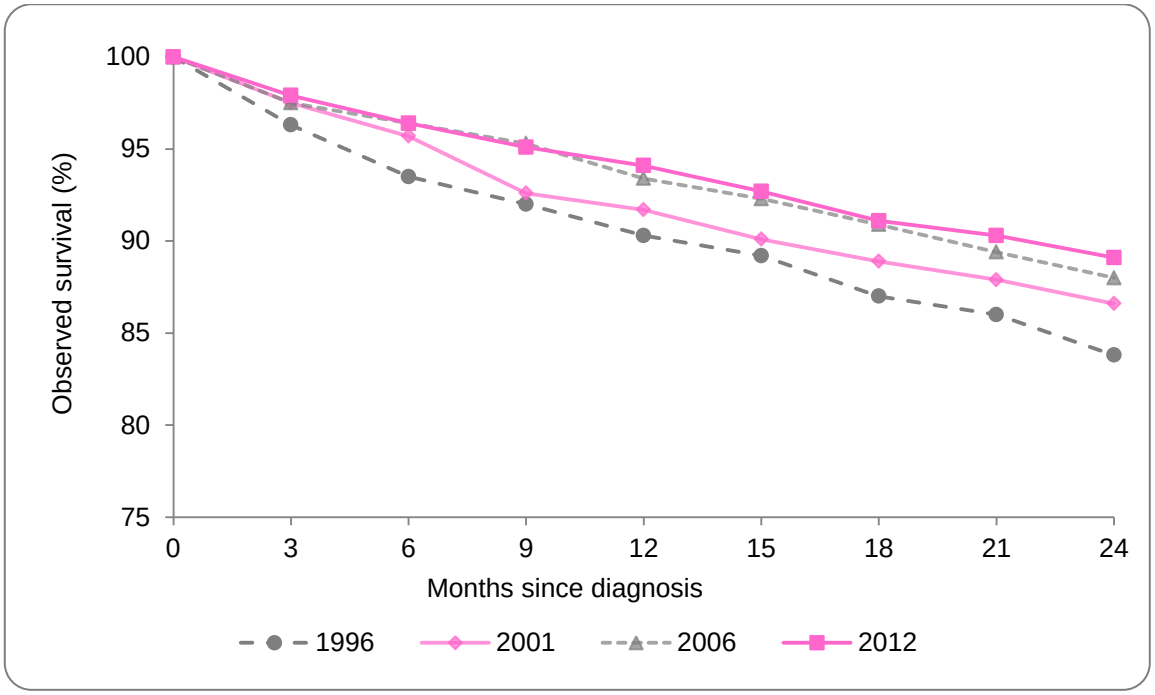
***** Other includes further care from social worker, counselling, occupational therapist and other healthcare professionals **N/A= not collected

- In 2012, 13.4% of patients had a record of being offered a referral for genetic testing.
- Overall, we found that recording of further after care treatment was lower in the electronic sources (CaPPS and COIS) used for the 2012 audit than was available through note review (2006 patients).

3.13 Patient outcomes

3.13.1 Observed survival (percentage of patients alive) of patients diagnosed with Invasive Breast cancer (C50) in Audit years 1996, 2001, 2006 and 2012

Months since diagnosis	1996	2001	2006	2012
6 months	93.5%	95.8%	96.3%	96.6 %
12 months	90.4%	91.7%	93.4%	94.2%
18 months	87.1%	89.0%	90.8%	91.1%
24 months	83.9%	86.6%	87.8%	88.9%

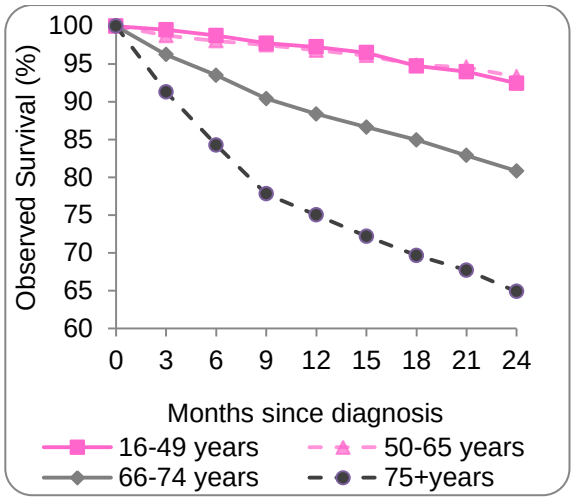


- Survival for breast cancer patients diagnosed in 2012 was excellent with observed survival (which includes deaths from other causes) 94.2% after one year and 88.9% after two years.
- Although survival was significantly higher in 2001 compared with 1996 (p=0.004) and there was a trend approaching significance towards a higher survival in 2006 when compared with 2001 (p=0.075), survival had plateaued between 2006 and 2012 with no significant differences observed (p=0.156).

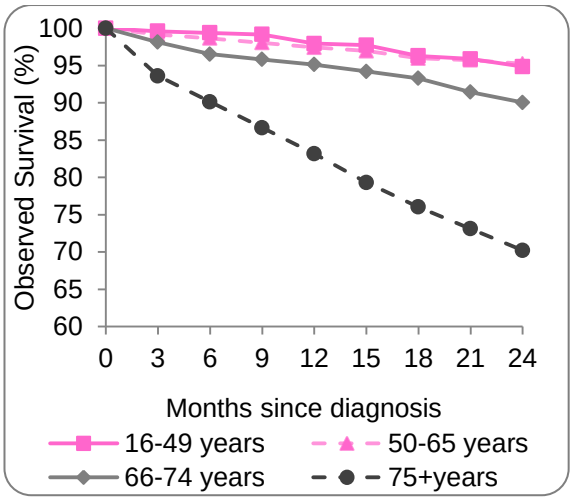
3.13.2 Survival by age: 1996 & 2001 and 2006 & 2012 combined

Observed Survival by Age	1996 &2001				2006 &2012			
	16-49 years	50-65 years	66-74 years	75+ years	16-49 years	50-65 years	66-74 years	75+ years
6 months	98.7%	98.0%	93.5%	84.3%	99.4%	98.7%	96.5%	90.1%
12 months	97.2%	96.8%	88.4%	75.0%	97.9%	97.4%	95.1%	83.2%
18 months	94.7%	94.8%	84.9%	69.7%	96.3%	96.0%	93.3%	76.0%
24 months	92.4%	93.3%	80.8%	64.9%	94.8%	95.2%	90.0%	70.2%

1996 & 2001



2006 & 2012



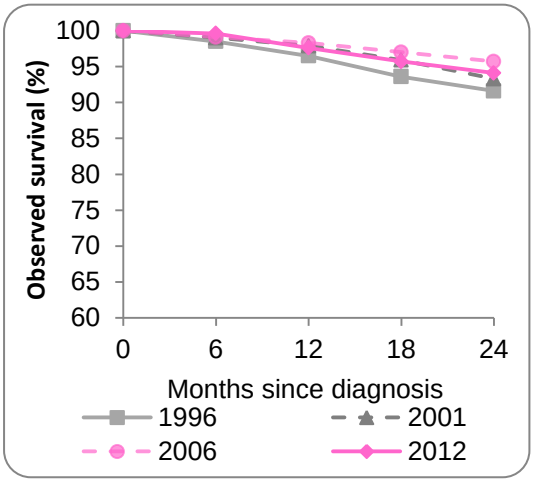
- Overall survival for patients within all age groups was significantly higher in 2006 & 2012 when compared with 1996 and 2001 with the most marked difference observed in patients aged 66-74 years with an almost 10% increase from 80.8% at 2 years following diagnosis in 1996 & 2001 to 90% at 2 years following diagnosis in 2006 & 2012 ($p<0.001$).
- Observed survival for breast cancer patients was similar for those aged 16 to 49 years and 50-65 years in both 1996 & 2001 and 2006 & 2012 audit years.
- However after the age of 65 years, observed survival decreased with increasing age ($p<0.001$). In particular two-year observed survival was 70.2% for those aged over 75 years when compared to 90% for those aged 66-74 years in 2012.

3.13.3 Survival by year of diagnosis and age (16-49 years, 50-65 years, 66-74 years and 75+ years)

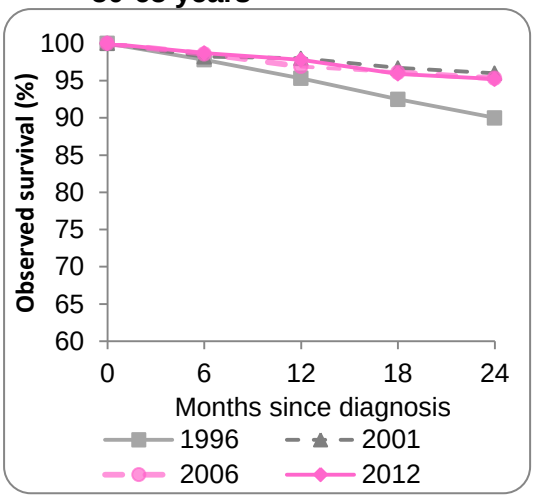
Observed survival by age and year of diagnosis	1996	2001	2006	2012
		16- 49 years		
6 months	98.5%	99.0%	99.1%	99.6%
12 months	96.5%	97.9%	98.3%	97.6%
18 months	93.6%	95.9%	97.0%	95.7%
24 months	91.6%	93.3%	95.7%	94.1%
		50-65 years		
6 months	97.8%	98.2%	98.6%	98.7%
12 months	95.3%	98.0%	96.9%	97.8%
18 months	92.5%	96.7%	96.1%	95.9%
24 months	90.0%	96.0%	95.3%	95.2%
		66-74 years		
6 months	92.5%	94.5%	96.4%	96.6%
12 months	89.1%	87.6%	95.2%	95.1%
18 months	85.7%	84.1%	94.0%	92.9%
24 months	81.6%	80.0%	89.2%	90.6%
		75+ years		
6 months	80.7%	87.8%	89.6%	90.5%
12 months	75.6%	74.4%	81.0%	84.8%
18 months	71.0%	68.3%	73.3%	78.0%
24 months	65.9%	63.9%	66.5%	73.0%

- Observed survival improvements were most marked for ladies over 65, however some of this is explained by improved general survival from other causes (see 3.13.4).
- No significant differences in survival by age were observed between patients aged less than 75 years at diagnosis in 2006 and 2012. However survival at two years following diagnosis for patients diagnosed over the age of 75 years in 2012 (73%) was significantly higher than observed in previous audit years. ($p<0.001$).

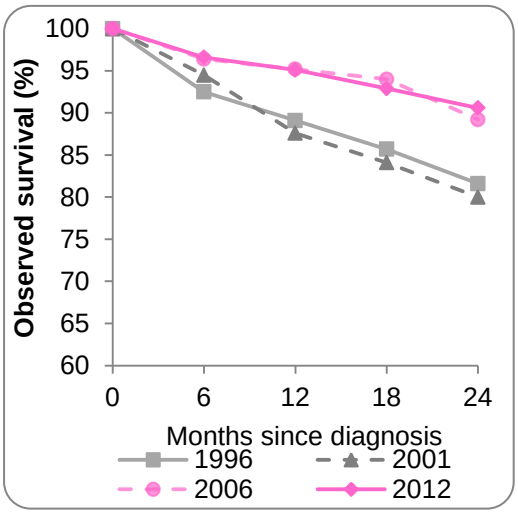
16- 49 years



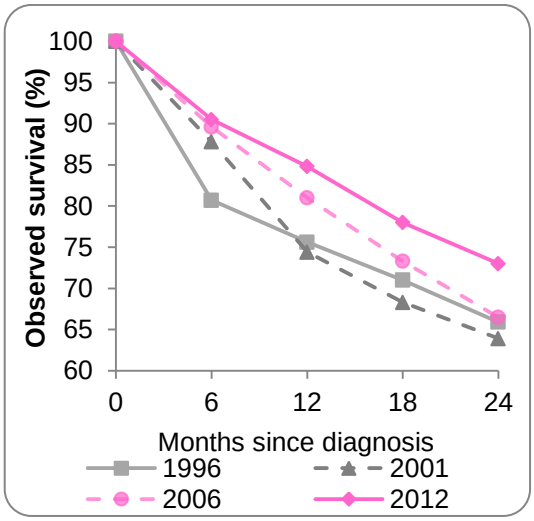
50-65 years



66-74 years



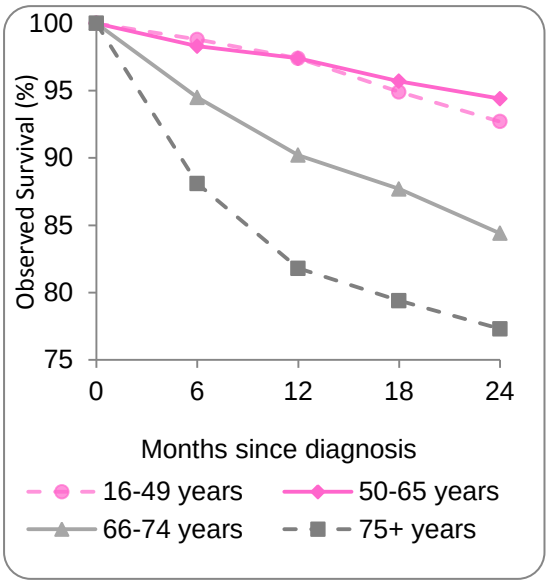
75+years



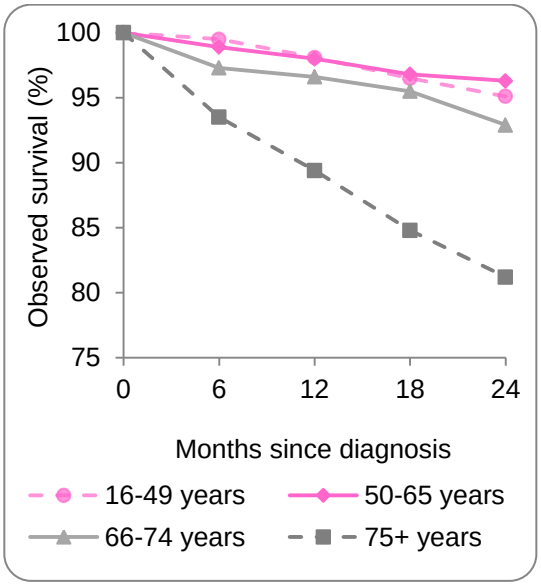
3.13.4 Relative Survival by age (this takes account of background mortality levels and better indicates deaths from breast cancer alone)

Relative Survival by age	1996 & 2001				2006 & 2012			
	16-49 years	50-65 years	66-74 years	75+ years	16-49 years	50-65 years	66-74 years	75+ years
6 months	98.8%	98.3%	94.5%	88.1%	99.5%	98.9%	97.3%	93.5%
12 months	97.4%	97.4%	90.2%	81.8%	98.1%	98.0%	96.6%	89.4%
18 months	94.9%	95.7%	87.7%	79.4%	96.5%	96.8%	95.5%	84.8%
24 months	92.7%	94.4%	84.4%	77.3%	95.1%	96.3%	92.9%	81.2%

1996 & 2001



2006 & 2012

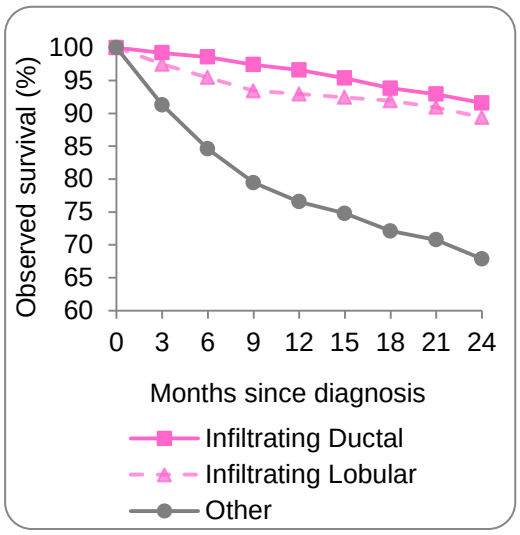


- Following the removal of deaths from causes other than breast cancer from the survival analysis (i.e. relative survival), the differences in survival by age are partially removed. This suggests that at least some of the age inequalities relating to survival are due to the higher frequency of other co-morbidities among older people.

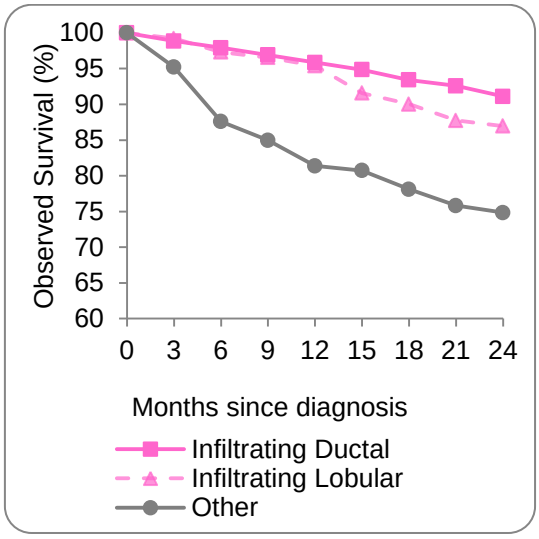
3.13.5 Observed survival (percentage of patients alive) by cell type: 1996 &2001 and 2006 & 2012 combined

Observed Survival by Cell type	1996 & 2001			2006 & 2012		
	Infiltrating Ductal	Infiltrating Lobular	Other	Infiltrating Ductal	Infiltrating Lobular	Other
6 months	98.6%	95.5%	84.6%	97.9%	97.3%	87.6%
12 months	96.6%	92.9%	76.6%	95.9%	95.4%	81.4%
18 months	93.8%	91.9%	72.1%	93.4%	90.0%	78.1%
24 months	91.6%	89.4%	67.9%	91.1%	87.0%	74.8%

1996 & 2001



2006 & 2012

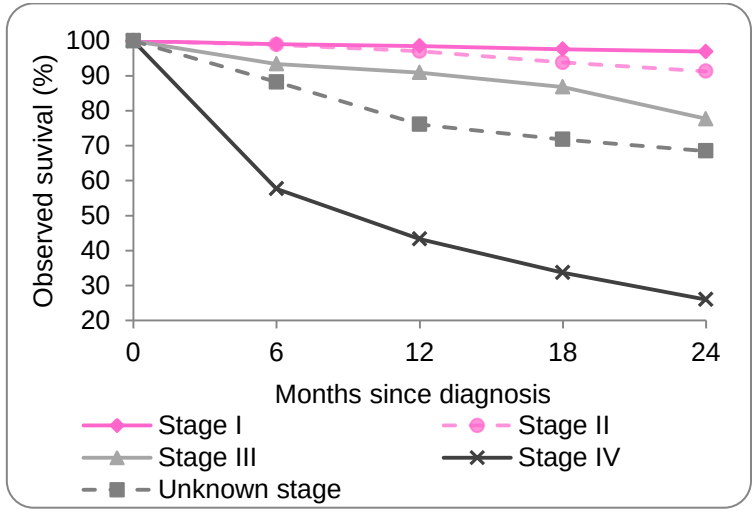


- No significant differences in survival by tumour cell type were observed between 1996 & 2001 and 2006 & 2012.
- However in both 1996 & 2001 and 2006 & 2012 survival was higher for patients with infiltrating ductal and infiltrating lobular tumours when compared with tumours of other cell types ($p<0.001$).

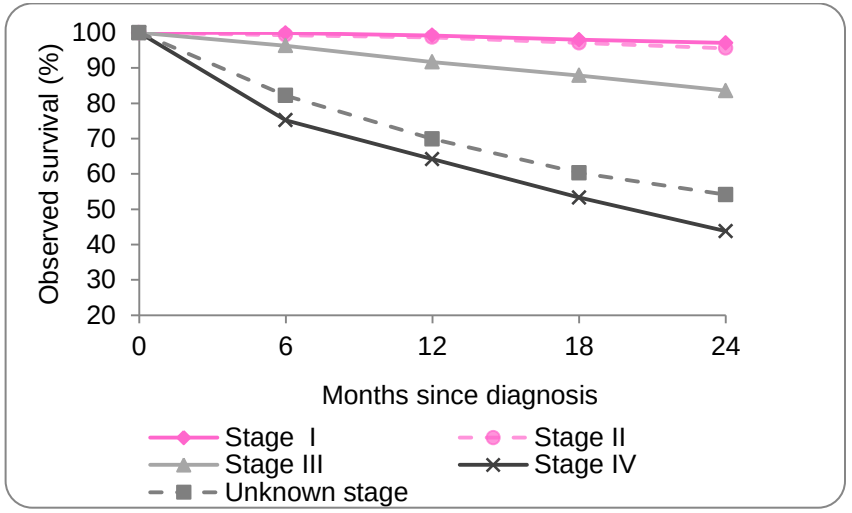
3.13.6 Observed survival (percentage of patients alive) by stage: 1996 &2001 and 2006 & 2012 combined

	1996 & 2001					2006 & 2012				
	Stage I	Stage II	Stage III	Stage IV	Unknown stage	Stage I	Stage II	Stage III	Stage IV	Unknown stage
6 months	99.0%	98.9%	93.4%	57.7%	88.2%	99.9%	99.3%	96.3%	75.2%	82.2%
12 months	98.5%	97.0%	90.9%	43.3%	76.1%	99.2%	98.7%	91.7%	64.2%	69.9%
18 months	97.6%	93.8%	86.8%	33.7%	71.8%	98.0%	97.1%	87.9%	53.3%	60.3%
24 months	96.9%	91.3%	77.7%	26.0%	68.5%	97.1%	95.6%	83.6%	43.8%	54.1%

1996 & 2001



2006 & 2012



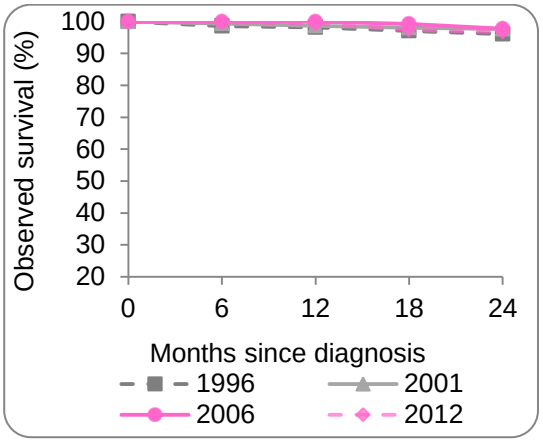
- Survival was best for earlier stage disease in 2006/2012 diagnosed patients, Stage I observed survival was 97% at 2 years compared with 44% for Stage IV disease (96% Stage II, 84% Stage III).
- Survival improved significantly from 1996-2001 for patients diagnosed with Stage II (91%), Stage III (78%) or Stage IV (26%).
- As overall survival has improved the survival differences by stage of disease are unlikely to be due to stage shift (i.e. more thorough investigation of patients leads to more accurate staging).

3.13.7 Observed survival (percentage of patients alive) year of diagnosis and stage

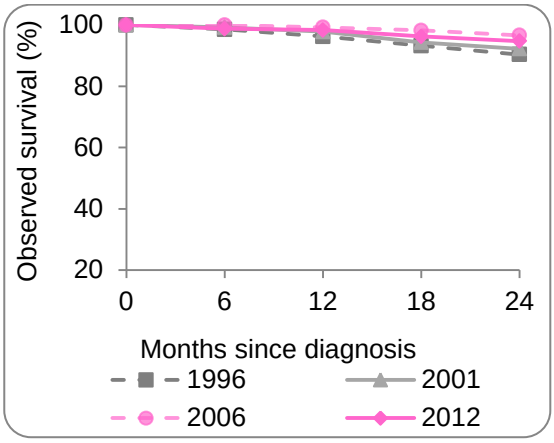
Observed survival by stage	1996	2001	2006	2012
		Stage I		
6 months	98.6%	99.4%	100.0%	99.8%
12 months	98.2%	98.7%	100.0%	99.4%
18 months	97.1%	98.1%	99.3%	97.4%
24 months	96.1%	97.7%	97.8%	96.8%
		Stage II		
	1996	2001	2006	2012
6 months	98.5%	99.2%	100.0%	98.7%
12 months	96.2%	97.8%	99.2%	98.3%
18 months	93.2%	94.3%	98.2%	96.2%
24 months	90.3%	92.2%	96.6%	94.7%
		Stage III		
	1996	2001	2006	2012
6 months	90.5%	96.6%	96.0%	96.5%
12 months	87.3%	94.8%	91.4%	91.9%
18 months	82.5%	91.4%	89.1%	86.7%
24 months	77.8%	77.6%	86.3%	80.9%
		Stage IV		
	1996	2001	2006	2012
6 months	59.4%	55.0%	75.4%	75.0%
12 months	46.9%	37.5%	60.9%	67.6%
18 months	35.9%	30.0%	52.2%	54.4%
24 months	28.1%	22.5%	39.1%	48.5%
		Unknown Stage		
	1996	2001	2006	2012
6 months	85.3%	90.1%	84.2%	80.0%
12 months	78.4%	74.5%	73.7%	65.7%
18 months	73.2%	70.9%	61.8%	58.6%
24 months	67.0%	69.5%	55.3%	52.9%

- No significant differences in observed survival of patients diagnosed with stage I, II and III in 2006 and 2012 were observed. However survival at 2 years following a diagnosis of stage IV Breast cancer was higher in 2012 when compared to previous audit years ($p<0.001$).

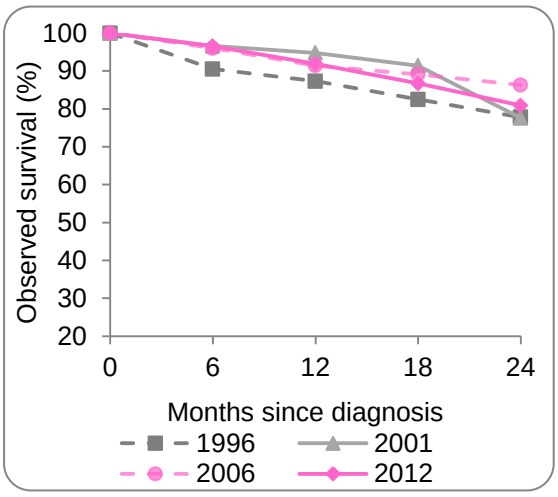
Stage I



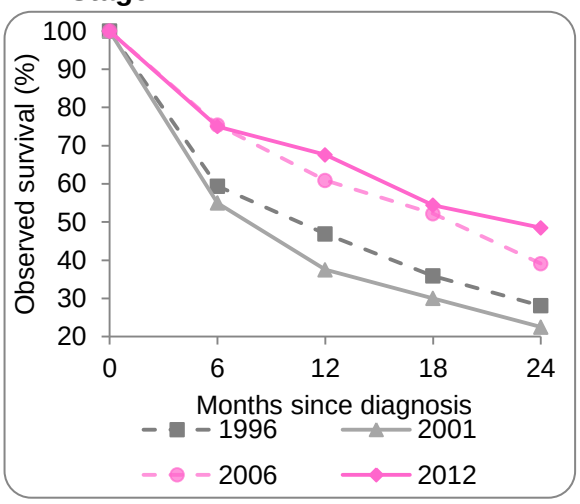
Stage II



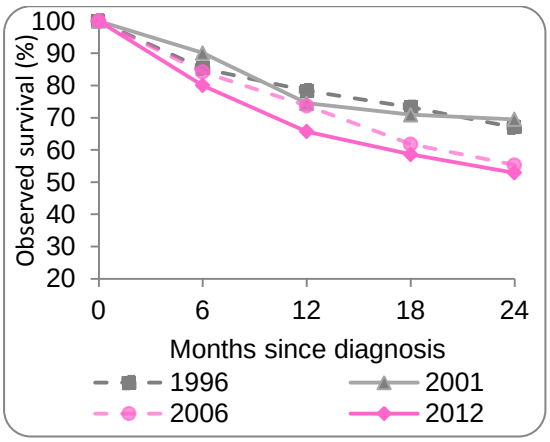
Stage III



Stage IV



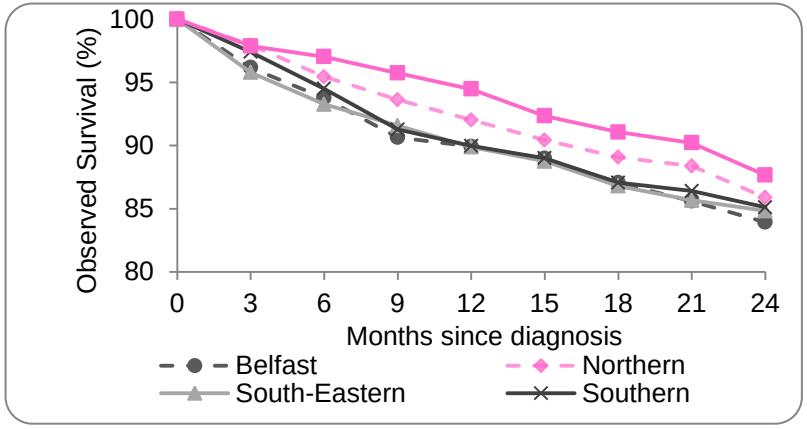
Unknown Stage



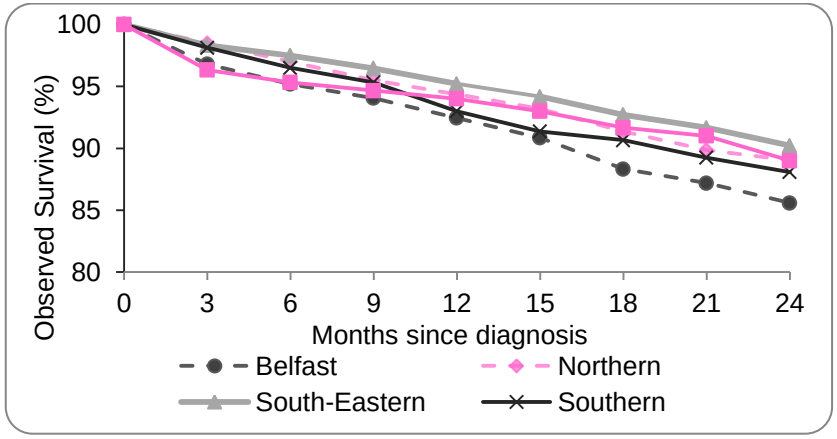
3.13.8 Observed survival (percentage of patients alive) by Trust of residence: 1996 &2001 and 2006 & 2012 combined

	1996 & 2001					2006 & 2012				
	Belfast	Northern	South-Eastern	Southern	Western	Belfast	Northern	South-Eastern	Southern	Western
6 months	93.8%	95.4%	93.3%	94.5%	97.0%	95.2%	97.0%	97.5%	96.5%	95.3%
12 months	89.9%	92.0%	89.9%	90.0%	94.5%	92.5%	94.4%	95.2%	93.0%	94.0%
18 months	87.1%	89.1%	86.8%	87.1%	91.1%	88.3%	91.4%	92.7%	90.7%	91.7%
24 months	83.9%	85.9%	84.8%	85.1%	87.7%	85.6%	89.0%	90.2%	88.1%	89.0%

1996 & 2001



2006 & 2012



- Survival was significantly higher in Belfast (p=0.020) and South-Eastern (p=0.006) Trust residents in 2006 & 2012 when compared with 1996 & 2001.
- Although survival was significantly lower in Belfast Trust residents (p<0.05) in 1996 & 2006, no significant differences in survival across the five HSC Trusts in 2006 & 2012 were observed.

4. BREAST CANCER SUMMARY

4.1 Study Patients

- The number of women diagnosed with invasive breast cancer increased by 52% between 1996 and 2012 with 1,287 patients diagnosed in 2012.

4.2 Referral and Presentation

- Over half (56%) of patients diagnosed with breast cancer in the 2012 audit subset came through GP referrals.
- Almost a third (29.9%) of all breast cancer patients diagnosed in 2012 (Audit subset) were referred through the breast screening programme which is double the number of referrals through BSP that were observed in 2006 (15.6%).
- Almost a third (32.4%) of patients had a GP 'red flag' referral priority recorded, 16% had a consultant upgrade to 'red flag' and 6.5% had an urgent referral from another source.
- After exclusion of screening patients no differences in the proportion of patients (n=818) with consultant upgrade to 'red flag' and GP 'red flag' referrals were observed between patients aged 0-49 years, 50-70 years and 70+years.
- However a higher proportion of patients aged 0-49 years had a routine referral from another source (20.5%) when compared with those aged 50-70 years (14.1%) and 71+ years (13.9%).

4.3 Family History, Co morbidities and lifestyle factors: 2012 Audit Subset

- Approximately 1 in 5 women had a positive family history of breast cancer in a first degree relative.
- Over a third of patients (39.4%) had a positive family history of breast cancer in any relative.
- There was higher recording of family history of breast cancer in 2012 when compared to other audit years.
- Less than half of patients (47%) in 2012 had a co-morbidity recorded which is lower than observed in 2006 (64.1%).
- A quarter of patients (26%) in the 2012 audit subset had hypertension, 13.9% had Chronic Pulmonary Disease (CPD) including asthma and 9.2% of patients had anxiety/depression.
- Oral contraceptive history was recorded for 42.8% women with 1 in 4 women reporting either past use (22.7%) or current use (3.3%).
- For patients that used oral contraceptives 1 in 3 (33%) reported duration of use for 5 years or more.

- Hormone Replacement Therapy history was recorded for 57.5% women with 15.6% women reporting past use and 3% reporting use of hormone replacement therapy at time of breast cancer diagnosis.

4.4 Symptoms: 2012 Audit Subset

- Over half of patients (52.1%) presented with a breast or axillary lump in 2012.
- 1 in 3 women were asymptomatic in 2012 with 8 of 10 asymptomatic patients being referred through the breast screening programme.
- A higher proportion (76.5%) of women aged 0-49 years presented with a breast/axillary lump when compared to those aged 50-70 years (33.3%) and 71+ years (67.5%).
- There was little change in the proportion of women presenting with nipple discharge/abnormality and skin changes between 2006 and 2012 (each approx. 10%).
- A higher proportion of women aged 71+ years presented with nipple discharge or abnormality (15.8%) when compared with women in younger age groups (11.8% of patients aged 0-49 years and 5.4% of patients aged 50-70 years).
- The proportion of women reporting have a breast/axillary lump for 12 months or more decreased from 4.6% in 2006 to 1.4% in 2012.

4.5 Diagnosis: 2012 Audit Subset

- The proportion women having a mammogram and/or a fine needle aspiration has remained relatively stable over time.
- There has been an increase in the proportion of women having a core biopsy with 94.4% having core biopsy in 2012 compared with 50.4% in 2006.
- The majority of tumours in all four audit years were infiltrating ductal carcinomas with the proportion of women with infiltrating ductal carcinomas remaining relatively stable over time.
- A higher proportion of women in 2012 (75.7%) were diagnosed at stage I or stage II than in 2006 (68.3%).
- Recording of stage has remained stable over time with 94% patients having a stage recorded in 2012 when compared with 92.5% in 1996, 87.3% in 2001 and 93.2% in 2006.
- 70.4% of patients undergoing a surgical procedure had a sentinel node biopsy which is an increase from 21.2% in 2006 when sentinel node biopsies were carried out in Altnagelvin and Ulster hospital.
- An increase in the reporting of whether a patient was seen by a breast cancer nurse during treatment was observed over the four audit years from just over a third of patients (39%) in 1996 to over three quarters of patients (77.9%) in the 2012 audit subset.

4.6 Treatment: 2012 Audit Subset

- Improvements in the proportions of breast cancer patients being discussed at multidisciplinary team meeting have been observed over the four audit years from a quarter of patients (26.1%) in 2001 and half of patients in 2006 (55.4%) to almost all patients within the audit cohort in 2012 (99.8%).
- There was a definite trend of service centralisation with a decrease in the number of operators from 1996 to 2001. An increase in the proportion of surgeons that operated on at least forty patients in the four month period studied in 2012 was observed when compared with the same four month period in previous audit years. Similar proportions of surgeons operated on at least 21patients in the four month period in 2006 (46.7%) and 2012 (47.1%).
- 90.5% of patients within the 2012 audit subset had surgery, which is similar to the proportion of patients having surgery that were observed across the previous three audit years.
- Use of chemotherapy decreased between 2006 and 2012 with a third of patients (33.6%) receiving chemotherapy in 2012 compared with 45.6% receiving chemotherapy in 2006.
- Following a decrease in the use of radiotherapy 2001 (74%) and 2006 (67%), the proportions of patients receiving radiotherapy between 2006 and 2012 (65.5%) remained stable.
- There was an increase in use of endocrine therapy between 2001, 2006 and 2012 with over 8 of 10 patients (83.7%) in 2012 receiving a form of endocrine therapy.
- 8.3% patients in 2012 received herceptin as a treatment which was similar to the proportion receiving herceptin in 2006 (9.9%).
- The most common treatment combination in all four audit years was surgery, radiotherapy and endocrine therapy with or without the addition of chemotherapy.
- Less than 2% of patients across all audit years did not have any form of active treatment.
- Almost 10% fewer patients had a mastectomy in 2012 when compared to 2006, with approximately half of surgery patients in 2012 having a mastectomy (48.9%) and half (51.1%) receiving a breast conserving surgical procedure.
- Almost 2 of 3 (63%) patients over the age of 71 years had a mastectomy which was a higher than the proportion patients aged 0-49 years (59.3%) and 50-70 years (38.1%).
- In 2012, patients of screening age (50-70 years) were more likely to have breast conserving surgery (61.9%) than younger (40.7%) or older women (37%).
- The proportions of women diagnosed with stage I, II or III breast cancer that went on to have a mastectomy were lower in 2012 than observed in 2006 and 2001. The proportions of patients receiving a mastectomy following diagnosis with stage IV disease remained increased from 32.8% in 2006 to 85.7% in 2012.
- A similar proportion of women received a primary reconstruction following a mastectomy in 2012 (13.7%) when compared to 2006 (15.6%) however there remain

differences by Trust with the Belfast and South Eastern Trust patients having higher levels than other Trusts.

- An increase in the proportion of patients receiving endocrine therapy was observed between the 2001 and 2006 audit years and 2012, with approximately 8 in 10 patients in 2012 receiving a form of endocrine therapy.
- Over time and since 2006 there has been better targeting of endocrine therapies to ER receptor positive patients.
- There was a decrease in the proportion of patients commencing on Tamoxifen and an increase in the proportion of patients commencing on Anastrozole and Letrozole observed between 2006 and 2012.
- In 2012 audit subset half (50.3%) of patients who received endocrine therapy in the form of an aromatase inhibitor (Anastrozole and Letrozole) had a DEXA scan recorded before commencing therapy.
- However, the recording of DEXA scan varied by the type of aromatase inhibitor prescribed with a higher of patients starting on Anastrozole (54.9%) having a DEXA scan recorded compared with 28.6% starting on Letrozole having a DEXA scan recorded.

4.7 Timelines

- In 2012, 94.5% of patients were diagnosed on day of presentation. This is an increase from 81.7% in 2006 and 81.3% in 2001.
- No significant differences in time to diagnosis by age at presentation were observed with 96% of patients aged under 60 years diagnosed with 14 days of presentation compared with 98% of patients aged over 60 years ($p>0.05$). This is in contrast to that observed 2006 when an association with age at presentation and time to diagnosis was observed with a higher proportion of patients aged 60 years and over (96%) diagnosed within 14 days of presentation than those aged under 60 (91%; $P<0.001$).
- In 2012, 603 (74.4%) of patients were on the 'Red Flag' pathway, 69 patients (8.5%) had an urgent referral from another source and 13.8% had a routine referral from another source.
- A higher proportion of patients with GP 'Red Flag' (97.5%), consultant upgrade (94.5%) to 'Red Flag' and urgent referral (93.2%) from another source were diagnosed on day of presentation for investigation than those with a routine referral from another source
- No significant differences in the proportion of patients diagnosed with 14 days of presentation for investigation were observed by referral type.
- In 2012 25.4% of patients had surgery within 14 days of diagnosis. This is significantly lower than the proportion (44.7%; $p<0.001$) of patients that received surgery by day 14 in 2006.
- In 2012, 70.2% of patients had surgery within 31 days of diagnosis. Again this was significantly lower than the proportion (83.5%; $p<0.001$) of patients within 31 days of diagnosis in 2006 but to a lesser extent than observed at day 14.

- A higher proportion of patients in 2012 audit subset with consultant upgrade to 'Red Flag' received surgery within 14 days (37.5%) and 31 days (80.4%) of diagnosis compared with patients other referral priorities.
- No significant differences in the proportion patients receiving surgery within 62 days of diagnosis were observed by referral source in 2012 audit subset.
- Over a third of patients (36.2%) in the 2012 audit subset received 1st treatment within 14 days of diagnosis with 8 out of 10 patients (81.1%) receiving 1st treatment within first month of diagnosis.
- A higher proportion of patients in 2012 audit subset with consultant upgrade to 'Red Flag' or urgent referral from another source received 1st treatment within 14 days (41.7% and 47.3% respectively) and 31 days (83.3% and 84.2% respectively) of diagnosis compared with patients other referral priorities.

4.8 Information and follow up care: 2012 Audit Subset

- A higher proportion of patients in 2012 had a record of treatment plan being discussed (95.6%) and written information given (41.8%) when compared to 2006.
- In 2012 the prognosis was discussed with over half of patients (52.8%).
- Although not recorded in the electronic sources used to collect data for the audit, 56 patients (14%) within the audit subset in 2012 were entered on a clinical trial. The Clinical trials included the Poetic study, SUPREMO study and Lymphoedema study.

4.9 Patient Outcomes

- Survival for breast cancer patients diagnosed in 2012 was excellent with observed survival (which includes deaths from other causes) 94.2% after one year and 88.9% after two years.
- Although survival was significantly higher in 2001 compared with 1996 ($p=0.004$) and there was a trend approaching significance towards a higher survival in 2006 when compared with 2001 ($p=0.075$), survival had plateaued between 2006 and 2012 with no significant differences observed ($p=0.156$).
- Overall survival for patients within all age groups was significantly higher in 2006 & 2012 when compared with 1996 and 2001 with the most marked difference observed in patients aged 66-74 years with an almost 10% increase from 80.8% at 2 years following diagnosis in 1996 & 2001 to 90% at 2 years following diagnosis in 2006 & 2012 ($p<0.001$).
- Observed survival for breast cancer patients was similar for those aged 16 to 49 years and 50-65 years in both 1996 & 2001 and 2006 & 2012 audit years.
- However after age 65 years observed survival decreased with increasing age ($p<0.001$). In particular two-year observed survival was 70.2% for those aged over 75 years when compared to 90% for those aged 66-74 years.
- Observed survival improvements were most marked for ladies over 65, however some of this is explained by improved general survival from other causes.
- No significant differences in survival by tumour cell type were observed between 1996 & 2001 and 2006 & 2012.

- In both 1996 & 2001 and 2006 & 2012 survival was higher for patients with infiltrating ductal and infiltrating lobular tumours when compared with tumours of other cell types ($p<0.001$).
- Survival was best for earlier stage disease in 2006/2012 diagnosed patients, Stage I observed survival was 97% at 2 years compared with 44% for Stage IV disease (96% Stage II, 84% Stage III).
- Survival improved significantly from 1996-2001 for patients diagnosed with Stage II (91%), Stage III (78%) or Stage IV (26%).
- As overall survival has improved the survival differences by stage of disease are unlikely to be due to stage shift (i.e. more thorough investigation of patients leads to more accurate staging).

4.10 Conclusions

The number of women diagnosed with invasive breast cancer in N. Ireland continues to increase with almost a third referred from the breast screening services, an increase from previous years reflecting the extension of the screening age limit.

Five-year relative survival following a diagnosis of invasive breast cancer has improved considerably over the last sixteen years with an estimated 9.6% improvement for patients diagnosed in 2008-2013 when compared with those diagnosed 1993-1997.

While some women delay presenting with symptoms the situation in relation to earlier diagnosis has improved as evidenced by stage at presentation and recorded delays.

Standard processes such as discussion at a MDT are in place for all patients while almost 80% had a record of Clinical Nurse Specialist involvement.

There was clear evidence of increased service centralisation and specialisation with protocols for sentinel node biopsy and improved targeting of hormone therapy evident.

Breast cancer patients received investigation and treatment promptly and within guidelines.

14% of patients were enrolled in clinical trials, which is a welcome increase from that observed in previous audit years.

13% of patients were referred to clinical genetics, an increase from previous years.

4.11 Recommendations

- Differences by Trust in breast reconstruction should be investigated.
- Awareness needs to be raised of the less common symptoms such skin changes as these account for about 10% of presentations. Differences in the assessment of oestrogen and progesterone receptor status by age at diagnosis and age at presentation should be investigated.
- The proportions of patients having surgery within 62 days of diagnosis in 2012 audit subset were similar to that observed in previous audit years, however a decrease in proportions of patients receiving surgery within 31 days of diagnosis in 2012. This may be due to treatments or investigations carried out before surgery in 2012 and warrants further investigation.
- A review of records to assess the proportion of patients commencing on aromatase inhibitors that received a DEXA scan in line with the NICE Clinical Guideline for breast cancer care (2009), showed that only half of patients starting on Aromatase Inhibitors had a DEXA recorded. This observation may be a true reflection of clinical practice or may be due to availability of this information within the electronic records searched. This should be investigated further.

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APPENDIX A –Summary of UK and NI breast cancer guidelines 1996-2011

1996: NI Cancer Services – Investing for the future

1. The management of patients with cancer should be undertaken by appropriately trained, organ and disease specific medical specialists.

2. All patients with cancer should be managed by multidisciplinary, multi-professional specialist cancer teams.

3. A Cancer Forum should be established involving all key interests in the delivery of cancer services.

4. Cancer Units should, in conjunction with local GPs and other providers, develop an effective communication strategy.

5. Northern Ireland should have one Cancer Centre, which in addition to its regional role, should act as a Cancer Unit to its local catchment population of around half a million.

6. There should be four other Cancer Units, one in each Board area, each serving a population of around a quarter of a million.

7. Radiotherapy services, together with chemotherapy services, should be moved as soon as possible to the Belfast City Hospital and become an integral part of the regional Cancer Centre.

8. Each Cancer Unit should develop a chemotherapy service. This service should be staffed by designated specialist nurses and pharmacists, and should be overseen by the non-surgical oncologist attached to the Unit, with back-up from a haematologist.

9. There should be a minimum target of 13 consultants in non-surgical oncology for Northern Ireland by 2005.

10. Any new appointments of trained cancer specialists should be to Cancer Units or to the Cancer Centre.

11. Guidelines should be drawn up and agreed for the appropriate investigation and management of patients presenting to non-cancer unit hospitals who turn out to have cancer.

12. The Cancer Centre and Cancer Units should each develop a specialist multi-professional palliative care team.

13. There should be a comprehensive review of palliative care services in Northern Ireland.

14. The N. Ireland Cancer Registry should be adequately resourced.

1996: Cancer Services – Investing for the future – Cancer working group sub-group reports

1. There should be one Breast Unit in each of the Northern, Southern and Western Board areas and two Units within the Eastern Board area (one Unit which should form part of the Cancer Centre) in order that populations of approximately 250,000 – 300,000 can be served. This population size would be expected to produce 150+ patients with breast cancer per year.

2. The Breast Unit at each of the five locations should be staffed by multidisciplinary teams, specialising in the treatment of breast disease. The "first stage" diagnostic team should include surgeons, radiologists, radiographers, a pathologist and a breast care nurse. The "second stage" treatment team should include the following additional members – oncologist, reconstructive/plastic surgeon and a psychologist.

3. The Breast Unit should provide a "one stop shop" at the initial diagnostic assessment clinic. Diagnosis should normally be based on triple assessment, which is clinical opinion followed by imaging and cytology or needle histology as required. Psychological/counselling support should also be available to the patient at the initial assessment clinic, with the breast care nurse playing a key role.

4. An initial treatment plan for the patient with breast cancer should be developed and explained to the patient at the initial assessment clinic. The treatment plan should be devised on the basis of multidisciplinary case discussion. The best method of achieving this should be for local unit determination.

5. Purchasers (General Practitioners and Boards) should ensure contracting arrangements determine that patients with suspected breast disease are only referred to the breast specialist at the Breast Unit. Purchasing patterns should reflect this practice.

6. Breast screening and symptomatic services should be integrated and common standards should apply across both where relevant.

7. Patients attending a Breast Unit for diagnostic purposes should be seen by a senior doctor with a specialist interest in breast disease, i.e. a breast specialist surgeon (consultant surgeon or associate specialist with special training in breast disease) or level 3 trainees in breast disease. Higher surgical trainees should only give unsupervised opinions in breast diagnostic clinics when judged competent to do so by the supervising consultant. They should also have been working on the Breast Unit for at least two months.

8. In the case of operative treatments, all patients' operations should either be undertaken by, or supervised by, a specialist breast care consultant surgeon. The consultant's supervisory role permits the training needs of future specialists to be met and, simultaneously, ensures the delivery of a high quality of care.

9. Each specialist Breast Unit should be in a position to offer reconstructive breast surgery, preferably undertaken by a surgeon with an interest in this aspect of breast disease. If such an arrangement is not possible then patients should be referred to another unit where such expertise is available.

10. Surgeons training in breast disease should get some exposure to the various reconstructive techniques.

11. Radiologists working in the Breast Unit should be consultant radiologists with appropriate training and experience as defined by the Royal College of Radiologists Breast Sub-Group.

12. Pathologists reporting breast specimens should follow the guidelines issued in "Pathology Reporting in Breast Cancer Screening", published by the National Co-ordinating Group for Breast Screening, Pathology. In addition, when reporting cytology, pathologists should follow the guidelines "Cytology Procedures and Reporting in Breast Cancer Screening", published by the same group. Pathologists should also be encouraged to participate in the National Breast Screening EQA Programme.

13. A further multi-disciplinary case team discussion should take place after surgery has been performed on new patients and histology results have been received, in order to determine the detailed treatment plan. This plan should be shared with the patient and the GP in an appropriate format.

14. Guidelines for the management of patients with breast disease should be disseminated to all General Practitioners.

15. Surgeons with an interest in breast cancer and who wish to maintain that interest should work within Breast Unit arrangements.

This report also highlighted issues of particular importance including:

1. The importance of good communication with patients (and their relatives and friends) and the need to share relevant information (written or otherwise) throughout all stages of a patient's care. It recognised a need to develop different types of information for patients, relatives and General Practitioners.

2. The need to gather information on outcomes and undertake audit on a cross Northern Ireland basis was identified. The possibility of developing audit guidelines and frameworks for application across Northern Ireland and establishing a multi-professional group to monitor audits should be considered.

3. The crucial interface between primary and secondary care must be recognised and must be managed and developed appropriately.

4. Screening and diagnostic services should be integrated to capitalize on the expertise developed within screening services as a result of multi-professional and team based approach to service provision.

2002: NHS Guidance on Cancer Services - Improving Outcomes in Breast Cancer

1. Multidisciplinary team working: All patients with breast cancer should be managed by multidisciplinary teams and all multidisciplinary teams should be actively involved in network-wide audit of processes and outcomes. Multidisciplinary teams should consider how they might improve the effectiveness of the way they work. Some units should consider working together to increase the number of patients managed by the team.

2. Minimising delay: No patient should have to wait more than four weeks for any form of treatment or supportive intervention.

3. Follow-up: The primary aims of clinical follow-up should be to identify and treat local recurrence and adverse effects of therapy, not to detect metastatic disease in asymptomatic women. Long-term routine hospital-based follow-up should cease, except in the context of clinical trials.

4. Review of services for screened and symptomatic patients: Each cancer network should review its arrangements for breast screening, with the goal of bringing services for screened and symptomatic patients into closer alignment. Networks should aim to achieve consistency in clinical policies, organisation and care, irrespective of the patient's point of entry into the system.

Recommendations in specific topic areas:

1. Patient-centred care

1.1. There should be minimal delay between referral from GP and an out-patient appointment, and between the first consultation and communication of diagnosis to the patient.

1.2. There should be pre-booking systems for appointments.

1.3. Whilst administrative delay and delays before treatment should be minimised, patients need adequate time to consider and discuss treatment options.

1.4. At every stage, patients should be offered clear, objective, full and prompt information in both verbal and written form.

1.5. Patients should also be informed about sources of social and practical help, such as local support groups and disability and benefits helplines, both verbally and in written form. Information should be provided in appropriate languages for patients from ethnic minorities.

1.6. Providers must be sensitive to potential problems with communication. Members of the breast care team should have special training in communication and counselling skills.

1.7. Senior members of the breast care multidisciplinary team should have formal training in communication skills.

1.8. Patients should be given adequate time to reflect before being expected to make any decisions about treatment.

1.9. There should be agreed procedures and protocols for breaking bad news at key transition points in the disease.

1.10. There should be a named breast care nurse with whom each patient can communicate at any time.

1.11. There should be a system for dealing with complaints by patients. Complaints should be taken seriously and answered promptly.

1.12. Psychosocial support should be available at every stage to help patients and their families cope with the effects of the disease. Health care personnel should have training to improve their ability to recognise the psychological needs of patients and to deal with them appropriately.

1.13. Social support should be available and there should be close liaison with local social services.

1.14. The breast care nurse should liaise with community occupational therapy services, which can play an important role in providing equipment, adaptations to patients' homes, and practical advice on activities of daily living

2. Rapid and accurate diagnosis

2.1. The same standard of care should be provided for all patients with suspected breast cancer, whether they are identified by screening or referred with symptoms.

2.2. The combination of clinical examination, mammography/ultrasound and image-guided core biopsy or fine needle aspiration (FNA) - known together as triple assessment - should be available for women with suspected breast cancer at a single visit. Both mammography and ultrasound imaging should be available. Centres which predominantly use core biopsy should also maintain expertise in FNA cytology so that this method can be used when appropriate.

2.3. All facilities and staff needed to carry out these three types of test should be in close proximity, and diagnostic services must be able to provide rapid and accurate information on imaging results and tissue samples. A breast care nurse should be available for support and counselling.

2.4. The results of tests should be given to the patient within five working days and within three days if possible.

2.5. The accuracy of triple assessment depends on the quality of each constituent test. There is wide variation in the adequacy of cytology samples taken by fine needle aspiration. Pathologists and cytologists should record the adequacy of samples; if they fall below the necessary standard for accurate diagnosis, surgeons and pathologists may require additional training in the technique and interpretation of samples, respectively.

2.6. Surgical biopsy is appropriate when triple assessment does not give a definitive result.

2.7. After surgery, the pathologist should give detailed reports on excised cancers which include information on tumour type, pathological size, histological grade, vascular invasion, extent of ductal carcinoma in situ, tumour margins, and lymph node status when appropriate. This information should also be given to the cancer registry.

2.8. Pathologists who provide reports on breast cancer resection specimens should participate in the National Breast Pathology External Quality Assurance Scheme.

2.9. Assays to measure hormone receptor status should be carried out on all excised tumour samples. Oestrogen receptor status should be assessed first; if the tumour is oestrogen-receptor negative or poor, progesterone receptor status should be measured. Tissue blocks from individual patients should be retained for possible future use.

2.10. All laboratories which carry out hormone receptor status assays or other tests intended to predict response to therapy should participate in the national quality assessment scheme.

3. Surgery

3.1 Sufficient tissue should be removed to ensure that no tumour is found at the surgical margins, since positive or narrow (<2mm) margins are associated with high rates of local recurrence. The minimum pathology dataset should include information on the distance of the closest margin to the edge of the tumour.

3.2 The pathologist should confirm that the margins of excised tissue are free of tumour cells. Patients who are found to have positive margins should be offered re-excision or mastectomy.

3.3 Axillary lymph node status is the single most powerful prognostic indicator for breast cancer. The possible adverse effects and anticipated benefits of axillary sampling or clearance should be discussed with patients.

3.4 Teams in centres which routinely carry out axillary clearance should consider training in less invasive forms of surgery. When axillary sampling is used, at least four nodes should be removed.

3.5 Sentinel node biopsy is an alternative to axillary sampling or clearance which provides information on the probable tumour status of other axillary lymph nodes; when sentinel node histology is negative, further treatment to the axilla may not be necessary. Teams which use sentinel node biopsy should have adequate training, should audit their results, and should be able to demonstrate false negative rates below 10%.

3.6 Patients who do not appear to have tumour in the lymph nodes should be informed about alternative methods of axillary management, the risks believed to be associated with each and the uncertainty about which is best, and their views should be respected.

3.7 Surgeons should discuss breast reconstruction with all patients. Reconstruction should be available at the initial surgical operation.

3.8 A range of primary operations should be available. If the cancer is not too large or diffuse, surgical options include mastectomy (removal of the whole breast) or breast conserving surgery (wide local excision or lumpectomy). In such cases, the choice should be made jointly by the surgeon and the patient, who should be fully informed of all the options and their potential risks, benefits and implications for further treatment. Surgeons should have the technical skills to support a full range of choices. Suitable patients should be offered breast conserving surgery.

3.9 Breast surgery, the management of excised specimens, and treatment decisions based on pathology and other prognostic information should follow locally written protocols based on BASO guidelines. Surgical treatment should not be offered or withheld on grounds of age alone.

3.10 After surgery, women should be given information on wound care, advice on exercise, and information on dealing with the after-effects of surgery. Support and counselling should be available and women should be given opportunities to talk over their feelings and fears with an experienced breast care nurse.

4. Radiotherapy

4.1 Breast cancer site-specific groups should produce network-wide guidelines on the appropriate use of radiotherapy for patients with invasive or in-situ disease. Radiotherapy should be regarded as standard therapy for all women who have undergone breast conserving surgery, and should also be discussed with women who have had mastectomy. An additional boost dose of radiation to the tumour bed should be considered for younger women, particularly those below the age of 40. Radiotherapy may be given as adjuvant or neo-adjuvant treatment, or it may be used as the sole local treatment modality when surgery is inappropriate.

4.2 Patients should be given clear information about both anticipated benefits and potential hazards of radiotherapy. In situations where there is uncertainty about the balance of risk and benefit.

4.3 Radiotherapy centres should have sufficient staff and capacity to guarantee access to radiotherapy within four weeks of identification of need.

4.4 Imaging that shows the heart and major blood vessels should be used in planning radiotherapy so that the cardiovascular system can be adequately protected during treatment.

4.5 A high quality radiotherapy service should be available for all patients. When one radiotherapy centre serves several cancer units, clinical oncologists should work between sites to assess and advise patients in one location and treat them in another.

4.6 The option of radiotherapy should be discussed with suitable patients before primary surgery, particularly those who are to have breast conserving surgery. Radiotherapy to the axillary area should not normally be given after surgical clearance of the axilla. Patients should be given clear information on the anticipated benefits and potential risks before decisions are made about treatment.

4.7 There should be adequate facilities such as hospital and hotel beds, and access to radiology and pathology services. An experienced oncology nurse should be available for all patients who require help, information or support.

5. Systemic therapy for early breast cancer

5.1 Combination chemotherapy and hormone therapy, normally using the same drugs as would be given in an adjuvant setting, may be considered to downstage tumours before surgery.

5.2 Women at intermediate or high risk of recurrence, who have not had neo-adjuvant chemotherapy, should normally be offered four to eight cycles of multiple-agent chemotherapy which includes anthracyclines.

5.3 All women with hormone receptor-positive tumours should be offered hormone treatment for five years after primary therapy.

5.4 Oncology wards should be available for patients who may not have adequate home support to cope with the adverse effects of chemotherapy. Systems are also required to provide support for patients in the community who may have problems associated with chemotherapy.

5.5 Chemotherapy should only be prescribed by specialist non-surgical oncologists working with chemotherapy nurse specialists, expert pharmacy and laboratory support. It should be administered in designated day-care facilities or on an oncology ward.

5.6 Patients should be encouraged to participate in well-designed clinical trials whenever possible. Patients asked to participate in clinical trials should receive a full explanation of the trial, together with written information about what taking part would involve.

5.7 Almost all patients with invasive breast cancer should be offered adjuvant systemic therapy (hormone therapy and/or chemotherapy). Systemic therapy should not be offered or withheld on grounds of age alone.

5.8 The choice of systemic therapy for individual women should be guided by guidelines based on up-to-date research knowledge and agreed by the breast care team. Risks and benefits of different options should be discussed with patients, who should have continuing access to a specialist nurse for support, practical advice and information.

5.9 Chemotherapy should only be given in units or centres where close supervision by oncologists and chemotherapy nurse specialists is available, plus expert pharmacy and 24 hour laboratory support.

5.10 Patients receiving chemotherapy and their GPs should have access to emergency care, information and advice from oncology trained staff on a 24 hour basis. They should be given written information on appropriate action for dealing with side effects of chemotherapy. There should be written guidelines on the management of complications and toxicities.

6. Follow-up after treatment for early breast cancer

6.1 All patients who have undergone treatment for breast cancer should have continuing access for an indefinite period to a breast care nurse.

6.2 Patients should be encouraged to contact the breast care nurse if they have any problems that could be linked with their cancer or treatment.

6.3 Routine long-term follow-up has not been shown to be effective and should cease.

6.4 Networks should agree evidence-based policy on the frequency of mammography for women who have been treated for breast cancer.

6.5 GPs should take responsibility for looking after women on long-term treatment with Tamoxifen or other hormone-modifying drugs, and for stopping such treatment after five years.

6.6 At the end of primary treatment, the patient and specialist should agree a written care plan. Intensive follow-up of women who have been treated for primary breast cancer should not be offered by the breast unit as a matter of routine.

6.7 Locally agreed measures should be developed to support the woman's transition from treatment by the unit.

6.8 General practitioners should be involved in shaping local arrangements for followupwh

7. Management of advanced, recurrent and metastatic disease

7.1 Every patient with advanced, recurrent or metastatic disease should be treated by a breast cancer multidisciplinary team (MDT) which includes a specialist oncologist. The team should have close links with a pain specialist and orthopaedic services.

7.2 Patients with locally advanced (T4) tumours are likely to have metastatic disease, so pre-treatment staging should include a bone scan, liver function tests and a chest x-ray as well as clinical evaluation. Local treatment should follow systemic therapy with chemotherapy, hormone treatment, or, in most cases, both.

7.3 Patients who respond well to systemic therapy should be offered surgery and radiotherapy to control local disease. Those with a poor response should normally be treated with radiotherapy.

7.4 The management of each patient with local recurrence should be discussed by the breast cancer MDT. Any combination of the major therapeutic modalities – surgery, radiotherapy and systemic treatment may be appropriate, the optimum treatment depending on various factors including previous treatment, the patient's general fitness, the site and extent of the recurrence, and tumour characteristics.

8. Palliative care

8.1 A palliative approach, involving both symptom control and attention to the psychological, social and spiritual well-being of the patient and her family/carers, should be provided throughout the course of the illness.

8.2 Women with breast cancer should have access to a range of services based in hospitals, hospices and in the community to ensure the delivery of effective palliative treatments and care.

8.3 Palliative care should be integrated between services provided by the breast care unit, the primary health care team, and specialist palliative care services, including the voluntary sector.

8.4 Palliative and supportive care networks have been established alongside cancer networks to coordinate care. These networks should be responsible for developing palliative care strategy and service delivery plans and for ensuring that services are fully integrated and coordinated within the network.

8.5 Multidisciplinary specialist palliative care teams should be available to provide optimal relief of pain and other symptoms and psychological, social and spiritual support for patients and their relatives and carers. The palliative care team should include a consultant in palliative medicine, nurses trained in palliative care, a social worker or other person trained in counselling patients who are dying and/or in pain.

8.6 The team should have ready access to the following services: physiotherapy, occupational therapy, counselling for both patients and relatives/carers.

8.7 All members of the palliative care team should participate in regular meetings to discuss patient care.

8.8 A specialist pain relief team should be available, as should access to spiritual support for women of different religions and those with no religious faith.

8.9 Women and their GPs should have access to the palliative care team on a 24-hour basis, and should have continuity of contact with a named member of the team. Appointment of a key worker to co-ordinate the care provided by different teams for each patient should be considered.

8.10 Patients should be helped to remain in the place they prefer, whether this is their home, a care home or hospice, and should choose where they wish to die.

9. The breast care team

9.1 The breast care team should be made up of individuals who have experience with breast cancer patients, substantial fixed time commitment to breast cancer patients, and where appropriate, specialist qualifications in breast cancer work.

9.2 The core breast team should include the designated breast surgeon(s), breast care nurse(s), a pathologist, a radiologist, an oncologist a coordinator and a team secretary.

9.3 The team as a whole should be responsible for planning care in a seamless way so that each patient receives prompt and appropriate care throughout the process of diagnosis and treatment, up to and including the period when palliation may be needed. The team must maintain close contact with all other professionals who are actively involved in supporting the patient or carrying out the treatment strategy decided by the core team. This includes the following: GPs/primary care teams, palliative care specialist/team, a breast radiographer, a psychiatrist/clinical psychologist, a social worker, a plastic surgeon, a clinical geneticist/genetics counsellor, a physiotherapist/lymphoedema specialist, a nominated orthopaedic surgeon with expertise in management of bone metastases, neurosurgeon, and an occupational therapist.

9.4 Teams based in cancer units must have close liaison with the associated cancer centre.

9.5 At any one time, a named member of the team should be the principal clinician to whom the patient relates. Patients should be given information about the members of the team involved in their management.

9.6 All new patients should be discussed, as well as any other patients whose cases are thought to require discussion as their condition or treatment progresses. Audit, clinical trials, and other issues should also be discussed at these meetings. There should be an operational policy meeting at least once a year at which the breast care team discusses and reviews its policies.

9.7 The core team should work closely together and meet on a regular basis (normally weekly) to discuss each patient with confirmed breast cancer both after initial diagnosis and after surgery to plan and monitor treatment. Decisions about future treatment should be discussed at these meetings.

9.8 The team must have adequate support to ensure that all decisions are recorded and communicated to patients and all those outside the core team.

9.9 The team should allocate adequate time to audit the activities and outcomes of the unit.

9.10 All breast referrals should be to specialist breast teams working in units which deal with at least 100 new cases of breast cancer per year.

10. Interprofessional communication

10.1 The breast care team must develop and implement systems that ensure rapid and effective communication between all healthcare professionals involved in each patient's management. There should be adequate means for communicating information on referral, diagnosis and treatment, follow-up and supportive/palliative care. District nurses and practice nurses in primary care must be linked into the communication network and be aware of referral criteria and routes to the breast care team for women who have been treated for breast cancer.

10.2 There should be sufficient administrative support, and the unit should be equipped with up to-date facilities to aid communication. The need for confidentiality should be recognised in all communication.

10.3 There should be an agreed system for referral to the specialist breast team if the assessment centre is not part of the breast cancer unit.

11. Clinical guidelines, up-to-date practice and continuing professional development

11.1 Breast care units should adhere to explicit protocols in the management of breast cancer patients, so that patients are treated according to pre-defined evidence-based courses of action.

11.2 The entry of patients into appropriate clinical trials in which management is governed by protocols can be a valuable means of improving standards of care, as well as contributing to Knowledge.

11.3 As evidence defining the effectiveness of interventions for breast cancer accumulates, it should be reflected in changing practice.

11.4 Members of the breast care team should continue their education in order that proven advances in treatment may be adopted. Team members should also be trained in non-clinical aspects of their work, particularly counselling and communication. Training for GPs particularly in cancer detection and follow-up after surgery is necessary to ensure that they can adequately fulfill their role in these areas.

12. Environment and facilities

12.1 Breast cancer treatment should be offered in a pleasant and appropriate physical environment. There should be private areas where patients and staff can discuss the diagnosis and treatment, where patients can be counselled without being overheard, and sufficient space for each woman to be accompanied by a friend or relative.

12.2 Attention should be paid to matters such as privacy in changing facilities, arrangements for the fitting of prostheses, availability of refreshments, and proximity and privacy of toilets.

12.3 Single-sex wards or bays should be available.

12.4 All units ideally should be equipped to offer dedicated diagnosis and treatment of all stages of breast cancer (other than radiotherapy facilities, which will be based in cancer centres).

12.5 Providers should also ensure that adequate transport facilities are available for patients. These should recognise and meet the needs of sick and vulnerable patients who may have to travel long distances for repeated episodes of treatment which may make them feel very unwell (radiotherapy and chemotherapy), and may compromise their employment and reduce compliance. Car or minicab services should be arranged for such patients.

1995: British Association of Surgical Oncologists (BASO) Guidelines for Surgeons in the Management of Symptomatic Breast Disease in the United Kingdom4

1. The unit should be seeing at least 50 new breast cancer cases per year.

2. A formal multidisciplinary meeting attended by members of the breast care team involved in primary treatments should be held weekly.

3. All patients diagnosed with breast cancer should have access to a breast care nurse, preferably preoperatively.

4. Women should be referred to a trained surgeon who works within a multidisciplinary breast clinic.

5. 80% of urgent referrals (as deemed by the surgeon) are to be seen within 5 working days of receipt of the referral.

6. 70% of all other new referrals are to be seen within 15 working days. (This has been superseded by the Government two week waiting time for all patients suspected of having cancer).

7. Over 90% of Fine Needle Aspirations from lesions which subsequently prove to be a cancer should be adequate as deemed by the breast pathologist.

8. 90% of palpable breast cancers should be diagnosed pre-operatively. Less than 10% of primary operable breast cancers should receive a frozen section.

9. Over 90% of patients proven to have breast cancer or an abnormality requiring an operation should be told within 5 working days of the date of the investigation.

10. Diagnosis should be based on triple assessment (Examination, Ultrasound/Mammography, Cytology).

11. 90% of patients should be admitted for an operation within 10 working days of the surgical decision to operate for diagnostic purposes. 90% of patients for therapeutic operations for cancer should be admitted within 15 working days of informing the patient of the need for surgical treatment. This should be carried out by trained breast surgeons, trainees with sufficient training in breast disease or trainees under direct supervision at operation.

12. Units should provide data on the number of patients treated, and by what methods.

13. Histological node status should be obtained on all invasive tumours either by sampling or clearance. It is recommended that “a sample” should contain at least 4 lymph nodes.

14. The Benign:Malignant operation ratio should be no more than 1:1 (This is for diagnostic operations only, excluding women who wish the lump to be removed even though it is benign and operations for nipple discharge and abscess).

15. Less than 10% of patients undergoing treatment for primary operable breast cancer should develop local recurrence at 5 and 10 years.

16. Reports of imaging examination should include details of site, size (in mm) and nature of any abnormality with an opinion as to the most likely diagnosis and make appropriate recommendations for further intervention where appropriate.

17. Mammographic localisation biopsy specimens must be X-rayed to ensure removal of the abnormality.

18. Adjuvant radiotherapy should start within 4 weeks of surgery.

19. GPs should receive communication giving diagnosis, care plan, and toxicity profile of any proposed systemic treatment from the first post-operative review and at the change of any treatment. BASO suggest annual mammography of the treated breast.

20. Survival and loco-regional recurrences at 5 and 10 years should be monitored.

21. Centres offering breast cancer treatment should ensure that there are adequate terminal care facilities to support the primary care team.

2005: NICE Referral guidelines for suspected cancer6

General recommendations

1. A patient who presents with symptoms suggestive of breast cancer should be referred to a team specialising in the management of breast cancer.

2. In most cases, the definitive diagnosis will not be known at the time of referral, and many patients who are referred will be found not to have cancer. However, primary healthcare professionals should convey optimism about the effectiveness of treatment and survival because a patient being referred with a breast lump will be naturally concerned.

3. People of all ages who suspect they have breast cancer may have particular information and support needs. The primary healthcare professional should discuss these needs with the patient and respond sensitively to them.

4. Primary healthcare professionals should encourage all patients, including women over 50 years old, to be breast aware in order to minimise delay in the presentation of symptoms.

Specific recommendations

1. A woman's first suspicion that she may have breast cancer is often when she finds a lump in her breast. The primary healthcare professional should examine the lump with the patient's consent. The features of a lump that should make the primary healthcare professional strongly suspect cancer are a discrete, hard lump with fixation, with or without skin tethering. In patients presenting in this way an urgent referral should be made, irrespective of age.

2. In a woman aged 30 years and older with a discrete lump that persists after her next period, or presents after menopause, an urgent referral should be made.

3. Breast cancer in women aged younger than 30 years is rare, but does occur. Benign lumps (for example, fibroadenoma) are common, however, and a policy of referring these women urgently would not be appropriate; instead, non-urgent referral should be considered. However, in women aged younger than 30 years: with a lump that enlarges, or with a lump that has other features associated with cancer (fixed and hard), or in whom there are other reasons for concern such as family history an urgent referral should be made.

4. The patient's history should always be taken into account. For example, it may be appropriate, in discussion with a specialist, to agree referral within a few days in patients reporting a lump or other symptom that has been present for several months.

5. In a patient who has previously had histologically confirmed breast cancer, who presents with a further lump or suspicious symptoms, an urgent referral should be made, irrespective of age.

6. In patients presenting with unilateral eczematous skin or nipple change that does not respond to topical treatment, or with nipple distortion of recent onset, an urgent referral should be made.

7. In patients presenting with spontaneous unilateral bloody nipple discharge, an urgent referral should be made.

8. Breast cancer in men is rare and is particularly rare in men under 50 years of age. However, in a man aged 50 years and older with a unilateral, firm subareolar mass with or without nipple distortion or associated skin changes, an urgent referral should be made.

Investigations

1. In patients presenting with symptoms and/or signs suggestive of breast cancer, investigation prior to referral is not recommended.

2. In patients presenting solely with breast pain, with no palpable abnormality, there is no evidence to support the use of mammography as a discriminatory investigation for breast cancer. Therefore, its use in this group of patients is not recommended. Non-urgent referral may be considered in the event of failure of initial treatment and/or unexplained persistent symptoms.

NICE (2009) Clinical Guideline 80: Early and locally advanced breast cancer: diagnosis and treatment

Referral, diagnosis, preoperative assessment and psychological support

- **Preoperative assessment of the breast and axilla**

The routine use of magnetic resonance imaging (MRI) of the breast is not recommended in the preoperative assessment of patients with biopsy-proven invasive breast cancer or ductal carcinoma in situ (DCIS).

Offer MRI of the breast to patients with invasive breast cancer:

- if there is discrepancy regarding the extent of disease from clinical examination, mammography and ultrasound assessment for planning treatment
- if breast density precludes accurate mammographic assessment
- to assess the tumour size if breast conserving surgery is being considered for invasive lobular cancer.

Preoperative staging of the axilla

Pretreatment ultrasound evaluation of the axilla should be performed for all patients being investigated for early invasive breast cancer and, if morphologically abnormal lymph nodes are identified, ultrasound-guided needle sampling should be offered.

Providing information and psychological support

All members of the breast cancer clinical team should have completed an accredited communication skills training programme.

All patients with breast cancer should be assigned to a named breast care nurse specialist who will support them throughout diagnosis, treatment and follow-up.

All patients with breast cancer should be offered prompt access to specialist psychological support, and where appropriate psychiatric services.

Surgery for early breast cancer

Surgery to the breast

DCIS
For all patients treated with breast conserving surgery for DCIS a minimum of 2 mm radial margin of excision is recommended with pathological examination to NHS Breast Screening Programme reporting standards.

Re-excision should be considered if the margin is less than 2 mm after discussion of the risks and benefits with the patient.

Enter patients with screen-detected DCIS into the Sloane Project1 (UK DCIS audit).

All breast units should audit their recurrence rates after treatment for DCIS.

Paget's disease

Offer breast conserving surgery with removal of the nipple-areolar complex as an alternative tomastectomy for patients with Paget's disease of the nipple that has been assessed as localised.

Offer oncoplastic repair techniques to maximise cosmesis.

Surgery to the axilla

Invasive breast cancer

Minimal surgery, rather than lymph node clearance, should be performed to stage the axilla for patients with early invasive breast cancer and no evidence of lymph node involvement on ultrasound or a negative ultrasound-guided needle biopsy. Sentinel lymph node biopsy (SLNB) is the preferred technique.

SLNB should only be performed by a team that is validated in the use of the technique, as identified in the New Start training programme[2].

Perform SLNB using the dual technique with isotope and blue dye.

Breast units should audit their axillary recurrence rates.

DCIS

Do not perform SLNB routinely in patients with a preoperative diagnosis of DCIS who are having breast conserving surgery, unless they are considered to be at a high risk of invasivedisease[3].

Offer SLNB to all patients who are having a mastectomy for DCIS.

Evaluation and management of a positive sentinel lymph node

Offer further axillary treatment to patients with early invasive breast cancer who:

- have macrometastases or micrometastases shown in a sentinel lymph node
- have a preoperative ultrasound guided needle biopsy with histologically proven metastatic cancer.

The preferred technique is axillary lymph node dissection (ALND) because it gives additional staging information.

Do not offer further axillary treatment to patients found to have only isolated tumour cells in their sentinel lymph nodes. These patients should be regarded as lymph node-negative.

Breast reconstruction

Discuss immediate breast reconstruction with all patients who are being advised to have a mastectomy, and offer it except where significant comorbidity or (the need for) adjuvant therapy may preclude this option. All appropriate breast reconstruction options should be offered and discussed with patients, irrespective of whether they are all available locally.

Postoperative assessment and adjuvant treatment planning

Predictive factors

Assess oestrogen receptor (ER) status of all invasive breast cancers, using immune histochemistry with a standardised and qualitatively assured methodology, and report the results quantitatively.

Do not routinely assess progesterone receptor status of tumours in patients with invasive breast cancer.

Test human epidermal growth receptor 2 (HER2) status of all invasive breast cancers, using a standardised and qualitatively assured methodology.

Ensure that the results of ER and HER2 assessments are available and recorded at the multidisciplinary team meeting when guidance about systemic treatment is made.

Adjuvant treatment planning

Consider adjuvant therapy for all patients with early invasive breast cancer after surgery at the multidisciplinary team meeting and ensure that decisions are recorded.

Decisions about adjuvant therapy should be made based on assessment of the prognostic and predictive factors, the potential benefits and side effects of the treatment. Decisions should be made following discussion of these factors with the patient.

Consider using Adjuvant! Online[4] to support estimations of individual prognosis and the absolute benefit of adjuvant treatment for patients with early invasive breast cancer.

Timing of adjuvant treatment

Start adjuvant chemotherapy or radiotherapy as soon as clinically possible within 31 days of completion of surgery[5] in patients with early breast cancer having these treatments.

Adjuvant systemic therapy

Endocrine therapy for invasive disease

Ovarian suppression/ablation

Do not offer adjuvant ovarian ablation/suppression to premenopausal women with ER-positive early invasive breast cancer who are being treated with tamoxifen and, if indicated, chemotherapy. Offer adjuvant ovarian ablation/suppression in addition to tamoxifen to premenopausal women with ER-positive early invasive breast cancer who have been offered chemotherapy but have chosen not to have it.

Aromatase inhibitors
Postmenopausal women with ER-positive early invasive breast cancer who are not considered to be at low-risk[6] should be offered an aromatase inhibitor, either anastrozole or letrozole, as their initial adjuvant therapy. Offer tamoxifen if an aromatase inhibitor is not tolerated orcontra indicated.

Offer an aromatase inhibitor, either exemestane or anastrozole instead of tamoxifen to postmenopausal women with ER-positive early invasive breast cancer who are not low-risk[7] and who have been treated with tamoxifen for 2-3 years.

Offer additional treatment with the aromatase inhibitor letrozole for 2-3 years to postmenopausal women with lymph node-positive ER-positive early invasive breast cancer who have been treated with tamoxifen for 5 years.

The aromatase inhibitors anastrozole, exemestane and letrozole, within their licensed indications, are recommended as options for the adjuvant treatment of early ER-positive invasive breast cancer in postmenopausal women.[8]

The choice of treatment should be made after discussion between the responsible clinician and the woman about the risks and benefits of each option. Factors to consider when making the choice include whether the woman has received tamoxifen before, the licensed indications and side-effect profiles of the individual drugs and, in particular, the assessed risk of recurrence.[9]

Endocrine therapy for DCIS

Do not offer adjuvant tamoxifen after breast conserving surgery to patients with DCIS.

Chemotherapy
Offer docetaxel to patients with lymph node-positive breast cancer patients as part of an adjuvant chemotherapy regimen.

Do not offer paclitaxel as an adjuvant treatment for lymph node-positive breast cancer.

Biological therapy
Offer trastuzumab, given at 3-week intervals for 1 year or until disease recurrence (whichever is the shorter period), as an adjuvant treatment to women with HER2-positive early invasive breast cancer following surgery, chemotherapy, and radiotherapy when applicable.

Assess cardiac function before starting treatment with trastuzumab. Do not offer trastuzumab treatment to women who have any of the following:

- a left ventricular ejection fraction (LVEF) of 55% or less
- a history of documented congestive heart failure
- high risk uncontrolled arrhythmias
- angina pectoris requiring medication
- clinically significant valvular disease
- evidence of transmural infarction on electrocardiograph (ECG)
- poorly controlled hypertension.

Repeat cardiac functional assessments every 3 months during trastuzumab treatment. If the LVEF drops by 10 percentage (ejection) points or more from baseline and to below 50% the trastuzumab treatment should be suspended. Restart trastuzumab therapy only after further cardiac assessment and a fully informed discussion of the risks and benefits with the woman.

Assessment and treatment for bone loss

Bone mineral density

Patients with early invasive breast cancer should have a baseline dual energy X-ray absorptiometry

(DEXA) scan to assess bone mineral density if they:

- are starting adjuvant aromatase inhibitor treatment
- have treatment-induced menopause
- are starting ovarian ablation/suppression therapy.

Do not offer a DEXA scan to patients with early invasive breast cancer who are receiving tamoxifen alone, regardless of pretreatment menopausal status.

Bisphosphonates
Offer bisphosphonates to patients identified by algorithms 1 and 2 in 'Guidance for the management of breast cancer treatment-induced bone loss: A consensus position statement from a UK expert group (2008) (see Appendix 2).

Adjuvant radiotherapy

Breast conserving surgery and radiotherapy

Patients with early invasive breast cancer who have had breast conserving surgery with clear margins should have breast radiotherapy.

Offer adjuvant radiotherapy to patients with DCIS following adequate breast conserving surgery[10] and discuss with them the potential benefits and risks.

Post-mastectomy radiotherapy
Offer adjuvant chest wall radiotherapy to patients with early invasive breast cancer who have had a mastectomy and are at a high risk of local recurrence. Patients at a high risk of local recurrence include those with four or more positive axillary lymph nodes or involved resection margins.

Consider entering patients who have had a mastectomy for early invasive breast cancer and who are at an intermediate risk of local recurrence, into the current UK trial (SUPREMO) assessing the value of postoperative radiotherapy. Patients at an intermediate risk of local recurrence include those with one to three lymph nodes involved, lympho-vascular invasion, histological grade 3 tumours, ER negative tumours, and those aged under 40 years.

Do not offer radiotherapy following mastectomy to patients with early invasive breast cancer who are at low risk of local recurrence (for example, most patients who are lymph node negative).

Dose fractionation
Use external beam radiotherapy giving 40 Gy in 15 fractions as standard practice for patients with early invasive breast cancer after breast conserving surgery or mastectomy.

Breast boost

Offer an external beam boost to the site of local excision to patients with early invasive breast cancer who have a high risk of local recurrence following breast conserving surgery, with clear margins, and whole breast radiotherapy.

If an external beam boost to the site of local excision following breast conservation is being considered in patients with early invasive breast cancer inform the patient of the side effects associated with this intervention, including poor cosmesis particularly in women with larger breasts.

Radiotherapy to nodal areas

Do not offer adjuvant radiotherapy to the axilla or supraclavicular fossa to patients with early breast cancer who have been shown to be histologically lymph node-negative.

Do not offer adjuvant radiotherapy to the axilla after ALND for early breast cancer.

If ALND is not possible following a positive axillary SLNB or 4-node sample, offer adjuvant radiotherapy to the axilla to patients with early breast cancer[11].

Offer adjuvant radiotherapy to the supraclavicular fossa in patients with early breast cancer and four or more involved axillary lymph nodes.

Offer adjuvant radiotherapy to the supraclavicular fossa to patients with early breast cancer and one to three positive lymph nodes if they have other poor prognostic factors (for example, T3and/or histological grade 3 tumours, with good performance status).

Do not offer adjuvant radiotherapy to the internal mammary chain to patients with early breast cancer who have had breast surgery.

Primary systemic therapy

Early breast cancer

Treat patients with early invasive breast cancer, irrespective of age, with surgery and appropriate systemic therapy, rather than endocrine therapy alone, unless significant comorbidity precludes surgery.

Preoperative systemic therapy can be offered to patients with early invasive breast cancer who are considering breast conserving surgery that is not advisable at presentation. However, the increased risk of local recurrence with breast conserving surgery and radiotherapy rather than mastectomy after systemic therapy should be discussed with the patient.

Locally advanced or inflammatory breast cancer

Offer patients with locally advanced or inflammatory breast cancer, who have been treated with chemotherapy, local treatment by mastectomy (or in exceptional cases, breast conserving surgery) followed by radiotherapy.

Complications of local treatment and menopausal symptoms

Complications of local treatment

Lymphoedema

Inform all patients with early breast cancer about the risk of developing lymphoedema and give them relevant written information before treatment with surgery and radiotherapy.

Give advice on how to prevent infection or trauma that may cause or exacerbate lymphoedema to patients treated for early breast cancer.

Ensure that all patients with early breast cancer who develop lymphoedema have rapid access to a specialist lymphoedema service.

Arm mobility

All breast units should have written local guidelines agreed with the physiotherapy department for postoperative physiotherapy regimens.

Identify breast cancer patients with pre-existing shoulder conditions preoperatively as this may inform further decisions on treatment.

Give instructions on functional exercises, which should start the day after surgery, to all breast cancer patients undergoing axillary surgery. This should include relevant written information from a member of the breast or physiotherapy team.

Refer patients to the physiotherapy department if they report a persistent reduction in arm and shoulder mobility after breast cancer treatment.

Menopausal symptoms

Discontinue hormone replacement therapy (HRT) in women who are diagnosed with breast cancer.

Do not offer HRT (including oestrogen/progestogen combination) routinely to women with menopausal symptoms and a history of breast cancer. HRT12 may, in exceptional cases, be offered to women with severe menopausal symptoms and with whom the associated risks have been discussed.

Offer information and counselling for all women about the possibility of early menopause and menopausal symptoms associated with breast cancer treatment.

Tibolone or progestogens are not recommended for women with menopausal symptoms who have breast cancer.

The selective serotonin re-uptake inhibitor antidepressants paroxetine13 and fluoxetine14 may be offered to women with breast cancer for relieving menopausal symptoms, particularly hot flushes, but not to those taking tamoxifen.

Clonidine, venlafaxine15 and gabapentin16 should only be offered to treat hot flushes in women with breast cancer after they have been fully informed of the significant side effects.

Soy (isoflavone), red clover, black cohosh, vitamin E and magnetic devices are not recommended for the treatment of menopausal symptoms in women with breast cancer.

Complications of local treatment and menopausal symptoms

Follow-up
Follow-up imaging

Offer annual mammography to all patients with early breast cancer, including DCIS until they enter the NHS Breast Screening Programme (NHSBSP)/Breast Test Wales Screening Programme (BTWSP). Patients diagnosed with early breast cancer who are already eligible for screening should have annual mammography for 5 years.

On reaching the NHSBSP/BTWSP screening age or after 5 years of annual mammography follow-up we recommend the NHSBSP/BTWSP stratify screening frequency in line with patient risk category.

Do not offer mammography of the ipsilateral soft tissues after mastectomy.

Do not offer ultrasound or MRI for routine post-treatment surveillance in patients who have been treated for early invasive breast cancer or DCIS.

Clinical follow-up
After completion of adjuvant treatment (including chemotherapy, and/or radiotherapy where indicated) for early breast cancer, discuss with patients where they would like follow-up to be undertaken. They may choose to receive follow-up care in primary, secondary, or shared care. Patients treated for breast cancer should have an agreed, written care plan, which should be recorded by a named healthcare professional (or professionals), a copy sent to the GP and a personal copy given to the patient.

This plan should include:

- designated named healthcare professionals
- dates for review of any adjuvant therapy
- details of surveillance mammography
- signs and symptoms to look for and seek advice on
- contact details for immediate referral to specialist care, and
- contact details for support services, for example support for patients with lymphoedema.

NICE (2009) Clinical Guideline 81: Advanced breast cancer: diagnosis and treatment

Diagnosis and assessment

- **Imaging assessment**

    - Assess the presence and extent of visceral metastases using a combination of plain radiography, ultrasound, computed tomography (CT) scans and magnetic resonance imaging (MRI).

    - Assess the presence and extent of metastases in the bones of the axial skeleton using bone windows on a CT scan or MRI or bone scintigraphy.

    - Assess proximal limb bones for the risk of pathological fracture in patients with evidence of bone metastases elsewhere, using bone scintigraphy and/or plain radiography.

    - Use MRI to assess bony metastases if other imaging is equivocal for metastatic disease or if more information is needed (for example, if there are lytic metastases encroaching on the spinal canal).

    - Positron emission tomography fused with computed tomography (PET-CT) should only be used to make a new diagnosis of metastases for patients with breast cancer whose imaging is suspicious but not diagnostic of metastatic disease.

- **Pathological assessment**

    - Patients with tumours of known oestrogen receptor (ER) status whose disease recurs should not have a further biopsy just to reassess ER status.

    - Patients with tumours of known human epidermal growth factor receptor 2 (HER2) status whose disease recurs should not have a further biopsy just to reassess HER2 status.

    - Assess ER and HER2 status at the time of disease recurrence if receptor status was not assessed at the time of initial diagnosis. In the absence of tumour tissue from the primary tumour, and if feasible, obtain a biopsy of a metastasis to assess ER and HER2 status.

- **Monitoring disease status**

    - Do not use bone scintigraphy to monitor the response of bone metastases to treatment.

    - Do not use PET-CT to monitor advanced breast cancer.

Providing information and support for decision making

- Assess the patient's individual preference for the level and type of information. Reassess this as circumstances change.
- On the basis of this assessment, offer patients consistent, relevant information and clear explanations, and provide opportunities for patients to discuss issues and ask questions.
- Assess the patient's individual preference for how much they wish to be involved in decision making. Reassess this as circumstances change.
- Be aware of the value of decision aids and the range available. Make the most appropriate decision aid available to the patient.

Systemic disease-modifying therapy

- Offer endocrine therapy as first-line treatment for the majority of patients with ER-positive advanced breast cancer.
- Offer chemotherapy as first-line treatment for patients with ER-positive advanced breast cancer whose disease is imminently life-threatening or requires early relief of symptoms because of significant visceral organ involvement, providing they understand and are prepared to accept the toxicity.
- For patients with ER-positive advanced breast cancer who have been treated with chemotherapy as their first-line treatment, offer endocrine therapy following the completion of chemotherapy.

- **Endocrine therapy**

  - Offer an aromatase inhibitor (either non-steroidal or steroidal) to:
    - postmenopausal women with ER-positive breast cancer and no prior history of endocrine therapy
    - postmenopausal women with ER-positive breast cancer previously treated with tamoxifen.
  - Offer tamoxifen and ovarian suppression as first-line treatment to premenopausal and perimenopausal women with ER-positive advanced breast cancer not previously treated with tamoxifen.
  - Offer ovarian suppression to premenopausal and perimenopausal women who have previously been treated with tamoxifen and then experience disease progression.
  - Offer tamoxifen as first-line treatment to men with ER-positive advanced breast cancer.

- **Chemotherapy**

  - On disease progression, offer systemic sequential therapy to the majority of patients with advanced breast cancer who have decided to be treated with chemotherapy.

  - Consider using combination chemotherapy to treat patients with advanced breast cancer for whom a greater probability of response is important and who understand and are likely to tolerate the additional toxicity.

  - For patients with advanced breast cancer who are not suitable for anthracyclines (because they are contraindicated or because of prior anthracycline treatment either in the adjuvant ormetastatic setting), systemic chemotherapy should be offered in the following sequence:

    - first line: single-agent docetaxel
    - second line: single-agent vinorelbine or capecitabine
    - third line: single-agent capecitabine or vinorelbine (whichever was not used as secondline treatment).

  - Gemcitabine in combination with paclitaxel, within its licensed indication, is recommended
    - as an option for the treatment of metastatic breast cancer only when docetaxel monotherapy
    - or docetaxel plus capecitabine are also considered appropriate1.

- **Biological therapy**

  - For patients who are receiving treatment with trastuzumab[2] for advanced breast cancer, discontinue treatment with trastuzumab at the time of disease progression outside the centralnervous system. Do not discontinue trastuzumab if disease progression is within the central nervous system alone.

Community-based treatment and supportive care

- Healthcare professionals involved in the care of patients with advanced breast cancer should ensure that the organisation and provision of supportive care services comply with the recommendations made in 'Improving outcomes in breast cancer: manual update' (NICE cancer service guidance [2002]) and 'Improving supportive and palliative care for adults with cancer' (NICE cancer service guidance [2004]), in particular the following two recommendations:

  - 'Assessment and discussion of patients' needs for physical, psychological, social,
    - spiritual and financial support should be undertaken at key points (such as diagnosis
    - at commencement, during, and at the end of treatment; at relapse; and when death is approaching).'

- 'Mechanisms should be developed to promote continuity of care, which might include the nomination of a person to take on the role of "key worker" for individual patients.'

Managing complications

- **Lymphoedema**

  - Assess patients with lymphoedema for treatable underlying factors before starting anylymphoedema management programme.
  - Offer all patients with lymphoedema complex decongestive therapy (CDT) as the first stage of lymphoedema management.
  - Consider using multi-layer lymphoedema bandaging (MLLB) for volume reduction as a first treatment option before compression hosiery.
  - Provide patients with lymphoedema with at least two suitable compression garments. These should be of the appropriate class and size, and a choice of fabrics and colours should be available.
  - Provide patients with lymphoedema with clear, written information and the contact details of local and national lymphoedema support groups.

- **Cancer-related fatigue**

  - Offer all patients with advanced breast cancer for whom cancer-related fatigue is a significant problem an assessment to identify any treatable causative factors and offer appropriate management as necessary.
  - Provide clear, written information about cancer-related fatigue, organisations that offer psychosocial support and patient-led groups.
  - Provide information about and timely access to an exercise programme for all patients with advanced breast cancer experiencing cancer-related fatigue.

- **Uncontrolled local disease**

  - A breast cancer multidisciplinary team should assess all patients presenting with uncontrolled local disease and discuss the therapeutic options for controlling the disease and relieving symptoms.
  - A wound care team should see all patients with fungating tumours to plan a dressing regimen and supervise management with the breast care team.
  - A palliative care team should assess all patients with uncontrolled local disease in order to plan a symptom management strategy and provide psychological support.

- **Bone metastases**

  - Consider offering bisphosphonates to patients newly diagnosed with bone metastases to prevent skeletal-related events and reduce pain.

  - The choice of bisphosphonate for patients with bone metastases should be a local decision, taking into account patient preference and limited to preparations licensed for this indication.

  - Use external beam radiotherapy in a single fraction of 8Gy to treat patients with bone metastases and pain.

  - An orthopaedic surgeon should assess all patients at risk of a long bone fracture, to consider prophylactic surgery.

- **Brain metastases**

  - Offer surgery followed by whole brain radiotherapy to patients who have a single or small number of potentially resectable brain metastases, a good performance status and who have no or well-controlled other metastatic disease.

  - Offer whole brain radiotherapy to patients for whom surgery is not appropriate, unless they have a very poor prognosis.

  - Offer active rehabilitation to patients who have surgery and/or whole brain radiotherapy.

  - Offer referral to specialist palliative care to patients for whom active treatment for brain metastases would be inappropriate.

NICE (2011) Quality Standard 12. Breast cancer quality standard

Statement 1. People presenting with symptoms that suggest breast cancer are referred to a unit that performs diagnostic procedures in accordance with NHS Breast Screening Programme guidance.

Statement 2. People with early invasive breast cancer are offered a pre-treatment ultrasound evaluation of the axilla and, if abnormal lymph nodes are identified, ultrasound-guided needle biopsy (fine needle aspiration or core). Those with no evidence of lymph node involvement on needle biopsy are offered sentinel lymph node biopsy when axillary surgery is performed.

Statement 3. People with early breast cancer undergoing breast conserving surgery, which may include the use of oncoplastic techniques, have an operation that both minimises local recurrence and achieves a good aesthetic outcome.

Statement 4. People with early breast cancer who are to undergo mastectomy have the options of immediate and planned delayed breast reconstruction discussed with them.

Statement 5. People with newly diagnosed invasive breast cancer and those with recurrent disease (if clinically appropriate) have the ER and HER2 status of the tumour assessed and the results made available within 2 weeks to allow planning of systemic treatment by the multidisciplinary team.

Statement 6. People with early invasive breast cancer, irrespective of age, are offered surgery, radiotherapy and appropriate systemic therapy, unless significant comorbidity precludes it.

Statement 7. People with early invasive breast cancer do not undergo staging investigations for distant metastatic disease in the absence of symptoms.

Statement 8. People with early invasive breast cancer are involved in decisions about adjuvant therapy after surgery, which are based on an assessment of the prognostic and predictive factors, and the potential benefits and side effects.

Statement 9. People having treatment for early breast cancer are offered personalised information and support, including a written follow-up care plan and details of how to contact a named healthcare professional.

Statement 10. Women treated for early breast cancer have annual mammography for 5 years after treatment. After 5 years, women who are 50 or older receive breast screening according to the NHS Breast Screening Programme timescales, whereas women younger than 50 continue to have annual mammography until they enter the routine NHS Breast Screening Programme.

Statement 11. People who develop local recurrence, regional recurrence and/or distant metastatic disease have their treatment and care discussed by the multidisciplinary team.

Statement 12. People with recurrent or advanced breast cancer have access to a 'key worker', who is a clinical nurse specialist whose role is to provide continuity of care and support, offer referral to psychological services if required and liaise with other healthcare professionals, including the GP and specialist palliative care services.

Statement 13. People who have a single or small number of potentially resectable brain metastases, a good performance status and who have no (or minimal) other sites of metastatic disease are referred to a neuroscience brain and other rare CNS tumours multidisciplinary team.

In addition, quality standards that should also be considered when commissioning and providing a high-quality breast cancer service are listed in related NICE quality standards.

APPENDIX B – Staging of breast cancer

Accurate staging is essential for the planning of appropriate treatment and for the comparison of the outcomes of such treatment (surgical and non-surgical). It is best achieved by a combination of techniques including physical examination, with careful inspection of the skin, palpation of the breast and regional lymph node areas (axillary, supraclavicular, internal mammary nodes), mammography and/or ultrasound and biopsy. Adjuncts to staging such as CT scanning and isotope bone scanning should be performed when clinically indicated. Pathological staging adds significant information to this process. It involves histological examination of the surgically resected specimen including evaluation of the total number of regional nodes removed and the number containing metastatic tumour. The TNM classification of breast carcinoma (6th Edition) 19is shown in Table 1.

Determining the tumour size (T)
The majority of breast tumours are staged pathologically. This is more precise as it is a measurement of the size of the invasive tumour. In a minority of cases clinical staging only is possible. In this case, as the estimation of tumour size by physical examination and mammography frequently give different results, accuracy can be improved using the formula:

Tumour size (T) = 0.5 x physical examination size + 0.5 x mammographic size.

Careful clinical examination of the skin to look for oedema, ulceration & satellite skin lesions is essential in all cases as these findings will upstage the T factor and may be unapparent at the time of pathological examination. The surgeon should therefore inform the pathologist of such clinical findings to prevent pathological understaging. In cases of multiple tumours within one breast the size of the largest tumour should be used to determine the T factor.

Determining the nodes (N)
As the majority of breast tumours are pathologically staged, information on the number of axillary nodes examined and the number involved by tumour will be available. The N factor is designated by the number of involved axillary nodes with 3 main categories N1-N3. Within each category subdivisions exist to allow for inclusion of internal mammary nodes detected by sentinel node biopsy or that are clinically apparent.

Determining metastases (M)
A proportion of patients will have metastatic disease detected by clinical examination, imaging and/or laboratory investigations at presentation, which will be designated M1. A negative clinical history and examination are sufficient to designate M0.

Stage group
In order to facilitate survival analysis the assigned TNM profile is condensed into a stage group category of which there are 7 (stages I, IIA, IIB, IIIA, IIIB ,IIIC & IV). (Table 2).

Example:

- 1.5cm invasive breast tumour. T = T1c
- 8 axillary nodes have histologically verified metastases. N=N2a
- clinically/radiologically there is no evidence of distant metastases. M=M0

The TNM profile of this example is T1 cN2a M0 and is thus assigned to stage group IIIA as it is known that the survival prospect associated with this profile is similar to the other TNM profiles within stage IIIA (ie. T2 N2 M0, T3 N1 M0 and T3 N2 M0).

Histological grade
Although histological grade (Nottingham Combined Histological Grade) is a significant prognostic factor it has not yet been incorporated into the TNM classification, largely due to concerns about its reproducibility. It is likely that this will change in the next edition of the TNM.

Nottingham Prognostic Index (NPI)20
The NPI is a clinically relevant prognostic index which is used to stratify breast cancer patients for adjuvant therapy. It was derived in 1982 from a retrospective multivariate study of patients with primary operable breast cancer who underwent simple mastectomy and triple node biopsy at the Nottingham City Hospital and has since been validated both by single centers and internationally.

It is a simple calculation based on tumour size, histological grade and number of positive lymph nodes.

NPI = 0.2 x Tumour size (cm) + tumour grade + nodal stage
[nodal stage] = 1 (if node negative), 2 (if 1-3 nodes positive), 3 (if 4 or more positive)
eg Tumour size = 2.0cm, grade 3, number involved nodes = 5
= 0.2 x 2.0 + 3 + 3
= 6.4 ie Poor prognosis

It stratifies patients into one of 3 prognostic groups with different chances of surviving breast cancer:
Good (<3.4), Moderate (3.4-5.4) and Poor (>5.4).

Table 1: TNM Classification of breast cancer		
Tumour size		
T0	T0	No evidence of primary tumour
T1	T1mic	tumour size <0.1cm (microinvasive)
	T1a	Tumour size >0.1 <0.5cm
	T1b	Tumour size >0.5 <1.0cm
	T1c	Tumour size >1.0 <2.0cm
T2	T2	Tumour size >2.0 <5.0cm
T3	T3	Tumour size >5.0 cm
T4	T4a	Tumour of any size with extension to chest wall
	T4b	Tumour of any size with oedema, ulceration or satellite skin lesions
	T4c	Both T4a and T4b
	T4d	Inflammatory carcinoma
Nodes		
N0	N0	No regional nodes involved
N1	N1a	Metastases in 1-3 axillary nodes
	N1b	Metastases in clinically inapparent internal mammery nodes
	N1c	Metastases in 1-3 axillary nodes +N1b
N2	N2a	Metastases in 4-9 axillary nodes Clinically apparent metastases in internal mammary nodes without axillary node metastases
N3	N3a	Metastases in > 10 axillary nodes or metastases in infraclavicular
	N3b	Clinically apparent metastases in internal mammary nodes with >1 axillary node metastases or clinically inapparent metastases in internal mammary nodes with >3 axillary node metastases
	N3c	Metastases in supraclavicular nodes
Metastases		
M0	M0	No distant metastases
M1	M1	Distant metastases

Table 2 Stage Group for Breast Cancer			
Stage	**T**	**N**	**M**
I	T1	N0	M0
IIA	T0	N1	M0
	T1	N1	M0
	T2	N0	M0
IIB	T2	N1	M0
	T3	N0	M0
IIIA	T0	N2	M0
	T1	N2	M0
	T2	N2	M0
	T3	N1	M0
	T3	N2	M0
IIIB	T4	N0	M0
	T4	N1	M0
	T4	N2	M0
IIIC	Any T	N3	M0
IV	Any T	Any N	M1

APPENDIX C - Incidence and mortality of breast cancer: 1993-2007

Incidence

Year	Number of cases	Percentage of all cancers	2013 EASIR (95% CI)	1976 EASIR (95% CI)	Odds in:
1993	772	24.4%	118.5 (110.1,126.9)	93.2 (86.4, 100.1)	13.8
1994	830	26.8%	126.7 (118.0,135.4)	100.4 (93.3,107.6)	13.2
1995	880	27.9%	133.7 (124.9,142.6)	104.3 (97.1,111.4)	12.3
1996	849	26.1%	126.3 (117.9,134.8)	99.7 (92.8, 106.7)	13.0
1997	856	26.1%	126.4 (117.9,134.9)	99.4 (92.5,106.3)	13.1
1998	911	27.5%	132.2 (123.6,140.8)	104.7 (97.7,111.7)	12.3
1999	940	28.1%	135.2 (126.5,143.9)	105.0 (98.0,111.9)	12.5
2000	952	28.0%	136.7 (128.0,145.4)	106.4 (99.4,113.4)	12.2
2001	923	28.1%	130.3 (121.8,138.7)	103.4 (96.5,110.3)	12.4
2002	952	27.4%	131.7 (123.3,140.1)	102.8 (96.0,109.5)	12.5
2003	1038	29.0%	142.8 (134.1,151.5)	112.7 (105.7,119.8)	11.4
2004	1137	31.2%	154.2 (145.2, 163.2)	119.1 (111.9, 126.3)	10.9
2005	1079	29.6%	143.8 (135.1,152.4)	110.6 (103.8, 117.4)	11.9
2006	990	26.7%	130.2 (122.1, 138.4)	100.3 (93.8, 106.8)	12.7
2007	1166	30.1%	151.7 (143.0, 160.5)	117.7 (110.7, 124.7)	10.9
2008	1179	29.1%	150.9 (142.2, 159.6)	118.4 (111.4, 125.3)	10.7
2009	1227	29.3%	155.5 (146.8, 164.3)	120.7 (113.7, 127.6)	10.4
2010	1217	29.1%	151.2 (142.6, 159.7)	115.8 (109.1, 122.4)	10.9
2011	1287	29.2%	157.5 (148.9, 166.1)	120.1 (113.3, 126.9)	10.7
2012	1316	28.9%	159.6 (150.9, 168.2)	120.9 (114.2, 127.6)	10.5
2013	1294	29.2%	154.6 (146.1, 163.0)	118.3 (111.6, 124.9)	10.5

Mortality

Year	Number of deaths	Percentage of all cancer deaths	2013 EASMR (95% CI)	1976 EASMR (95% CI)	Odds in:
1993	329	18.8%	51.0 (33.7,42.3)	38.0 (33.7 42.3)	33.7
1994	338	19.2%	52.0 (46.4, 57.5)	37.1 (32.9, 41.3)	36.1
1995	330	19.5%	49.5 (44.2, 54.9)	35.7 (31.6, 39.8)	36.3
1996	312	18.2%	46.8 (41.6, 52.1)	32.6 (28.8, 36.4)	38.7
1997	259	14.8%	38.4 (33.7, 43.1)	26.9 (23.4, 30.3)	49.4
1998	299	17.2%	44.2 (39.2, 49.3)	31.3 (27.6, 35.0)	41.1
1999	290	16.6%	42.4 (37.5, 47.3)	29.8 (26.2, 33.4)	43.3
2000	286	15.9%	41.5 (36.7, 46.3)	29.3 (25.7, 32.8)	43.1
2001	315	18.0%	45.2 (40.2, 50.2)	30.9 (27.3, 34.5)	36.4
2002	278	15.8%	39.4 (34.8, 44.1)	26.5 (23.2,29.7)	50.7
2003	282	15.3%	39.7 (35.1, 44.4)	26.4 (23.1, 29.6)	51.8
2004	324	17.8%	45.1 (40.2, 50.0)	30.7 (27.2, 34.3)	41.2
2005	301	16.5%	41.0 (36.3, 45.6)	26.6 (23.5, 29.8)	54.5
2006	300	16.3%	40.2, (35.7, 44.8)	27.3 (24.0, 29.8)	48.2
2007	309	17.1%	40.9 (36.3, 45.5)	26.7 (23.6, 29.9)	51.3
2008	315	16.7%	41.0 (36.5, 45.6)	27.7 (24.4, 30.9)	48.5
2009	302	16.1%	39.3 (34.8, 43.8)	26.1 (23.0, 29.2)	47.7
2010	268	14.1%	34.0 (29.9, 38.1)	23.2 (20.3, 26.1)	54.1
2011	336	17.6%	41.3 (36.9, 45.8)	27.2 (24.1, 30.3)	53.2
2012	290	14.8%	35.3 (31.2, 39.4)	23.1 (20.3, 25.9)	62.6
2013	313	16.0%	37.7 (33.5, 41.8)	24.5 (21.6, 27.4)	60.1

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