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&

ASSOCIATION OF BREAST SURGERY

AN AUDIT OF SCREEN DETECTED BREAST CANCERS FOR THE YEAR OF SCREENING APRIL 2009 TO MARCH 2010

DISTRIBUTED AT THE
ASSOCIATION OF BREAST SURGERY CONFERENCE

16th MAY 2011
MANCHESTER CENTRAL CONVENTION COMPLEX

West Midlands
Cancer Intelligence Unit

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FOREWORDS

I am delighted once again to contribute the foreword to the annual audit of screen-detected cancers. This is the first report to be badged as a co-production with the Association of Breast Surgeons. When the screening programme was established in the late 1980s, the concept of such an organisation would have astounded and perhaps horrified many. But over the years the treatment of breast cancer has advanced in great strides. Treatment is still surgically led, and there are many options now available to women and their doctors regarding the type of surgery, the chemotherapy, hormonal and biological therapies which may follow, and reconstruction is now a very real option for those women undergoing mastectomy. The screening programme and its associated surgeons are pleased to have played a role in facilitating these developments.

We are pleased to present data for the entire UK and the Isle of Man. While devolution has meant some divergence in screening policies across the home countries, this report is evidence that the breast screening programmes to continue to work together.

The non-operative diagnosis rate has risen slightly this year. A detailed examination of these data reveals that the "cytology alone" category of cancer diagnosis has fallen to only 1% from 3%. While cytology was at one stage regarded as a major improvement in diagnostic technique, things have moved on once again, and it became apparent that women whose units continued to rely on it were potentially at some disadvantage. Therefore the screening programme asked those units to move to histological diagnosis and the data presented here show the effect of that move.

I congratulate screening units and the surgical community for once again bringing these data together and thank the West Midlands Cancer Intelligence Unit for the analysis and production of this report.

Professor Julietta Patnick CBE
Director for the NHS Cancer Screening Programmes

Welcome to the latest edition of the NHSBSP and ABS National breast screening audit report covering the year from April 2009 to March 2010. Worldwide this is a unique audit of the performance of a National breast screening programme and we should use it to celebrate the high quality performance of those involved in delivering the service to our patients. There are many positives to take from the audit, in particular the long term survival data.

The process of investigating outliers identified from the data is now well established; allowing more detailed analysis and also providing useful information for Quality Assurance visits to screening units. Each region now produces an annual report on their outliers providing valuable feedback and hopefully leading to improvements in care for women with screen-detected lesions. At this year's ABS meeting in Manchester we have a session dedicated to the analysis of outliers; both within our own programme and in other centres and I hope this will provide a valuable springboard for lively discussion.

Thanks are due to all the surgeons and staff in screening units and QA reference centres who have worked so hard to produce and collate the data. The quality of data returns has improved year on year due to their dedication. As always, I am indebted to all the members of the screening audit committee who have given their time to plan the audit and review the manuscript. Finally, the audit would not be possible without the huge contribution from Gill Lawrence, Olive Kearins, Shan Cheung and all the team at the West Midlands Cancer Intelligence Unit; I am extremely grateful to them. The audit continues to evolve, expand and produce stimulating information. I hope you will find much of interest within this report.

Neil Rothnie
Chair of the NHSBSP and ABS Screening Audit Group

ACKNOWLEDGEMENTS

The 2009/10 audit of screen-detected breast cancers was designed and directed by the NHS Breast Screening Programme and Association of Breast Surgery Screening Audit Group.

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The Screening Audit Group would like to extend their thanks to the following individuals and groups for their contributions to the 2009/10 audit of screen-detected breast cancer.

NHSBSP Surgical QA Co-ordinators, QA Co-ordinators and Programme Directors for overseeing regional data collection and validation at the regional QA reference centres.

QA Data Managers, Screening Office Managers and staff within the NHSBSP for collecting, collating and validating the regional data.

Regional cancer registry staff who co-operated with their regional QA reference centres to collect survival audit data.

Mrs Helen Bray from the Office for National Statistics, and Mrs Diane Edwards, GIS Specialist Cancer Information, at the West Midlands Cancer Intelligence Unit for producing the map of the NHSBSP.

Ms Lucy Davies at the ABS office for valuable assistance and support, including the distribution of booklets.

The Screening Audit Group would also like to thank the NHSBSP National Office for its financial assistance in support of the 2009/10 audit of screen-detected breast cancers.

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INTRODUCTION

AIMS AND OBJECTIVES

The 2009/10 NHS Breast Screening Programme (NHSBSP) and Association of Breast Surgery (ABS) audit of screen-detected breast cancer was undertaken to examine NHSBSP clinical activity in the period 1 April 2009 to 31 March 2010. The audit is designed to assess clinical performance by comparison of data with as many as possible of the clinical Quality Assurance (QA) standards recommended by the UK NHS Breast Screening Programme. These include the standards set in the following publications:

Quality Assurance Guidelines for Surgeons in Breast Cancer Screening
NHSBSP Publication No. 20, 4th Edition, March 2009

Guidelines for Quality Assurance Visits
NHSBSP Publication No. 40, Revised, October 2000

Reference is also made to the following publications:

Surgical Guidelines for the Management of Breast Cancer
Association of Breast Surgery, 2009

Guidelines for Non-operative Diagnostic Procedures and Reporting in Breast Cancer Screening.
NHSBSP Publication No.50, June 2001

NHS Clinical Guidelines for Breast Screening Assessment, Publication No.50. January 2005

NICE Clinical Guideline 80 on the Diagnosis and treatment of early and locally advanced breast cancer (February 2009)

National Mastectomy and Breast Reconstruction Audit. A national audit of provision and outcomes of mastectomy and breast reconstruction surgery for women in England. Second Annual Report (2009) and Third Annual Report (2010)

All Breast Cancers Report: A UK analysis of all symptomatic and screen-detected breast cancers diagnosed in 2006, NHS Breast Screening Programme and NCIN, October 2009

The 2009/10 NHSBSP & ABS audit covers the following main topic areas:

- the number and invasive status of screen-detected breast cancers
- non-operative diagnosis, number of assessment visits, diagnostic open biopsies
- tumour characteristics, lymph node status, invasive grade, NPI score and receptor status
- surgical treatment of the breast, immediate reconstruction, neo-adjuvant therapy
- surgical treatment of the axilla
- waiting times
- surgical caseload
- repeat operations to the breast
- the axilla: pre-operative assessment, sentinel lymph nodes biopsy, nodal status, and surgical treatment to the axilla
- adjuvant therapy and waiting times to radiotherapy
- survival analysis

ORGANISATION OF THE AUDIT

Organisation of Data Collection

As in previous years, responsibility for regional data collection was devolved to regional QA reference centres under the direction of surgical QA co-ordinators, QA directors and QA co-ordinators. Prior to the start of data collection an information pack was sent to all surgical QA co-ordinators, QA directors, QA co-ordinators and directors of regional cancer registries. This pack included, in both electronic and paper format:

- a timetable of events (Appendix A)
- a main NHSBSP & ABS breast audit questionnaire with guidance notes (Appendix B)
- an adjuvant therapy data collection form with guidance notes (Appendix C)
- a survival audit data collection form with guidance notes (Appendix D)

The format of the audit was designed by the NHSBSP & ABS Screening Audit Group and was subject to comment from the surgical QA co-ordinators, QA directors and QA co-ordinators in an attempt to ensure that, as far as possible, ambiguities were eliminated. Guidance notes and data checks, designed to assist the collection of consistent data, were incorporated.

Main Audit Questionnaire

The NHSBSP & ABS Breast Screening Audit main questionnaire was designed to enable collection of data describing breast screening activity in the 2009/10 screening year. The cohort of women included was selected to be identical to that included in the statistical KC62 reports for 2009/10, from which UK NHSBSP core screening measures are routinely calculated. Information was sought in such a way as to allow comparison of findings with current QA standards.

Adjuvant Therapy Audit

Each screening surgeon was asked to collect information for women with a date of first offered screening appointment from 1 April 2008 to 31 March 2009 inclusive. Information was sought regarding start dates for radiotherapy, where applicable, and whether or not the women had started chemotherapy and/or endocrine therapy. These data were linked to data collected in the main audit for 2008/09 to provide information on waiting times for adjuvant therapy and patterns of treatment.

Survival Audit

The survival audit utilised existing links between QA reference centres and regional cancer registries to obtain death data for women with screen-detected breast cancer. Details of the women with screen-detected breast cancer diagnosed between 1 April 1992 and 31 March 1993 were obtained by the breast screening services and matched with databases held at regional cancer registries to identify the date of death for any woman who died on or before 31 March 2010.

Responsibility for survival audit data collection rested with regional breast screening QA co-ordinators. Effective communication and collaboration with regional cancer registries is a vital element in the success of the survival audit.

Unit Level Data

Data for 94 screening units were included in the 2009/10 NHSBASP & ABS Breast Screening Audit. The smallest units, defined as the twenty units with the lowest number of women screened, are highlighted in white in the graphs throughout this booklet. The number of women screened by these units in 2009/10 varied from 5,291 to 13,585.

Responsibility for Data Collection

NHSBSP & ABS Breast Screening Audit information packs were sent to NHSBSP representatives in nine QA reference centres in England and to Wales, Scotland and Northern Ireland. Data for the nine

QA reference centres in England and data for Wales, Northern Ireland, Scotland and the Isle of Man are presented in this document. Screening cases in Isle of Man are managed by the Warwickshire, Solihull & Coventry Breast Screening Service.

In each region, the surgical QA co-ordinator, QA director and QA co-ordinator and their equivalents in the Celtic countries were responsible for working together to ensure that the data were collected from their breast screening services. Lead surgeons in each breast screening service were responsible for making sure that the data were available and complete, and lead surgeons in each screening service were asked to give confirmation to their QA co-ordinator that the data for their breast screening service were a fair representation of screening activity in the audit period (to "sign off" the data). The QA co-ordinator in each region was given the responsibility for ensuring that all the data were signed off before submission.

The identification of individuals with responsibility for ensuring that data are gathered and are a true reflection of clinical work is intended to clarify ownership of the information for the audit. Ownership of the information is essential if a need for change is highlighted which must be accepted and implemented.

The ground level data collection was carried out by a range of staff, including individual surgeons, QA reference centre staff, breast screening service office staff, staff at regional cancer registries, oncology staff, some non-surgical clinicians who have an interest in QA and some dedicated clinical data collection officers. For those screening services supported by the National Breast Screening System a set of standard analytical crystal reports was designed to allow the audit data to be retrieved from screening computer systems. These reports were created by Mrs Margot Wheaton and were available to all regions. Data were collated on a regional basis by QA reference centres under the direction of the surgical QA co-ordinators, QA directors and QA co-ordinators and submitted to the West Midlands QA Reference Centre for collation and evaluation.

Obtaining Complete and Valid Audit Data

Ensuring that audit data were supplied in a consistent format was essential to the validation process. The West Midlands QA Reference Centre has developed specialist spreadsheets in Microsoft Excel which are used by each regional QA reference centre to collate regional data in a standard format. Individual screening services either provide the data to their regional QA reference centre in the Excel spreadsheet or by hand on a paper copy. The spreadsheet includes data validation checks. A specially designed spreadsheet was also provided for the survival audit. The collection of data at breast screening service/unit level involved detailed consideration of cases and cross checks against existing KC62 reports.

Data Evaluation

The West Midlands QA Reference Centre, guided by the NHSBSP & ABS Screening Audit Group, acted as the central collection and collation point for national data. During the collation of national data, extensive validation checks are used to ensure that the data are an accurate reflection of clinical activity in the UK NHSBSP. National data were evaluated in comparison to current QA standards where these were available. Commentary and recommendations have been made by the NHSBSP & ABS Screening Audit Group.

Publication of Audit Data

The NHSBSP & ABS 2009/10 Audit of Screen-detected Breast Cancers is published as a booklet with financial assistance from the NHSBSP National Office. The booklet will be distributed at the ABS annual conference on **16 May 2011.** Once published, the booklet will be available to download from the following web sites.

West Midlands Cancer Intelligence Unit	www.wmpho.org.uk/wmciu/
NHS Cancer Screening Programmes	www.cancerscreening.nhs.uk

Referencing this Document

This document should be cited in the following way: *"An audit of screen-detected breast cancers for the year of screening April 2009 to March 2010", NHSBSP & ABS, May 2011*.

USING THE AUDIT DATA TO IMPROVE PERFORMANCE

Recommended uses of the NHSBSP & ABS Breast Screening Audit data are as follows:

At National Level

The NHSBSP and ABS Breast Screening Audit data should be considered formally at a meeting of the regional breast screening QA directors to identify recommendations for action, where performance does not meet a QA standard. This may include suggestions for training and recommendations for the management and organisation of services.

At Local/Regional Level

The annual NHSBSP & ABS Breast Screening Audit data should be considered formally at a meeting of the regional breast screening QA team and also at a regional workshop where the data for individual screening units in each region are analysed and presented.

Where the audit identifies a screening service as an 'outlier' in a particular area, regional QA reference centres and regional surgical QA co-ordinators should ensure that screening services audit the cases involved to establish whether the results reflect a data collection or recording problem. If the data are found to represent clinical practice correctly, the reasons for the failure to follow recommended guidelines should be ascertained.

Regional QA reference centres and regional surgical QA co-ordinators should follow up any failures to meet national QA standards with individual screening services. There should be formal recording of the plans put in place to achieve each of the standards failed, and routine monitoring to ensure that action has been taken to rectify the problem.

The annual NHSBSP & ABS Breast Screening Audit data should also be used to celebrate high quality services. Attention should not only be focused on failure to meet QA standards. Achievement of standards should also be recorded and recognition for high quality work given. It is important that audits such as this do not demoralise the dedicated professionals within the breast cancer screening and treatment teams.

YOUR COMMENTS

The NHSBSP & ABS audit of screen-detected breast cancers has developed over the years, with improvements in design and organisation resulting in improved data quality and increasingly useful audit results. To continue this development process your comments and suggestions are extremely useful. If you have any comments or suggestions about the 2009/10 audit, about this document or about the development of future NHSBSP & ABS Breast Screening Audits please put them in writing to:

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PROVISION OF DATA FOR THE 2009/10 AUDIT

The map below shows the areas covered by the nine English QA reference centres and information centres in Wales, Scotland, Northern Ireland and the location of Isle of Man. Data from the North East and Yorkshire and Humber Strategic Health Authorities are collated in one QA reference centre, called North East, Yorkshire & Humber.

KEY FINDINGS AND RECOMMENDATIONS

CANCERS DETECTED BY SCREENING

2,133,189 women were screened by the UK NHSBSP in England, Wales, Northern Ireland and Scotland between 1 April 2009 and 31 March 2010. 17,013 cancers were detected in women of all ages; 80% were invasive, 19% non-invasive and 1% micro-invasive. The invasive status of 8 cancers was unknown. The Isle of Man submitted data to the UK NHSBSP audit for the second time in 2009/10. 29 breast cancers were detected, 24 were invasive and 5 were non/micro-invasive.

The cancer detection rates for all cancers and for small invasive cancers (<15mm in diameter) were 8.0 per 1,000 women screened and 3.4 per 1,000 women screened respectively. Six screening units (two in South Central, two in North East, Yorkshire & Humber and two in North West) have had cancer detection rates for small (<15mm in diameter) cancers below 3.0 per 1,000 women throughout the 3-year period 2007/08-2009/10. Regional QA reference centres should carry out audits with these screening units to ascertain the reasons for these consistently low results.

65% of women with a screen-detected breast cancer were aged between 50 and 64 years when they were invited to attend the screening appointment leading to their diagnosis. 26% of screen-detected breast cancers were diagnosed in women aged 65-70 years. 7% of cancers were detected in women aged 70 years or more.

NON-OPERATIVE DIAGNOSIS

96% of cancers detected were diagnosed non-operatively. In Northern Ireland, 39% of cancers were diagnosed non-operatively by both C5 cytology and B5 core biopsy. Five units (two in Northern Ireland, two in North West and one in Scotland) have had a diagnosis rate by both C5 cytology and B5 core biopsy above 30% throughout the 3-year period 2007/08-2009/10. Regional QA reference centres should investigate why these units use both C5 cytology and B5 core biopsy so extensively to obtain a non-operative diagnosis.

The proportion of cancers diagnosed by C5 cytology alone has fallen from 19% in 2000/01 to 1% in 2009/10. Northern Ireland had the highest proportion (9%) of cancers diagnosed by C5 cytology only in 2009/10. This has decreased from 31% in 2008/09. Four units (one in Northern Ireland and three in North West) have had C5 only diagnosis rates above 15% throughout the 3-year period 2007/08-2009/10. These have decreased with time in all four units. Nevertheless, regional QA reference centres should investigate why C5 cytology alone is still being used to diagnose such a high proportion of cancers in these units.

The non-operative diagnosis rate for invasive cancers was 98%. Only one unit in South Central did not meet the 90% minimum standard and only 3 units failed to meet the 95% target (one in North West, one in South West and one in North East, Yorkshire & Humber. Regional QA reference centres should investigate why these units failed to meet the target for the non-operative diagnosis of invasive cancers. The non-operative diagnosis rate for non-invasive cancers was 84%. The proportion of non-invasive cancers without a non-operative diagnosis varied from 13% in West Midlands, East Midlands and North East, Yorkshire & Humber to 23% in South Central. 51 units failed to meet the 85% minimum standard. 30 units have failed to meet the minimum standard for the whole of the 3-year period 2007/08-2009/10. Regional QA reference centres should investigate the screening units in their regions which failed to meet the minimum standard.

For 20% of cancers with a B5a (Non-invasive) non-operative diagnosis, invasive disease was found at surgery. Four screening units have rates significantly higher than the UK average rate and in 18 screening units, more than half of the under-diagnosed cancers had an invasive size of at least 10mm.

Regional QA reference centres should carry out audits with these units to confirm the reasons for the unusually high proportion of B5a (Non-invasive) cancers found to be invasive at surgery, and to ascertain the reason why core biopsies did not identify the invasive component for cancers with an invasive size of at least 10mm.

98 cases with a B5b (Invasive) non-operative diagnosis were found to have non-invasive or micro-invasive cancer with no associated invasive disease following surgery. Explanations provided included that the invasive tumour had been completely excised in the core (20 cases) or that the patient had received neo-adjuvant chemotherapy (9 cases). For 36 cases with a B5b (Invasive) non-operative diagnosis, no malignant disease was identified at surgery, but subsequent audit confirmed that a correct diagnosis of invasive cancer had been reported in the non-operative core biopsy. 94% of the 219 cancers diagnosed by C5 cytology alone were found to be invasive after surgery. Regional QA reference centres should audit the 13 cases diagnosed by C5 cytology alone that were found to be non-invasive, micro-invasive or "malignant – cytology only" at surgery.

87% of women had a non-operative diagnosis after only one assessment clinic visit. The non-operative diagnosis rate for invasive cancers was 10% higher in women having more than one assessment clinic visit. For non/micro-invasive cancers, the increase in non-operative diagnosis achieved after more than one assessment visit was higher at 19%. 18 units failed to achieve a non-operative diagnosis rate of 80% (the previous minimum standard for all cancers) at the first visit. Regional QA reference centres should carry out audits with these screening units.

DIAGNOSTIC OPEN BIOPSIES

In the UK as a whole, 2,424 diagnostic open biopsies were performed in 2009/10. Of these 69% were benign and 31% were malignant. The benign open biopsy rate was 0.79 per 1,000 women screened. Regional QA reference centres in London and Wales should investigate the reasons for their relatively high benign open biopsy rates. The malignant open biopsy rate has fallen from 2.04 per 1,000 women screened in 1996/97 to 0.35 per 1,000 women screened in 2009/10 as the non-operative diagnosis rate has increased from 63% to 96%.

There were 13 false positive core biopsies recorded in 2009/10. Regional QA reference centres and their pathology QA co-ordinators should review these cases to ascertain the reason(s) for these results, implementing corrective action as appropriate. 8 cancers which were diagnosed by open biopsy had a mastectomy or a mastectomy with axillary surgery as the first surgical operation. Regional QA reference centres and regional surgical QA co-ordinators should review these cases. 15 invasive cancers and 8 non/micro-invasive cancers diagnosed by open biopsy had no non-operative procedure recorded. Regional QA reference centres and regional surgical QA co-ordinators should audit these 23 cases to establish whether they reflect a data collection problem. If the data are found to represent clinical practice correctly, the reasons for the failure to attempt non-operative diagnosis should be ascertained.

33% of invasive cancers and 32% of non/micro-invasive cancers diagnosed by malignant open biopsy following cytology or core biopsy performed during the assessment process had a C4 cytology or B4 core biopsy result indicating suspicion of malignant disease. In South West, 50% (27 cases) of the non/micro-invasive cancers diagnosed by open biopsy had a B4 core biopsy or C4 cytology result. The regional QA reference centre should review these cases. Nine screening units had C4/B4 rates significantly higher than the average rate of 34%. Regional QA reference centres should carry out audits with these units to confirm the reasons for the unusually high proportion of C4/B4 non-operative diagnosis results.

The classification by pathologist of core biopsies which are considered to represent lobular neoplasia as B3 means that, if lobular carcinoma in situ is verified in the surgical specimen, the non-operative diagnosis rate for non-invasive cancers will appear lower than it should be.

TUMOUR CHARACTERISTICS

7% of all surgically treated non-invasive cancers had incomplete cytonuclear grade or/and size. In 23 units, data incompleteness was greater than 10%. One unit in South Central had unknown cytonuclear grade and size for all its surgically treated non-invasive cancers. None of these were lobular carcinoma in situ (LCIS) cases. Of the 84 non-invasive cancers with unknown cytonuclear grade, 19 (23%) were in North East, Yorkshire & Humber. Of the 156 non-invasive cancers with grade not assessable or unknown, 112 (72%) were LCIS alone. The size of 52 non-invasive cancers (2%) was not assessable, and for 201 cancers (6%) the size was unknown. In London, 13% of non-invasive cancers had unknown or not assessable size. Regional QA reference centres and regional pathology QA co-ordinators should audit non-invasive cancers with unknown cytonuclear grade and/or size to ascertain the reason that these important prognostic indicators were not recorded. They should also identify which of their screening units are participating in the Sloane Project to ascertain if their practices and procedures could be used to improve data quality in other units.

38% of the 3,158 surgically treated non-invasive cancers were less than 15mm in diameter and 13% were larger than 40mm. 56% of the surgically-treated non-invasive cancers had high cytonuclear grade, 28% had intermediate cytonuclear grade and 11% had low cytonuclear grade. 16 units had significantly higher and 15 units significantly lower proportions of non-invasive cancers with a high cytonuclear grade over the 3 year period 2007/08-2009/10. Regional QA reference centres and regional pathology QA co-ordinators should carry out audits with these outlier units to ascertain the reason for their unusual cytonuclear grade distributions.

53% of surgically treated cancers had an invasive tumour diameter of less than 15mm. For only 233 cases (2%) was the invasive tumour diameter greater than 50mm. The whole tumour size was not provided for 256 (2%) surgically treated invasive cancers. 25% of the cancers without a whole tumour size were in North East, Yorkshire & Humber. Regional QA reference centres should ascertain why this important information was not available from their screening units.

In the UK as a whole, 98% of surgically treated invasive cancers had known nodal status. This varied between 97% in London and South Central to 100% in Northern Ireland. Regional QA reference centres and regional surgical QA co-ordinators should audit the cases in the 3 screening units (two in London and one in South Central) which had more than 5% of cases with unknown nodal status in order to determine the reasons for the absence of these important prognostic data. In the UK as a whole, 22% of cases had positive nodal status; this varied from 8% to 39% in individual screening units. It would be interesting to determine whether this wide range of node positivity is related to differences in the number of blocks taken and the intensity with which the presence of micro-metastases is investigated.

Although nodal assessment is not always indicated for non-invasive cancers, 30% of non-invasive cancers had known nodal status. This varied from 25% in South West, Wales and Scotland to 38% in Northern Ireland. 84% of non-invasive cancers treated with mastectomy had known nodal status, compared with 9% of those treated with conservation surgery. Of the 943 non-invasive cancers with known nodal status, 9 had positive nodal status recorded.

Overall, 26% of invasive cancers were Grade I, 52% Grade II and 21% Grade III. Grade was not assessable for 47 cases and unknown for 76 cases. Control charts suggest that there are local variations in the interpretation of invasive grade definitions which should be investigated by regional QA reference centres and regional pathology QA co-ordinators. In the Grade I control chart, 4 units have been outliers every year during the 3-year period 2007/08-2009/10. A similar pattern is seen for the Grade III control chart; with 3 units being outliers throughout the 3-year period 2007/08-2009/10.

Data were available to calculate a Nottingham Prognostic Index (NPI) score for 97% of surgically treated invasive cancers. A small number of units have been outliers in NPI control charts every year during the 3-year period 2007/08-2009/10. Regional QA reference centres and their regional pathology QA co-ordinators and surgical QA co-ordinators should investigate the reasons for the unusual NPI distributions and the high proportion of cases with unknown NPI group seen in five

screening units (two in South Central, two in London and one in North West).

ER status was unknown for 11% of cases. 1% of invasive cancers and 51% of non-invasive cancers had unknown ER status. Regional QA reference centres should ensure that the ER status is recorded for all invasive cancers and that the results are available for discussion at multi-disciplinary meetings. Of the 15,226 cancers with known ER status, 89% were ER positive. 90% of invasive cancers with known ER status and 82% of non-invasive cancers with known ER status were ER positive. PgR status was known for 60% of all cancers. This varied from 37% in East Midlands to 95% in London. Of the invasive cancers with known PgR status, 76% were positive. Of the 1,293 invasive cancers that were known to be ER negative, 57 (4%) were PgR positive.

HER-2 status data were available for 96% of invasive cancers. 21% of the invasive cancers without a HER-2 status were in London. In two screening units, 31% of the 235 invasive and 25% of the 163 invasive cancers had unknown HER-2 status. The regional QA reference centres should audit these cases to determine whether this is a data recording problem or if the data reflect clinical practice. Of the invasive cancers with known HER-2 status, 11% were positive. In one screening unit in South West, 55% of the 128 invasive cancers were HER-2 positive. The regional QA reference centre should audit these cases.

SURGICAL TREATMENT

72% of non-invasive cancers were treated with breast conserving surgery. 38 cancers apparently received no surgery. Mastectomy rates for non-invasive cancers varied from 22% in East of England to 34% in West Midlands. 125 potentially large high cytonuclear grade non-invasive cancers were treated with breast conserving surgery. Regional QA reference centres and regional surgical QA co-ordinators should review the data recorded for these cases to ensure that they were not under-treated.

In the UK as a whole, the mastectomy rate for invasive cancers was 24%. Mastectomy rates in individual screening units varied between 10% and 50%. 243 invasive cancers and 38 non-invasive cancers had no surgery recorded, and for 1 non-invasive cancer and 14 invasive cancers, treatment information was not available. Regional QA reference centres and regional surgical QA co-ordinators should audit these cases. 91% of invasive cancers with an invasive tumour diameter greater than 50mm were treated with mastectomy compared with 17% of small (less than15mm diameter) invasive cancers.

Overall only 10% of cancers with whole tumour size less than 15mm were treated with mastectomy compared with 17% of cancers with an invasive tumour size of less than 15mm. These data indicate that the presence of *in situ* disease which extends beyond the invasive lesion accounts for a proportion of the mastectomies performed on small invasive cancers. In order to ascertain the reasons for non-random variation in clinical practice, regional QA reference centres and regional surgical QA co-ordinators should review the data for all screening units lying outside (above and below) the control limits in Figure 24 which shows the inter-unit variation in the proportion of small invasive cancers which had a mastectomy in the 3 year period 2007/08-2009/10.

20% of screen-detected cancers treated with mastectomy were recorded as having immediate reconstruction in 2009/10. This is similar to the 21% immediate reconstruction rate reported in the *National Mastectomy and Breast Reconstruction Audit Third Annual Report, 2010*. The highest recorded immediate reconstruction rates for all screen-detected cancers were in South East Coast (31%), and the lowest in Northern Ireland (9%). Only 16% of invasive cancers treated with mastectomy were recorded as having immediate reconstruction compared with 33% of non-invasive cancers treated with mastectomy. These rates are similar to the rates of 17% and 38% for invasive and non-invasive cancers reported in the *NMBRA Second Annual Report, 2009.* For invasive cancers treated with mastectomy, recorded immediate reconstruction rates varied from 5% in Northern Ireland to 26% in South East Coast. For non/micro-invasive cancers, recorded immediate reconstruction rates varied from 18% in Wales to 50% in West Midlands. Overall recorded immediate reconstruction rates in individual screening units varied from 0 cases in four units to over 40% of cases in four units.

A total of 626 cancer patients received neo-adjuvant therapy. 609 patients had invasive cancer and 14 patients had non-invasive cancer. 243 women with invasive breast cancer (2%) had no surgery. Of these, 119 had neo-adjuvant therapy recorded. As with adjuvant chemotherapy, the use of neo-adjuvant chemotherapy was higher in younger patients. The use of neo-adjuvant endocrine therapy was higher for the oldest patients aged at least 71 years (39% of whom had no surgery recorded), compared to 17% of the patients aged less than 50. 17 cancers were recorded as having received neo-adjuvant Herceptin; all were HER2 positive invasive cancers. 358 cancers (2%) had neo-adjuvant endocrine therapy recorded, 343 were invasive cancers. 330 cancers (92%) with neo-adjuvant endocrine therapy recorded were ER and/or PgR positive, 22 cases had unknown ER and PgR status and the remaining six cases were ER and PgR negative.

WAITING TIMES AND SURGICAL CASELOAD

In the UK as a whole (excluding Scotland), 88% of women had their first surgery within 62 days of the 'date of last read' of the mammogram. The proportion of women having their surgery within 62 days varied from 79% in South East Coast to 98% in Northern Ireland. Patients who had a non-operative diagnosis generally waited for a shorter period of time before having their first therapeutic operation than those who did not have a successful non-operative diagnosis. If cases with neo-adjuvant therapy are excluded, the proportion of women having their surgery within 62 days increases to 90%. There is, however considerable variation between regions; from 80% in South East Coast (10% below the national standard) to 94% in East of England and 99% in Northern Ireland. There was even greater variation between screening units. 15 units had significantly longer waiting times than the UK average of 90% and a further 12 units failed to meet the 90% minimum standard in 2009/10. In one relatively large unit in South East Coast only, 63% of women received their first surgery within 62 days. Regional QA reference centres and QA surgeons in England should investigate the reasons that the screening units in their areas failed to meet the national 62 day waiting times standard.

There were 544 consultant breast surgeons working in the UK NHSBSP in 2009/10. 92% of women were treated by a surgeon with a screening caseload of at least 20 cases. Of the 138 surgeons with screening caseload of less than 10 cases, 33% treated more than 30 symptomatic breast cancers. 11 of the 13 surgeons who had a screening caseload of less than 10 because of private practice were in London. Information was unavailable to explain the low caseload of 6 surgeons treating a total of 15 women. Three of these surgeons were in North East, Yorkshire & Humber. Regional QA reference centres and regional surgical QA co-ordinators should ensure that all screening cases treated by low caseload surgeons have received satisfactory treatment. Combining the data submitted for the past three audit years, 188 surgeons (34%) had an annual average caseload of less than 10 cases and 4 treated an average of at least 100 cases per year. Currently, only the responsible consultant and not necessarily the surgeon who actually undertakes the operation is recorded on the NBSS. The caseload for some surgeons will thus include patients operated on by associate specialists or supervised trainees.

REPEAT OPERATIONS

4,118 patients (25%) had more than one operation. 3,183 patients with invasive cancer (24%) and 935 patients with non/micro-invasive cancer (28%) had more than one operation. 86% of invasive cancers and 44% of non/micro-invasive cancers without a non-operative diagnosis had a repeat operation. Although the overall repeat operation rate for the 742 surgically treated cancers (with known invasive status) without a non-operative diagnosis was 56%, repeat operations for cancers without a non-operative diagnosis formed only 10% of the total repeat operations. 35 cancers without a non-operative diagnosis, which were not LCIS, had no further surgery despite the margins being involved or of unknown status. 19 (54%) of these were in Scotland. Regional QA reference centres should audit cases where no repeat operation appears to have been undertaken for cases with involved margins or with unknown margin status. 23% of invasive cancers and 25% of non/micro-invasive cancers with a non-operative diagnosis had a repeat operation. 76 surgeons had unusually high or low repeat therapeutic operation rates in the 3 year period 2007/08-2009/10. Regional QA reference centres and regional surgical QA co-ordinators should audit the work of these surgeons to ascertain the reasons for their atypical practice.

Invasive cancers with a C5 cytology only diagnosis had the lowest repeat operation rate (19%). Invasive cancers with a B5b core biopsy had a repeat operation rate of 21%. Non/micro-invasive cancers with a B5a (Non-invasive) core biopsy had a repeat operation rate of 26%. Invasive cancers with a B5a (Non-invasive) core biopsy had the highest repeat operation rate (59%).

20% of all cancers with a non-operative diagnosis, which were initially treated with breast conserving surgery, had repeat therapeutic operations (breast conserving surgery or mastectomy) to clear margins. 13% of all cancers with a non-operative diagnosis, had repeat breast conserving surgery to clear margins. This varied between 10% in Scotland and Northern Ireland and 18% in South East Coast. In the 3-year period 2007/08-2009/10, 41 surgeons and 13 screening units had unusually high repeat breast conserving surgery rates (four of these were in South West). 39 surgeons had unusually low repeat breast conserving surgery rates. Regional QA reference centres and regional QA surgeons should review the data for screening units and individual surgeons with atypical practice. 27% of invasive cancers and 20% of non/micro-invasive cancers with a B5a (Non-invasive) core biopsy had a repeat therapeutic breast conserving surgery to clear margins.

19% of all cancers with a non-operative diagnosis had an initial therapeutic mastectomy at the first operation, and 5% had initial therapeutic conservation surgery converted to a mastectomy at a subsequent repeat operation. 26 surgically treated invasive cancers diagnosed by C5 cytology only had a mastectomy as their first therapeutic operation. 8 of these cancers were in Northern Ireland. Regional QA reference centres and regional surgical QA co-ordinators should audit these cases. 7% of all cancers with a non-operative diagnosis, which were initially treated with therapeutic breast conserving surgery, were eventually converted to a mastectomy. 30 surgeons and 18 screening units had unusually high repeat rates and 16 surgeons and 13 screening units had unusually low rates in the 3-year period 22007/08-2009/10. Regional QA reference centres and regional QA surgeons should review the data for surgeons and screening units with atypical practice. Invasive cancers with a B5a (Non-invasive) core biopsy had the highest conversion of breast conserving surgery to mastectomy (23%). This varied from 13% in East of England to 44% in Northern Ireland.

Of the 15,227 cases which had surgery to the breast and were found to be malignant (invasive or non/micro-invasive) at surgery, 75% had complete margin data for all operations. For the first operation, 97% of cases had information on whether or not the radial margin was clear, but only 82% of the cases had the margin distance recorded. Of the 11,303 cancers treated with breast conserving surgery, 95% were recorded as having clear margins at their final operation. Of the 3,924 cases treated with a mastectomy, 90% were recorded as having clear margins at their final operation. Regional QA reference centres should audit the 308 cases recorded as not having had clear margins at the final operation and the 667 cases where the final margin status was recorded as unknown to ensure that these cancers were not under-treated.

THE AXILLA

In the UK excluding Scotland, 9,175 (58%) cases had a record of an axillary ultrasound at assessment. Of these, 88% were confirmed to be invasive after surgery and 11% non-invasive. Overall, 59% of the invasive cancers and 34% of non-invasive cancers had axillary ultrasound recorded. Of the 1,225 invasive cancers with an axillary ultrasound result recorded, 624 were node positive at surgery; giving a positive predictive value of an abnormal ultrasound of 51%.

15% of the invasive cancers having an axillary ultrasound examination, had an abnormal ultrasound result and 86% of these had an axillary node sample (core biopsy or cytology). Of the 1,055 cancers with an abnormal ultrasound result which had an axillary node biopsy, 42% had a C5/B5 diagnosis. Of these, 84 had neo-adjuvant therapy recorded. Of the 363 invasive cancers with a C5/B5 result which did not have neo-adjuvant therapy, 16 (4%) had false positive results, i.e. were found to be node negative at surgery. Regional QA reference centres should audit these cases to determine whether these are data recording errors as was the case for all but one of the false positive cases in the 2008/09 audit. Of the 2,418 invasive cancers without neo-adjuvant therapy recorded that were confirmed to be node positive on surgery, 361 (15%) had positive nodes diagnosed pre-operatively by means of needle biopsy. Of the 11,723 invasive cancers without neo-adjuvant therapy that did not

have an axillary biopsy before surgery or where it was not known whether an axillary biopsy was taken, 2,132 (18%) had positive nodes found at surgery.

A sentinel lymph node biopsy (SLNB) procedure was recorded for 8,882 invasive cancers (67%) with axillary surgery. Of these, 63% had the full dual SLNB procedure using isotope and blue dye recorded. This varied from 17% in Wales to 99% in Scotland. Although the use of SLNB has increased by 9% since 2008/09, there is still widespread variation. 8 screening units used SLNB for fewer than 20% of their patients with invasive cancer, while in 15 screening units, over 90% of the patients with invasive cancers had a SLNB. Regional QA reference centres and regional surgical QA co-ordinators should ensure that the use of SLNB is being rolled out in all of their screening units.

In 2009/10, the proportion of cases with fewer than 4 nodes examined increased to 42.3%. 40.5% of these involved a SLNB procedure, leaving an underlying rate of 1.8% with fewer than 4 nodes examined when a SLNB procedure was not used. 94% of the 4,344 invasive cancers, which either did not have a SLNB procedure or where it was not known whether or not a SLNB procedure was performed, had 4 or more nodes taken. This varied from 81% in Wales to 99% in East Midlands. 17 screening units did not meet the 90% minimum standard. Regional QA reference centres and regional surgical QA co-ordinators should audit all the invasive cancers without a SLNB or where the type of axillary procedure used is unknown, which have fewer than 4 nodes reported to ensure that the axilla has not been under-treated.

The proportion of cases with positive nodal status (16%) was lower for cases which underwent a SLNB procedure compared with cases which did not have a SLNB procedure (33%). This could be due to the selection of patients for axillary sampling or clearance, who were thought to be of high risk (e.g. high grade, palpable nodes) or who had positive nodes on non-operative ultrasound guided cytology or core biopsy. 138 cancers which had their positive nodal status determined from a SLNB procedure had fewer than 4 nodes taken. 56 (41%) of these cases were in 7 screening units. Of the 130 cases with no subsequent axillary procedure, 15% had an invasive tumour size of 10mm or less, 26% were Grade I, and 22% were in the Excellent or Good NPI Groups. A further 15 invasive cancers had their positive nodal status determined on the basis of fewer than 4 nodes without a SLNB procedure. In total, 591 (4%) invasive cancers appear to have insufficient nodal information to provide a satisfactory diagnostic work-up. Regional QA reference centres and regional surgical QA co-ordinators should follow up all of these cases to ensure that the appropriate nodal procedures have been undertaken and that the axilla has not been under-treated.

Although nodal assessment is not always indicated for non-invasive cancers, 30% of non-invasive cancers had known nodal status. 84% of non-invasive cancers treated with mastectomy had known nodal status, compared with 9% of those treated with breast conserving surgery. Of the 943 non-invasive cancers with known nodal status, 9 (1%) had positive nodal status recorded. 2 of the 90 micro-invasive cancers with known nodal status were positive. 64% of non-invasive cancers treated with a mastectomy and 85% of non-invasive cancers treated with breast conserving surgery had their nodal status determined on the basis of a SLNB. The former varied widely between screening units. The maximum numbers of nodes taken for non-invasive cancers treated with conservative surgery and mastectomy were 15 and 29 respectively. Regional QA reference centres should audit non-invasive cancers where more than 10 nodes were taken to ascertain why the axilla appears to have been over-treated.

Axillary surgery was performed for 99% of invasive cancers with a B5b (Invasive) core biopsy and all invasive cancers diagnosed by C5 cytology only. 123 invasive cancers with a B5b (Invasive) core biopsy, 46 invasive cancers with a B5a (Non-invasive) core biopsy and 17 invasive cancers without a non-operative diagnosis had no axillary procedure recorded. In South Central, 15% of B5a (Non-invasive) cancers that were found to be invasive at surgery had no axillary operation recorded. Regional QA reference centres and regional surgical QA co-ordinators should audit the invasive cancers with no surgery to the axilla recorded to ascertain whether the data for these cases are recorded correctly and, if so, why the nodal status was not determined.

Although 93% of invasive cancers with a B5a (Non-invasive) diagnosis had axillary surgery, only 331 (48%) of these cancers had their axillary surgery at the first operation; this varied from 39% in Wales

and West Midlands to 69% in Scotland. Of the 331 cases with axillary assessment at first operation, 71% had SLNB performed, compared to 58% of those with axillary assessment at later operation. During the period 2007/08-2009/10, 6 screening units had significantly lower rates of axillary surgery at first operation for invasive cancers with a B5a (Non-invasive) diagnosis, and 9 units had significantly higher rates. Of these 15 outliers, 4 are in North West, 4 are in West Midlands and 3 are in East of England.

41% of invasive cancers with a positive nodal status had a repeat operation to the axilla. This varied from 30% in London to 53% in South West and West Midlands, and from 0% in 3 screening units to over 60% in 17 units. 34% of invasive cancers with positive nodal status had a repeat operation to the axilla following a SLNB and 7% after an axillary operation which did not involve a SLNB. Overall in the UK, 83% of repeat operations on the axilla were carried out on invasive cancers with positive nodal status determined on the basis of SLNB. This varied between 51% in Scotland and 98% in Wales. In a small number of units with repeat operation rates above the UK average, the majority of the invasive cancers had their positive nodal status determined without a SLNB or using an unknown nodal procedure. Regional QA reference centres should audit these invasive cancers to ensure that the nodal operation data for these cases are recorded correctly and to ascertain why the nodal procedure type was not known.

ADJUVANT THERAPY

15,674 cases (92% of all cases) were included in the adjuvant therapy audit. Scotland and Wales had the highest proportion of eligible cases (100% and 99% respectively). South East Coast had the lowest proportion of eligible cases, with 37% of cases excluded. 78% of invasive cancers and 41% of non-invasive cancers had radiotherapy recorded. 26% of the invasive cancers and 10 patients with non-invasive cancer had chemotherapy recorded. Regional QA reference centres should audit these 10 cases to ascertain if this is a data recording issue.

85% of invasive cancers and 19% of non-invasive cancers had endocrine therapy recorded. There are differing opinions regarding the benefit of offering endocrine therapy to women with non-invasive breast cancer. As *NICE Clinical Guideline 80 Early and locally advanced breast cancer: Diagnosis and treatment* (2009) states that Tamoxifen should not be offered to these women, it will be interesting to see if the proportion of women with non-invasive breast cancer who do receive endocrine therapy decreases in future audits. Endocrine therapy was the main treatment recorded for invasive cancers at all ages, followed by radiotherapy. The use of radiotherapy decreased gradually with age for both invasive and non-invasive cancers.

There was a clear decrease in chemotherapy treatment with age; with only 15% of women aged 65-70 receiving chemotherapy compared with 35% of women aged 49-55. This may be because a higher proportion of younger women have aggressive, fast growing cancers, but may also indicate a reluctance to prescribe chemotherapy to older women where the risk/benefit balance and clinical effectiveness are less clear.

Overall, 54% of women received radiotherapy within 60 days of their final surgery and 90% within 90 days. 38 women (1%) had not received radiotherapy 200 days after their final surgery. Only 45% of women with invasive breast cancer and 39% of women with non-invasive breast cancer had started their radiotherapy within 90 days of their first assessment visit and 202 women (3%) with invasive breast cancer had not started radiotherapy after 200 days. Regional QA reference centres should review all of the cases (invasive and non-invasive) where radiotherapy was not started within 200 days of final surgery.

For invasive cancers which did not have chemotherapy, the median time between final surgery and radiotherapy was similar for patients undergoing one or more surgical operations (58 or 57 days respectively) but varied somewhat between regions. The longest waiting times were seen in South East Coast, London and Wales. In the Cancer Reform Strategy published in December 2007, a new radiotherapy waiting times standard was introduced which specifies that the time between the date when a person is determined to be 'fit to treat' after surgery and the start of radiotherapy should be no

more than 31 days. If this standard is to be achieved, considerable reductions in the time between final surgery and radiotherapy will be required in all regions.

94% of women with invasive cancer treated with breast conserving surgery had radiotherapy recorded, compared to only 57% of women with conservatively treated non-invasive cancers. In 2009/10, in three screening units more than 20% of invasive cancers treated with breast conserving surgery did not have radiotherapy recorded. In the 3-year period 2006/07-2008/09, 19 screening units had significantly lower rates of radiotherapy. Five of these units were in South East Coast, three in London and three in Scotland. The two units with the highest proportion of invasive cancers without radiotherapy were in South Central (46%) and East of England (25%). 14% of conservatively treated invasive cancers without radiotherapy recorded were larger than 20mm in diameter, 13% were Grade III and 12% were node positive. Given the benefits demonstrated in clinical trials from the provision of radiotherapy to patients treated with breast conserving surgery, regional QA reference centres should audit all conservatively treated invasive breast cancers which did not have radiotherapy recorded to ascertain if this is a true reflection of clinical practice or a data recording issue.

196 non-invasive cancers without radiotherapy recorded were high cytonuclear grade and 11 were more than 40mm in diameter. In the 3-year period 2006/07-2008/09, in South East Coast, South Central and South West, more than 50% of conservatively treated non-invasive cancers had no radiotherapy recorded. Provided that the tumour margins were adequate, it may be acceptable for conservatively treated non-invasive cancers to not receive adjuvant radiotherapy. However, regional QA reference centres should ascertain each screening unit's policy regarding the provision of radiotherapy to these cancers as *NICE Clinical Guideline 80* recommends that adjuvant radiotherapy should be offered to patients with DCIS following adequate breast conserving surgery and the relative risks and benefits discussed.

34% of women with node positive invasive cancer did not have chemotherapy recorded. Older women with node positive invasive cancers were less likely to have chemotherapy recorded than younger women; only 25% of women aged less than 65 with node positive invasive cancers did not have chemotherapy recorded compared with 54% of older patients. 14% of the 884 node positive invasive cancers which had no chemotherapy were Grade III and 6% were HER-2 positive. Given the relatively small numbers of cancers involved, all regional QA reference centres and regional surgical QA co-ordinators should audit Grade III and/or HER-2 positive, node positive invasive cancers with no chemotherapy recorded to determine whether the absence of chemotherapy treatment data is a true reflection of clinical practice or a data recording issue.

The decision to give endocrine therapy did appear to depend to a large extent on ER and PgR status. However, 689 ER positive, invasive cancers and 35 ER negative, PgR positive invasive cancers did not have endocrine therapy recorded. 17% of the ER positive invasive cancers not treated with endocrine therapy were Grade III, 18% were node positive and 16% were larger than 20mm in diameter. In 7 screening units, more than 20% of the ER positive cancers that did not receive endocrine therapy were Grade III, node positive and/or larger than 20mm diameter tumours. Three of these units were in East of England. Regional QA reference centres and regional surgical QA co-ordinators should audit ER and PgR positive invasive cancers to determine whether the absence of endocrine therapy data is a true reflection of clinical practice or a data recording issue.

The proportion of non-invasive cancers with endocrine therapy recorded varied markedly between regions from 2% in Scotland to 62% in Northern Ireland. The proportion of ER positive non-invasive cancers with endocrine therapy recorded decreased overall from 45% in 2007/08 to 38% in 2008/09. Similar decreases occurred in most regions; the exceptions being North West and Wales where 10% and 17% increases were apparent. Given the potential side effects of endocrine treatment, regional QA reference centres and regional surgical QA co-ordinators should determine the reasons why endocrine therapy appears to have been given to invasive and non-invasive with unknown ER or negative ER/PgR status.

15% of women with ER negative, node positive invasive cancers did not have chemotherapy recorded compared to 42% of ER negative, node negative invasive cancers. This suggests that nodal status was taken into account when deciding whether women would benefit from chemotherapy. Of the 43

ER negative, node positive invasive cancers which had no chemotherapy recorded, 28 (65%) were Grade III, 8 (19%) were HER-2 positive, 22 were diagnosed in women aged less than 65 (11% of those with ER negative node positive cancers) and 21 in women aged 65 or above (24%of those with ER negative node positive cancers). Given the relatively small numbers of cancers involved, all regional QA reference centres and regional surgical QA co-ordinators should audit the ER negative, node positive invasive cancers with no chemotherapy recorded to determine whether the absence of chemotherapy treatment data is a true reflection of clinical practice or a data recording issue.

635 (45%) HER-2 positive cases did not have chemotherapy recorded. In the UK as a whole, 12% of these cases were greater than 20mm in diameter, 25% were Grade III, 9% were node positive and 34% were in the MPG1, MPG2 or PPG groups. In 5 screening units, all HER-2 positive invasive cancers had chemotherapy recorded, whilst in 7 units more than 70% of these cancers had no chemotherapy recorded. Given that Trastuzumab Herceptin is only usually prescribed for HER-2 positive patients who have already received chemotherapy, regional QA reference centres and regional surgical QA co-ordinators should audit HER-2 positive cases with no chemotherapy recorded to determine whether the absence of chemotherapy treatment data is a true reflection of clinical practice or a data recording issue

SURVIVAL

Of the 7,025 cancers submitted to the survival analysis for the period 1 April 1992 to 31 March 1993, 190 (3%) were excluded because they were not registered at the cancer registries. A further 111 cancers (2%) were excluded because they were not confirmed to be primary tumours and 18 because their invasive status was not known. 15-year relative survival for women with screen-detected invasive breast cancer diagnosed in 1992/93 is 83.0% (95% CI 81.5%-84.5%). This varies from 77.8% in East Midlands and Scotland to 91.5% in Northern Ireland. However, there is no significant difference between the UK average and the relative survival rates in each region. 5-year relative survival for women with screen-detected invasive breast cancer has improved significantly from 93.5% in 1992/93 to 97.1% in 2002/03.

The 15-year relative survival of women with less than 15mm diameter invasive breast cancers is 91.0% compared with a 15-year relative survival rate of 48.2% for women with tumours with a diameter greater than 50mm. At 93.5%, the 15-year relative survival rate is also significantly higher for women with Grade I cancers (28% of the cohort) compared with women with Grade III cancers (15% of the cohort) whose 15-year relative survival is 65.3%. At 90.1%, the 15-year relative survival for women with node negative cancers (42% of the cohort) is higher than for the women with node positive cancers (18% of the cohort) whose 15-year relative survival is 62.8%.

5-year relative survival rates for women with cancers in the Excellent Prognostic Group (EPG) and Good Prognostic Group (GPG) diagnosed in 1992/93 are 100.1% and 98.6% respectively. At 92.4%, the 5-year relative survival rate for the 13% of women with cancers in the Moderate Prognostic Group 1 (MPG1) is significantly worse than that of women with cancers in the EPG and GPG groups. The 5-year relative survival rates for women with the 6% of cancers in the Moderate Prognostic Group 2 (MPG2) and the 4% of women with cancers in the Poor Prognostic Group (PPG) is even lower at 83.6% and 58.5% respectively. There are marked and statistically significant increases in the 5-year relative survival rates for MPG1 (4% increase), MPG2 (6% increase) and PPG (19% increase) cancers between 1992/93 and 2002/03. These improvements in survival, particularly the 19% increase in the PPG cancers, are almost certainly due to the development and use of new adjuvant treatments.

TOPICS TO BE AUDITED BY REGIONAL OA REFERENCE CENTRES

Topic	Region/unit (number of cases affected)	Reference
<15mm invasive detection rate below 3.0 per 1000 women screened over 3 years	6 screening units	Ch1 P20
High proportion of cases diagnosed with cytology alone, and both cytology and core biopsy	9 screening units	Ch2 P.23
Low non-operative diagnosis rate for invasive cancers	4 screening units	Ch2 P.24
Low non-operative diagnosis rate for non-invasive cancers	All regions (71 screening units)	Ch2 P25
B5a cancers which become invasive after surgery - outliers in 3-year rolling data control chart	WM (1 screening unit)	Ch2 P.27
Over 50% of B5a cancers (invasive after surgery) with ≥10mm invasive size	18 screening units	Ch2 P.27
B5a cancers which had no malignant component found at surgery	All regions (62 cases)	Ch2 P.27
C5 only diagnosis found to be not invasive at surgery	13 cases	Ch2 P.27
B5b cancers which had no invasive component found at surgery	All regions (183 cases)	Ch2 P.27
Low proportion of cases diagnosed in 1 visit	18 screening units	Ch2 P.29
High benign open biopsy rates	London, Wales	Ch2 P.30
False positive cytology and core biopsy cases	13 cases	Ch2 P.31
Mastectomy as diagnostic open biopsy	8 cases	Ch2 P.31
No non-operative diagnosis attempted	23 cases	Ch2 P.31
High proportion of C4 and/or B4 cytology/core biopsy diagnosis prior to open biopsy - outliers in 3-year rolling data control chart	9 screening units	Ch2 P.33
Unknown size/grade for non-invasive cancers	All regions (249 cases)	Ch3 P.35
Non invasive cancers with a high cytonuclear grade - outliers in 3-year rolling data control chart	31 screening units	Ch3 P.36
Unknown invasive whole tumour size information	218 cases	Ch3 P.36
Invasive cancers with no surgery to the axilla	All regions (203 cases)	Ch3 P.37
Nodal status data unknown for invasive cancers	London, SC (3 screening units)	Ch3 P.37
Proportion of invasive cancers with positive nodal status (of those with known nodal status)	5 screening units	Ch3 P.37
Interpretation of invasive grade definition - outliers in 3-year rolling data control chart	6 screening units	Ch3 P.39
Significant variance in proportion of cancers in NPI groups - outliers in 3-year rolling data control chart	NW (1 screening unit)	Ch3 P.41
High proportion of cases with unknown NPI group	5 screening units	Ch3 P.41
Availability of ER status for all invasive cancers	All regions (110 cases)	Ch3 P.43
Availability of HER-2 data for all invasive cancers	16 screening units	Ch3 P.44
HER-2 positivity above 25% for invasive cancers	SW (1 screening unit)	Ch3 P.44
Large non-invasive cancers with breast conserving surgery	All regions (78 cases)	Ch4 P.45
Large/unknown size and high/unknown grade non-invasive cancers treated with breast conserving surgery	All regions (81 cases)	Ch4 P.45
No surgery or unknown treatment for invasive cancers	All regions (257 cases)	Ch4 P.46
Mastectomy rate for small invasive cancers - outliers in 3-year rolling data control chart	24 screening units	Ch4 P.48
Cancers with mastectomy but unknown immediate reconstruction	135 cases	Ch4 P.49
Proportion of mastectomy cases having immediate reconstruction - outliers in 2-year rolling data control chart	22 screening units	Ch4 P.50
Small, low grade with no abnormal lymph nodes invasive cancers with neo-adjuvant chemotherapy	NW, SEC, SW (6 cases)	Ch4 P.52

Topic	Region/unit (number of cases affected)	Reference
Waiting times - 62 days between date of last read and first therapeutic surgery	15 screening units	Ch5 P.54
Satisfactory treatment for low screening caseload surgeons	All regions (138 surgeons)	Ch5 P.58
More than 3 therapeutic operations	37 cases	Ch6 P.60
High/low repeat operation for conservation surgery or mastectomy by surgeon - outliers in 3-year rolling data control chart	76 surgeons	Ch6 P.61
High repeat breast conserving surgery by unit - outliers in 3-year rolling data control chart	13 screening units	Ch6 P.69
High repeat breast conserving surgery by surgeon - outliers in 3-year rolling data control chart	41 surgeons	Ch6 P.69
Mastectomy carried out on C5 only invasive cancers	26 cases	Ch6 P.71
Initial breast conserving surgery converted to mastectomy by unit - outliers in 3-year rolling data control chart	18 screening units	Ch6 P.73
Final margins not clear or unknown	975 cases	Ch6 P.75
Low proportion of cases with a SLNB	17 screening units	Ch7 P.79
Units not using full dual SLNB technique	All regions	Ch7 P.80
Less than 4 nodes obtained without/unknown SLNB	All regions (238 cases)	Ch7 P.83
Positive nodal status determined by less than 4 nodes and no sentinel lymph node biopsy procedure	15 cases	Ch7 P.83
>10 nodes taken for non-invasive cancers	28 cases	Ch7 P.86
B5a to invasive cancers with axillary surgery at first operation - outliers in 3-year rolling data control chart	15 screening units	Ch7 P.89
High repeat operation rates to the axilla without SLNB/unknown nodal procedure type	7 screening units	Ch7 P.91
Non-invasive cancers with chemotherapy recorded	11 cases	Ch8 P.93
Invasive cancers with no surgery and with chemotherapy recorded	39 cases	Ch8 P.93
Invasive cancers with no surgery and with radiotherapy recorded	18 cases	Ch8 P.93
Radiotherapy waiting time (over 200 days after final surgery)	38 cases	Ch8 P.96
No radiotherapy recorded for conservatively treated invasive cancers which are Grade III, larger than 20mm and/or had positive nodal status	All regions (152 cases)	Ch8 P.98
Invasive cancers treated by breast conserving surgery with no radiotherapy recorded - outliers in 3-year rolling data control chart	19 screening units	Ch8 P.100
No chemotherapy for Grade III and/or HER-2 positive, node positive invasive cancers	All regions (157 cases)	Ch8 P.101
Proportion of ER positive invasive cancers without endocrine therapy is 5% in excess of the UK average (6%)	EoE, London (229 cases)	Ch8 P.103
No endocrine therapy for ER negative, PgR positive invasive cancers	All regions (35 cases)	Ch8 P.103
Hormone therapy given to cancers with ER negative or unknown	178 cases	Ch8 P.104
ER negative, node positive invasive cancers without chemotherapy	43 cases	Ch8 P.105
No chemotherapy for HER-2 positive invasive cases which are larger than 20mm, grade III and/or had positive nodal status	All regions (233 cases)	Ch8 P.106
Regions 5% or more above UK average in the five adjuvant summary propositions	All regions except NEYH and WM	Ch8 P.107

CHAPTER 1
BREAST CANCERS DETECTED BY THE UK NHSBSP

1.1 Number and Invasive Status of Screen-Detected Breast Cancers and Total Women Screened

The 2009/10 UK NHSBSP audit examines surgical activity undertaken for the 2,133,189 women screened in England, Wales, Northern Ireland and Scotland between 1 April 2009 and 31 March 2010. 94 screening units in the UK were included in the audit. The number of women screened varied from 5,291 women in a screening unit in North West (where 36 cancers were detected) to 57,817 women in a screening unit in Scotland (where 451 cancers were detected).

In 2009/10, 17,013 cancers were detected in women of all ages, 13,672 (80%) were invasive, 3,196 (19%) were non-invasive and 137 (1%) were micro-invasive. The invasive status of 8 cancers was unknown. Figure 1 shows the number of invasive and non/micro-invasive cancers and cancers with unknown invasive status detected in each region. In the Isle of Man, a total of 29 cancers were detected. Due to the small numbers and the difficulties this presents when data are broken down into subgroups, data for the Isle of Man have only been included in Chapter 1.

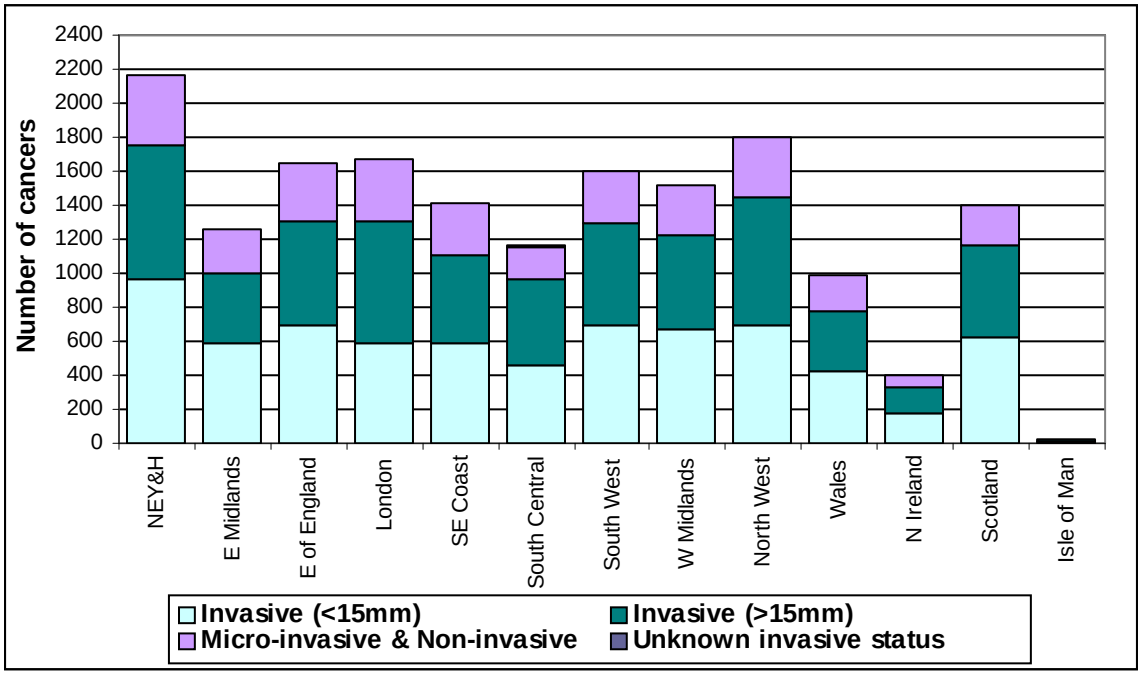

Figure 1 (Table 1): Variation in the number and invasive status of screen-detected breast cancers in each region and country contributing to the 2009/10 NHSBSP audit

The following summary table shows that the number of women screened each year has risen by more than 554,000 since 2002/03 when the NHSBSP started to invite women up to 70 years of age. After a gradual increase from 2002/03 to 2005/06, total and invasive cancer detection rates show little change, levelling off at around 8.1 per 1,000 women screened and around 6.4 per 1,000 women screened respectively. The total number of cancers detected 2009/10 was slightly lower than in 2008/09 although the number of women screened was higher. More invasive cancers were diagnosed in 2009/10 than in 2008/09, but fewer non/micro-invasive cancers.

14 YEAR COMPARISON: NUMBER OF CANCERS DETECTED

Year of data collection	Number of invasive cancers	Number of non-invasive and micro-invasive cancers	Total cancers	Number of women screened	Cancer detection rates per 1,000 women screened		
					Invasive	Non/Micro-invasive	Total
1996/97	5,860	1,468	7,410	1,340,175	4.4	1.1	5.5
1997/98	6,427	1,726	8,215	1,419,287	4.5	1.2	5.8
1998/99*	6,337	1,634	8,028	1,308,751	4.7	1.2	6.1
1999/00	7,675	2,076	9,797	1,550,285	5.0	1.3	6.3
2000/01	7,945	2,080	10,079	1,535,019	5.2	1.4	6.6
2001/02	7,911	2,218	10,191	1,507,987	5.2	1.5	6.8
2002/03	8,931	2,416	11,593	1,579,165	5.7	1.5	7.3
2003/04	10,400	2,868	13,290	1,685,661	6.2	1.7	7.9
2004/05	11,063	2,953	14,040	1,748,997	6.3	1.7	8.0
2005/06	12,600	3,317	15,944	1,942,449	6.5	1.7	8.2
2006/07	12,491	3,337	15,856	1,955,825	6.4	1.7	8.1
2007/08	13,305	3,466	16,792	2,042,497	6.5	1.7	8.2
2008/09	13,532	3,491	17,045	2,116,588	6.4	1.6	8.1
2009/10	13,672	3,333	17,013	2,133,189	6.4	1.6	8.0

* Data from Scotland are absent in 1998/99. Isle of Man figures not included in this table

In 2009/10, the cancer detection rate for all cancers was 8.0 per 1,000 women screened. This varied from 6.7 per 1,000 women screened in the Isle of Man and 7.1 per 1,000 women screened in Northern Ireland to 9.1 per 1,000 women screened in Wales.

Invasive cancer detection rates varied between 5.7 per 1,000 women screened in Northern Ireland and 7.2 per 1,000 women screened in Wales. The invasive cancer detection rate in Northern Ireland has fallen from 6.0 per 1,000 women screened in 2008/09 to 5.7 per 1,000 women screened in 2009/10. 43 additional invasive cancers were diagnosed in 2009/10 when 9,636 more women were screened. In East Midlands, the invasive cancer detection rate has fallen from 6.5 per 1,000 women screened in 2008/09 to 6.1 per 1,000 women screened in 2009/10. 95 fewer invasive cancers were diagnosed in 2009/10 when 4,418 fewer women were screened.

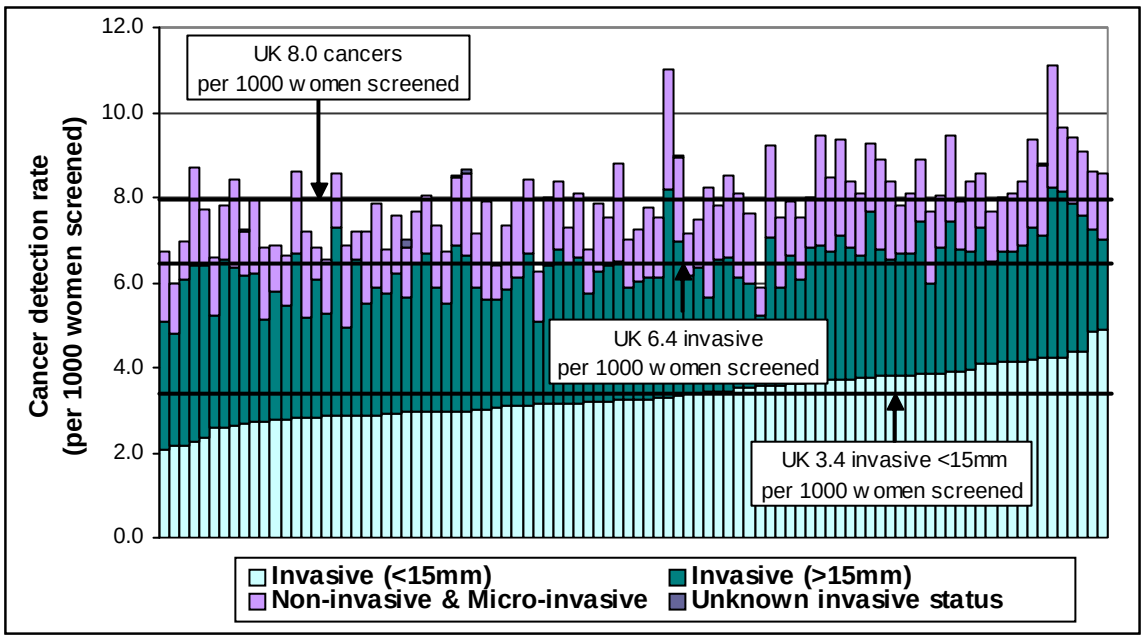

Figure 2: Variation with screening unit in the overall cancer detection rate expressed as the number of cancers detected per 1,000 women screened

The UK cancer detection rate for non/micro-invasive cancers was 1.6 per 1,000 women screened. This varied from 1.3 per 1,000 women screened in Northern Ireland and South Central to 1.9 per 1,000

women screened in Wales. In the Isle of Man, the non/micro-invasive cancer detection rate was lower than the UK average at 1.2 per 1,000 women screened and the small invasive cancer detection rate was higher at 3.5 per 1,000 women screened. Figure 2 shows how the cancer detection rates in each screening unit varied according to invasive status. The overall cancer detection rate varied from 5.9 per 1,000 women screened in a unit screening 14,599 women to 11.1 per 1,000 women screened in a unit screening 16,317 women annually. In two screening units, the cancer detection rate for all cancers was below 6.0 per 1,000 women screened. For small invasive cancers (<15mm in diameter), the UK cancer detection rate was 3.4 per 1,000 women screened; varying between 2.7 per 1,000 women screened in London and 3.9 per 1,000 women screened in Wales. Five of the seven screening units in London had cancer detection rates for small invasive cancers of 3 per 1,000 women or less. Six screening units (two in South Central, two in North East, Yorkshire & Humber and two in North West) had cancer detection rates for small (<15mm in diameter) cancers below 3.0 per 1,000 throughout the 3-year period 2007/08-2009/10. Regional QA reference centres should carry out audits with these screening units to ascertain the reasons for these consistently low results.

1.2 Age Profile of Women with Screen-Detected Breast Cancer

The following summary table shows the effect of the first age expansion in the past 8 years. In 2009/10, 65% of women with a screen-detected breast cancer were aged between 50 and 64 when they were invited for the screening appointment leading to their diagnosis. The proportion of cancers diagnosed in women aged 65 to 70 increased from 13% in 2002/03 prior to the roll out of the age expansion and levelled off at 27% between 2005/06 and 2007/08. In 2008/09 and 2009/10, when most of screening services had completed the first round of screening for the extended population, there was a slight decrease; with 25-26% of cancers being diagnosed in women aged 65-70. In 2009/10, 4% of cancers were detected in women aged 71-75.

AGE DISTRIBUTION OF SCREEN-DETECTED BREAST CANCERS (%)

Age	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
<50	2	2	2	1	1	2	2	2
50-52	17	15	14	13	13	13	13	14
53-55	16	13	12	11	10	10	10	10
56-58	16	17	16	14	13	12	12	11
59-61	16	16	16	15	15	16	16	14
62-64	16	14	14	14	14	14	16	17
65-67	7	10	11	14	13	14	13	15
68-70	6	8	10	13	14	13	12	11
70+	4	5	5	6	6	6	6	7
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
65+	17	23	26	33	33	33	31	33

At the start of the 2009/10 audit period, the expansion of the NHSBSP to include women aged 50-70 had been rolled out in the 4 screening units in Northern Ireland as well as in England, Wales and Scotland. The expansion in Northern Ireland is reflected in Figure 3 in the proportion of breast cancers detected in women aged 65-70, which increased from 9% in 2008/09 to 30% in 2009/10.

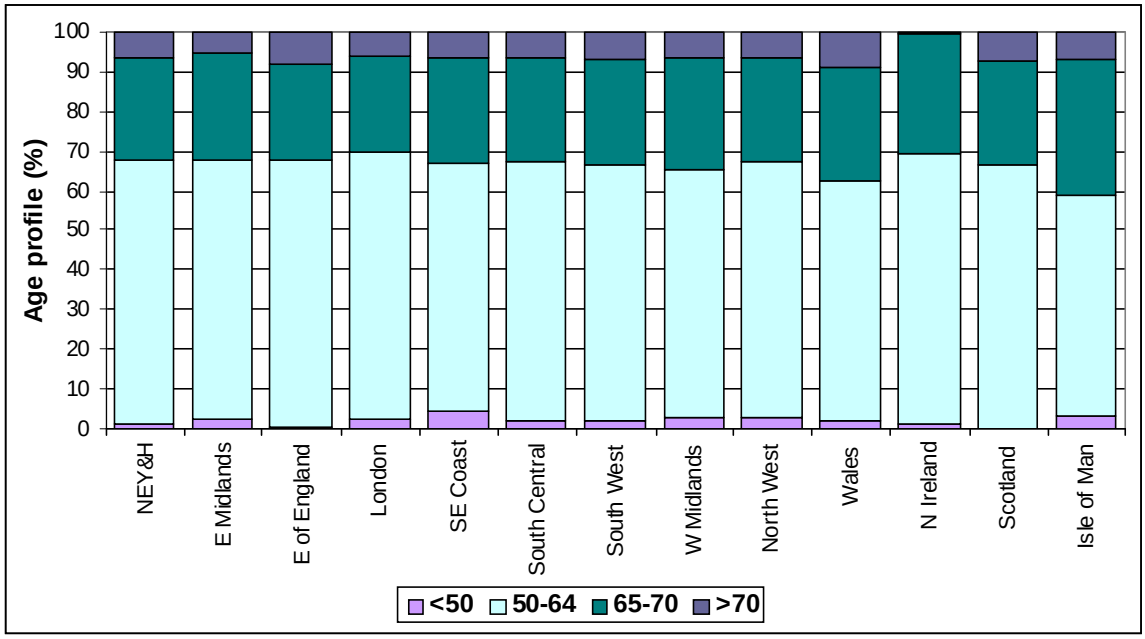

Figure 3 (Table 2): Age at screening appointment

KEY FINDINGS:

- 2,133,189 women were screened by the UK NHSBSP in England, Wales, Northern Ireland and Scotland between 1 April 2009 and 31 March 2010.
- 17,013 cancers were detected in women of all ages; 80% were invasive, 19% non-invasive and 1% micro-invasive. The invasive status of 8 cancers was unknown.
- The Isle of Man submitted data to the UK NHSBSP audit for the second time in 2009/10. 29 breast cancers were detected, 24 were invasive and 5 were non/micro-invasive.
- In the UK as a whole in 2009/10, the cancer detection rates for all cancers and for small invasive cancers (<15mm in diameter) were 8.0 per 1,000 women screened and 3.4 per 1,000 women screened respectively.
- Six screening units (two in South Central, two in North East, Yorkshire & Humber and two in North West) have had cancer detection rates for small (<15mm in diameter) cancers below 3.0 per 1,000 women throughout the 3-year period 2007/08-2009/10. Regional QA reference centres should carry out audits with these screening units to ascertain the reasons for these consistently low results.
- 65% of women with a screen-detected breast cancer were aged between 50 and 64 years when they were invited to attend the screening appointment leading to their diagnosis.
- 26% of screen-detected breast cancers were diagnosed in women aged 65-70 years. 7% of cancers were detected in women aged 70 years or more .

CHAPTER 2
DIAGNOSIS

2.1 Non-operative Diagnosis

The following are mutually exclusive diagnostic categories into which all screen-detected breast cancers fall:

DIAGNOSTIC CATEGORIES		
Non-operative diagnosis by C5 cytology or malignant core biopsy (B5)	Malignant open biopsy	Clinical and/or radiological grounds only, referred direct to non-surgical treatment

The UK NHSBSP definition of a non-operative diagnosis is a diagnosis by C5 cytology or B5 core biopsy. Other than cancers diagnosed by diagnostic open biopsy, the only remaining diagnostic category is that of diagnosis on radiological and/or clinical grounds alone. Such cancers are rare in the UK NHSBSP; there being only 6 in 2009/10. These cancers are included only in Table 3.

In 2009/10, 96% of cancers detected in the UK NHSBSP were diagnosed non-operatively. The following summary table shows that over the last 14 years the non-operative diagnosis rate for the UK as a whole has risen from 63% to 96%. This rise has been accompanied by an increase from 17% to 88% in the proportion of cancers diagnosed by B5 core biopsy alone.

14 YEAR COMPARISON: NON-OPERATIVE DIAGNOSIS RATES

Year of data collection	*Total cancers*	*Number of cancers with C5 and/or B5*	*% with non-operative diagnosis by*				*Non-operative diagnosis rate (%)*
			C5 only	*C5 and B5*	*C5 (+/- B5)*	*B5 only (no C5)*	
1996/97	*7,310*	*4,576*	*-*	*-*	*45*	*17*	*63*
1997/98	*8,215*	*5,866*	*-*	*-*	*42*	*29*	*71*
*1998/99**	*8,002*	*6,449*	*-*	*-*	*36*	*44*	*81*
*1999/00**	*8,906*	*7,590*	*-*	*-*	*31*	*54*	*85*
2000/01	*10,079*	*8,775*	*19*	*8*	*-*	*60*	*87*
2001/02	*10,191*	*9,043*	*13*	*9*	*-*	*66*	*89*
2002/03	*11,593*	*10,575*	*10*	*8*	*-*	*73*	*91*
2003/04	*13,290*	*12,338*	*8*	*7*	*-*	*77*	*93*
*2004/05**	*13,783*	*12,856*	*7*	*6*	*-*	*80*	*93*
2005/06	*15,944*	*15,000*	*5*	*6*	*-*	*83*	*94*
2006/07	*15,856*	*14,968*	*4*	*6*	*-*	*84*	*94*
2007/08	*16,792*	*15,977*	*4*	*5*	*-*	*86*	*95*
2008/09	*17,045*	*16,243*	*3*	*5*	*-*	*87*	*95*
2009/10	*17,013*	*16,270*	*1*	*6*	*-*	*88*	*96*

*Data from Scotland are absent in 1998/99 and 1999/00. 275 cancers from East of England are absent in 2004/05

Figure 4 shows how the non-operative diagnosis rate and the proportion of cancers diagnosed by B5 core biopsy alone, by both C5 cytology and B5 core biopsy and by C5 cytology only, varied between regions. In Northern Ireland, 39% of cancers were diagnosed non-operatively by both C5 cytology and B5 core biopsy (155 cancers). Relatively high numbers of cancers were diagnosed by both C5 cytology and B5 core biopsy in North East, Yorkshire & Humber (352 cancers) and in Scotland (201 cancers). Northern Ireland also had the highest proportion (9%) of cancers diagnosed by C5 cytology only (37 cancers), followed by the North West at 5% (91 cancers).

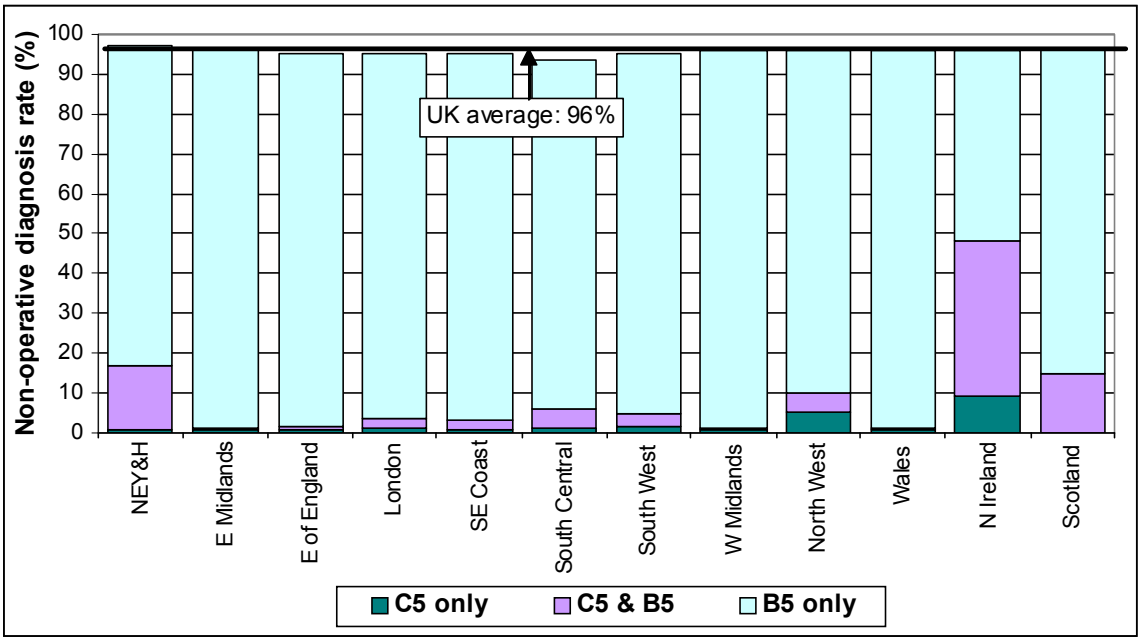

Figure 4 (Table 4): Variation in non-operative diagnosis rate and the proportion of cancers detected by cytology alone, core biopsy alone or cytology and core biopsy as a percentage of cancers detected

Figure 5 shows how the non-operative diagnosis rate and the proportion of cancers diagnosed by B5 core biopsy alone, by both C5 cytology and B5 core biopsy and by C5 cytology only varied between screening units in 2009/10. Five units (two in Northern Ireland, two in North West and one in Scotland) have had a diagnosis rate by both C5 cytology and B5 core biopsy above 30% throughout the 3-year period 2007/08-2009/10. One further unit in Northern Ireland had a diagnosis rate by both C5 cytology and B5 core biopsy above 30% in 2009/10 alone. Regional QA reference centres should investigate why these units use both C5 cytology and B5 core biopsy so extensively to obtain a non-operative diagnosis.

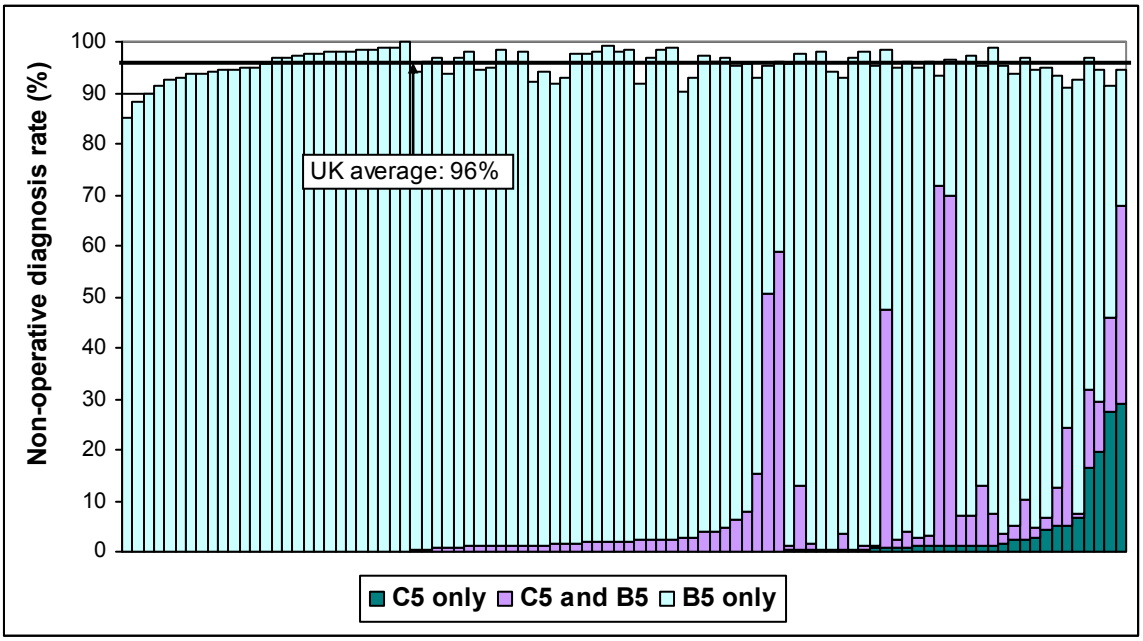

Figure 5: Variation between screening units in non-operative diagnosis rate and in the proportion of cancers detected by cytology alone, core biopsy alone or cytology and core biopsy as a percentage of cancers detected

Four units (one in Northern Ireland and three in North West) have had C5 only diagnosis rates above 15% throughout the 3-year period 2007/08-2009/10. These C5 only diagnosis rates have decreased with time in all four units (from 68% to 29% in the Northern Ireland unit and from 60% to 28%, 47% to 20% and 28% to 16% in the North West units). *NHS Clinical Guidelines for Breast Cancer Screening Assessment* published in January 2005 state that 'core biopsy provides better sensitivity and specificity

than FNA and facilitates definitive diagnosis of benign lesions'. The preferred use of core biopsy was also recommended in the *NHS Cancer Screening Programmes Clinical Guidelines for Breast Cancer Screening Assessment* (Publication No. 49 3rd Edition) that were published in June 2010. Regional QA reference centres in Northern Ireland and the North West should investigate why their units continued to use C5 cytology alone to obtain a non-operative diagnosis in 2009/10. All screening units should move to the use of core biopsy by the 1 April 2010 deadline set by the Director of the National Cancer Screening Programmes.

KEY FINDINGS:

- In 2009/10, 96% of cancers detected in the UK NHSBSP were diagnosed non-operatively.
- In Northern Ireland, 39% of cancers were diagnosed non-operatively by both C5 cytology and B5 core biopsy. Five units (two in Northern Ireland, two in North West and one in Scotland) have had a diagnosis rate by both C5 cytology and B5 core biopsy above 30% throughout the 3-year period 2007/08-2009/10. One further unit in Northern Ireland had a diagnosis rate by both C5 cytology and B5 core biopsy above 30% in 2009/10 alone. Regional QA reference centres should investigate why these units use both C5 cytology and B5 core biopsy so extensively to obtain a non-operative diagnosis.
- The proportion of cancers diagnosed by C5 cytology alone has fallen from 19% in 2000/01 to 1% in 2009/10. Northern Ireland had the highest proportion (9%) of cancers diagnosed by C5 cytology only in 2009/10. This has decreased from 31% in 2008/09. Four units (one in Northern Ireland and three in North West) have had C5 only diagnosis rates above 15% throughout the 3-year period 2007/08-2009/10. These have decreased with time in all four units. Nevertheless, regional QA reference centres should investigate why C5 cytology alone is still being used to diagnose such a high proportion of cancers in these units.

2.1.1 Non-operative Diagnosis Rate for Invasive Cancers

Quality Objective	**To minimise unnecessary surgery (i.e. diagnostic open surgical biopsies that prove to be malignant)**
Minimum Standard	**90% of all invasive cancers should have a non-operative pathological diagnosis**
Target Standard	**95% of all invasive cancers should have a non-operative pathological diagnosis**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

In the UK as a whole, the non-operative diagnosis rate for invasive cancers was 98% and only 221 invasive cancers did not have a non-operative diagnosis (Table 5). Only one unit in South Central did not meet the 90% minimum standard and only 3 units failed to meet the 95% target (one in North West (94%), one in South West (94%) and one in North East, Yorkshire & Humber (94%). Regional QA reference centres should investigate why these units failed to meet the target for the non-operative diagnosis of invasive cancers. 19 units achieved a 100% non-operative diagnosis rate for invasive cancers.

2.1.2 Non-operative Diagnosis Rate for Non-invasive Cancers

Quality Objective	**To minimise unnecessary surgery (i.e. diagnostic open surgical biopsies that prove to be malignant)**
Minimum Standard	**85% of all non-invasive cancers should have a non-operative pathological diagnosis**
Target Standard	**90% of all non-invasive cancers should have a non-operative pathological diagnosis**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

In 2009/10, the non-operative diagnosis rate for non-invasive cancers was 84%. 513 non-invasive cancers did not have a non-operative diagnosis (Table 6). The proportion of non-invasive cancers without a non-operative diagnosis varied from 13% in West Midlands, East Midlands and North East, Yorkshire & Humber to 23% in South Central. The following summary table shows how the non-operative diagnosis rate for non-invasive cancers has changed over the last three audit periods. The non-operative diagnosis rate for non-invasive cancers is less consistent than that for invasive cancers. It has increased by between 2% and 5% in most regions since 2007/08, but in Wales and Scotland it decreased by 3% and 4% in 2009/10 compared with 2007/08.

3 YEAR SUMMARY: NON-OPERATIVE DIAGNOSIS RATES FOR NON-INVASIVE CANCERS

Region	***2007/08***	***2008/09***	***2009/10***	***3 Year 2007-10***
N East, Yorks & Humber	*88*	*90*	*87*	*88*
East Midlands	*86*	*85*	*87*	*86*
East of England	*79*	*79*	*82*	*80*
London	*83*	*82*	*83*	*83*
South East Coast	*81*	*81*	*83*	*82*
South Central	*74*	*84*	*77*	*78*
South West	*78*	*83*	*82*	*81*
West Midlands	*82*	*84*	*87*	*84*
North West	*85*	*84*	*86*	*85*
Wales	*89*	*91*	*86*	*89*
Northern Ireland	*82*	*82*	*84*	*83*
Scotland	*86*	*87*	*82*	*85*
United Kingdom	***83***	***84***	***84***	***84***

Figure 6 shows the variation between screening units in the proportion of non-invasive cancers with a non-operative diagnosis. Only 23 screening units achieved the 90% non-operative diagnosis target for non-invasive cancers. 51 units failed to meet the 85% minimum standard. This has increased from 44 units in 2008/09. 30 units have failed to meet the minimum standard throughout the 3-year period 2007/08-2009/10. The three screening units (one in South Central (50%), one in South West (55%) and one in Scotland (60%) which had the lowest non-operative diagnosis rates for non-invasive cancers in 2009/10, have had the lowest rates throughout the 3-year period 2007/08-2009/10. Regional QA reference centres should investigate why screening units in their regions failed to meet the 85% minimum standard for the non-operative diagnosis of non-invasive cancers. There was no obvious relationship between low non-operative diagnosis rates for non-invasive cancers and the rates for <15mm invasive cancers.

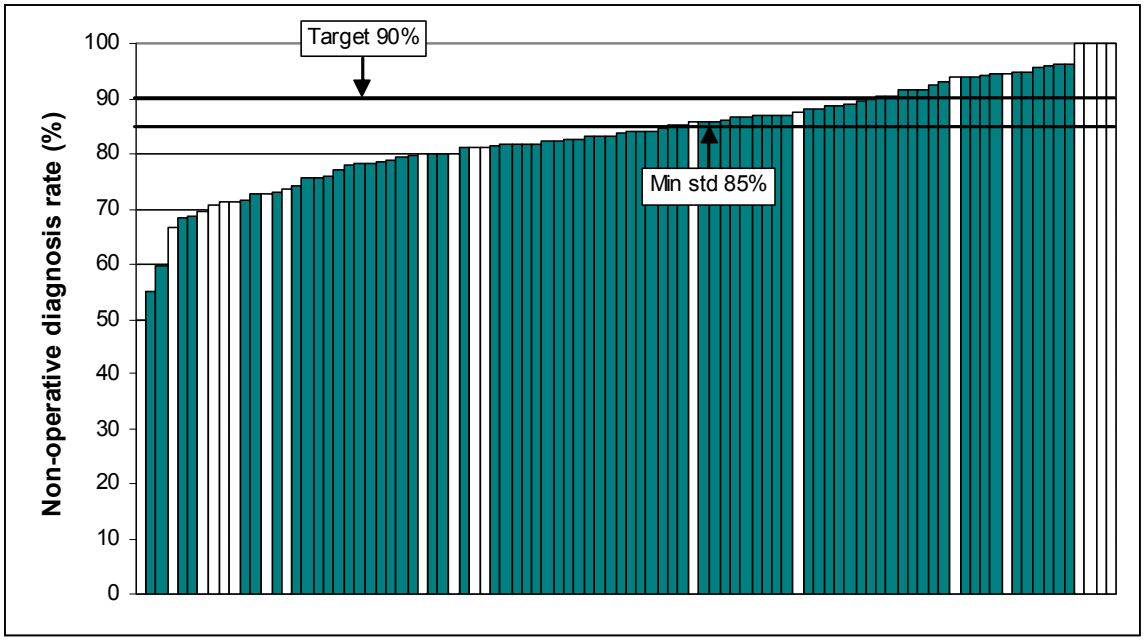

Figure 6: Variation in the proportion of non-invasive cancers with a non-operative diagnosis (The 20 smallest units are highlighted in white)

KEY FINDINGS:

- The UK non-operative diagnosis rate for invasive cancers was 98%. Only one unit in South Central did not meet the 90% minimum standard and only 3 units failed to meet the 95% target (one in North West (94%), one in South West (94%) and one in North East, Yorkshire & Humber (94%). Regional QA reference centres should investigate why these units failed to meet the target for the non-operative diagnosis of invasive cancers.
- The non-operative diagnosis rate for non-invasive cancers was 84%. The proportion of non-invasive cancers without a non-operative diagnosis varied from 13% in West Midlands, East Midlands and North East, Yorkshire & Humber to 23% in South Central. 51 units failed to meet the 85% minimum standard. 30 units have failed to meet the minimum standard for the whole of the 3-year period 2007/08-2009/10. Regional QA reference centres should investigate the screening units in their regions which failed to meet the minimum standard.

2.1.3 Invasive Status at Core Biopsy

Screening units were asked to supply the invasive status predicted at core biopsy for those cancers with a B5 diagnosis. Of the 16,047 cancers with a B5 diagnosis, 3,443 (21%) were B5a (Non-invasive), 12,506 (78%) were B5b (Invasive) and 98 (1%) had invasive status B5c (Micro-invasive, Not Assessable or Unknown) at core biopsy (Table 7). Of the latter , 25 were in North East, Yorkshire & Humber. The proportion of cancers with a B5a (Non-invasive) diagnosis varied from 17% in Scotland and 18% in South Central to 24% in North West and Northern Ireland. There is as yet, no agreement by the Pathology Big 18 on the use of the B5c category, nor on how to code micro-invasive cancers.

2.1.4 Invasive Status at Core Biopsy Compared with Invasive Status of Surgical Specimen

The majority of cancers diagnosed by core biopsy go on to have surgery, at which a definitive invasive status is determined. 38 of the 3,443 cancers with a B5a (Non-invasive) non-operative diagnosis had no surgery and one case had unknown surgical treatment, so the non-operative diagnosis of non-invasive cancer was retained. Of the remaining 3,404 cases, 2,514 (74%) had surgical confirmation of non-invasive cancer and 119 (3%) had a diagnosis of micro-invasive cancer at surgery (Table 8). For 693 (20%) cancers, invasive disease was found at surgery. This varied from 16% in Scotland to 25% in Northern Ireland. For 62 (2%) cases, no malignant disease was identified at surgery, but subsequent audit confirmed that a correct diagnosis of non-invasive cancer had been reported in the non-operative core biopsy. For a further 16 cases, the histological status after surgery was unknown. 13 of these cases were from North East, Yorkshire & Humber.

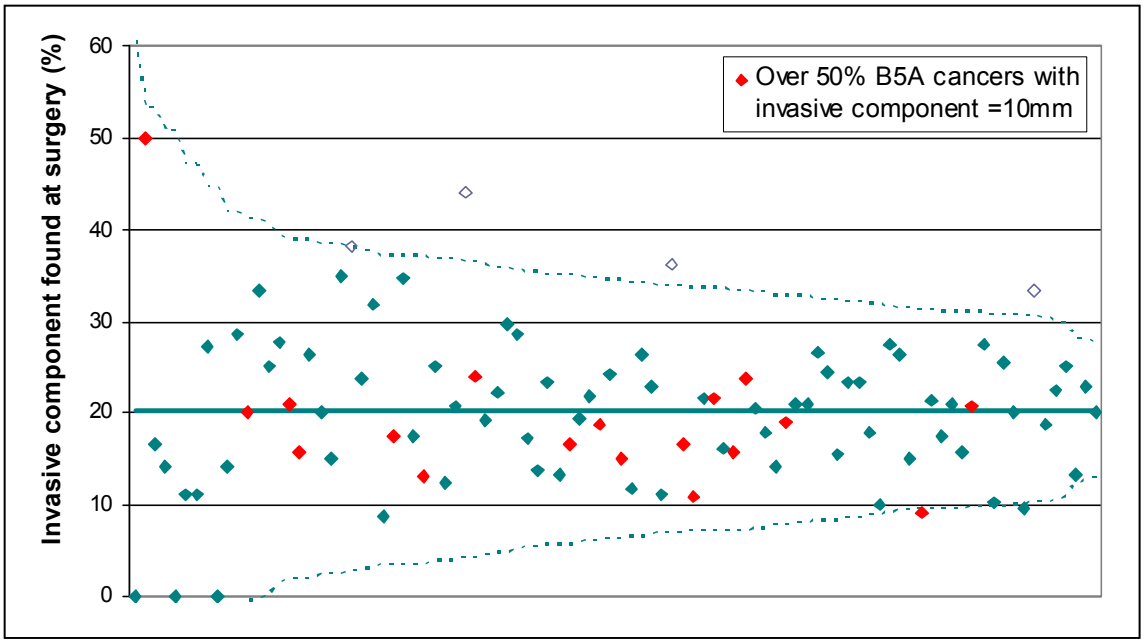

Figure 7: Variation with screening unit in the proportion of cancers with a B5a (Non-invasive) non-operative diagnosis found to be invasive at surgery (open diamonds represent units which lie outside the control limits)

Figure 7 shows the unit variation on the proportion of cancers with a B5a (Non-invasive) diagnosis which were found to have an invasive component in the surgical specimen, expressed as a percentage of cancers diagnosed as B5a (Non-invasive). The dashed lines in Figure 7 are the upper and lower control limits which approximate to the 95% confidence intervals of the average rate (solid line). Four screening units (open green diamonds) are outside the upper control limit and have rates significantly higher than the average rate of 20%. Regional QA reference centres should carry out audits with these units to confirm the reasons for the unusually high proportion of B5a (Non-invasive) cancers found to be invasive at surgery. In 18 screening units, more than half of the under-diagnosed cancers had an invasive size of at least 10mm (red diamonds in Figure 7). Regional QA reference centres should ascertain the reason why core biopsies did not identify the invasive component in these cancers.

Of the 12,506 cases with a B5b (Invasive) non-operative diagnosis, 243 had no surgery and 14 had unknown surgical treatment. In the UK as a whole, 99% (12,096 cases) of the remaining 12,249 cases had surgical confirmation of invasive cancer (Table 9). 98 cases with a B5b (Invasive) non-operative diagnosis were found to have non-invasive (71 cases) or micro-invasive cancer (27 cases) with no associated invasive disease in the surgical specimen. Explanations provided for these cases included that the invasive tumour had been completely excised in the core (20 cases) or that the patient had received neo-adjuvant chemotherapy (9 cases). For 36 cases no malignant disease was identified at surgery, but subsequent audit confirmed that a correct diagnosis of invasive cancer had been reported in the non-operative core biopsy. These cases are referred to as “Invasive - biopsy only”. A further 19 cases had unknown histological status after surgery. Of the 19 cases, six (32%) were in North West and five (26%) were in North East, Yorkshire and Humber.

The following summary table shows that the proportion of cancers that had a B5a (Non-invasive) non-operative diagnosis but which were found to be unknown invasive status, “non-invasive - biopsy only”, micro-invasive or invasive after surgery has fallen by 3% in the past 10 years (from 29% to 26%). The proportion of cases with a B5b (Invasive) core biopsy which were not confirmed to be invasive following surgery has increased gradually over the past 6 years; from 0.5% in 2004/05 to 1.2% in 2009/10.

10 YEAR COMPARISON: INVASIVE STATUS FOLLOWING CORE BIOPSY

Year of data collection	B5a (Non-invasive)			B5b (Invasive)		
	Total with surgery	Not non-invasive at surgery*		Total with surgery	Not invasive at surgery**	
		No.	%		No.	%
2000/01	1,660	482	29	5,026	63	1.3
2001/02	1,881	542	29	5,405	45	0.8
2002/03	2,274	635	28	6,743	69	1.0
2003/04	2,748	717	26	8,357	95	1.4
2004/05	2,750	666	24	8,999	46	0.5
2005/06	3,267	838	26	10,685	60	0.6
2006/07	3,351	895	27	10,569	85	0.8
2007/08	3,590	967	27	11,312	105	0.9
2008/09	3,598	933	26	11,702	131	1.1
2009/10	3,404	890	26	12,249	153	1.2

*Not non-invasive includes invasive, micro-invasive, “non-invasive - biopsy only” and unknown invasive status
**Not invasive at surgery includes non-invasive, micro-invasive, “invasive - biopsy only” and unknown invasive status

2.1.5 Invasive Status of Cancers Diagnosed by C5 Cytology Only

223 cancers were diagnosed by C5 cytology alone, compared with 568 in 2008/09. Four of these cancers had no surgery. 94% of the 219 cancers diagnosed by C5 cytology alone which received surgical treatment were invasive (Table 10). 12 cancers (5%) diagnosed by C5 cytology alone were non-invasive and none were micro-invasive. One case was found to be “malignant - cytology only” at surgery. Regional QA reference centres should audit the 13 cases diagnosed by C5 cytology alone that were found to be non-invasive or “malignant - cytology only” at surgery.

KEY FINDINGS:

- For 20% of cancers with a B5a (Non-invasive) non-operative diagnosis, invasive disease was found at surgery. Four screening units have rates significantly higher than the UK average rate and in 18 screening units, more than half of the under-diagnosed cancers had an invasive size of at least 10mm. Regional QA reference centres should carry out audits with these units to confirm the reasons for the unusually high proportion of B5a (Non-invasive) cancers found to be invasive at surgery, and to ascertain the reason why core biopsies did not identify the invasive component for cancers with an invasive size of at least 10mm.
- 98 cases with a B5b (Invasive) non-operative diagnosis were found to have non-invasive or micro-invasive cancer with no associated invasive disease following surgery. Explanations provided included that the invasive tumour had been completely excised in the core (20 cases) or that the patient had received neo-adjuvant chemotherapy (9 cases).
- For 36 cases with a B5b (Invasive) non-operative diagnosis, no malignant disease was identified at surgery, but subsequent audit confirmed that a correct diagnosis of invasive cancer had been reported in the non-operative core biopsy.
- 94% of the 219 cancers diagnosed by C5 cytology alone were found to be invasive after surgery. Regional QA reference centres should audit the 13 cases diagnosed by C5 cytology alone that were found to be non-invasive, micro-invasive or "malignant – cytology only" at surgery.

2.2 Number of Visits for Core Biopsy/Cytology Procedures

It is possible that increases in non-operative diagnosis have led to more anxiety, with women having to return to the assessment clinic for repeat diagnostic tests before receiving a definitive diagnosis. Therefore, the number of visits at which a core biopsy/cytology procedure was undertaken in order to achieve a non-operative diagnosis was requested. The majority (87%) of women with screen-detected breast cancer had all attempts at core biopsy and/or cytology performed at one assessment clinic visit (Table 11). Figure 8 shows the non-operative diagnosis rates for invasive and non/micro-invasive cancers in each region achieved after one or more visits to an assessment clinic. In the UK as a whole, the non-operative diagnosis rate for invasive cancers was 10% higher in women having more than one assessment clinic visit. This varied between 3% in Scotland and 19% in South East Coast. For non/micro-invasive cancers, the increase in non-operative diagnosis achieved after more than one assessment visit was higher at 19%. This varied from 8% in Wales and Northern Ireland to 30% in East Midlands.

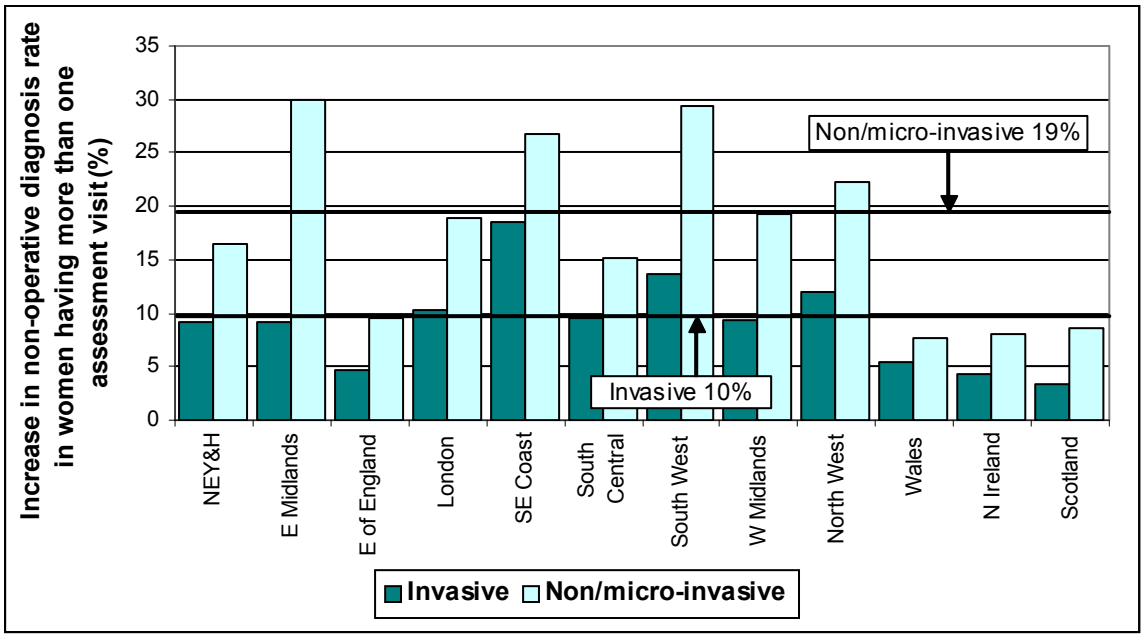

Figure 8 (Table 12 and 13): Increase in non-operative diagnosis rate in women having more than one assessment visit

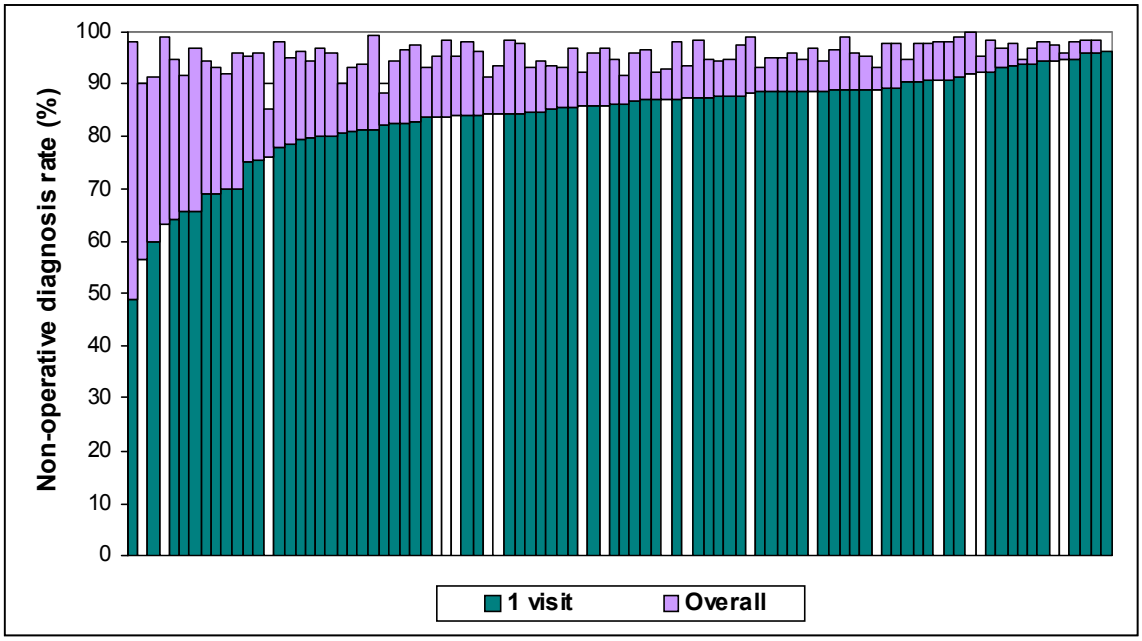

Figure 9: Variation in overall non-operative diagnosis rate and the non-operative diagnosis rate achieved after only 1 visit, presented as a proportion of all screen-detected cancers in each screening unit (The 20 smallest units are highlighted in white)

Figure 9 illustrates the non-operative diagnosis rate achieved by individual screening units after one assessment visit and overall. For 18 units the non-operative diagnosis rate achieved after one assessment visit was less than 80% (the previous minimum standard for all cancers). Regional QA reference centres should carry out audits with these screening units to establish what procedures were undertaken at each visit and the results of each investigation.

KEY FINDINGS:

- 87% of women had a non-operative diagnosis after only one assessment clinic visit.
- The non-operative diagnosis rate for invasive cancers was 10% higher in women having more than one assessment clinic visit. For non/micro-invasive cancers, the increase in non-operative diagnosis achieved after more than one assessment visit was higher at 19%.
- 18 units failed to achieve a non-operative diagnosis rate of 80% (the previous minimum standard for all cancers) at the first visit. Regional QA reference centres should carry out audits with these screening units.

2.3 Diagnostic Open Biopsies

2.3.1 Status of Diagnostic Open Biopsies

Quality Objective	**To minimise benign diagnostic open surgical biopsies**
Maximum Standard	**<15 per 10,000 prevalent screen (1.5 per 1,000)** **<10 per 10,000 incident screen (1.0 per 1,000)**
Target Standard	**<10 per 10,000 prevalent screen (1.0 per 1,000)** **<7.5 per 10,000 incident screen (0.75 per 1,000)**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

In the UK as a whole, 2,424 diagnostic open biopsies were performed. Of these, 1,681 (69%) were benign and 743 (31%) were malignant. Figure 10 shows the regional variation in benign and malignant diagnostic open biopsy rates. The benign open biopsy rate was 0.79 per 1,000 women screened,

varying from 0.55 per 1,000 women screened in Northern Ireland to 1.07 per 1,000 women screened in London and 1.01 per 1,000 women screened in Wales. The UK benign open biopsy rate is within the minimum standard for prevalent (first) and incident (subsequent) screens, but outside the 0.75 per 1,000 women screened target for incident screens which constitute more than 80% of the total benign biopsies performed. The benign open biopsy rates in London and Wales exceeded the maximum standards for incident screens. Regional QA reference centres should investigate the reasons for these relatively high benign open biopsy rates. Overall, the malignant open biopsy rate was 0.35 per 1,000 women screened; varying from 0.23 per 1,000 women screened in North East, Yorkshire & Humber to 0.50 per 1,000 women screened in South Central.

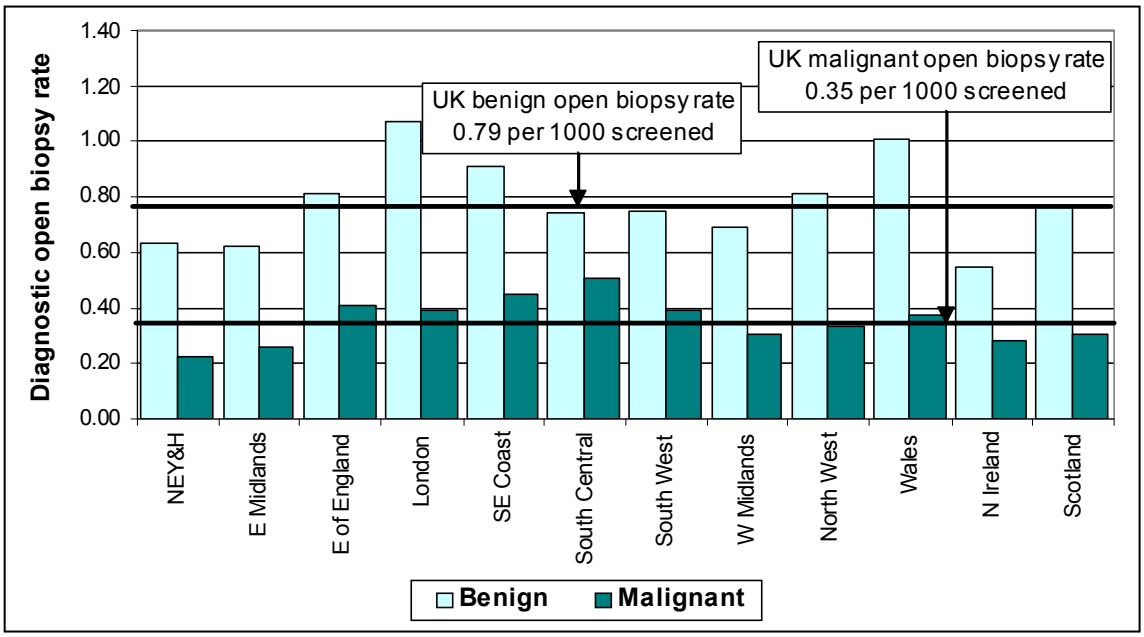

Figure 10 (Table 14): Variation in benign and malignant diagnostic open biopsy rates expressed as the number of diagnostic open biopsies undertaken per 1,000 women screened

The following summary table shows that the UK benign open biopsy rate has fallen over 14 years from 1.50 per 1,000 women screened in 1996/97 to 0.79 per 1,000 women screened in 2009/10. Over the same period, the UK malignant open biopsy rate has fallen from 2.04 per 1,000 women screened to 0.35 per 1,000 women screened as the non-operative diagnosis rate has increased from 63% to 96%.

14 YEAR COMPARISON: BENIGN AND MALIGNANT DIAGNOSTIC OPEN BIOPSY RATES

Year of data collection	*Number of women screened*	*Number of benign open biopsies*	*Number of malignant open biop-sies*	*Benign open biopsy rate per 1000 women screened*	*Malignant open biopsy rate per 1000 women screened*	*Non-operative diagnosis rate (%)*
1996/97	*1,340,175*	*2,015*	*2,734*	*1.50*	*2.04*	*63*
1997/98	*1,419,287*	*2,251*	*2,349*	*1.59*	*1.66*	*71*
*1998/99**	*1,308,751*	*1,830*	*1,553*	*1.40*	*1.19*	*81*
*1999/00**	*1,429,905*	*1,838*	*1,316*	*1.29*	*0.92*	*85*
2000/01	*1,535,019*	*2,042*	*1,304*	*1.33*	*0.85*	*87*
2001/02	*1,507,987*	*2,018*	*1,148*	*1.34*	*0.76*	*89*
2002/03	*1,582,269*	*1,901*	*1,018*	*1.20*	*0.64*	*91*
2003/04	*1,685,661*	*1,825*	*952*	*1.08*	*0.56*	*93*
*2004/05**	*1,717,170*	*1,795*	*927*	*1.05*	*0.54*	*93*
2005/06	*1,942,449*	*1,847*	*944*	*0.95*	*0.49*	*94*
2006/07	*1,955,825*	*1,811*	*888*	*0.93*	*0.45*	*94*
2007/08	*2,042,497*	*1,801*	*815*	*0.87*	*0.40*	*95*
2008/09	*2,116,588*	*1,765*	*802*	*0.83*	*0.38*	*95*
2009/10	*2,133,189*	*1,681*	*743*	*0.79*	*0.35*	*96*

*Data from Scotland are absent in 1998/99 and 1999/00. Data for 2 units from East of England are absent in 2004/05

Table 15 shows the false positive cytology and core biopsy figures obtained from CQA and BQA reports for each region. In the UK as a whole, there were 13 false positive core biopsy cases and no false positive cytology cases recorded. Regional QA reference centres and their pathology QA co-ordinators should review these cases to ascertain the reason(s) for the false positive results, implementing corrective action as appropriate.

2.3.2 Non-operative Histories for Cancers Diagnosed by Diagnostic Open Biopsy

The number of cancers diagnosed by open biopsy decreased slightly from 802 in 2008/09 to 743 in 2009/10. Of the latter, 221 (30%) were invasive, 8 (1%) micro-invasive and 513 (69%) non-invasive (Table 16). 327 (44%) of the 743 cases did not have further surgical treatment after their diagnostic open biopsy. Eight cancers diagnosed by open biopsy were treated by mastectomy or mastectomy with axillary surgery as their first surgical treatment. Regional QA reference centres and regional surgical QA co-ordinators should ascertain the reason that mastectomies were performed as the first operation for these women. This may be because radiological and clinical opinion was strongly supportive of the presence of malignant disease.

Tables 17 and 18 describe the non-operative history of cancers diagnosed by open biopsy according to whether the women had no non-operative cell or tissue sample, cytology only, core biopsy only or both cytology and core biopsy. For 86% of invasive cancers diagnosed by open biopsy there had been unsuccessful attempts to obtain a non-operative diagnosis using core biopsy alone (Table 17). For non/micro-invasive cancers the proportion of cases where non-operative diagnosis had been attempted with core biopsy alone was higher at 90% (Table 18). Table 17 also shows that, of the 221 invasive cancers diagnosed by open biopsy, 15 (7%) had no non-operative procedure recorded and that, of the 521 non/micro-invasive cancers diagnosed by open biopsy, 8 (2%) had no non-operative procedure recorded. Regional QA reference centres and regional surgical QA co-ordinators should audit these 23 cases to establish whether they reflect a data collection problem. If the data are found to represent clinical practice correctly, the reasons for the failure to attempt non-operative diagnosis should be ascertained.

The following 10 year summary table shows that, in line with the increased use of core biopsy since 2000/01, the proportion of invasive cancers undergoing cytology as the only procedure prior to a diagnostic open biopsy has decreased from 31% to 5%, while the proportion undergoing core biopsy alone has risen from 36% to 86%. For non/micro-invasive cancers the proportion undergoing cytology as the only procedure prior to a diagnostic open biopsy has decreased from 11% to 1%, while the proportion undergoing core biopsy alone has risen from 65% to 90%.

10 YEAR COMPARISON :
PERCENTAGE OF CANCERS WITH MALIGNANT OPEN BIOPSY

	Invasive				***Non/Micro-invasive***			
Year of data collection	***No non-operative procedure***	***Cytology only***	***Core biopsy only***	***Both cytology and core biopsy***	***No non-operative procedure***	***Cytology only***	***Core biopsy only***	***Both cytology and core biopsy***
2000/01	*10*	*31*	*36*	*24*	*6*	*11*	*65*	*19*
2001/02	*9*	*23*	*43*	*25*	*4*	*7*	*69*	*19*
2002/03	*8*	*16*	*55*	*21*	*3*	*3*	*80*	*14*
2003/04	*6*	*14*	*65*	*15*	*4*	*1*	*82*	*13*
*2004/05**	*5*	*12*	*69*	*14*	*2*	*1*	*88*	*8*
2005/06	*6*	*11*	*70*	*13*	*2*	*1*	*90*	*7*
2006/07	*5*	*10*	*73*	*12*	*2*	*1*	*88*	*9*
2007/08	*3*	*9*	*75*	*12*	*3*	*2*	*90*	*6*
2008/09	*6*	*6*	*80*	*8*	*2*	*1*	*91*	*6*
2009/10	*7*	*5*	*86*	*3*	*2*	*1*	*90*	*7*

*Data for 2 units from East of England are absent in 2004/05

Of the 221 invasive cancers diagnosed by open biopsy in 2009/10, 8% (17 cases) had an inadequate (C1) cytology sample or a normal (B1) core biopsy sample (Table 19). This varied from 0% in East

Midlands, Scotland and Northern Ireland to 25% in Wales (3 cases). 10% had a benign result (C2/B2, 23 cases), 42% were suspicious of benign disease (C3/B3, 92 cases) and 33% were suspicious of malignant disease (C4/B4, 74 cases).

For the 521 non/micro-invasive cancers which had a malignant open biopsy in 2009/10, 32% (166 cases) had a C4 and/or B4 cytology or biopsy result and 59% (307 cases) had a C3 and/B3 non-operative result (Table 20). In South West, 50% (27 cases) of the non/micro-invasive cancers diagnosed by open biopsy had a B4 core biopsy or C4 cytology result indicating suspicion of malignancy prior to diagnostic surgery. The regional QA reference centre should review these cases to ascertain the reasons for these results.

The following summary table shows that in first 6 years of the 10 year period studied, the highest proportion (38% - 46%) of invasive cancers diagnosed by malignant open biopsy were those with a C4 cytology or B4 core biopsy result. In the most recent 4 years, the proportion of invasive cancers with a C3 cytology or B3 core biopsy result has increased and has become higher than the proportion with a C4/B4 diagnosis. The proportion with a C1 cytology or B1 core biopsy result has fallen from 22% to 8% since 2000/01.

10 YEAR COMPARISON :
PERCENTAGE OF CANCERS WITH MALIGNANT OPEN BIOPSY:
WORST CYTOLOGY AND CORE BIOPSY RESULTS

Year of data collection	Invasive				Non/Micro-invasive			
	C1/B1	C2/B2	C3/B3	C4/B4	C1/B1	C2/B2	C3/B3	C4/B4
2000/01	22	15	18	46	19	13	26	37
2001/02	16	17	20	38	14	13	31	37
2002/03	15	12	22	42	12	10	36	39
2003/04	12	14	26	42	9	8	39	40
2004/05	10	13	30	42	5	7	50	35
2005/06	10	9	34	41	3	3	57	35
2006/07	10	6	40	39	3	5	54	36
2007/08	10	14	39	34	3	5	56	34
2008/09	8	5	42	39	2	3	59	34
2009/10	8	10	42	33	4	4	59	32

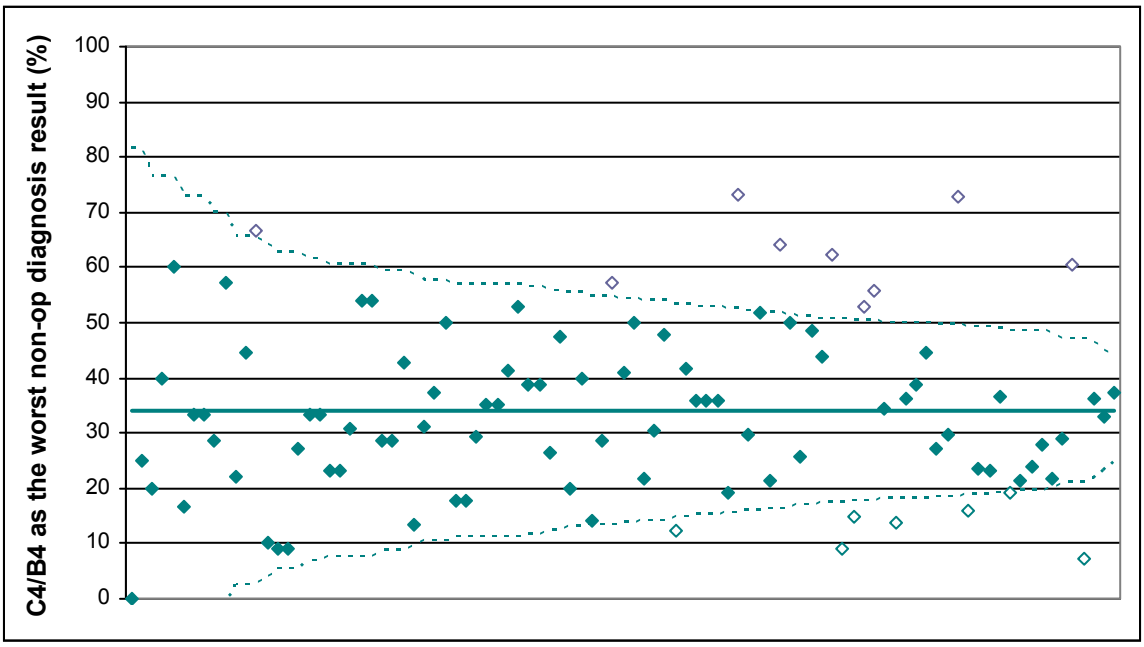

Figure 11: Variation with screening unit in the proportion of invasive cancers where during the 3-year period 2007/08-2009/10 the worst non-operative result was C4/B4 (open diamonds represent units which lie outside the control limits)

Figure 11 shows the variation between screening units in the proportion of invasive cancers where during the 3-year period 2007/08-2009/10 the worst non-operative result was C4/B4. The dashed lines in Figure 11 are the upper and lower control limits which approximate to the 95% confidence intervals of the average rate (solid line). Nine screening units (open green diamonds) are outside the upper control limit and have rates significantly higher than the average rate of 34%. Regional QA reference centres should carry out audits with these units to confirm the reasons for the unusually high proportion of C4/B4 non-operative diagnosis results.

The summary table also shows that the proportion of non/micro-invasive cancers diagnosed by malignant open biopsy which had a C3 cytology or B3 core biopsy result has increased over the 10 year period studied, from 26% in 2000/01 to 59% in 2009/10. The proportion with a C1 cytology or B1 core biopsy and C2 cytology or B2 core biopsy results has fallen sharply. The proportion of non-invasive cancers with a C4 cytology or B4 core biopsy result has decreased slightly in the last 7 years. As a result, the reversal in the proportions of cancers with C4/B4 and C3/B3 non-operative results seen with invasive cancers is greater and occurs earlier for non/micro-invasive cancers.

The rise in the proportion non-invasive lesions diagnosed by malignant open biopsy which had a B3 core biopsy result may in part be due to the classification by pathologist of core biopsies which are considered to represent lobular neoplasia (atypical lobular hyperplasia and lobular carcinoma in situ) as B3, in line with current NHSBSP guidelines (*Guidelines for Non-operative Diagnostic Procedures and Reporting in Breast Cancer Screening, NHSBSP Publication No.50 [June 2001]*). When lobular carcinoma in situ (LCIS) is verified in the surgical specimen, this would, according to current guidelines, be coded as malignant and such cases could contribute to a lower non-operative diagnosis rate for non-invasive cancers. In 2009/10, a total of 399 cancer cases were diagnosed as B3/C3. Of these, 77 (19%) cases had only LCIS in the surgical specimen.

KEY FINDINGS:

- 2,424 diagnostic open biopsies were performed in 2009/10. Of these 69% were benign and 31% were malignant.
- The benign open biopsy rate was 0.79 per 1,000 women screened. Regional QA reference centres in London and Wales should investigate the reasons for their relatively high benign open biopsy rates.
- The malignant open biopsy rate has fallen from 2.04 per 1,000 women screened in 1996/97 to 0.35 per 1,000 women screened in 2009/10 as the non-operative diagnosis rate has increased from 63% to 96%.
- There were 13 false positive core biopsies recorded in 2009/10. Regional QA reference centres and their pathology QA co-ordinators should review these cases to ascertain the reason(s) for these results, implementing corrective action as appropriate.
- 8 cancers which were diagnosed by open biopsy had a mastectomy or a mastectomy with axillary surgery as the first surgical operation. Regional QA reference centres and regional surgical QA co-ordinators should review these cases.
- 15 invasive cancers and 8 non/micro-invasive cancers diagnosed by open biopsy had no non-operative procedure recorded. Regional QA reference centres and regional surgical QA co-ordinators should audit these 23 cases to establish whether they reflect a data collection problem. If the data are found to represent clinical practice correctly, the reasons for the failure to attempt non-operative diagnosis should be ascertained.
- 33% of invasive cancers and 32% of non/micro-invasive cancers diagnosed by malignant open biopsy following cytology or core biopsy performed during the assessment process had a C4 cytology or B4 core biopsy result indicating suspicion of malignant disease. In South West, 50% (27 cases) of the non/micro-invasive cancers diagnosed by open biopsy had a B4 core biopsy or C4 cytology result indicating suspicion of malignancy prior to diagnostic surgery. The regional QA reference centre should review these cases.
- Nine screening units hadC4/B4 rates significantly higher than the average rate of 34%. Regional QA reference centres should carry out audits with these units to confirm the reasons for the unusually high proportion of C4/B4 non-operative diagnosis results.
- The classification by pathologist of core biopsies which are considered to represent lobular neoplasia as B3 means that, if lobular carcinoma in situ is verified in the surgical specimen, the non-operative diagnosis rate for non-invasive cancers will appear lower than it should be.

CHAPTER 3
TUMOUR CHARACTERISTICS

3.1 Cytonuclear Grade and Size for Non-invasive Breast Cancers

3.1.1 Data Completeness

The following summary table shows that in the UK as a whole, data completeness for non-invasive cancers has improved markedly since 2000/01. In 2009/10, the incompleteness of cytonuclear grade and/or size data varied from 1% in Scotland to 11% in Northern Ireland (Table 21). Of the 201 surgically treated non-invasive cancers with unknown size, 62 (31%) had a benign outcome at surgery with no evidence of non-invasive disease found in the surgical specimen (Table 21).

10 YEAR COMPARISON: DATA COMPLETENESS FOR SURGICALLY TREATED NON-INVASIVE CANCERS (%)

Year of data collection	*Unknown cytonuclear grade*	*Unknown size*	*Unknown cytonuclear grade and/or size*
2000/01	*6*	*11*	*14*
2001/02	*10*	*13*	*19*
2002/03	*10*	*14*	*20*
2003/04	*3*	*11*	*11*
*2004/05**	*2*	*7*	*7*
2005/06	*3*	*7*	*8*
2006/07	*2*	*6*	*7*
2007/08	*4*	*7*	*8*
2008/09	*3*	*6*	*7*
2009/10	*3*	*6*	*7*

*Data for 2 units from East of England are absent in 2004/05

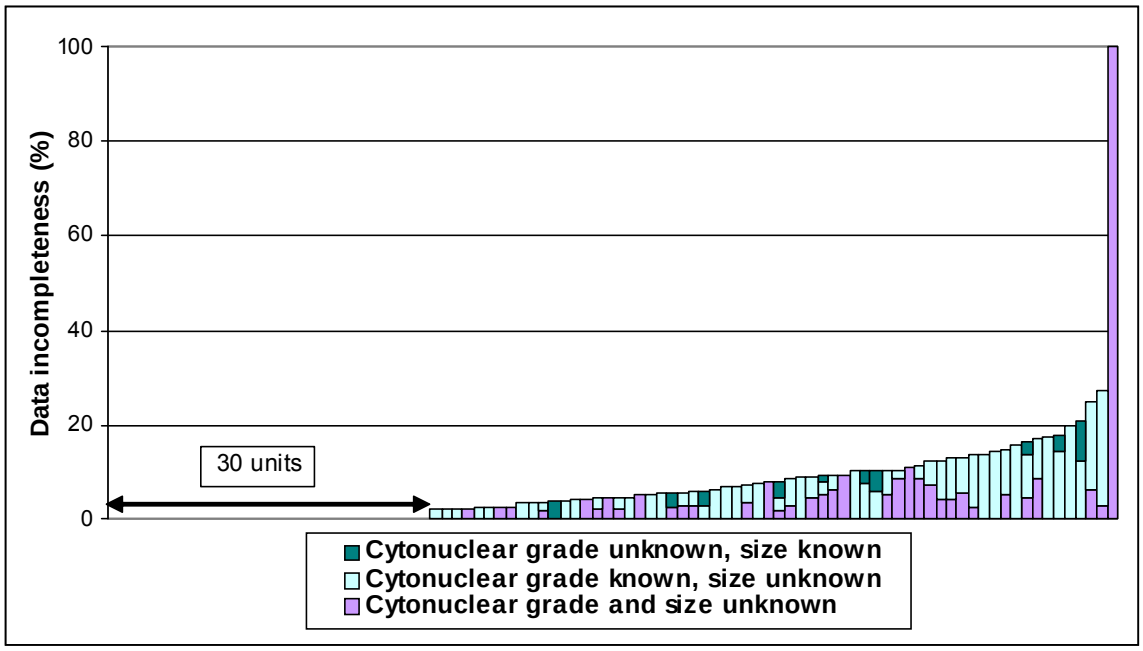

Figure 12: Variation in the data incompleteness of cytonuclear grade and size for non-invasive cancers in each screening unit (Cases with no surgery are excluded)

Figure 12 shows for cases that were surgically treated, how the proportion of non-invasive cancers with unknown cytonuclear grade and/or size varied between screening units in 2009/10. Overall, 30 units had complete cytonuclear grade and size, and 7% of all surgically treated non-invasive cancers had incomplete cytonuclear grade or/and size (215 cases). In 23 units, data incompleteness was greater than 10%. One unit in South Central had unknown cytonuclear grade and size for all its surgically treated non-invasive cancers. None of these were lobular carcinoma in situ (LCIS) cases. Of the 84 non-invasive cancers with unknown cytonuclear grade, 19 (23%) were in North East, Yorkshire & Humber (Table 21). Of the 156 non-invasive cancers with grade not assessable or unknown (Table 22), 112 (72%) were LCIS alone. The size of 52 non-invasive cancers (2%) was not assessable, and for 201 cancers (6%) the size was unknown (Table 21). In London, 13% of non-invasive cancers had unknown or not assessable size (Table 23).

Regional QA reference centres and regional pathology QA co-ordinators should audit non-invasive cancers with unknown cytonuclear grade and/or size to ascertain the reason that these important prognostic indicators were not recorded. They should identify which of their screening units are participating in the Sloane Project to ascertain if their practices and procedures could be used to improve data quality in other units. They should also encourage units which already have high quality data to participate in the Project as recommended in *NICE Clinical Guideline 80 on the Diagnosis and treatment of early and locally advanced breast cancer* (2009), and in the 4th edition of *NHSBSP Publication 20, QA Guidelines for surgeons in breast cancer screening* (March 2009).

3.1.2 Non-invasive Cancer Size

In 2009/10, 38% of the 3,158 surgically treated non-invasive cancers were less than 15mm in diameter and 13% were larger than 40mm (Table 23). The former varied from 32% in South Central to 45% in Wales and the latter from 7% in Northern Ireland to 16% in West Midlands.

3.1.3 Cytonuclear Grade

In the UK as a whole, 1,777 (56%) of the 3,158 surgically treated non-invasive cancers had high cytonuclear grade, 889 (28%) had intermediate cytonuclear grade, and 336 (11%) had low cytonuclear grade (Table 22).

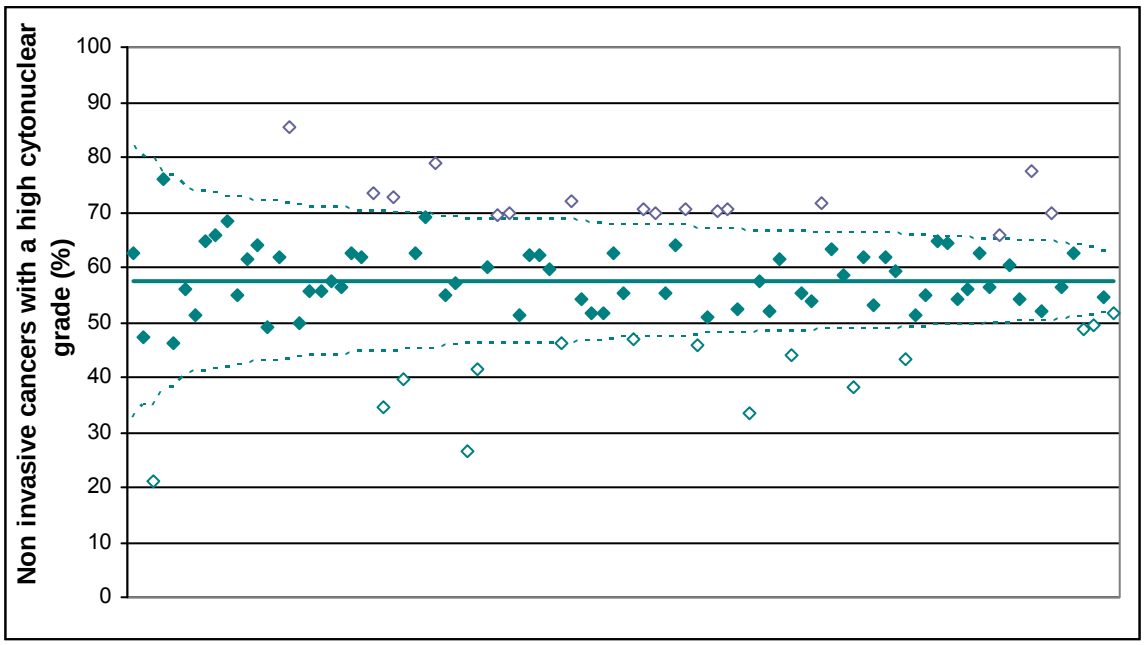

Figure 13: Variation with screening unit in the proportion of non-invasive cancers with a high cytonuclear grade in (2007/08 - 2009/10) (open diamonds represent units which lie outside the control limits) (Cases with no surgery are excluded)

Figure 13 shows for each screening unit over the 3-year period 2007/08-2009/10, the proportion of non-invasive cancers with a high cytonuclear grade. The two dashed lines are the upper and lower

control limits which approximate to the 95% confidence intervals of the average proportion of cases with high cytonuclear grade (solid line). There is considerable variation between units; with 16 lying above the upper control limit and 15 below the lower control limit. Regional QA reference centres and regional pathology QA co-ordinators should carry out audits with these outlier units to ascertain to ascertain the reason for their unusual cytonuclear grade distributions.

KEY FINDINGS:

- 7% of all surgically treated non-invasive cancers had incomplete cytonuclear grade or/and size. In 23 units, data incompleteness was greater than 10%. One unit in South Central had unknown cytonuclear grade and size for all its surgically treated non-invasive cancers. None of these were lobular carcinoma in situ (LCIS) cases.
- Of the 84 non-invasive cancers with unknown cytonuclear grade, 19 (23%) were in North East, Yorkshire & Humber. Of the 156 non-invasive cancers with grade not assessable or unknown, 112 (72%) were LCIS alone.
- The size of 52 non-invasive cancers (2%) was not assessable, and for 201 cancers (6%) the size was unknown. In London, 13% of non-invasive cancers had unknown or not assessable size.
- Regional QA reference centres and regional pathology QA co-ordinators should audit non-invasive cancers with unknown cytonuclear grade and/or size to ascertain the reason that these important prognostic indicators were not recorded. They should also identify which of their screening units are participating in the Sloane Project to ascertain if their practices and procedures could be used to improve data quality in other units.
- 38% of the 3,158 surgically treated non-invasive cancers were less than 15mm in diameter and 13% were larger than 40mm.
- 56% of the surgically-treated non-invasive cancers had high cytonuclear grade, 28% had intermediate cytonuclear grade and 11% had low cytonuclear grade.
- 16 units had significantly higher and 15 units significantly lower proportions of non-invasive cancers with a high cytonuclear grade over the 3-year period 2007/08-2009/10. Regional QA reference centres and regional pathology QA co-ordinators should carry out audits with these outlier units to ascertain the reason for their unusual cytonuclear grade distributions.

3.2 Tumour Size for Invasive Breast Cancers

Of the 13,429 surgically treated invasive cancers, 3,353 (25%) had an invasive tumour size less than 10mm in diameter, 3,815 (28%) had an invasive tumour diameter greater than 10mm but less than 15mm, 3,110 (23%) were between 15mm and 20mm in diameter, 2,249 (17%) had an invasive tumour diameter greater than 20mm but less than or equal to 35mm and 476 (4%) had a diameter greater than 35mm but less than or equal to 50mm. Only 233 cases (2%) were greater than 50mm in diameter (Table 24).

The whole tumour size is the maximum diameter of the whole tumour, including any non-invasive component which extends beyond the invasive lesion. Whole tumour size was not provided for 256 (2%) of the surgically treated invasive cancers (Table 25). 65 (25%) of the cancers without a whole tumour size were in North East, Yorkshire & Humber. Regional QA reference centres should ascertain why this important information was not available from their screening units.

KEY FINDINGS:

- 53% of surgically treated cancers had an invasive tumour diameter of less than 15mm. For only 233 cases (2%) was the invasive tumour diameter greater than 50mm.
- The whole tumour size was not provided for 256 (2%) surgically treated invasive cancers. 25% of the cancers without a whole tumour size were in North East, Yorkshire & Humber. Regional QA reference centres should ascertain why this important information was not available from their screening units.

3.3 Lymph Node Status

Screening guidelines recommend that invasive cancers should have axillary node assessment. 243 invasive cancers which did not have surgery have been excluded from this section as no information was available concerning their lymph node status.

Quality Objective	**To ensure adequate staging of the axilla in patients with invasive breast cancer**
Minimum Standard	**>90% of women treated for early invasive cancers should have an axillary staging procedure carried out if metastatic nodal metastasis is not confirmed non-operatively**
Target Standard	**100% of women treated for early invasive cancers should have an axillary staging procedure carried out if metastatic nodal metastasis is not confirmed non-operatively**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

3.3.1 Availability of Nodal Status for Invasive Cancers

In 2009/10, nodal status was known for 98% of surgically treated invasive cancers, varying from 97% in London and South Central to 100% in Northern Ireland (Table 83). A total of 198 invasive cancers were recorded as having no nodes obtained and 15 invasive cancers did not have a record of whether or not nodes were obtained.

The availability of nodal status for invasive cancers is shown for individual screening units in Figure 14. Where nodal status is unknown, this may be because no nodes were obtained, because it is not known whether or not nodes were obtained or because the number of positive nodes was not recorded. Nodal status was known for 100% of invasive cancers in 32 screening units, which is an improvement from 23 units last year. All screening units met the 90% minimum standard. However, regional QA reference centres and regional surgical QA co-ordinators should audit the cases in the three screening units (two in London and one in South Central) which had more than 5% of cases with unknown nodal status in order to determine the reasons for the absence of these important prognostic data.

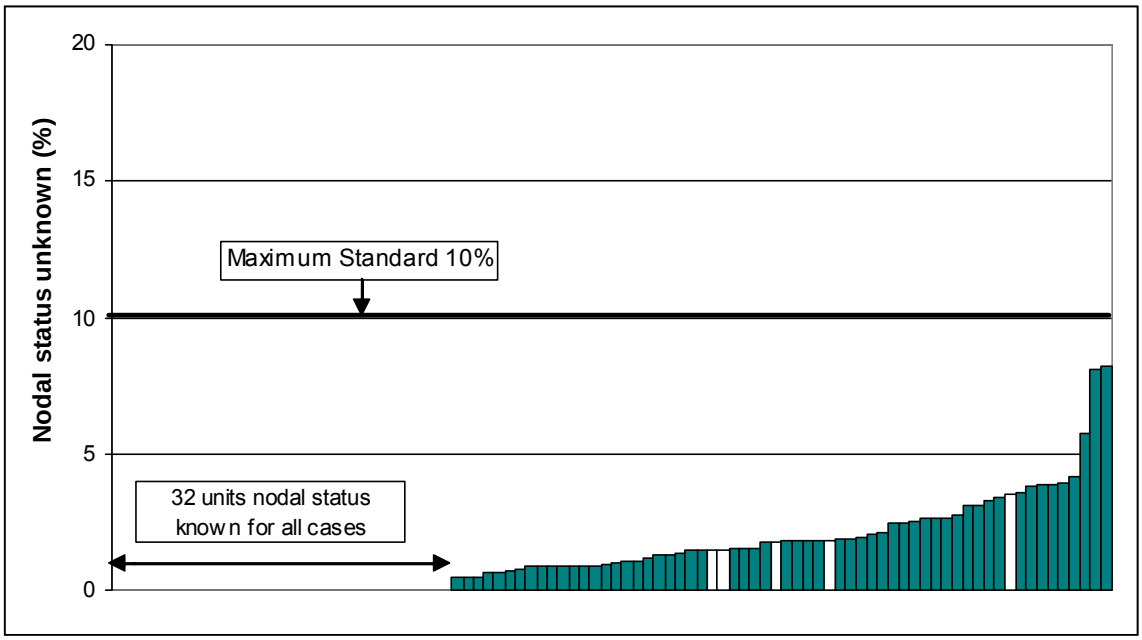

Figure 14: The non-availability of lymph node status for invasive breast cancers in each screening unit (5 of the 20 smallest units are highlighted in white)

3.3.2 Lymph Node Status for Invasive Cancers

Of the 13,216 invasive cancers with known nodal status, 2,858 (22%) had positive nodes (Table 86). There was some regional variation in lymph node status; with the proportion of node positive cancers varying from 19% in East Midlands, South West, West Midlands and Wales to 24% in South East Coast, South Central and Scotland. Figure 15 shows that there was a wider variation in nodal status in individual screening units; with five units lying outside the control limits (2 above and 3 below). It would be interesting to determine whether this wide range of node positivity is related to differences between units in the number of blocks taken, and the intensity with which the presence of micro-metastases is investigated.

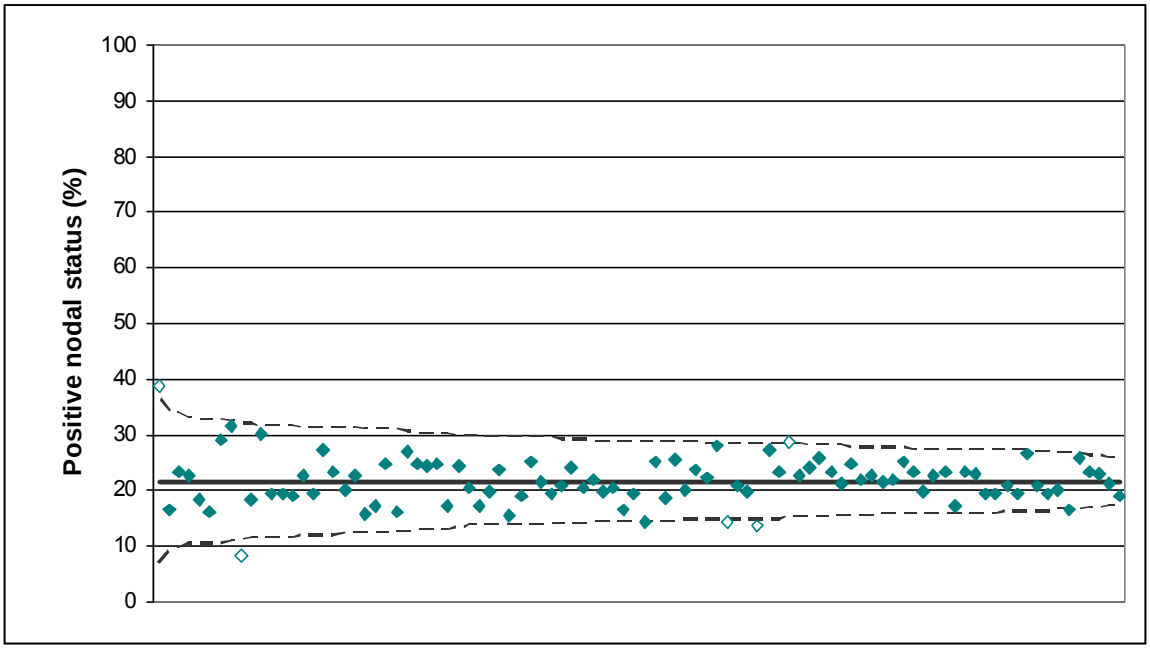

Figure 15: Variation with screening unit in the proportion of invasive cancers with positive nodal status expressed as a percentage of cases with known nodal status
(open diamonds represent units which lie outside the control limits)

3.3.3 Availability of Nodal Status for Non-invasive Cancers

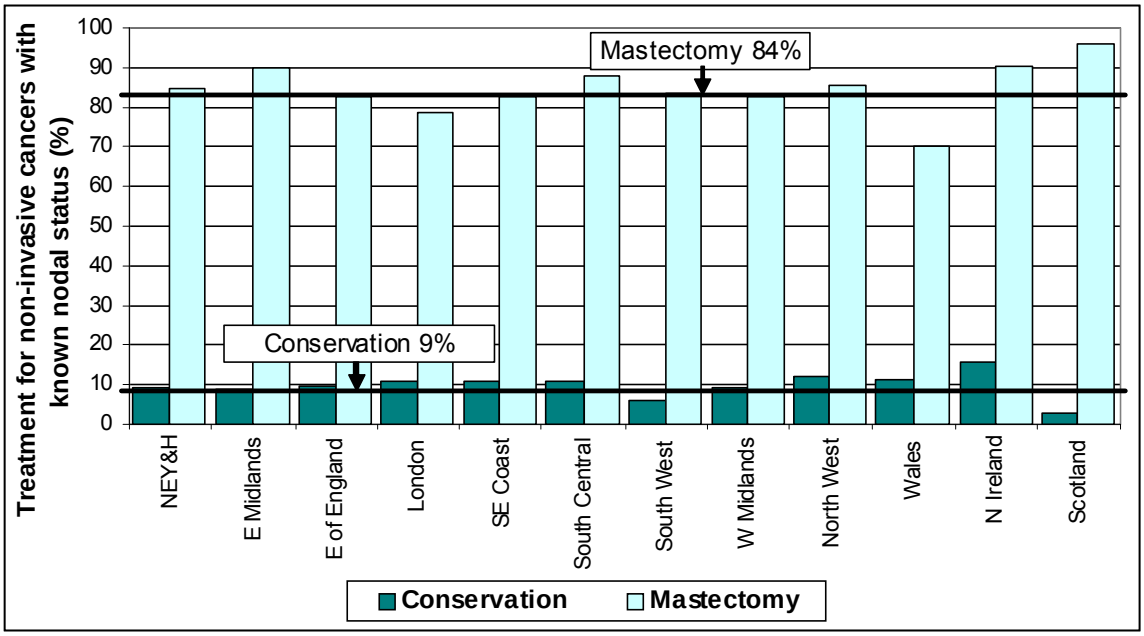

Figure 16 (Table 91): The proportion of non-invasive cancers treated with conservation surgery or mastectomy with known nodal status

38 non-invasive cancers which did not have surgery have been excluded from this section as no data were available concerning their lymph node status. Although nodal assessment is not always indicated

for non-invasive cancers, nodes are usually obtained when a mastectomy is performed, especially if the assessment process provides suspicion of invasive disease.

Of the 3,158 surgically treated non-invasive cancers, 30% had known nodal status. This varied from 25% in South West, Wales and Scotland to 38% in Northern Ireland (Table 90). For three cancers in London and one cancer in East of England, it was not known whether or not nodes were taken. 84% of the non-invasive cancers treated by mastectomy had known nodal status, varying from 70% in Wales to 96% in Scotland (Figure 16). Seven screening units (two in East of England, and one in Northern Ireland, North East, Yorkshire & Humber, Wales, West Midlands and London) had significantly lower proportions of patients treated with mastectomy with known nodal status.

Only 9% of non-invasive cancers treated with conservation surgery had known nodal status. Nine screening units had significantly higher proportions (up to 40%) of patients treated with breast conserving surgery who had known nodal status and two had significantly lower proportions. Of the 943 non-invasive cancers with known nodal status, 9 (1%) had positive nodal status recorded (Table 92).

KEY FINDINGS:

- In the UK as a whole, 98% of surgically treated invasive cancers had known nodal status. This varied between 97% in London and South Central to 100% in Northern Ireland. Regional QA reference centres and regional surgical QA co-ordinators should audit the cases in the 3 screening units (two in London and one in South Central) which had more than 5% of cases with unknown nodal status in order to determine the reasons for the absence of these important prognostic data.
- In the UK as a whole, 22% of cases had positive nodal status; this varied from 8% to 39% in individual screening units. It would be interesting to determine whether this wide range of node positivity is related to differences in the number of blocks taken and the intensity with which the presence of micro-metastases is investigated.
- Although nodal assessment is not always indicated for non-invasive cancers, 30% of non-invasive cancers had known nodal status. This varied from 25% in South West, Wales and Scotland to 38% in Northern Ireland.
- 84% of non-invasive cancers treated with mastectomy had known nodal status, compared with 9% of those treated with conservation surgery.
- Of the 943 non-invasive cancers with known nodal status, 9 had positive nodal status recorded.

3.4 Grade of Invasive Cancers

Of the 13,429 invasive cancers which had surgery, 3,482 (26%) were Grade I, 7,038 (52%) were Grade II and 2,786 (21%) were Grade III (Table 27). Grade was not assessable for 47 cases over 32 units and grade was unknown for 76 cases (1%) over 39 units.

The control charts in Figure 17 show the variation in the proportions of Grade I, II and III cancers recorded for individual screening units. The cases were plotted with the assumption that the proportions are normally distributed. The screening units are positioned with the same x-value in the 3 graphs, according to the total number of invasive cancers which had surgery, so that the units with the highest number of invasive cancers are located at the right hand side of the graphs. The three points (Grade I, II and III) for a single unit can thus be compared vertically. Any points that are outside the 2 dashed lines (95% upper and lower control limits) are considered as significantly higher or lower than the average represented by the solid line.

The control charts in Figure 17 suggest that there are local variations in the interpretation of invasive grade definitions which should be investigated by regional QA reference centres and their regional pathology QA co-ordinators. For example, 2 of the 3 units in Wales are outliers in the Grade I control chart. In the Grade I control chart, 4 units have been outliers every year during the 3-year audit period 2007/08-2009/10 (one in East Midlands, Scotland, South Central and North West). A similar pattern is seen for the Grade III control chart; with 3 units being outliers in all 3 audit years (two in Scotland and one in East of England).

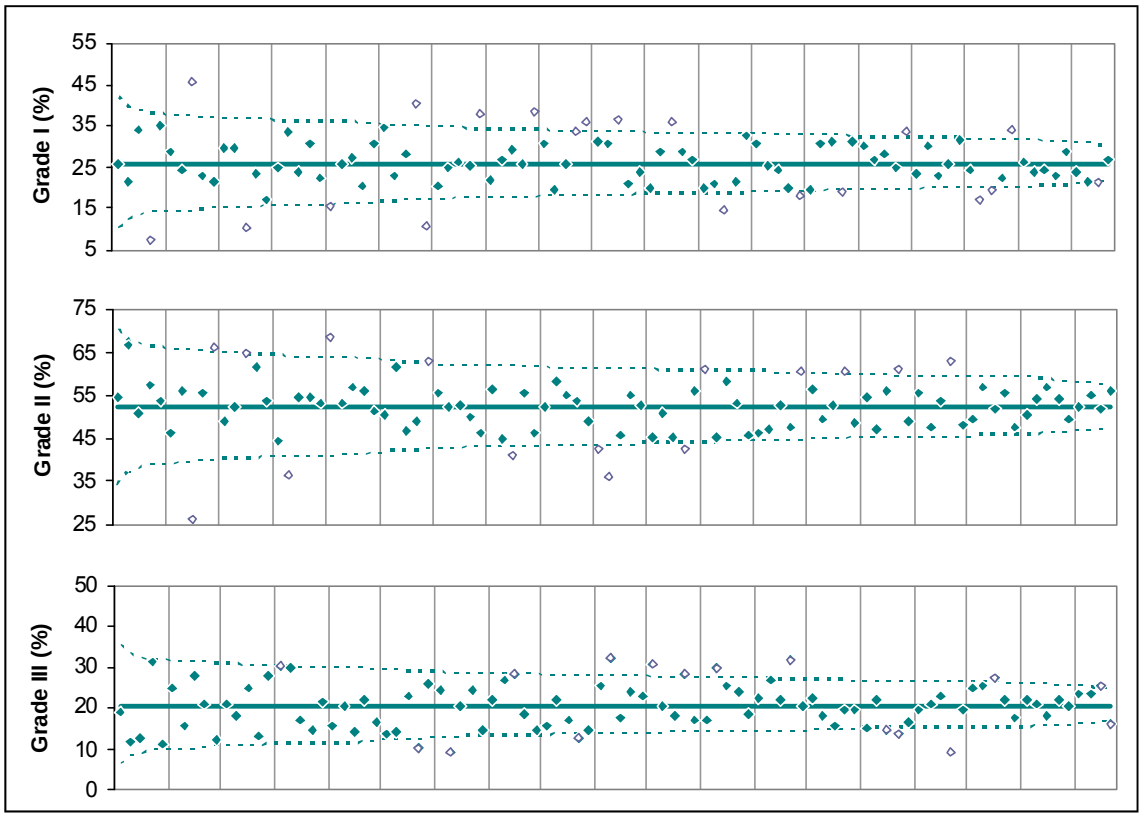

Figure 17: Variation in the grade of surgically treated invasive cancers in each screening unit (open diamonds represent units which lie outside the control limits)

KEY FINDINGS:

- Overall, 26% of invasive cancers were Grade I, 52% Grade II and 21% Grade III. Grade was not assessable for 47 cases and unknown for 76 cases.
- Control charts suggest that there are local variations in the interpretation of invasive grade definitions which should be investigated by regional QA reference centres and regional pathology QA co-ordinators.
- In the Grade I control chart, 4 units have been outliers every year during the 3-year period 2007/08-2009/10. A similar pattern is seen for the Grade III control chart; with 3 units being outliers throughout the 3-year period 2007/08-2009/10.

3.5 NPI of Invasive Cancers

NPI Score = 0.2 x Invasive Size (cm) + Grade + Nodes

EPG	(Excellent Prognostic Group)	≤2.4
GPG	(Good Prognostic Group)	2.401-3.4
MPG1	(Moderate Prognostic Group 1)	3.401-4.4
MPG2	(Moderate Prognostic Group 2)	4.401-5.4
PPG	(Poor Prognostic Group)	>5.4

The Nottingham Prognostic Index (NPI) score was calculated for surgically treated invasive cancers in order to allocate them to one of five prognostic groups. An NPI score was calculated for all surgically treated invasive cancers with complete size, grade and nodal status information, even if nodal status was based on fewer than 4 nodes. It should be noted that the differences in invasive grade outlined in Figure 17 will have affected the NPI groupings.

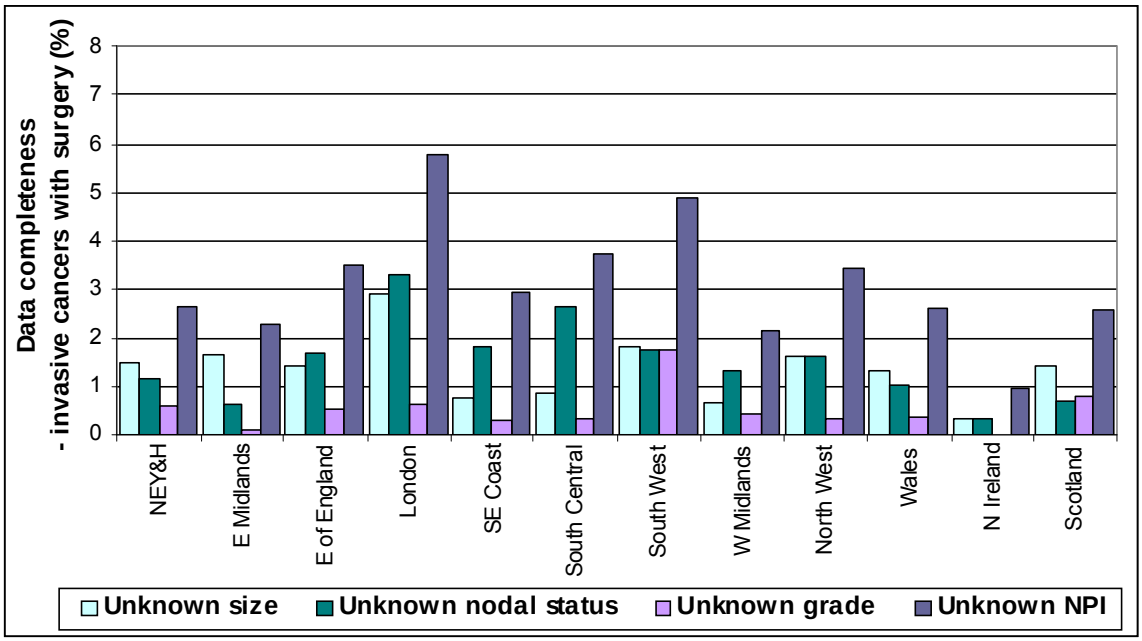

Figure 18 (Table 28): Data completeness of tumour characteristics of surgically treated invasive cancers

An NPI score cannot be calculated if size, nodal status or grade is unknown or if grade is not assessable. Overall, an NPI score could not be calculated for 3% (442 cases) of the 13,429 invasive cancers which had surgery. Of these, 38 cases had benign outcome at surgery, with no cancer cells found in the surgical specimen. Figure 18 shows that the proportion of cancers with unknown NPI was the lowest in Northern Ireland (1%) and highest in London (6%). The high proportion of cancers with an unknown NPI score in London was due to unknown invasive size and nodal status. The proportions of cancers with an unknown NPI score in London varied by unit between 3% and 11% in individual screening units.

Of the 12,987 surgically treated invasive cancers with known NPI score, the highest proportion fell into the Good Prognostic Group (37%), with only 6% (821 cases) in the Poor Prognostic Group (Table 29). As expected with cancers detected by screening, in the UK as a whole the majority (58%) of cancers fell into the two best prognostic groups, EPG (Excellent Prognostic Group) and GPG (Good Prognostic Group). The proportion of EPG and GPG cancers varied from 54% in South Central to 65% in East Midlands.

In Figure 19, the proportion of invasive cancers for individual screening units in each NPI group and with unknown NPI group is plotted in the control charts. As in Figure 17, data for the same unit can be compared vertically across the 4 graphs. Any points that are outside the 2 dashed lines (95% upper and lower control limits) are considered as significantly higher or lower than the average, represented by the solid line.

The first control chart in Figure 19 shows that 15 units have a significantly higher or lower proportion of EPG and GPG cancers than the UK as a whole. The third control chart shows that 6 units have a significantly higher proportion of PPG cancers. 5 units have a significantly higher proportion than the average with unknown NPI group (fourth control chart). In the EPG and GPG control chart, 1 unit in North West has been an outlier every year during the 3-year period 2007/08-2009/10, and 9 units have been outliers in 2 out of 3 of these years. In MPG control chart, 1 unit in the North West has been an outlier every year during the 3-year period 2007/08-2009/10. Less consistent patterns are seen for the other control charts; with only a few units being outliers in 2 out of 3 audit years. Regional QA reference centres and their regional pathology QA co-ordinators and surgical QA co-ordinators should investigate the reasons for the unusual NPI distributions and the high proportion of cases with unknown NPI group seen in five screening units (two in London, one in South West, one in South Central and one in North West).

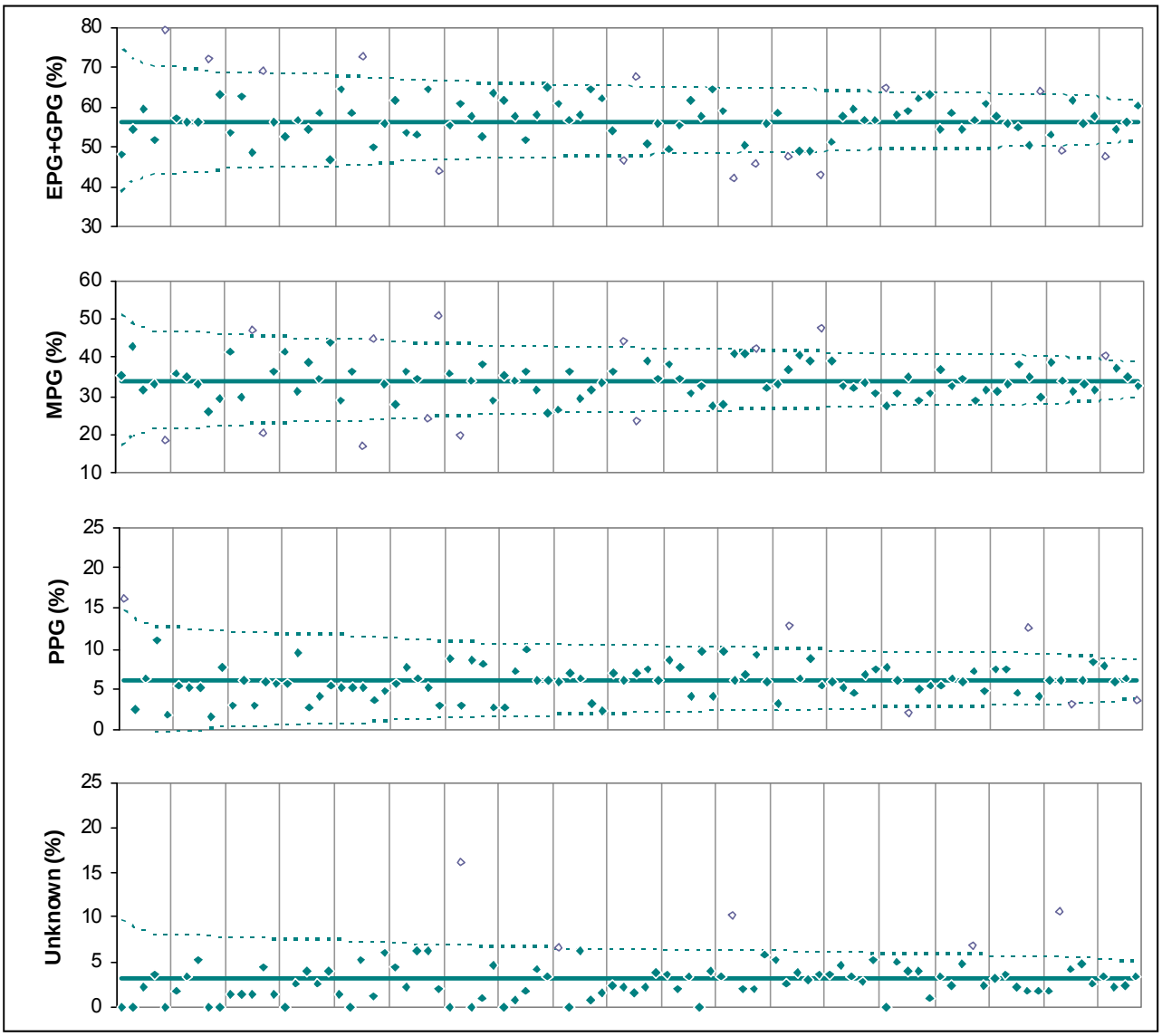

Figure 19: NPI groups for surgically treated invasive cancers in each screening unit (open diamonds represent units which lie outside the control limits)

KEY FINDINGS:

- Data were available to calculate a Nottingham Prognostic Index (NPI) score for 97% of surgically treated invasive cancers.
- A small number of units have been outliers in NPI control charts every year during the 3-year period 2007/08-2009/10. Regional QA reference centres and their regional pathology QA co-ordinators and surgical QA co-ordinators should investigate the reasons for the unusual NPI distributions and the high proportion of cases with unknown NPI group seen in five screening units (two in South Central, two in London and one in North West).

3.6 Receptor Status

Oestrogen Receptor (ER) and Human Epidermal Growth Factor Receptor 2 (HER-2 status) should be available for all invasive cancers when they are discussed at multi-disciplinary meetings in order to plan the most appropriate neo-adjuvant or adjuvant treatment. Progesterone Receptor (PgR) status can provide additional prognostic information for ER negative invasive cancers.

In the UK as a whole, ER status was unknown for 1,787 (11%) of all cancers included in the main audit (Table 30). This may be because the test was not done, the test result was unknown or no information on ER status was provided. ER status was not known for 1% of invasive cancers and for

51% of non-invasive cancers (Figure 20). The proportion of non-invasive cancers with unknown ER status varied from 27% in Northern Ireland to 76% in Wales. Regional QA reference centres should ensure that the ER status is recorded for all invasive cancers and that the results are available for discussion at multi-disciplinary meetings. Of the 15,226 cancers with known ER status, 13,606 (89%) were ER positive. 90% of invasive cancers with known ER status and 82% of non-invasive cancers with known ER status were ER positive.

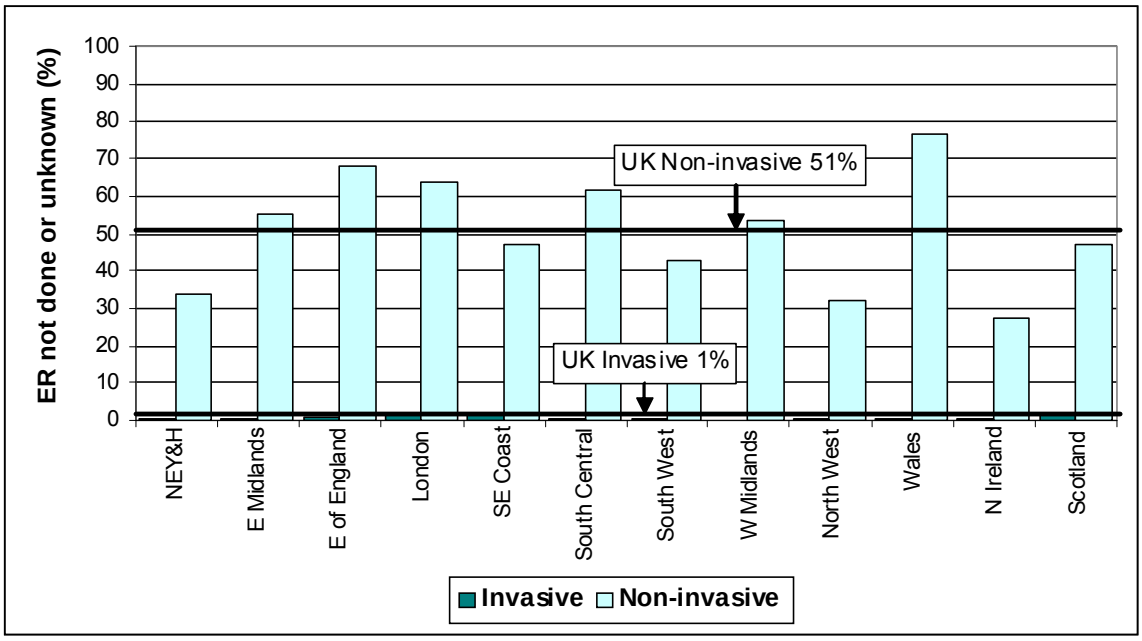

Figure 20 (Table 31 and 32): Variation in the proportion of invasive and non-invasive cancers with ER status unknown or not provided

PgR status was known for 60% of all cancers (Table 33). PgR status was known for 67% of invasive cancers and for 31% of non-invasive cancers. The proportion of invasive cancers with known PgR status varied from 37% in East Midlands to 95% in London. Of the 9,227 invasive cancers with known PgR status, 76% were positive. Of the 1,293 invasive cancers that were known to be ER negative, 57 (4%) were PgR positive, 1,047 (81%) were PgR negative and 189 (15%) did not have their PgR status determined (Table 34).

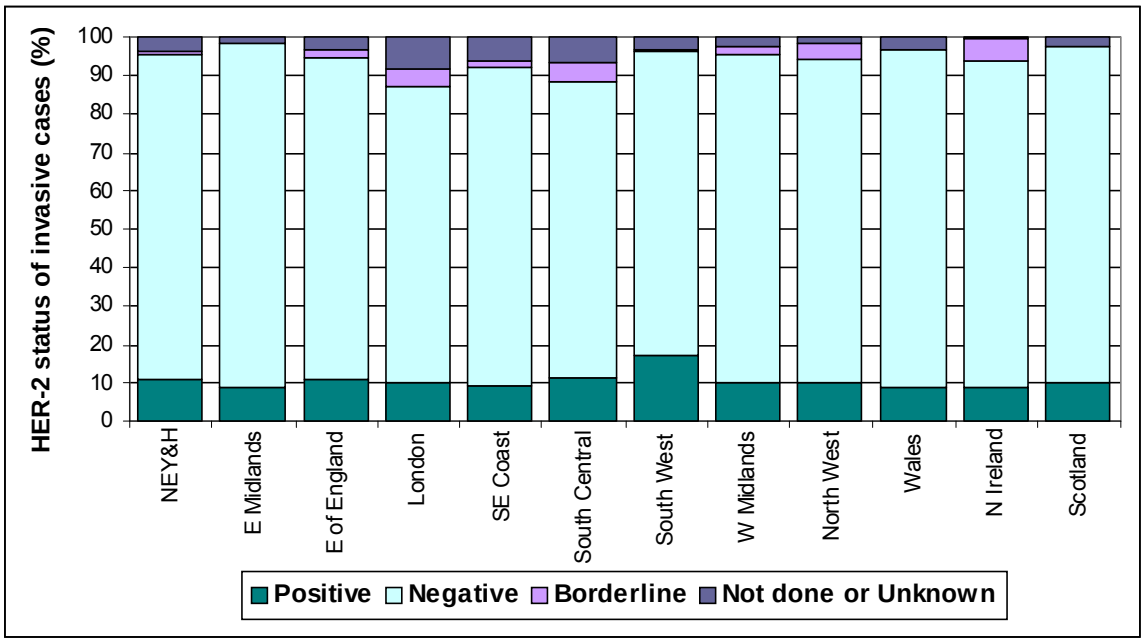

Figure 21 (Table 35): Variation in HER-2 status for invasive cancers

HER-2 status data were available for 96% of the 13,672 invasive cancers included in the main audit (Table 35). This is an increase from 91% of cancers with known HER-2 status at an equivalent point in

time in 2008/09. The proportion of cases with known HER-2 status varied from 92% in London to 99% in North West and Northern Ireland (Figure 21). 21% of the invasive cancers without a HER-2 status were in London (109 cases) where, in one screening unit, 31% of the 235 invasive cancers had unknown HER-2 status. In one unit in South Central, 25% of the 163 invasive cancers had unknown HER-2 status. The regional QA reference centres should audit these cases to determine whether this is a data recording problem or if the data reflect clinical practice.

Of the 13,163 invasive cancers with known HER-2 status, 11% were positive, 87% were negative and 2% were borderline. HER-2 positivity varied from 9% in East Midlands, South East Coast, Wales and Northern Ireland to 17% in South West where, in one screening unit, 55% of the 128 invasive cancers were HER-2 positive. The regional QA reference centre should audit these cases. Of the 509 cases without a HER-2 status, 33% had an invasive size of less than 10mm, 23% were Grade I and 68% had negative nodal status (Table 36).

KEY FINDINGS:

- ER status was unknown for 11% of cases. 1% of invasive cancers and 51% of non-invasive cancers had unknown ER status. Regional QA reference centres should ensure that the ER status is recorded for all invasive cancers and that the results are available for discussion at multi-disciplinary meetings.
- Of the 15,226 cancers with known ER status, 89% were ER positive. 90% of invasive cancers with known ER status and 82% of non-invasive cancers with known ER status were ER positive.
- PgR status was known for 60% of all cancers. This varied from 37% in East Midlands to 95% in London. Of the invasive cancers with known PgR status, 76% were positive. Of the 1,293 invasive cancers that were known to be ER negative, 57 (4%) were PgR positive.
- HER-2 status data were available for 96% of invasive cancers. 21% of the invasive cancers without a HER-2 status were in London. In two screening units, 31% of the 235 invasive and 25% of the 163 invasive cancers had unknown HER-2 status. The regional QA reference centres should audit these cases to determine whether this is a data recording problem or if the data reflect clinical practice.
- Of the invasive cancers with known HER-2 status, 11% were positive. In one screening unit in South West, 55% of the 128 invasive cancers were HER-2 positive. The regional QA reference centre should audit these cases.

CHAPTER 4
SURGICAL TREATMENT

4.1 Surgical Treatment for Non-invasive and Micro-invasive Breast Cancer

In the UK as a whole in 2009/10, 72% of the 3,196 non-invasive cancers were treated by breast conserving surgery, 27% were treated by mastectomy, 38 cancers (1%) apparently received no surgery and for 1 cancer it was not known whether or not surgery had been performed (Table 37). The mastectomy rate varied from 22% in East of England to 34% in West Midlands. All 137 micro-invasive cancers included in this audit period received surgery, 60% had breast conserving surgery and 40% had a mastectomy (Table 38).

Quality Objective **To minimise local recurrence after breast conservation surgery for DCIS**

Outcome Measure **Patients with extensive (>40mm diameter) or multicentric disease should usually undergo treatment by mastectomy**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

In 2009/10, 38% of the 3,158 non-invasive cases with surgery were less than 15mm in diameter and 13% were larger than 40mm (Table 23). Of the 406 non-invasive cancers larger than 40mm, 78 (19%) had breast conserving surgery Table 39). Regional QA reference centres should audit these cases to ensure that they have not been under-treated.

NUMBER OF NON-INVASIVE CANCERS TREATED WITH BREAST CONSERVING SURGERY

	>40mm		Unknown size		
Region	**High cytonuclear grade** (Table 40)	**Unknown cytonuclear grade**	**High cytonu-clear grade**	**Unknown cytonuclear grade** (Table 41)	**Total***
N East, Yorks & Humber	6	0	2	16	24
East Midlands	3	0	0	3	6
East of England	2	0	2	6	10
London	3	0	5	1	9
South East Coast	8	0	3	12	23
South Central	3	0	3	3	9
South West	4	0	1	2	7
West Midlands	5	0	0	2	7
North West	8	0	3	7	18
Wales	4	0	1	0	5
Northern Ireland	2	0	1	1	4
Scotland	3	0	0	0	3
United Kingdom	**51**	**0**	**21**	**53**	**125**

*Each non-invasive cancer is counted once only; “non-invasive - biopsy only” cases are excluded

The preceding summary table shows that, in total, 125 potentially large, high cytonuclear grade or unknown cytonuclear grade non-invasive cancers were treated with breast conserving surgery. Regional QA reference centres and regional surgical QA co-ordinators should review the data recorded for these cases to ensure that they were not under-treated.

KEY FINDINGS:

- 72% of non-invasive cancers were treated with breast conserving surgery. 38 cancers apparently received no surgery. Mastectomy rates for non-invasive cancers varied from 22% in East of England to 34% in West Midlands.
- 125 potentially large high cytonuclear grade non-invasive cancers were treated with breast conserving surgery. Regional QA reference centres and regional surgical QA co-ordinators

4.2 Surgical Treatment for Invasive Breast Cancer

Of the 13,672 invasive breast cancers detected by the UK NHSBSP in 2009/10, 10,069 (74%) underwent breast conserving surgery and 3,346 (24%) had a mastectomy. Figure 22 shows the regional variation in invasive cancer mastectomy rates which ranged from 20% in South West to 29% in North East, Yorkshire & Humber. Mastectomy rates in individual screening units varied between 10% and 50%. 243 cases (2%) had no surgery and treatment information was unavailable for 7 cases in London, 5 cases in Scotland and 2 cases in North East, Yorkshire & Humber. Regional QA reference centres and regional surgical QA co-ordinators should audit these 257 cases to ascertain why surgical treatment was not given or why the surgical treatment that was given was not recorded.

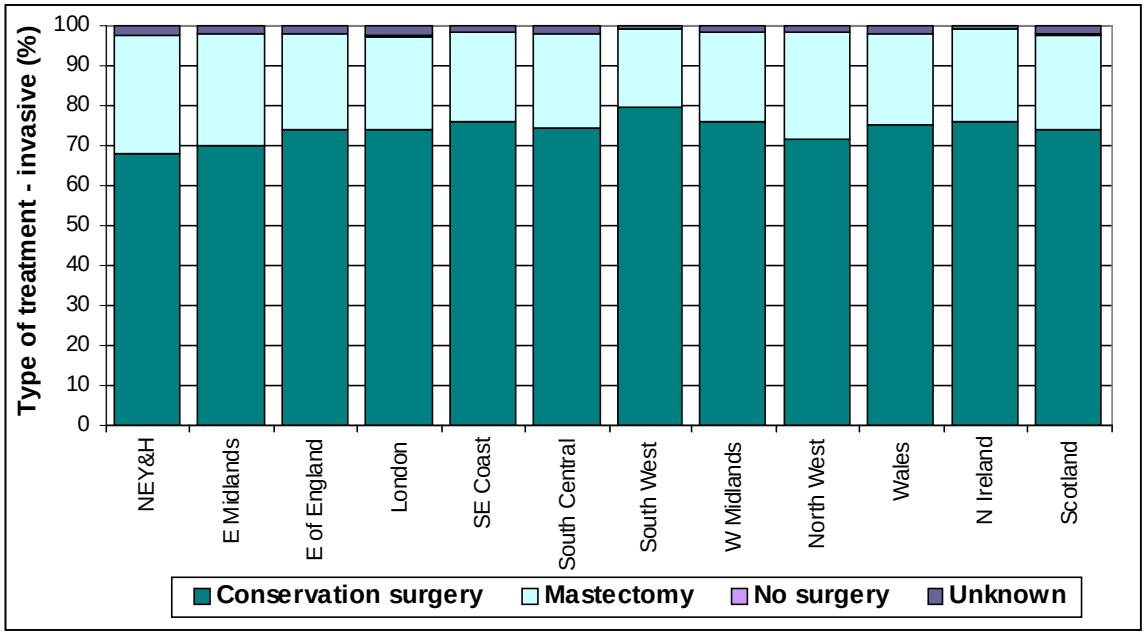

Figure 22 (Table 42): Type of treatment for invasive cancers (all sizes)

4.2.1 Surgical Treatment of Invasive Cancers According to Invasive Size

In most regions there was a clear variation in mastectomy rate with tumour size (Figure 23); the overall rates being 17%, 23%, 37%, 67% and 91% for cancers with invasive tumour diameters of less than 15mm, 15mm-20mm, greater than 20mm to 35mm, greater than 35mm to 50mm and greater than 50mm respectively (Table 43). In South West, mastectomy rates for cancers with invasive tumour diameters in the two largest size categories were particularly low (50% and 72%).

The following summary table shows that the overall mastectomy rate for small (<15mm) invasive cancers remained fairly stable between 1996/97 and 2007/08, varying between 18% and 21%. In 2008/09 it reached its lowest rate of 17%, and this remained the same in 2009/10. Table 43 shows that the highest mastectomy rates in 2009/10 for small (<15mm) invasive cancers were recorded in East Midlands, North West and North East, Yorkshire & Humber (21%) and the lowest rates (13%) in Northern Ireland.

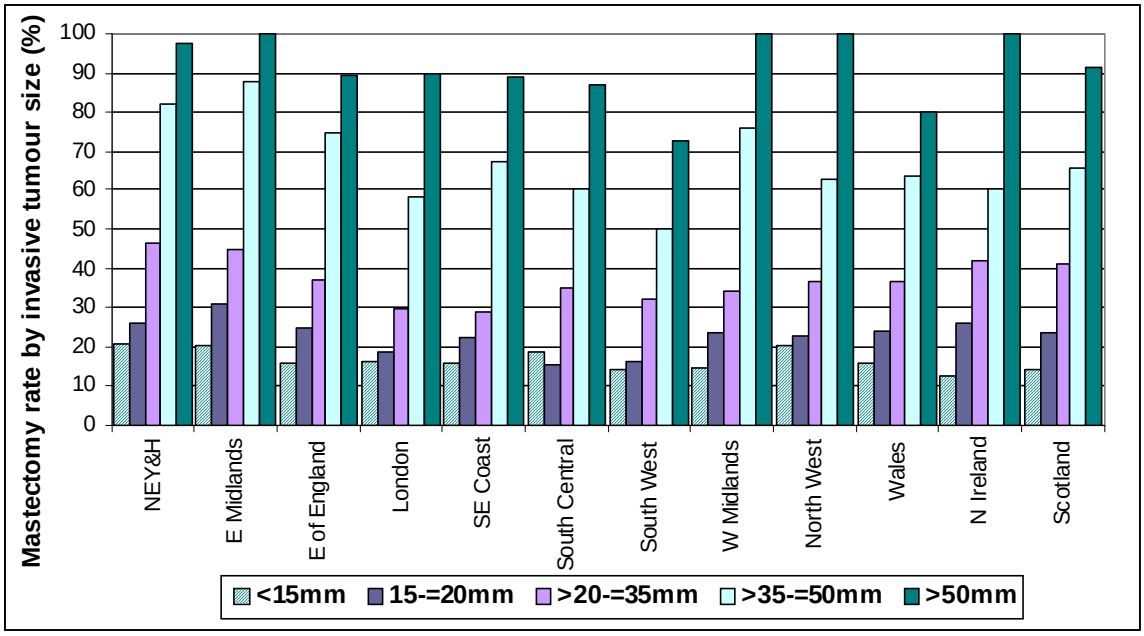

Figure 23 (Table 43): Variation in mastectomy rates with invasive tumour size

14 YEAR COMPARISON: TREATMENT FOR SMALL INVASIVE CANCERS (invasive size <15mm)					
Year of data collection	*Total invasive cases <15mm*	*Breast conserving surgery*		*Mastectomy*	
		No.	*%*	*No.*	*%*
1996/97	*3,135*	*2,449*	*78*	*601*	*19*
1997/98	*3,384*	*2,693*	*80*	*651*	*19*
*1998/99**	*3,344*	*2,697*	*81*	*618*	*18*
1999/00	*4,150*	*3,337*	*80*	*773*	*19*
2000/01	*4,189*	*3,363*	*80*	*796*	*19*
2001/02	*4,233*	*3,333*	*79*	*879*	*21*
2002/03	*4,878*	*3,950*	*81*	*918*	*19*
2003/04	*5,489*	*4,475*	*82*	*1,006*	*18*
2004/05	*5,795*	*4,723*	*82*	*1,071*	*18*
2005/06	*6,678*	*5,424*	*81*	*1,254*	*19*
2006/07	*6,567*	*5,359*	*82*	*1,208*	*18*
2007/08	*7,002*	*5,720*	*82*	*1,282*	*18*
2008/09	*7,022*	*5,809*	*83*	*1,213*	*17*
2009/10	*7,168*	*5,938*	*83*	*1,230*	*17*

*Data from Scotland are absent in 1998/99

4.2.2 Surgical Treatment of Invasive Cancers According to Whole Tumour Size

The whole tumour size is the maximum diameter of the whole tumour, including any non-invasive component which extends beyond the invasive lesion. The following table shows how mastectomy rates in 2009/10 varied with the size of the invasive cancer and with whole tumour size. As expected, mastectomy rates increased with invasive tumour size from 17% for small (<15mm) tumours to 91% for very large (>50mm) tumours. For small (<15mm) invasive cancers, mastectomy rates also increased as the whole tumour size increased. Thus, while only 10% of small (<15mm) cancers with whole tumour size <15mm had mastectomies, 89% of small (<15mm) cancers with whole tumour size >50mm had mastectomies. The lower mastectomy rate for small (<15mm) cancers with whole tumour size <15mm indicates that the presence of *in situ* disease which extends beyond the invasive lesion accounts for a proportion of the mastectomies performed on small (<15mm) invasive cancers.

INVASIVE CANCER TREATMENT – VARIATION WITH TUMOUR SIZE				
Size	Invasive size (Table 43)		Whole tumour size for cancers with invasive component <15mm (Table 44)	
	No.	Mastectomy Rate (%)	No.	Mastectomy Rate (%)
<15mm	1,230	17	549	10
15-≤20mm	704	23	160	19
>20-≤35mm	828	37	219	34
>35-≤50mm	319	67	135	70
>50mm	213	91	141	89

Tables 43 and 44 show that in every region, the mastectomy rate for cancers with whole tumour size <15mm was lower than that for cancers with an invasive tumour size <15mm. The difference was greatest in East Midlands (21% compared to 11%), and least in South West (14% compared to 11%).

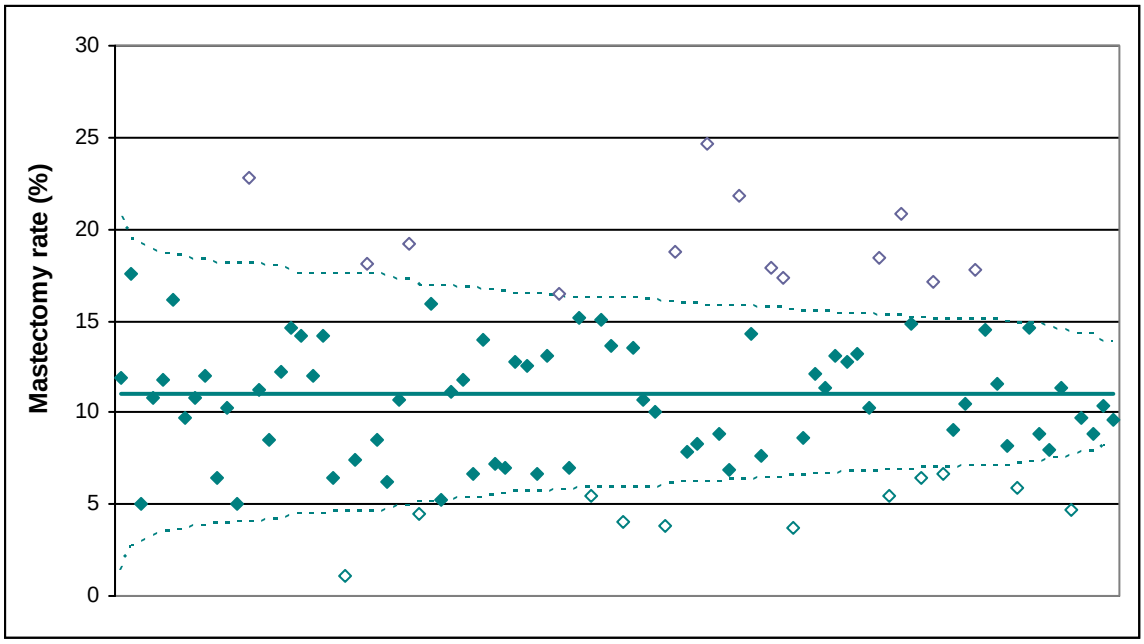

Figure 24: Variation in the mastectomy rates for invasive cancers with a whole tumour size <15mm in each screening unit in 2007/08-2009/10 (open diamonds represent units which lie outside the control limits)

Figure 24 shows the variation between screening units in the mastectomy rate for invasive cancers with whole tumour size <15mm in the 3-year period 2007/08-2009/10. The two dashed lines are the upper and lower control limits which approximate to the 95% confidence intervals of the average mastectomy rate (solid line). Mastectomy rates which are outside the control limits are significantly higher (13 units) or lower (11 units) than the average rate of 11%. Of the 13 units with unusually high mastectomy rates, three are in East Midlands, three in North East, Yorkshire & Humber and three in North West. Regional QA reference centres and regional surgical QA co-ordinators should review the data for screening units lying outside (above and below) the control limits to ascertain the reasons for this unusual clinical practice. For units with unusually high mastectomy rates, access to reconstruction (immediate and delayed) and the role of patient choice would be of particular interest. For units with unusually low mastectomy rates, cosmetic outcomes and recurrence rates would be of particular relevance.

KEY FINDINGS:

- In the UK as a whole, the mastectomy rate for invasive cancers was 24%. Mastectomy rates in individual screening units varied between 10% and 50%.
- 243 invasive cancers and 38 non-invasive cancers had no surgery recorded, and for 1 non-invasive cancer and 14 invasive cancers, treatment information was not available. Regional QA reference centres and regional surgical QA co-ordinators should audit these cases.

KEY FINDINGS:

- 91% of invasive cancers with an invasive tumour diameter greater than 50mm were treated with mastectomy compared with 17% of small (less than 15mm diameter) invasive cancers.
- Overall only 10% of cancers with whole tumour size less than 15mm were treated with mastectomy compared with 17% of cancers with an invasive tumour size of less than 15mm. These data indicate that the presence of *in situ* disease which extends beyond the invasive lesion accounts for a proportion of the mastectomies performed on small invasive cancers.
- In order to ascertain the reasons for non-random variation in clinical practice, regional QA reference centres and regional surgical QA co-ordinators should review the data for all screening units lying outside (above and below) the control limits in Figure 24 which shows the inter-unit variation in the proportion of small invasive cancers which had a mastectomy.

4.3 Immediate Reconstruction Following Mastectomy

Overall, of the 17,013 cancers detected in 2009/10, 4,269 (25%) were treated with mastectomy. Of these, 3,295 (77%) cases had no immediate reconstruction recorded, and for 135 (3%) cases it was unknown whether or not immediate reconstruction was performed. 839 (20%) were recorded as having immediate reconstruction. The latter is in good agreement with the rate of 21% reported in the *National Mastectomy and Breast Reconstruction Audit Third Annual Report, 2010* for all breast cancers (screen-detected and symptomatic) treated with mastectomy in the period 1 January 2008 to 31 March 2009. Table 46 shows that, of the 839 cancers known to have had immediate reconstruction following mastectomy, 537 (64%) were invasive, 12 (1%) were micro-invasive and 290 (35%) were non-invasive. Only 16% of the 3,346 invasive cancers treated with mastectomy (Table 53) had immediate reconstruction recorded compared with 33% of the 868 non-invasive cancers treated with mastectomy. These results are similar to those reported in the *NMBRA Second Annual Report, 2009* where 17% of women with invasive breast cancer had immediate reconstruction compared with 38% of women with non-invasive breast cancer.

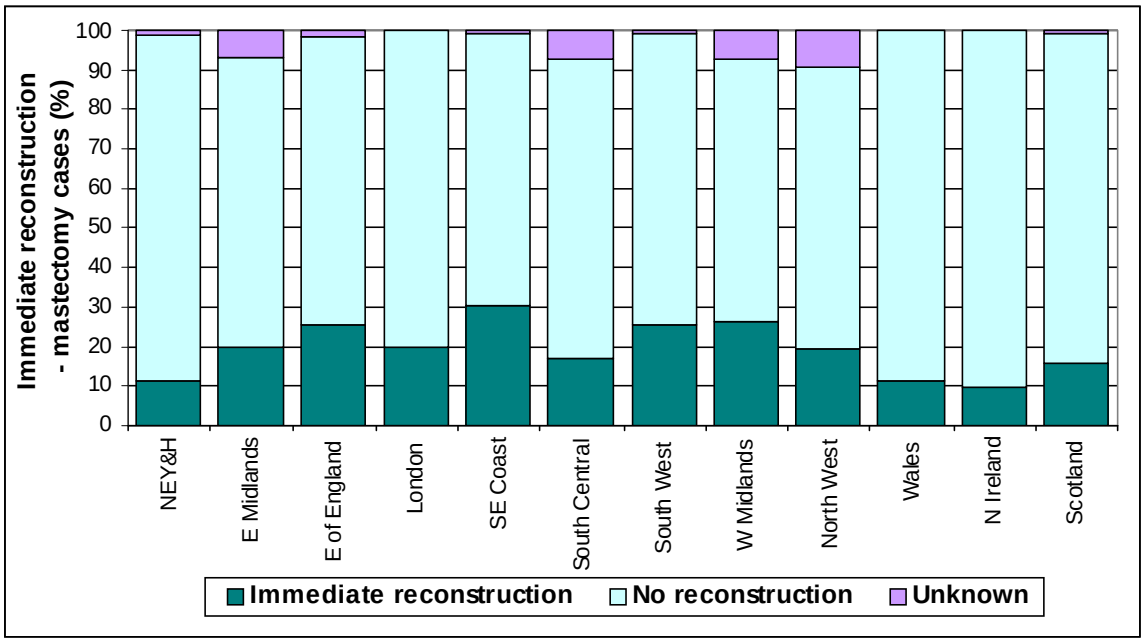

Figure 25 (Table 45): Proportion of cancers having immediate reconstruction

Figure 25 shows how recorded immediate reconstruction rates for all screen-detected cancers treated with mastectomy varied with region in 2009/10. The highest recorded immediate reconstruction rate was in South East Coast (31%) and the lowest in Northern Ireland (9%). In the North West, it was not known whether or not immediate reconstruction was performed in 9% of cases. East Midlands, South Central and West Midlands also had more than 20 cases where it was not known whether or not immediate reconstruction was performed.

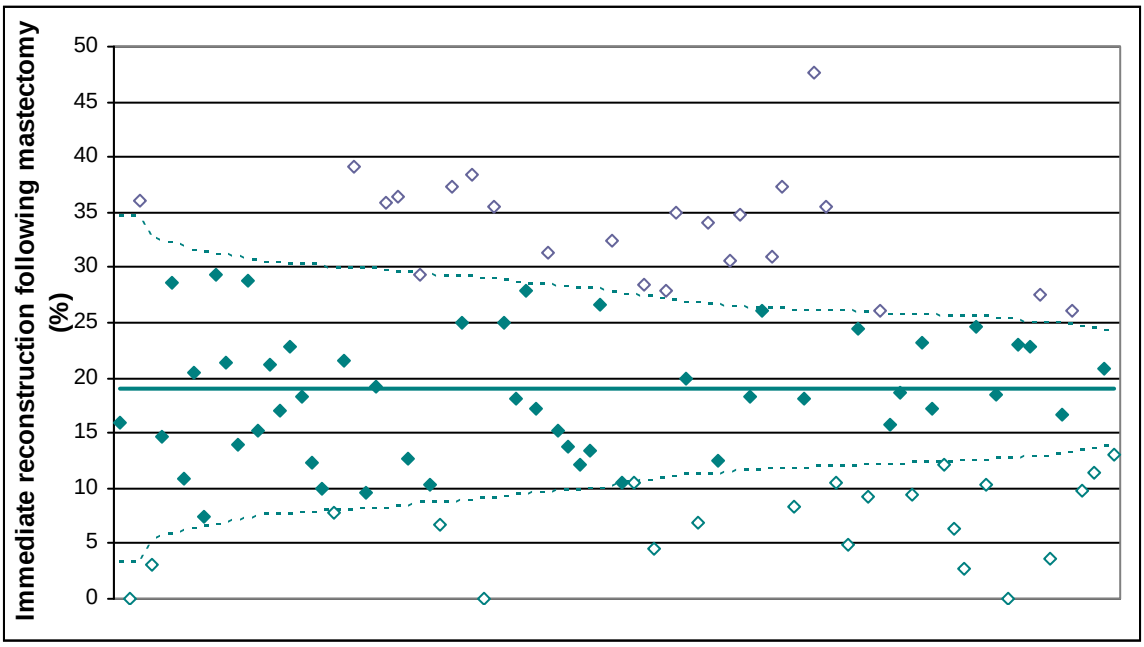

Figure 26: Variation in immediate reconstruction in each screening unit in 2008/09-2009/10 (open diamonds represent units which lie outside the control limits)

Figure 26 demonstrates the variation between screening units in the proportion of cases having immediate reconstruction in the 2-year period 2008/09-2009/10. The two dashed lines are the upper and lower control limits which approximate to the 95% confidence intervals of the average mastectomy rate (solid line). Immediate reconstruction rates which are outside the control limits are significantly higher (23 units) or lower (22 units) than the average rate of 19%. Of the latter 22 units, seven are in North East, Yorkshire & Humber and four in North West. Of these, two in the North West and two in North East, Yorkshire & Humber are also high outliers in Figure 24 and have unusually high mastectomy rates for small (<15mm) invasive cancers.

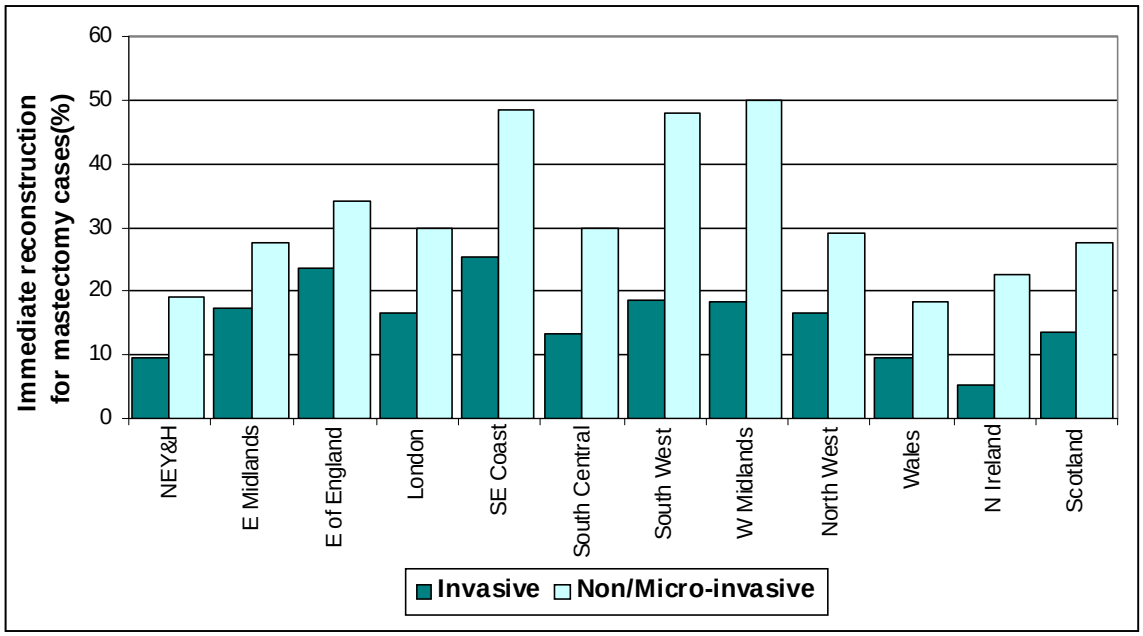

Figure 27: Variation in the proportion of invasive and non/micro-invasive cancers with immediate reconstruction

Figure 27 shows that for invasive cancers treated with mastectomy, immediate reconstruction rates varied from 5% in Northern Ireland to 26% in South East Coast, and that for non/micro-invasive cancers treated with mastectomy, immediate reconstruction rates varied from 18% in Wales to 50% in West Midlands. Figure 28 shows a very wide variation in recorded immediate reconstruction between screening units in 2009/10; with rates ranging from 0 cases in four screening units to over 40% of cases in four units. Immediate reconstruction rates were higher for non/micro-invasive cancers in almost all units (75 units). For invasive cancers, there was no obvious relationship between reported immediate reconstruction rates and whole tumour size.

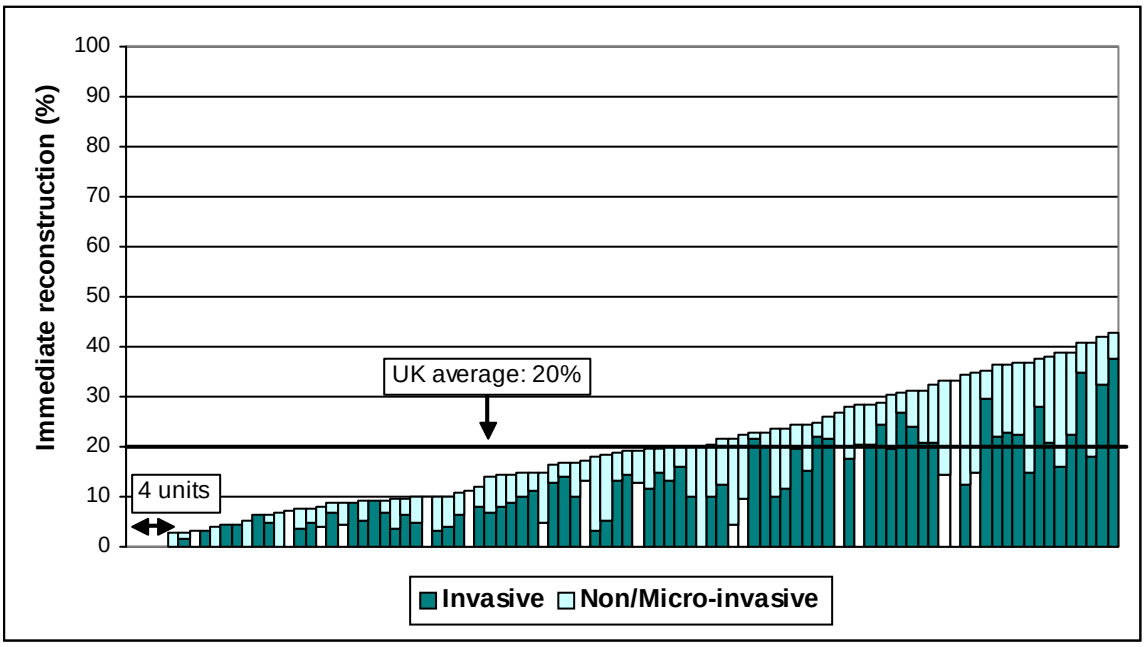

Figure 28: Variation in the proportion of immediate reconstruction in each screening unit. (16 of the 20 smallest units are highlighted in white)

KEY FINDINGS:

- 20% of screen-detected cancers treated with mastectomy were recorded as having immediate reconstruction in 2009/10. This is similar to the 21% immediate reconstruction rate reported in the *National Mastectomy and Breast Reconstruction Audit Third Annual Report, 2010*.
- The highest recorded immediate reconstruction rates for all screen-detected cancers were in South East Coast (31%), and the lowest in Northern Ireland (9%).
- Only 16% of invasive cancers treated with mastectomy were recorded as having immediate reconstruction compared with 33% of non-invasive cancers treated with mastectomy. These rates are similar to the rates of 17% and 38% for invasive and non-invasive cancers reported in the *NMBRA Second Annual Report, 2009.*
- For invasive cancers treated with mastectomy, recorded immediate reconstruction rates varied from 5% in Northern Ireland to 26% in South East Coast. For non/micro-invasive cancers, recorded immediate reconstruction rates varied from 18% in Wales to 50% in West Midlands. Overall recorded immediate reconstruction rates in individual screening units varied from 0 cases in four units to over 40% of cases in four units.

4.4 Neo-adjuvant Therapy

A total of 626 cancer patients received neo-adjuvant therapy in 2009/10 (Table 47). This included 609 (4%) of the 13,672 patients with invasive cancer and 14 patients with non-invasive cancer. Radiological size and core biopsy grade were recorded for cases with neo-adjuvant therapies. Only 57 cases did not have a complete record of all 3 types of neo-adjuvant therapy. 53 of these cases were in one unit in North West and 4 cases were in one unit in London.

243 women with invasive breast cancer (2%) had no surgery. Of these, 119 had neo-adjuvant therapy recorded. This may be because surgery was not planned until the course of neo-adjuvant therapy was completed and as a result the surgery had taken place after the audit cut off date, or because the neo-adjuvant therapy was the only treatment received by the patient. Six units (one each in East of England, London, North East, Yorkshire & Humber and Scotland and two in Wales) had relatively high numbers of patients without surgery. With the exception of the London unit, a high proportion of the cases in these units (between 50% and 86%) that did not have surgery, were recorded as having had neo-adjuvant therapy.

The following table shows how the use of neo-adjuvant therapy varied with age. As with adjuvant chemotherapy, the use of neo-adjuvant chemotherapy was higher in younger patients. The use of neo-adjuvant endocrine therapy was higher for the oldest patients aged at least 71 years; 39% of whom had no surgery recorded, compared to 17% of the patients aged less than 50.

USE OF NEO-ADJUVANT THERAPIES			
Age	*Chemotherapy*	*Herceptin*	*Endocrine therapy*
<50	*3.9%*	*0.3%*	*1.7%*
50 – 64	*2.0%*	*0.1%*	*2.0%*
65 – 70	*1.3%*	*0.1%*	*2.2%*
71+	*0.6%*	*0.1%*	*3.4%*

4.4.1 Neo-adjuvant Chemotherapy

298 cancers (2% of all cancers diagnosed in 2009/10) had neo-adjuvant chemotherapy recorded (Table 48). 296 cancers were invasive, one cancer was non-invasive and for one cancer the invasive status was not known. The proportion of cancers having neo-adjuvant chemotherapy varied between regions from 1% in Wales, Scotland, Northern Ireland, West Midlands and North East Yorkshire & Humber to 3% in North West, South Central and London. 106 (36%), of the invasive cancers with neo-adjuvant chemotherapy recorded had unknown whole tumour size, 116 (39%) had a tumour size of larger than 20mm on mammography and 74 (25%) had a tumour size less than 20mm on mammography. 71% of the 296 invasive cancers were Grade II or III, and 19 cases were Grade I. 98 cases had an abnormal axillary ultrasound result. Six invasive cancers with neo-adjuvant chemotherapy recorded were small (20mm or less), Grade I and were not proven to have abnormal lymph nodes. Regional QA reference centres should ascertain if the data for these cancers and the one non-invasive cancer with neo-adjuvant chemotherapy were recorded correctly.

4.4.2 Neo-adjuvant Herceptin

In the UK as a whole, 17 cases were recorded as having received neo-adjuvant Herceptin, all of which were HER-2 positive invasive cancers (Table 49). Six cases were in North West, and four cases were in London.

4.4.3 Neo-adjuvant Endocrine Therapy

358 cancers (2%) had neo-adjuvant endocrine therapy recorded (Table 50). 343 were invasive cancers, 13 were non-invasive and the invasive status for two cancers was unknown. The proportion of cases receiving neo-adjuvant endocrine therapy varied between regions from 0% in Northern Ireland, South Central and East Midlands to 6% (101 cases) in North West. 330 cancers (92%) with neo-adjuvant endocrine therapy recorded were ER and/or PgR positive, 6% (22 cases) had unknown ER and PgR status and the remaining six cases were ER and PgR negative. It was not known whether the endocrine receptor status was determined from the core biopsy or from resection specimens. Of the 358 cases that had neo-adjuvant endocrine therapy recorded, 78 (22%) had no surgery and 30 (8%) also had other adjuvant therapy. 66% of the cases who received neo-adjuvant endocrine therapy were aged 60 years or over and 28% were in North West.

KEY FINDINGS:

- A total of 626 cancer patients received neo-adjuvant therapy. 609 patients had invasive cancer and 14 patients had non-invasive cancer.
- 243 women with invasive breast cancer (2%) had no surgery. Of these, 119 had neo-adjuvant therapy recorded.
- As with adjuvant chemotherapy, the use of neo-adjuvant chemotherapy was higher in younger patients.
- The use of neo-adjuvant endocrine therapy was higher for the oldest patients aged at least 71 (39% of whom had no surgery recorded) compared to 17% of the patients aged less than 50.
- 17 cancers were recorded as having received neo-adjuvant Herceptin; all were HER-2 positive invasive cancers.
- 358 cancers (2%) had neo-adjuvant endocrine therapy recorded, 330 cancers (92%) with neo-adjuvant endocrine therapy recorded were ER and/or PgR positive, 22 cases had unknown ER and PgR status and the remaining six cases were ER and PgR negative.

CHAPTER 5
WAITING TIMES AND SURGICAL CASELOAD

5.1 Waiting Times

The *NHS Cancer Plan*, which was published in 2000, set out the goal that by 2001 no breast cancer patient in England should wait longer than one month from diagnosis to first treatment, and that by 2002 no patient should wait longer than two months between an urgent referral by their GP for suspected breast cancer and the start of treatment; the only exceptions being if there is a good clinical reason or personal choice.

The *NHS Cancer Plan* (September 2000) cancer waiting time targets:
- **31 days from decision to treat to first treatment**
- **62 days from urgent GP referral to first treatment**

In the 4th Edition of the *NHSBSP Quality Assurance Guidelines for Surgeons in Breast Cancer Screening* published in March 2009, the following waiting time standards were included in an attempt to bring the screening standards in line with those in the *NHS Cancer Plan*.

Quality Objective	**To minimise patient anxiety between a decision that a therapeutic operation is required for cancer and the date for operation**
Outcome Measure	**If surgery is the primary treatment, then patients should be offered a date for surgery within 31 days of the 'decision to treat'. 100% of patients should be admitted for operation within 31 days of the 'decision to treat'.**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

Quality Objective	**To minimise the delay between referral for investigation and first breast cancer treatment.**
Outcome Measure	**If surgery is the primary treatment, then patients should be offered a date for surgery within 62 days of the date of referral. 100% of patients should be admitted for operation within 62 days of the date of referral.**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

As from 1 January 2009, screening cases in England have been included in the new Going Forward on Cancer Waits (GFoCW) cancer waiting time performance monitoring system. In order to monitor performance against the 31 and 62 day standards, the 'date of the last read' of the screening mammogram recorded on the National Breast Screening System (NBSS) has been taken as the 'date of referral'. In GFoCW, instead of a 100% standard with adjustments to allow clock pauses (i.e. periods of time that can be removed from the calculation of how long a patient waited), an unadjusted 31 day standard of 96% has been set for all cancer patients and an unadjusted 62 day standard of 90% has been set for patients with screen-detected breast cancer. These standards are 4% and 10% lower than the 100% standards included in the 4th Edition of the *NHSBSP Quality Assurance Guidelines for Surgeons in Breast Cancer*.

The 'decision to treat date' was not collected for screen-detected cases included in the 2009/10 audit. It is therefore not possible to assess performance against the surgical QA and the GFoCW 31 day standards accurately. However, with the exception of Scotland, the 'date of last read' was collected for the first time in the 2009/10 audit. Waiting time between 'date of last read' and first surgery could thus be calculated and compared with the 62-day waiting time standard.

In the UK as a whole (excluding Scotland), 88% of women had their first surgery within 62 days of the 'date of last read' of the mammogram (Table 51). This is 2% below the 62 day standard of 90%. The proportion of women having their surgery within 62 days varied from 79% in South East Coast to 98% in Northern Ireland. Patients who had a non-operative diagnosis generally waited for a shorter period of time before having their first therapeutic operation than those who did not have a successful non-operative diagnosis. Table 52 shows that 89% of the patients who had a non-operative diagnosis received their first operation within 62 days of the 'date of last read', compared to 77% for those who did not have a successful non-operative diagnosis (Table 53).

One of the reasons for delayed surgery is neo-adjuvant therapy. In the 2009/10 audit, 626 women were recorded as having had neo-adjuvant therapy. If cases with neo-adjuvant therapy are excluded, the proportion of women having their surgery within 62 days increases to 90% for the UK as a whole (excluding Scotland) (Table 54). There is, however considerable variation between regions (Figure 29); from 80% in South East Coast (10% below the national standard) to 94% in East of England and 99% in Northern Ireland.

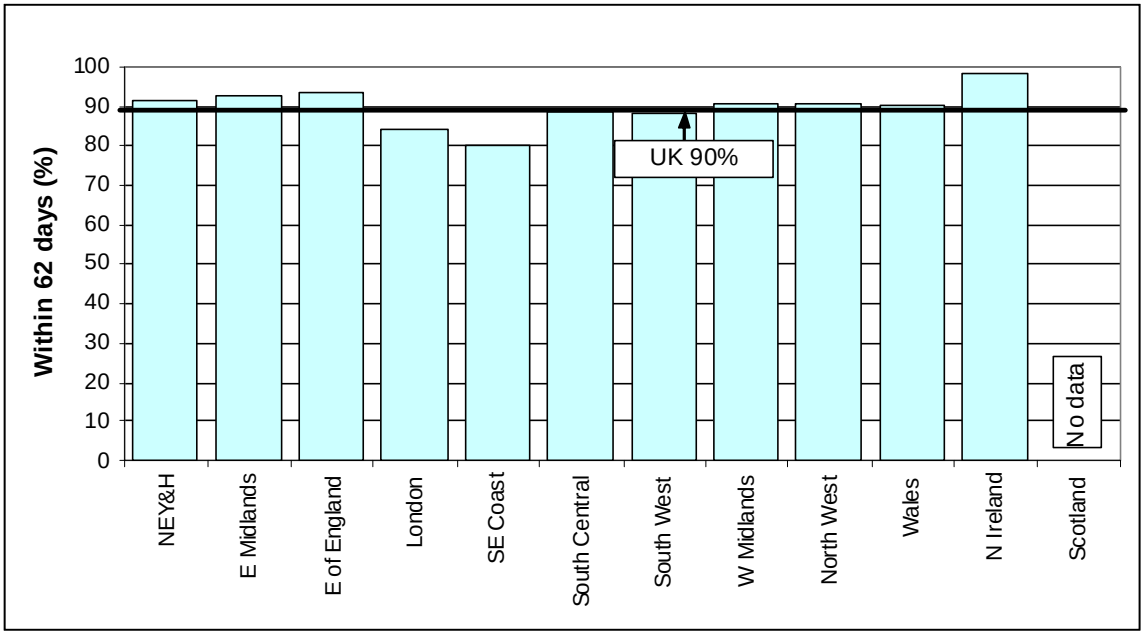

Figure 29 (Tables 54): Percentage of women who did not have neo-adjuvant treatment who had their surgery (therapeutic or diagnostic) within 62 days of last read of mammogram

There was even greater variation between screening units. Figure 30 shows, for cases with a non-operative diagnosis and without neo-adjuvant therapy recorded, the proportion of cases receiving their first therapeutic surgery within 62 days of the 'date of last read'. The dashed line is the lower control limit which approximate to the 95% confidence interval of the average rate (solid line). In one relatively large unit in South East Coast only 63% of women received their first surgery within 62 days. 14 other units also had significantly longer waiting times; falling outside the lower control limit in Figure 30; 2 of these were also in South East Coast, 4 were in London and 3 were in South West. A further 12 units failed to meet the 90% standard; two of these were again from South East Coast. Regional QA reference centres and QA surgeons in England should investigate the reasons that the screening units in their areas failed to meet the national 62 day waiting times standard.

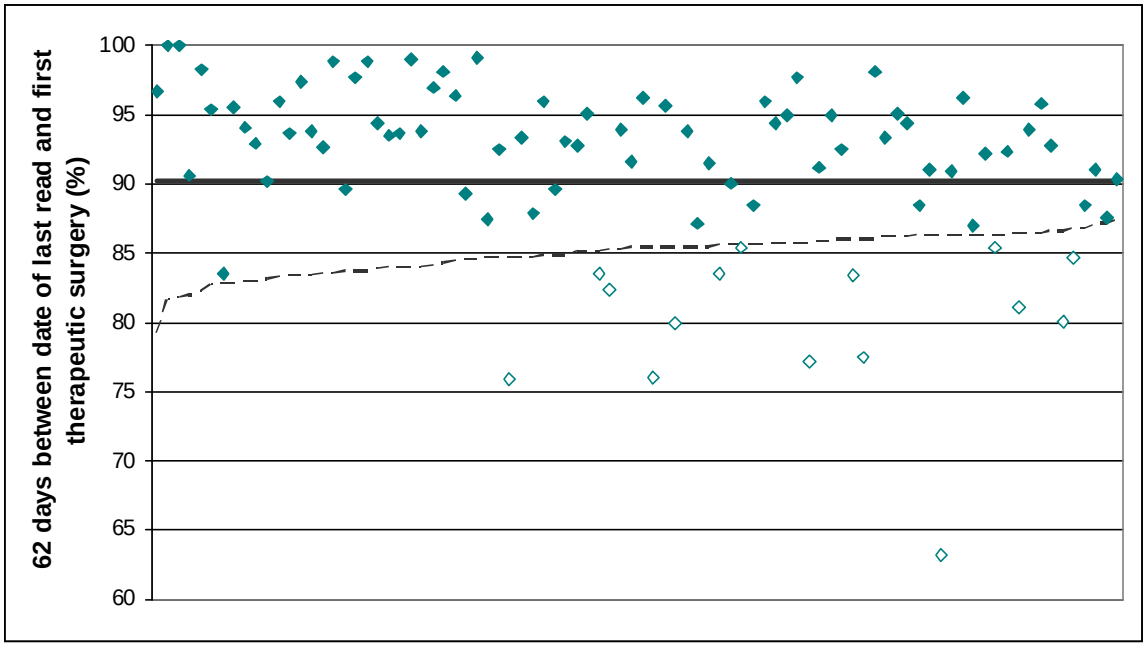

Figure 30: Variation with screening unit in the proportion of women with a non-operative diagnosis who had their first therapeutic surgery within 62 days of the 'date of last read' for their mammogram (cases with neo-adjuvant therapy have been excluded) (open diamonds represent units which lie outside the control limits)

KEY FINDINGS:

- In the UK as a whole (excluding Scotland), 88% of women had their first surgery within 62 days of the 'date of last read' of the mammogram. The proportion of women having their surgery within 62 days varied from 79% in South East Coast to 98% in Northern Ireland.
- Patients who had a non-operative diagnosis generally waited for a shorter period of time before having their first therapeutic operation than those who did not have a successful non-operative diagnosis.
- If cases with neo-adjuvant therapy are excluded, the proportion of women having their surgery within 62 days increases to 90%. There is, however considerable variation between regions; from 80% in South East Coast (10% below the national standard) to 94% in East of England and 99% in Northern Ireland.
- There was even greater variation between screening units. 15 units had significantly longer waiting times than the UK average of 90% and a further 12 units failed to meet the 90% minimum standard in 2009/10. In one relatively large unit in South East Coast only 63% of women received their first surgery within 62 days. Regional QA reference centres and QA surgeons in England should investigate the reasons that the screening units in their areas failed to meet the national 62 day waiting times standard.

5.2 Surgical Caseload

Quality Objective	**To ensure specialist surgical care**
Outcome Measure	**Breast cancer surgery should be performed only by surgeons with a specialist interest in breast disease (defined as at least 30 surgically treated cases per annum [screening and symptomatic]). Each surgeon involved in the NHSBSP should maintain a surgical caseload of at least 10 screen-detected cancers per year averaged over a three year period.**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

There were 544 consultant breast surgeons working in the UK NHSBSP in 2009/10. This UK figure counts only once the 60 surgeons who worked in more than one region. Throughout this section, each surgeon is credited with their total UK screening caseload. Surgeons who share cases are each credited with the case. 492 of the 544 consultant surgeons were identified by their unique GMC registration code. A code other than the GMC code was provided for a further 48 surgeons from Scotland. Data for the remaining 4 unidentified surgeons have been assumed to be for 4 individual surgeons, 1 of which was from overseas. It should be noted that currently, only the responsible consultant and not necessarily the surgeon who actually undertakes the operation is recorded on the NBSS. This means that the caseload for some surgeons will include patients operated on by associate specialists or supervised trainees.

The following summary table shows that the proportion of women managed or treated by surgeons with a screening caseload of 20 or more has increased from 86% in 2000/01 to 91% to 93% from 2004/05 onwards. In 2009/10, 81% women were treated by surgeons with an annual caseload of more than 30 screen-detected cancers and 3% (466) were treated by surgeons with an annual caseload of less than 10 screen-detected cancers (Table 57). Combining the data submitted for 2007/08, 2008/09 and 2009/10 NHSBSP/ABS audits, an annual average screening caseload can be calculated for 558 consultant surgeons who managed or treated patients with screen-detected cancers (Table 58). Of these, 188 (34%) had an annual average caseload of less than 10 cases and 4 treated an average of at least 100 cases per year. 58 of the low caseload surgeons reported an annual symptomatic caseload in excess of 30 cases, 25 joined or left the NHSBSP during the three year period, 35 were surgeons from another region and 25 were plastic surgeons. 17 low caseload surgeons operated on patients privately (13 in London) and for 23 no information was available (Table 59).

10 YEAR SUMMARY : SCREENING SURGICAL CASELOAD

Year of data collection	*Number of screening surgeons*	*Median screening caseload*	*Proportion of women treated by a surgeon with screening caseload 20+ (%)*	*Number of surgeons with screening caseload <10*	*Number of surgeons with no information to explain screening caseload <10*
2000/01	*419*	*17*	*86*	*159*	*25*
2001/02	*439*	*18*	*85*	*156*	*52*
2002/03	*472*	*18*	*86*	*174*	*55*
2003/04	*481*	*19*	*89*	*161*	*15*
*2004/05**	*484*	*20*	*91*	*151*	*10*
2005/06	*511*	*23*	*93*	*149*	*11*
2006/07	*559*	*22*	*91*	*186*	*16*
2007/08	*526*	*29.5*	*92*	*142*	*6*
2008/09	*549*	*27*	*92*	*149*	*4*
2009/10	*544*	*29*	*92*	*138*	*6*

*Data for 2 units from East of England are absent in 2004/05

The variation in screening surgical caseload in each region in 2009/10 is shown in Figure 31. The 60 surgeons working in more than one region appear in each region's figures. 255 surgeons (47%) treated 30-99 cases. 76 surgeons (14%) treated 20-29 screening cases and 69 (13%) treated 10-19 screening cases. 138 surgeons (25%) had a screening caseload of fewer than 10 cases. The highest proportions of surgeons with a screening caseload of fewer than 10 cases were in South East Coast (44%) and London (49%). Surgical specialisation was most advanced in South West and Northern Ireland and in Wales where only 21% and 22% of surgeons respectively treated fewer than 10 screening cases. Table 61 shows that the highest median surgical caseload was in Wales (47 cases) and the lowest in London (11 cases). The highest caseload for a single surgeon was in Scotland, where one surgeon was clinically responsible for 181 cases. Five other surgeons had a screening caseload of at least 100 cases in 2009/10.

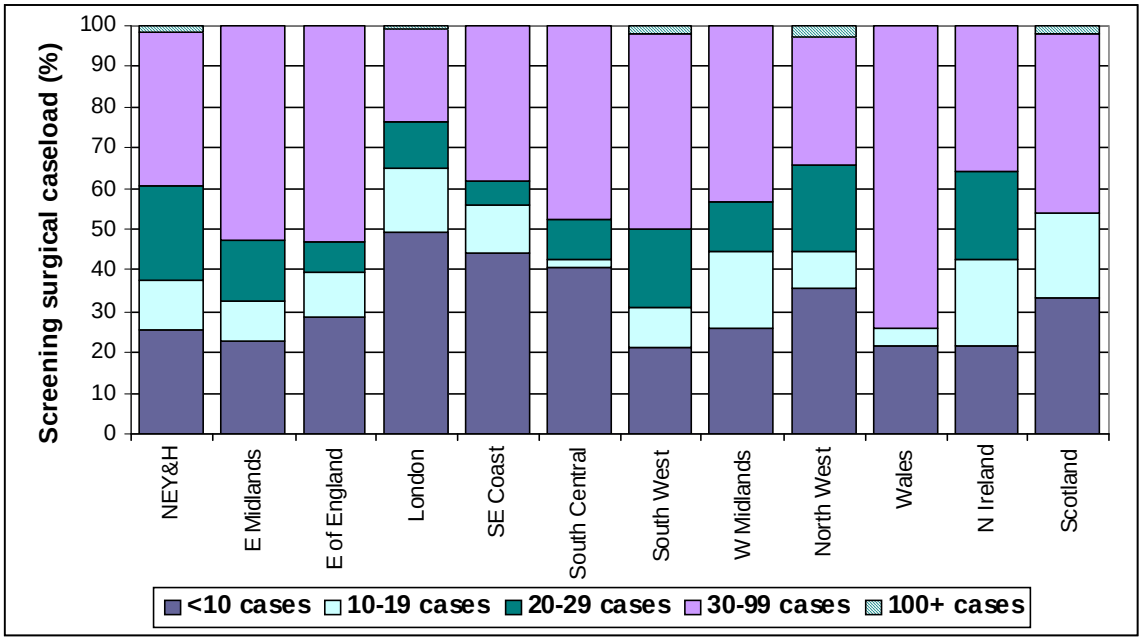

Figure 31 (Table 60): Variation in screening surgical caseload expressed as number of cases per surgeon

Table 62 shows the number of women treated in 2009/10 by 1, 2, 3 or more surgeons and those with no referral to a consultant surgeon. Of the 17,013 screen-detected cases included in the audit, the majority (99%) were recorded under one consultant surgeon, 131 (1%) were recorded under 2 surgeons and 108 had no consultant surgeon recorded.

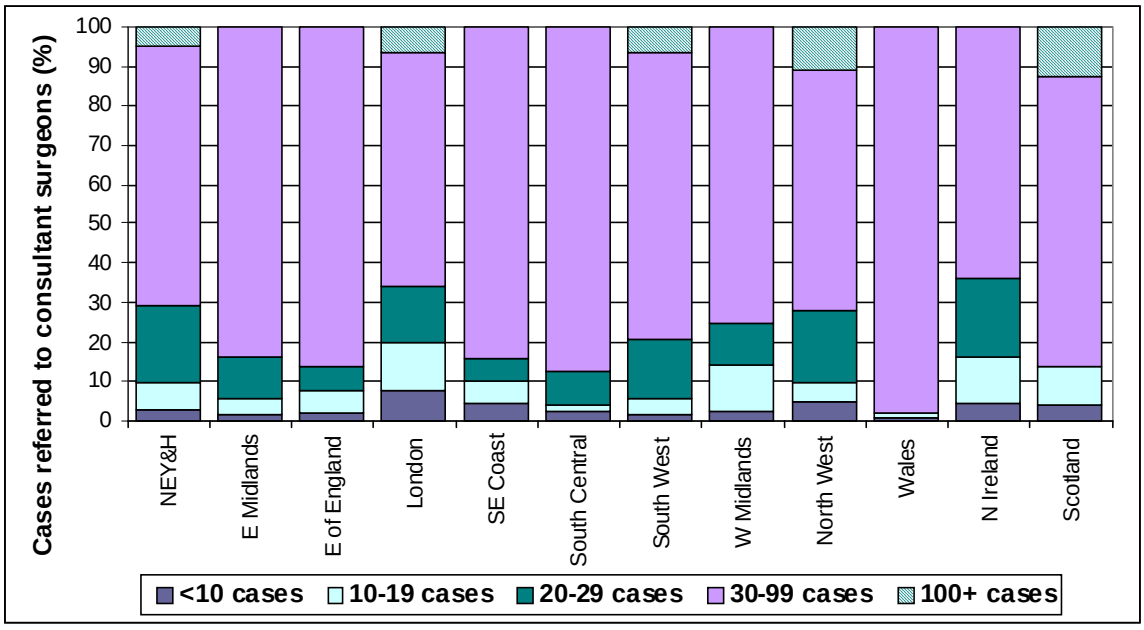

Figure 32 (Table 57): Variation in the proportion of women treated by surgeons with differing screening caseloads

Figure 32 shows the variation in the proportion of women treated by surgeons with differing screening caseloads in 2009/10. Of the 16,905 women who were under the care of a consultant surgeon, 700 (4%) were treated by 6 surgeons with a screening caseload of 100 cases or more. A further 13,005 women (76%) were treated by a surgeon with a screening caseload of 30-99 cases. In Wales, 98% of women were treated by a surgeon with a screening caseload of 30-99 cases. In the UK as a whole, 466 women (3%) were treated by a surgeon with a screening caseload of fewer than 10 cases. 126 (27%) of these women were in London.

A list of 6 possible reasons was provided to explain why surgeons had a screening caseload of fewer than 10 cases (see Appendix B). If multiple reasons were given, only one was included. The reasons

given to explain caseloads of fewer than 10 cases are shown in Figure 33. Of the 138 surgeons in the UK with a screening caseload of fewer than 10 cases in 2009/10, 45 (33%) treated more than 30 symptomatic breast cancers during this period and 19 (14%) either joined or left the NHSBSP in 2009/10. Other reasons (plastic surgeon, private practice, surgeons from other region) were given for 52 surgeons (38%). 11 of the 13 surgeons who had a screening caseload of less than 10 cases because they were in private practice were in London.

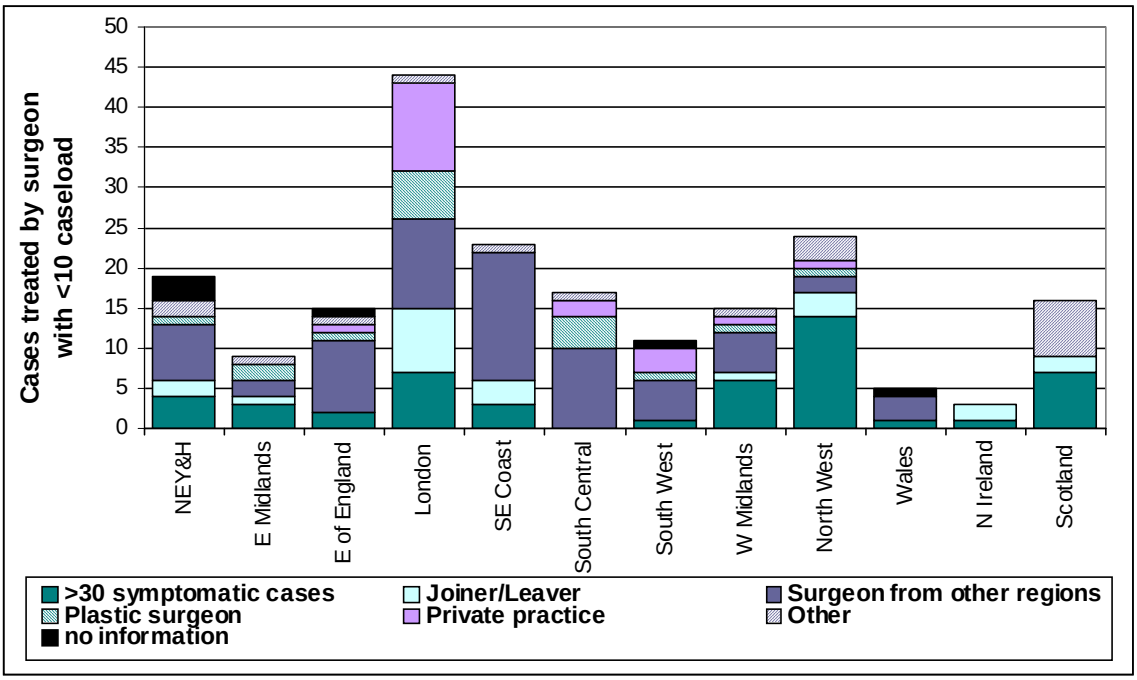

Figure 33 (Table 63): Explanations provided for surgeons treating fewer than 10 screening cases in 2009/10

For 16 surgeons who treated a total of 56 women, a reason other than one of the 6 listed was given. These were: patient choice, locum surgeon, long term sick leave, not screening in the area during 2009/10. There was no information to explain the low screening caseload recorded for 6 surgeons who treated a total of 15 women. Three of these surgeons were in North East, Yorkshire & Humber. Regional QA reference centres and regional surgical QA co-ordinators should ensure that all screening cases treated by low caseload surgeons have received satisfactory treatment.

KEY FINDINGS:

- There were 544 consultant breast surgeons working in the UK NHSBSP in 2009/10.
- 92% of women were treated by a surgeon with a screening caseload of at least 20 cases.
- Of the 138 surgeons with screening caseload of less than 10 cases, 33% treated more than 30 symptomatic breast cancers. 11 of the 13 surgeons who had a screening caseload of less than 10 because of private practice were in London.
- Information was unavailable to explain the low caseload of 6 surgeons treating a total of 15 women. Three of these surgeons were in North East, Yorkshire & Humber. Regional QA reference centres and regional surgical QA co-ordinators should ensure that all screening cases treated by low caseload surgeons have received satisfactory treatment.
- Combining the data submitted for the past three audit years, 188 surgeons (34%) had an annual average caseload of less than 10 cases and 4 treated an average of at least 100 cases per year.
- Currently, only the responsible consultant and not necessarily the surgeon who actually undertakes the operation is recorded on the NBSS. The caseload for some surgeons will thus include patients operated on by associate specialists or supervised trainees.

CHAPTER 6
REPEAT OPERATIONS

6.1 Repeat Operations

Details of each operation were requested so that the reasons for repeat operations could be examined. All operations, both diagnostic and therapeutic, were coded as either breast conserving surgery alone (Cons), mastectomy alone (Mx), axillary surgery alone (Ax) or a combination (e.g. Cons & Ax, Mx & Ax). Diagnostic open biopsies were coded as breast conserving surgery. For a cancer without a non-operative diagnosis by C5 cytology or B5 core biopsy, the first operation was defined to be diagnostic even if there was also therapeutic intent. The number of therapeutic operations is thus one fewer than the total number of operations and the number of therapeutic operations is counted from the second operation. The number of therapeutic operations for cases with a non-operative diagnosis is the same as the total number of operations. It should also be noted that attempting axillary surgery does not necessarily mean that axillary lymph nodes are successfully harvested. Conversely, incidental axillary lymph nodes can be obtained during a mastectomy or breast conserving surgery procedure.

In the UK as a whole, 4,118 (25%) of the 16,727 surgically treated patients underwent more than one operation. 3,183 patients with invasive cancers (24%) and 935 patients with non/micro-invasive cancers (28%) underwent more than one operation. Figure 34 shows how repeat operation rates for patients who had invasive and non/micro-invasive breast cancers varied between regions. The highest repeat operation rates for non/micro-invasive cancers were in Wales and West Midlands (35%) and the highest repeat operation rate for invasive cancers was in South West (27%).

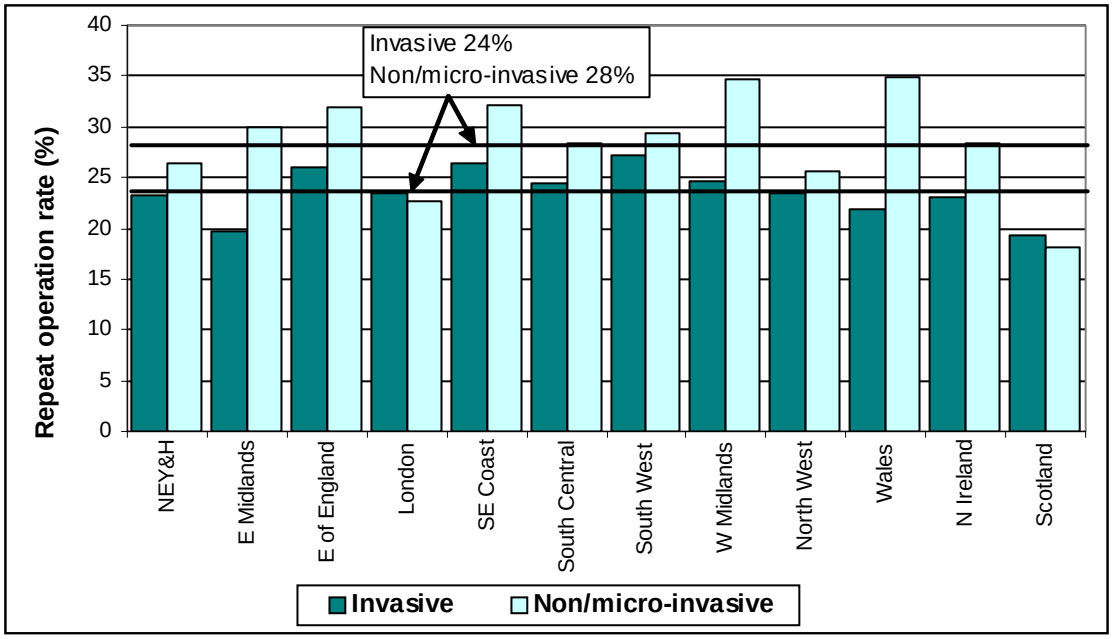

Figure 34 (Table 65): Proportions of surgically treated invasive and non-invasive cancers undergoing two or more operations

Table 64 shows the repeat operation rates in each region for the 742 surgically treated cancers (with known invasive status) that did not have a non-operative diagnosis. Although the overall repeat operation rate for these cancers was 56% (416 cases), repeat operations for cancers without a non-operative diagnosis formed only 10% of the total repeat operations. Of the 221 invasive cancers without a non-operative diagnosis, 86% had a repeat operation. This varied from 70% in London to 100% in North East, Yorkshire & Humber, South East Coast, Wales and Northern Ireland. Only 44% of the 521 non/micro-invasive cancers without a non-operative diagnosis had a repeat operation. This varied from 24% in Scotland to 62% in Wales.

Of the remaining 327 surgically treated cancers without a non-operative diagnosis, 8 had a mastectomy as their diagnostic/final operation (no further surgery possible). A further 319 had breast conserving surgery as their diagnostic/final surgery; 252 (79%) of these had clear margins (tumour removed no further operation), and 67 had involved or unknown margin status. Of these 67 cases, 32 (48%) had LCIS only (therefore no further surgery). 35 were not LCIS and had no further surgery despite the margins being involved or of unknown status. 19 (54%) of these cases were in Scotland. Regional QA reference centres should audit cases where no repeat operation appears to have been undertaken for cases with involved margins or with unknown margin status.

6.2 Repeat Therapeutic Operations

Quality Objective	**To minimise the number of therapeutic operations in women undergoing conservation surgery for an invasive cancer or DCIS**
Minimum Standard	**>95% of women should have three or fewer operations**
Target Standard	**100% of women should have three or fewer operations**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

Of the 16,727 surgically treated cancers, 3,702 (22%) cancers with a non-operative diagnosis underwent more than one therapeutic operation, 3% less than the repeat operation rate for all cancers. 2,994 (23%) invasive cancers with a non-operative diagnosis and 708 (25%) non/micro-invasive cancers with a non-operative diagnosis underwent more than one therapeutic operation.

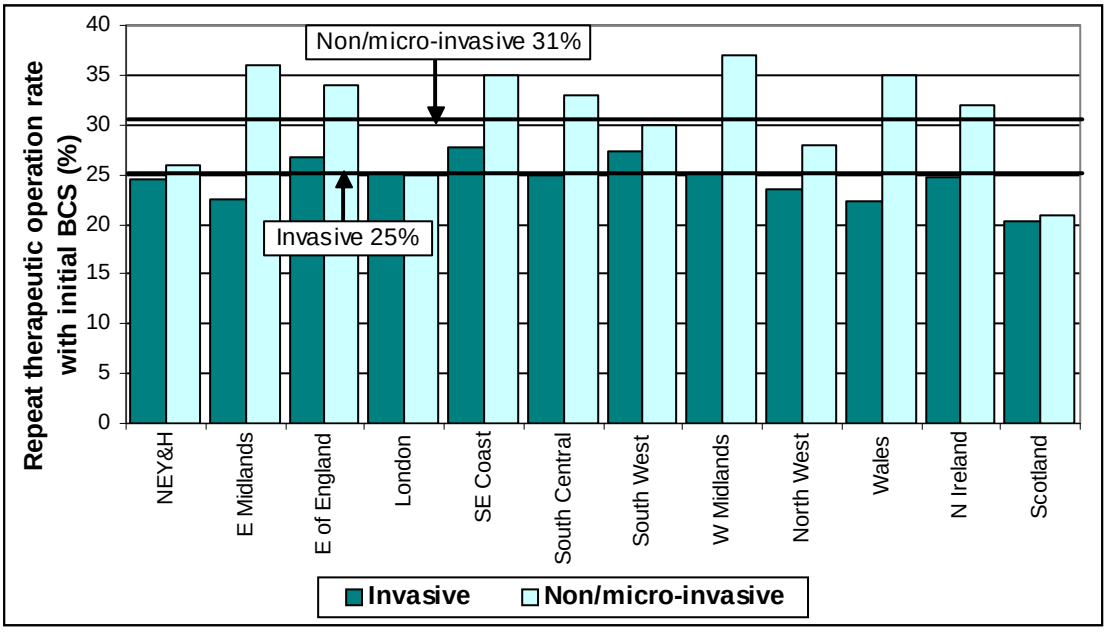

Figure 35 (Tables 66 & 67): Proportions of invasive and non/micro-invasive cancers undergoing two or more operations after initial therapeutic breast conserving surgery (BCS)

Of the 13,451 invasive cancers with a non-operative diagnosis, 10,522 were initially treated by therapeutic breast conserving surgery. Of these, 25% had repeat therapeutic operations (Figure 35). 192 cases had three operations and 22 cases had more than three operations. Of the 2,135 non/micro-invasive cancers with a non-operative diagnosis and initially treated by therapeutic breast conserving surgery, 31% had repeat therapeutic operations. 70 had three operations and 15 had more than three operations. Regional QA reference centres and regional surgical QA co-ordinators should audit the 37 cases which had more than three therapeutic operations to ascertain the reason for this unusual practice. 10 of these cases were in South East Coast and 7 were in a single unit within this region.

Figure 36 shows how the proportion of cases with a non-operative diagnosis undergoing repeat breast conserving surgery or mastectomy after initial therapeutic breast conserving surgery varied between surgeons during the 3-year period 2007/08-2009/10. Surgeons who initially treated fewer than 20 cases with breast conserving surgery over the 3-year period are shaded. Overall, 20% of cases with initial therapeutic breast conserving surgery had one or more repeat therapeutic operations (breast conserving surgery or mastectomy). Of the 470 surgeons, 386 had 20 or more cases with initial breast conserving surgery. 40 of these surgeons had a repeat therapeutic operation rate above the 95% upper control limit and 36 had a rate under the 95% lower control limit. Regional QA reference centres and regional surgical QA co-ordinators should audit the work of these surgeons to ascertain the reasons for this unusual practice.

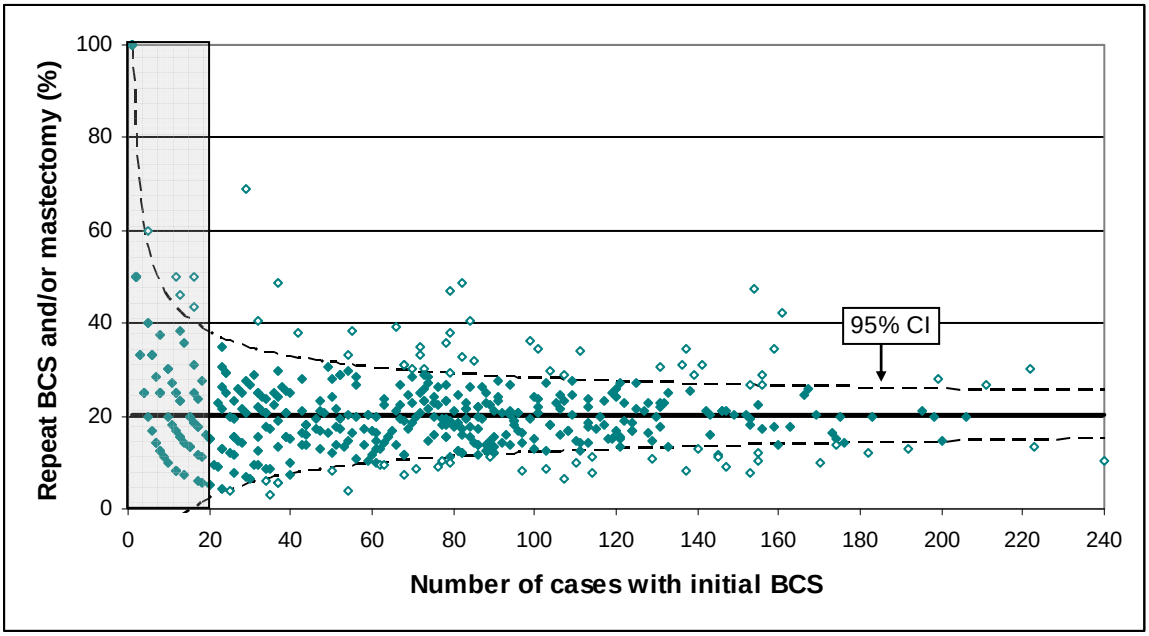

Figure 36: Variation between surgeons in the proportion of cases initially treated with breast conserving surgery (BCS) that underwent repeat operations (only patients treated by 1 surgeon included) in the 3-year period 2007/08-2009/10 Data for Scotland are not included
(open diamonds represent units which lie outside the control limits)

KEY FINDINGS:

- 4,118 patients (25%) had more than one operation. 3,183 patients with invasive cancer (24%) and 935 patients with non/micro-invasive cancer (28%) had more than one operation.
- 86% of invasive cancers and 44% of non/micro-invasive cancers without a non-operative diagnosis had a repeat operation. Although the overall repeat operation rate for the 742 surgically treated cancers (with known invasive status) without a non-operative diagnosis was 56%, repeat operations for cancers without a non-operative diagnosis formed only 10% of the total repeat operations.
- 35 cancers without a non-operative diagnosis, which were not LCIS, had no further surgery despite the margins being involved or of unknown status. 19 (54%) of these were in Scotland. Regional QA reference centres should audit cases where no repeat operation appears to have been undertaken for cases with involved margins or with unknown margin status.
- 25% of invasive cancers and 30% of non/micro-invasive cancers with a non-operative diagnosis had a repeat operation.
- 76 surgeons had unusually high or low repeat therapeutic operation rates in the 3-year period 2007/08-2009/10. Regional QA reference centres and regional surgical QA co-ordinators should audit the work of these surgeons to ascertain the reasons for their atypical practice.

6.3 Type and Sequence of Therapeutic Operations

The reasons for repeat therapeutic operations for cancers with a non-operative diagnosis vary with the invasive status predicted by the non-operative diagnosis. The following hypothetical scenarios could result in a requirement for a repeat therapeutic operation to the breast.

Scenario 1 : Margins not clear for the expected tumour component (invasive or non-invasive)
- repeat operation (breast conserving surgery or mastectomy) to clear involved margin(s)

Scenario 2 : Margins not clear because of an unexpected tumour component (invasive or non-invasive) and a repeat operation (breast conserving surgery or mastectomy) undertaken to clear involved margin(s)
- multi-focal invasive or non-invasive cancer present
- small cancers with a B5b (Invasive) non-operative diagnosis found after surgery to have DCIS present which reaches the excision margin(s)

Scenario 3 : Re-excision to improve cosmesis

The following hypothetical scenarios could result in a requirement for a repeat operation involving the axilla. These are dealt with briefly in this chapter and in more detail in Chapter 7.

Scenario 4 : Invasion present which was not predicted by the non-operative diagnosis and a repeat operation is undertaken to obtain axillary lymph nodes
- cancers with a B5a (Non-invasive) non-operative diagnosis found to be invasive after surgery where nodes were not taken at first operation
- cancers with a C5 diagnosis where the invasive status could not be predicted and where nodes were not taken at the first operation in line with local protocol

Scenario 5 : Additional therapeutic nodal procedure(s)
- insufficient number of nodes harvested at first operation
- therapeutic clearance of nodes when a number of the nodes taken at the first operation are positive
- clearance of nodes following a positive sentinel lymph node biopsy procedure

Repeat operation rates for various groups of screen-detected breast cancers with differing non-operative diagnoses are presented in flow charts which show the number and proportion of the different types and sequences of therapeutic operations undertaken in the UK as a whole. Figure 37 shows the flow chart for cancers with a B5b (Invasive) core biopsy, Figure 38 for cancers with C5 cytology only, Figure 39 for non/micro-invasive cancers with a B5a (Non-invasive) core biopsy and Figure 40 for cancers with a B5a (Non-invasive) core biopsy which were found to be invasive at surgery. Each flow chart shows the type of surgery performed at the first, second, third or, in rare cases, fourth operation.

99% of cancers with a B5b (Invasive) core biopsy result proved to be invasive following therapeutic surgery (Table 9). The therapeutic surgery can thus be planned in advance and these cases are least likely to require a repeat therapeutic operation. Of the 157 B5b (Invasive) cancers with a first operation involving only the axilla (Figure 37), 128 (82%) used a SLNB procedure and for 2 of the 19 cases where the only operation was to the axilla, a SLNB procedure was used. 7 of these 19 cases had neo-adjuvant therapy. 116 (74%) B5b (Invasive) cancers had a subsequent mastectomy and 70 (60%) had an immediate reconstruction recorded. It is probable that the latter had axillary surgery to test for positive nodes.

94% of surgically treated cancers with C5 cytology only and no B5 core biopsy proved to be invasive after surgery (Table 10). For these cancers, where the invasive status cannot be distinguished microscopically, radiological or clinical features are of increased importance when planning the therapeutic operation. Overall, 77% of surgically treated cancers with a B5a (Non-invasive) core biopsy

result were confirmed following surgery to be non-invasive or micro-invasive and 20% were identified as having invasive disease (Table 8). There was, however, wide variation between screening units; the proportion of cancers with a B5a (Non-invasive) core biopsy found to be invasive after surgery varying between 0% and 50% (Figure 7 in Chapter 2).

The following summary table shows the regional variation in repeat therapeutic operation rates for cancers with each type of non-operative diagnosis. The data in this and all other summary tables in this chapter exclude the 243 cancers with a B5b (Invasive) core biopsy for which the invasive status was not confirmed after surgery (see Figure 37), and the 117 cancers with a B5a (Non-invasive) core biopsy which had no tumour in the surgical resection specimen or had unknown invasive status at surgery (see Figure 39).

REPEAT THERAPEUTIC OPERATION RATES

	Invasive cancers						***Non-invasive or micro-invasive cancers***	
	B5b (Table 68)		***C5 only, no B5*** *(Table 69)*		***B5a*** *(Table 70)*		***B5a*** *(Table 71)*	
Region	***No.***	*%*	***No.***	***%***	***No.***	***%***	***No.***	***%***
N East, Yorks & Humber	*333*	*21*	*3*	*38*	*48*	*68*	*79*	*23*
East Midlands	*154*	*17*	*0*	*0*	*30*	*53*	*57*	*26*
East of England	*265*	*23*	*4*	*50*	*45*	*61*	*83*	*31*
London	*249*	*21*	*0*	*0*	*35*	*53*	*59*	*20*
South East Coast	*231*	*23*	*0*	*0*	*33*	*50*	*71*	*30*
South Central	*178*	*21*	*2*	*15*	*25*	*54*	*36*	*24*
South West	*281*	*24*	*3*	*16*	*40*	*63*	*67*	*27*
West Midlands	*233*	*21*	*2*	*25*	*43*	*67*	*78*	*32*
North West	*238*	*19*	*21*	*24*	*52*	*59*	*66*	*23*
Wales	*130*	*18*	*0*	*0*	*25*	*61*	*53*	*30*
Northern Ireland	*50*	*19*	*4*	*11*	*16*	*80*	*15*	*25*
Scotland	*190*	*17*	*0*	*0*	*19*	*53*	*31*	*17*
United Kingdom	***2532***	***21***	***39***	***19***	***411***	***59***	***695***	***26***

Shaded if 5% or more above the value for the UK as a whole and more than one cancer is included

Invasive cancers with a C5 cytology only diagnosis had the lowest proportion of repeat operations (19%). Of the 39 invasive cancers with a C5 cytology only and repeat operations, 21 (54%) were in North West. Invasive cancers with a B5b core biopsy had a repeat operation rate of 21%. This varied from 17% in East Midlands and Scotland to 24% in South West. Non/micro-invasive cancers with a B5a (Non-invasive) core biopsy had a repeat operation rate of 26%. This varied from 17% in Scotland to 32% in West Midlands and 31% in East of England. Invasive cancers with a B5a (Non-invasive) core biopsy had the highest repeat operation rate (59%). This varied from 50% in South East Coast to 80% in Northern Ireland. Repeat operation rates in 2009/10 are generally 1-2% higher than those in 2008/09, but repeat operation rates for invasive cancers with C5 cytology only have decreased by 1%.

KEY FINDINGS:

- Invasive cancers with a C5 cytology only diagnosis had the lowest repeat operation rate (19%).
- Invasive cancers with a B5b core biopsy had a repeat operation rate of 21%.
- Non/micro-invasive cancers with a B5a (Non-invasive) core biopsy had a repeat operation rate of 26%.
- Invasive cancers with a B5a (Non-invasive) core biopsy had the highest repeat operation rate (59%).

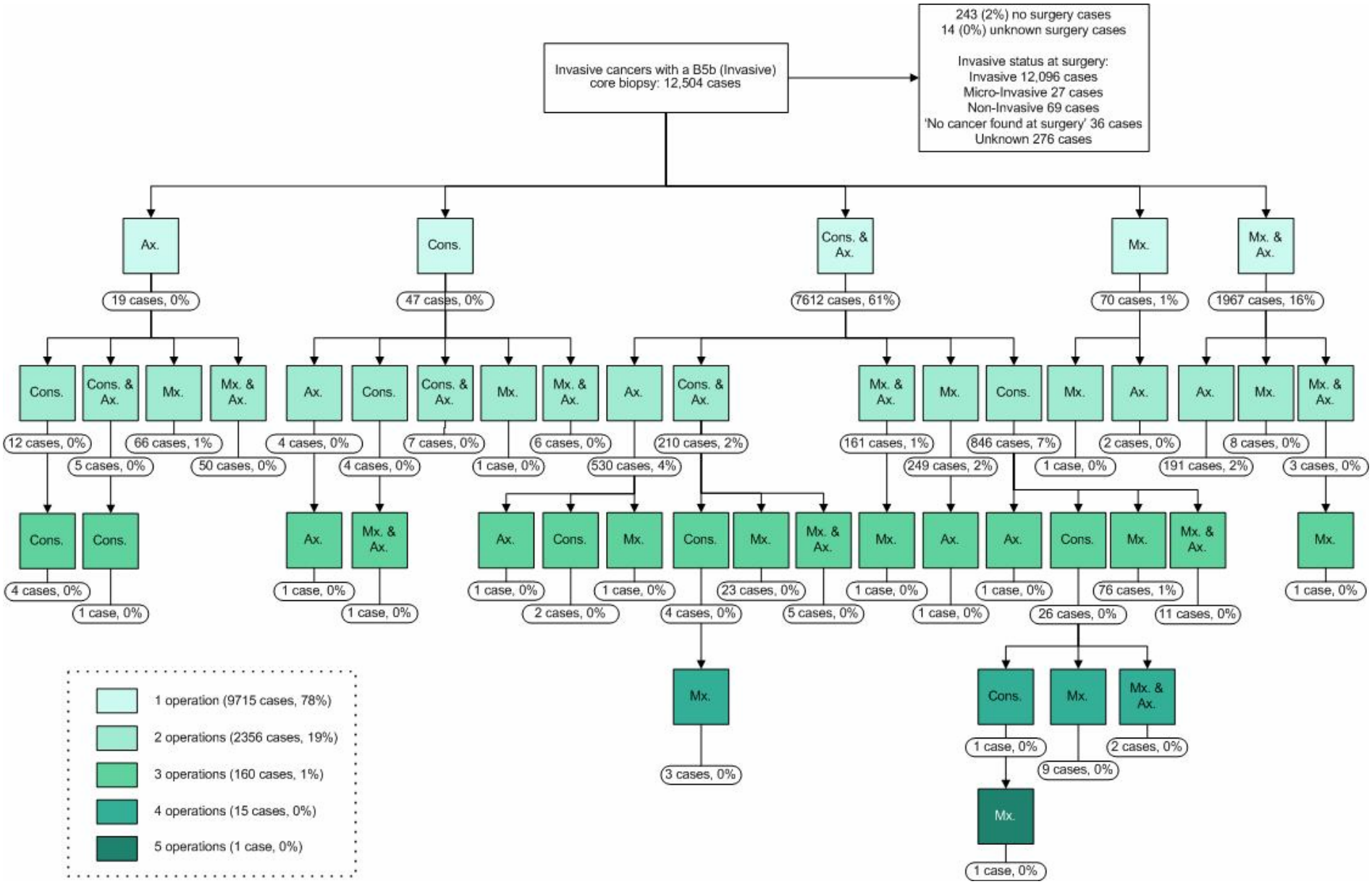

Figure 37: Sequence of operations for Invasive cancers with a B5b (Invasive) core biopsy

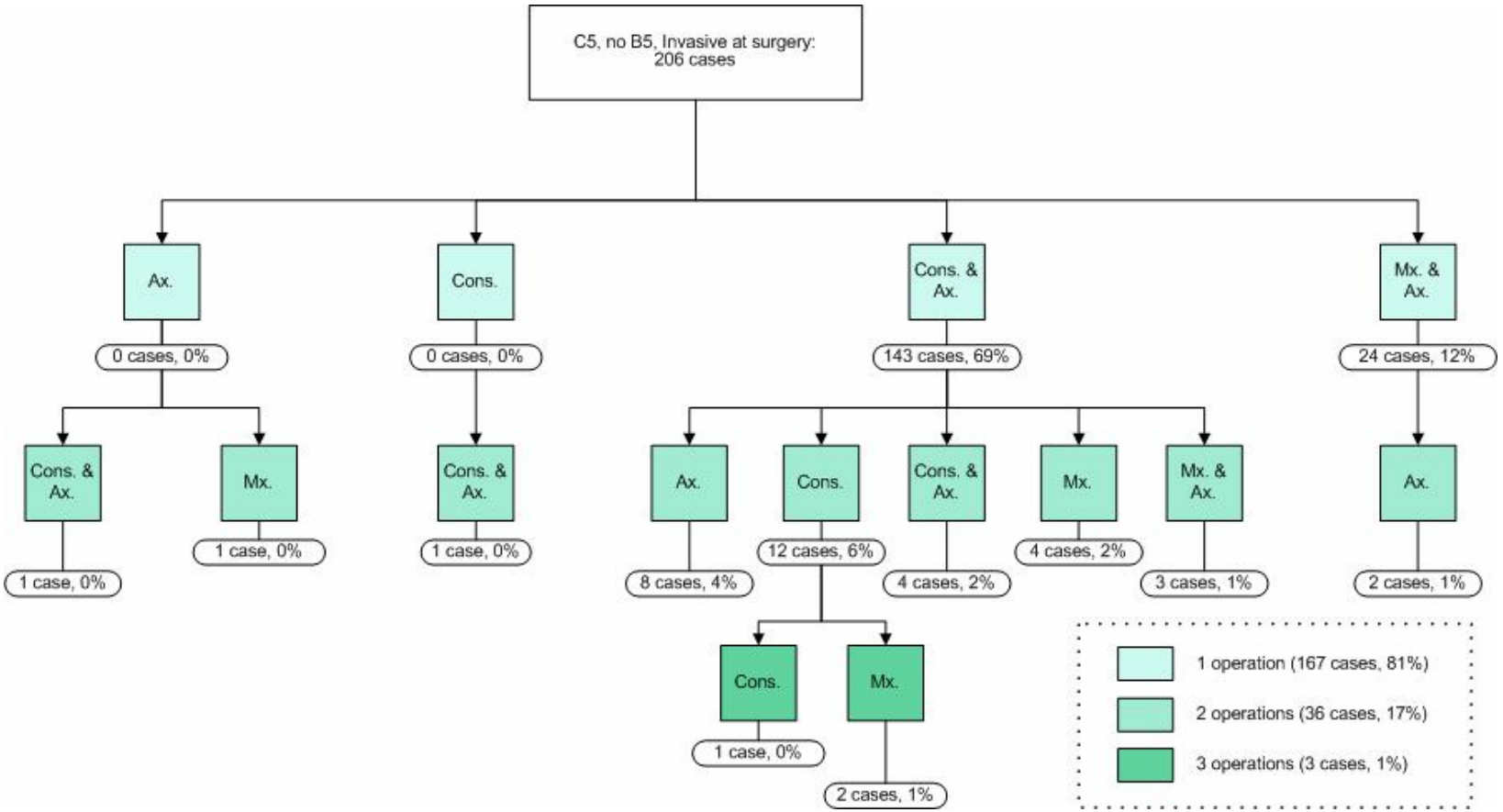

Figure 38: Sequence of operations for invasive cancers with C5 Cytology only, no B5 core biopsy

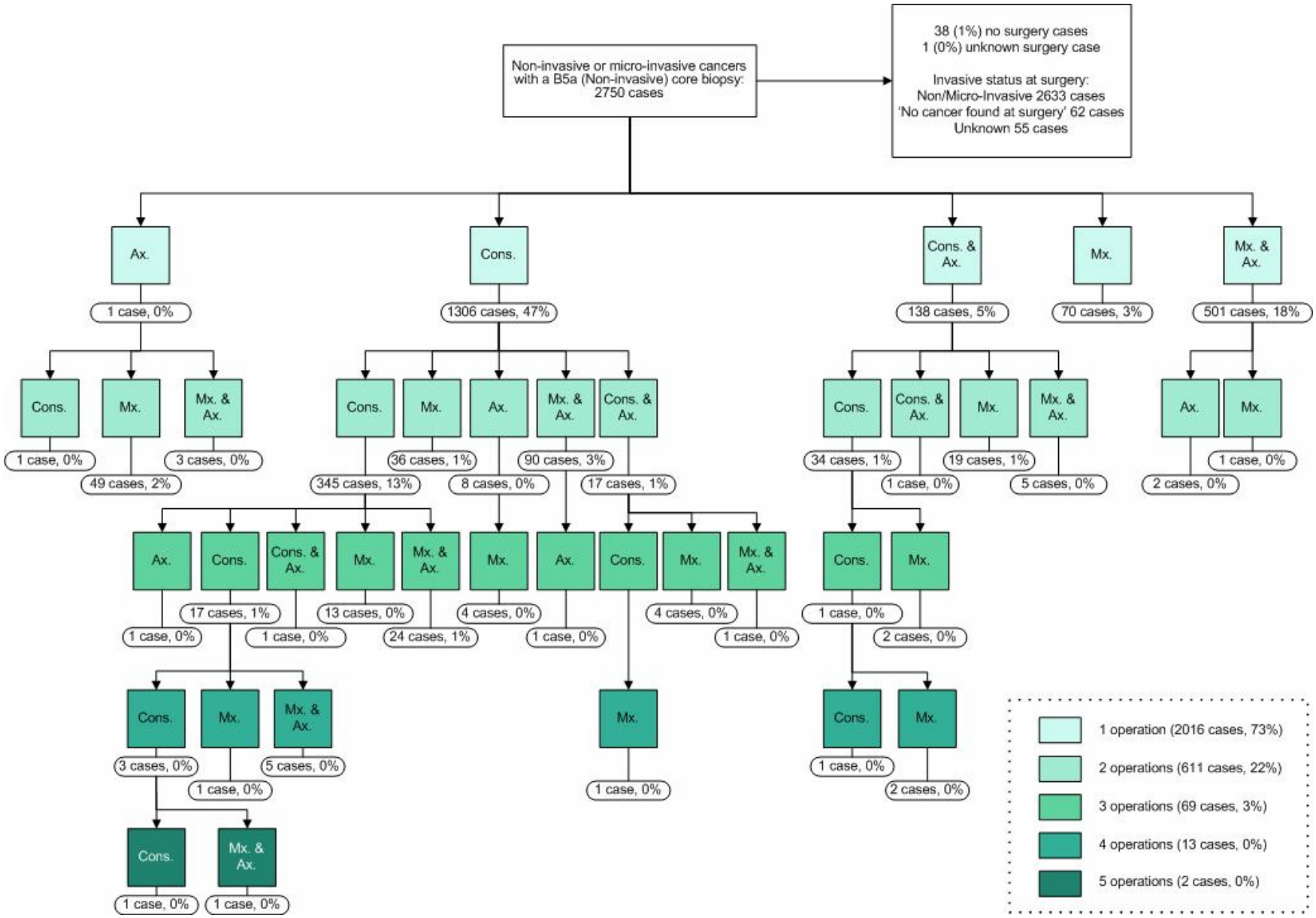

Figure 39: Sequence of operations for non-invasive or micro-invasive cancers with a B5a (Non-invasive) core biopsy

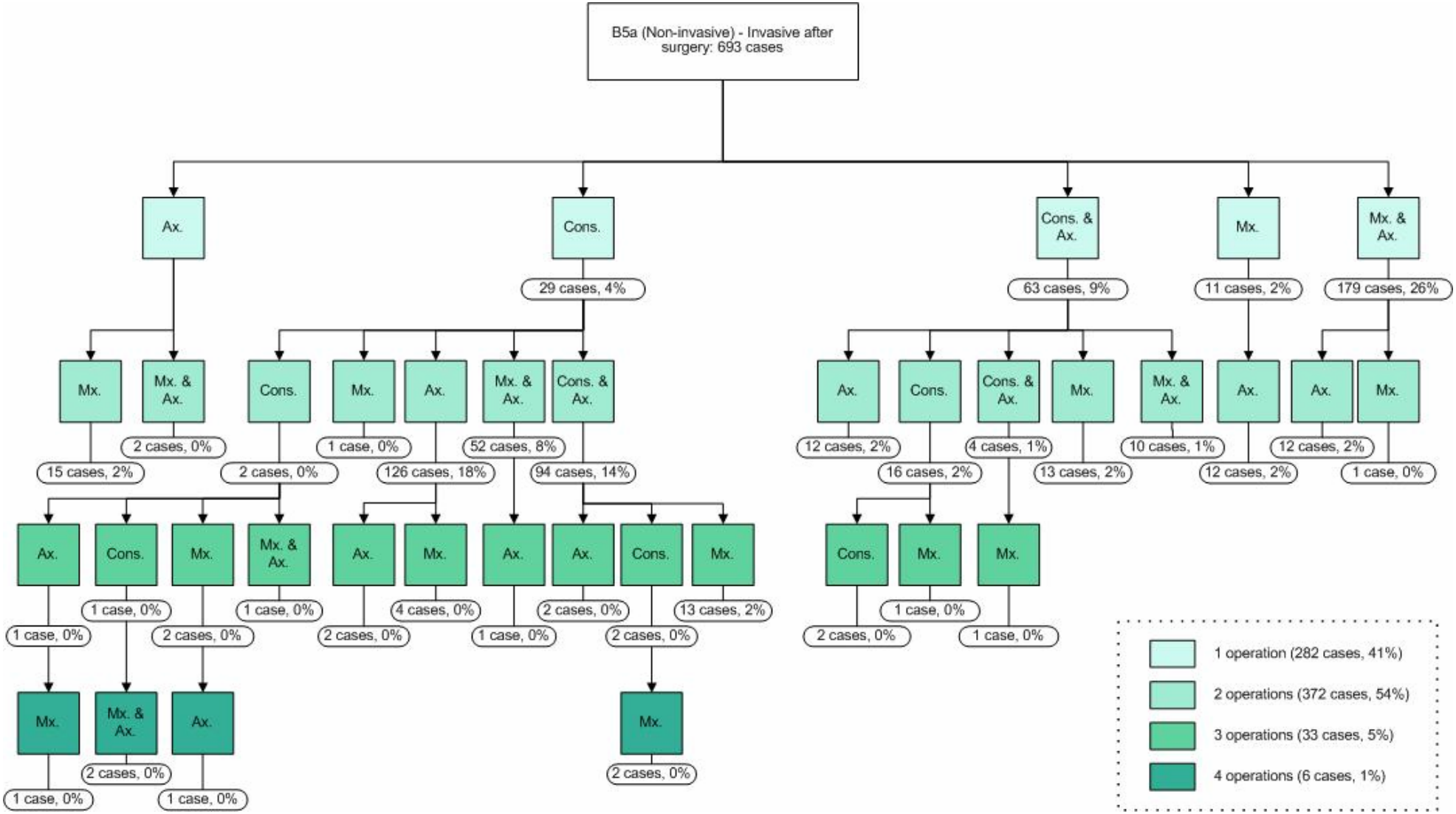

Figure 40: Sequence of operations for cancers with B5a (Non-invasive) core biopsy determined to be invasive after surgery

6.4 Repeat Breast Conserving Surgery to Clear Margins

In the UK as a whole, 20% of all cancers with a non-operative diagnosis, which were initially treated with breast conserving surgery, had repeat therapeutic operations (breast conserving surgery or mastectomy) to clear margins. This varied from 15% in Scotland to 24% in South East Coast. Figure 41 shows that in the UK as a whole, 13% of all cancers with a non-operative diagnosis, which were initially treated with breast conserving surgery, had repeat breast conserving surgery to clear margins. This varied between 10% in Scotland and Northern Ireland and 18% in South East Coast.

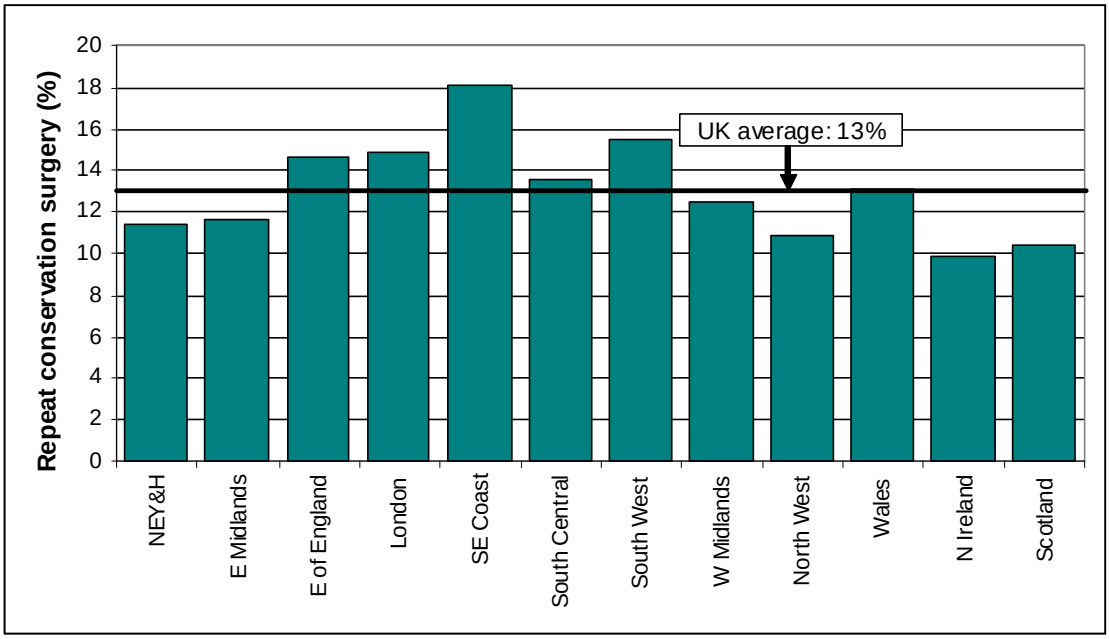

Figure 41: Proportion of cancers which were initially treated with breast conserving surgery and had repeat breast conserving surgery to clear margins

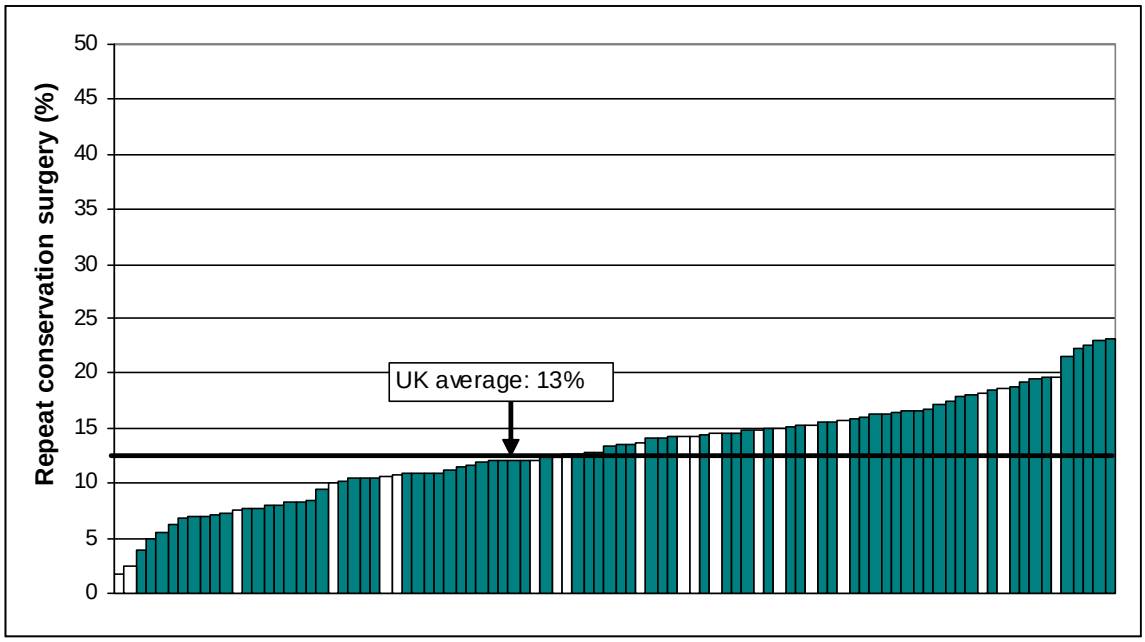

Figure 42: Proportion of cancers in each screening unit which were initially treated with breast conserving surgery and had repeat breast conserving surgery to clear margins
(19 of the smallest units are highlighted in white, one small unit had no repeat operations)

Figure 42 shows the wide variation in 2009/10 between screening units in the proportion of cancers initially treated with breast conserving surgery that had repeat breast conserving surgery to clear margins. 5 units had repeat rates in excess of 20% and for 3 units (2 of which were small) the rate was below 5%.

Figure 43 shows how proportion of cancers initially treated with breast conserving surgery that had repeat breast conserving surgery to clear margins varies with screening unit over the 3-year period 2007/08-2009/10. The dashed lines in Figure 43 are the upper and lower control limits which approximate to the 95% confidence intervals of the average rate of 12.7% (solid line). 13 units had repeat rates above the upper control limit; four of these units were in South West, two in South East Coast and two in London. 21 units had rates below the lower control limit; six of these units were in North West, three in North East, Yorkshire and Humber and three in Scotland.

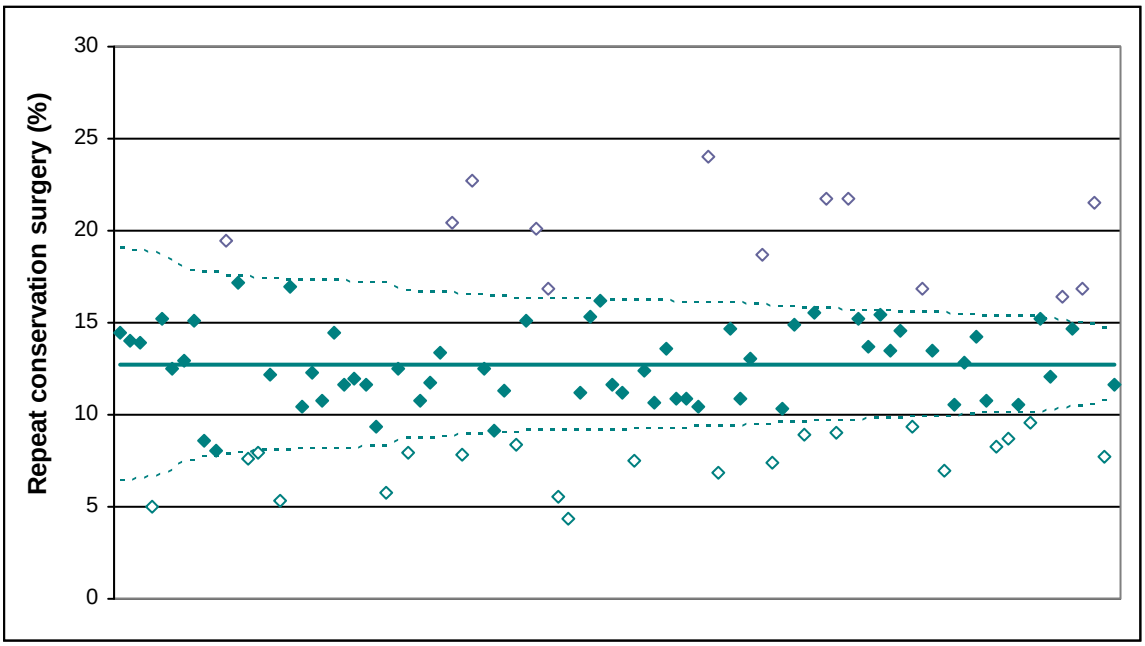

Figure 43: Variation between screening units in the proportion of cancers which were initially treated with breast conserving surgery and had repeat breast conserving surgery to clear margins in 2007/08-2009/10 (open diamonds represent units which lie outside the control limits)

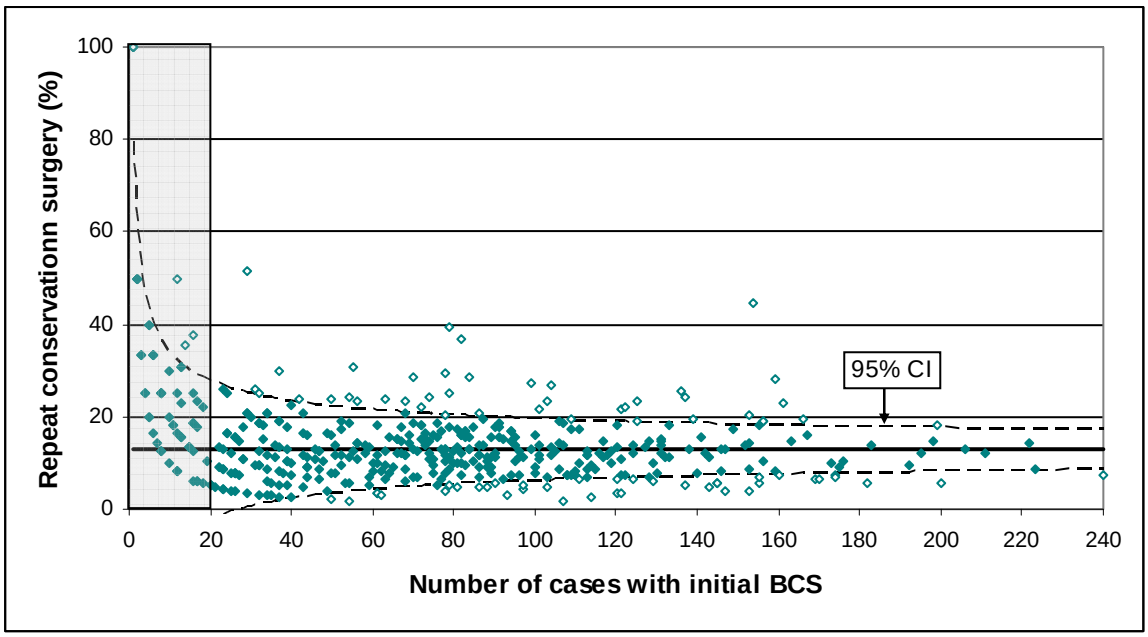

Figure 44: Variation between surgeons in the proportion of cancers which were initially treated with breast conserving surgery and had repeat breast conserving surgery to clear margins in 2007/08-2009/10 (open diamonds represent surgeons which lie outside the control limits)

Figure 44 shows the variation between surgeons in the proportion of cancers initially treated with breast conserving surgery that had repeat breast conserving surgery to clear margins over the 3-year period 2007/08-2009/10. Surgeons who initially treated fewer than 20 cases with conservation surgery over the 3-year period are shaded. The dashed lines in Figure 44 are the upper and lower control limits which approximate to the 95% confidence intervals of the average rate of 12.8% (solid line). Of the

443 surgeons, 382 had 20 or more cases with initial breast conserving surgery. 41 of the 382 surgeons had repeat rates above the upper control limit and 39 had repeat rates below the lower control limit. Regional QA reference centres and regional QA surgeons should review the data for screening units and individual surgeons lying outside (above and below) the control limits in Figure 43 and Figure 44 to ascertain the reasons for their unusual practice.

REPEAT BREAST CONSERVING SURGERY TO CLEAR MARGINS

	Invasive cancers						***Non-invasive or micro-invasive cancers***	
	B5b		***C5 only, no B5***		***B5a***		***B5a***	
Region	***No.***	***%***	***No.***	***%***	***No.***	***%***	***No.***	***%***
N East, Yorks & Humber	*127*	*11*	*1*	*14*	*7*	*16*	*41*	*15*
East Midlands	*61*	*9*	*0*	*0*	*6*	*20*	*39*	*25*
East of England	*110*	*12*	*0*	*0*	*17*	*31*	*52*	*23*
London	*144*	*15*	*0*	*0*	*12*	*24*	*28*	*13*
South East Coast	*127*	*15*	*0*	*0*	*12*	*32*	*52*	*27*
South Central	*77*	*11*	*2*	*25*	*10*	*36*	*24*	*22*
South West	*134*	*13*	*3*	*17*	*16*	*34*	*42*	*22*
West Midlands	*85*	*9*	*0*	*0*	*16*	*35*	*43*	*24*
North West	*81*	*9*	*11*	*13*	*14*	*24*	*35*	*17*
Wales	*52*	*9*	*0*	*0*	*8*	*29*	*38*	*27*
Northern Ireland	*20*	*9*	*1*	*4*	*2*	*11*	*8*	*17*
Scotland	*83*	*10*	*0*	*0*	*4*	*19*	*20*	*14*
United Kingdom	***1101***	***11***	***18***	***10***	***124***	***27***	***422***	***20***

Shaded if 5% or more above the value for the UK as a whole and more than one cancer is included

The preceding summary table shows for cancers with various non-operative diagnoses, the regional variation in the proportion of cancers initially treated with breast conserving surgery that had repeat conserving surgery to clear margins. In the UK as a whole, 11% of invasive cancers with a B5b (Invasive) non-operative diagnosis, which were initially treated with breast conserving surgery, had repeat breast conserving surgery to clear margins. This varied from 9% in Northern Ireland, Wales, North West, West Midlands and East Midlands to 15% in London and South East Coast. 10% of invasive cancers with a C5 cytology only non-operative diagnosis, which were initially treated with breast conserving surgery, had repeat breast conserving surgery to clear margins.

20% of non/micro-invasive cancers with a B5a (Non-invasive) non-operative diagnosis initially treated with breast conserving surgery had repeat breast conserving surgery to clear margins. This varied from 13% in London to 27% in Wales and South East Coast. Invasive cancers with a B5a (Non-invasive) non-operative diagnosis, which were initially treated with breast conserving surgery, had the highest repeat breast conserving surgery rate to clear margins (27%). This varied from 11% in Wales to 36% in South Central.

6.5 Breast Conserving Surgery Converted to Mastectomy

In the UK as a whole, 19% of all cancers with a non-operative diagnosis had an initial therapeutic mastectomy at the first operation and 5% had initial therapeutic breast conserving surgery converted to a mastectomy at a subsequent repeat operation. The proportion of all cancers with a non-operative diagnosis having an initial therapeutic mastectomy varied from 14% in South West to 23% in East Midlands (Figure 45). The proportion of all cancers with a non-operative diagnosis having initial therapeutic breast conserving surgery converted to a mastectomy at a subsequent operation varied from 4% in Scotland to 8% in Northern Ireland.

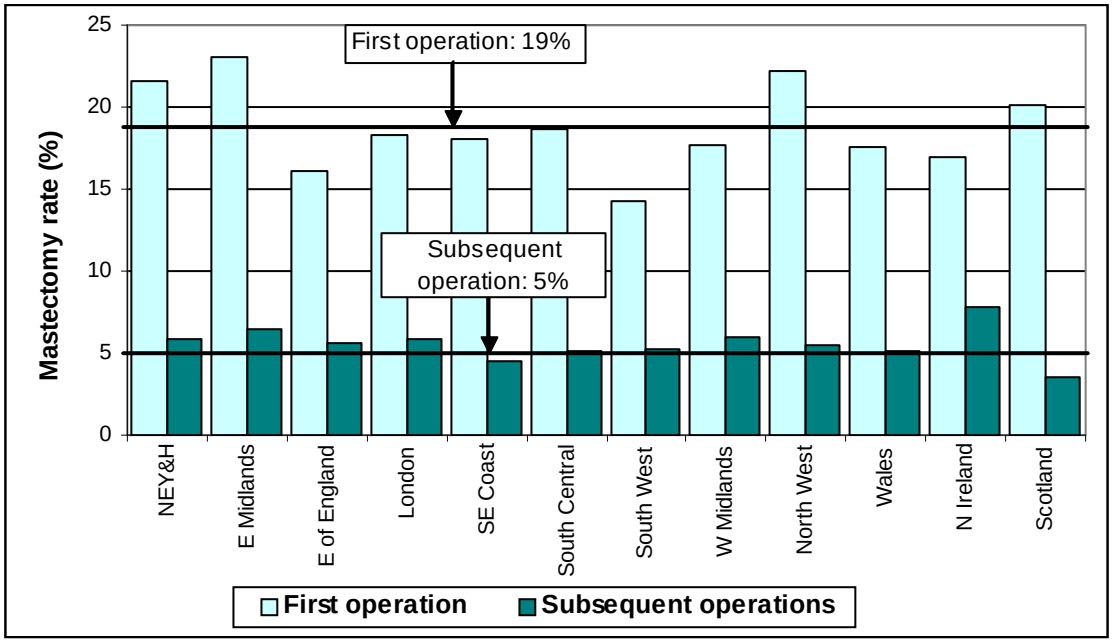

Figure 45: Proportions of all cancers undergoing mastectomy at first operation and subsequent operations

MASTECTOMY AS FIRST THERAPEUTIC OPERATION

	Invasive cancers						***Non-invasive or micro-invasive cancers***	
	B5b		***C5 only, no B5***		***B5a***		***B5a***	
Region	***No.***	***%***	***No.***	***%***	***No.***	***%***	***No.***	***%***
N East, Yorks & Humber	*362*	*22*	*1*	*13*	*19*	*27*	*68*	*19*
East Midlands	*188*	*20*	*2*	*50*	*27*	*47*	*61*	*27*
East of England	*192*	*16*	*1*	*13*	*18*	*24*	*39*	*14*
London	*208*	*17*	*0*	*0*	*17*	*26*	*64*	*22*
South East Coast	*164*	*16*	*2*	*22*	*28*	*42*	*43*	*18*
South Central	*141*	*16*	*5*	*38*	*16*	*35*	*37*	*25*
South West	*151*	*13*	*1*	*5*	*16*	*25*	*48*	*19*
West Midlands	*187*	*17*	*0*	*0*	*17*	*27*	*51*	*21*
North West	*267*	*21*	*5*	*6*	*28*	*32*	*81*	*27*
Wales	*126*	*17*	*1*	*33*	*12*	*29*	*28*	*16*
Northern Ireland	*40*	*15*	*8*	*22*	*2*	*10*	*15*	*24*
Scotland	*217*	*19*	*0*	*0*	*15*	*42*	*39*	*21*
United Kingdom	***2243***	***18***	***26***	***13***	***215***	***31***	***574***	***21***

Shaded if 5% or more above the value for the UK as a whole and more than one cancer is included

The preceding table summarises the regional variation in the proportion of cancers in each diagnostic category that had a mastectomy as their first therapeutic operation. In the UK as a whole, invasive cancers with a B5b (Invasive) core biopsy had an initial mastectomy rate of 18%. This varied from 13% in South West to 22% in North East Yorkshire & Humber. 26 (13%) of the 206 surgically treated invasive cancers diagnosed by C5 cytology only had a mastectomy as their first therapeutic operation. 8 (31%) of these cancers were in Northern Ireland and 5 (19%) in North West and South Central. Regional QA reference centres and regional surgical QA co-ordinators should audit these 26 cases to determine why cancers with unconfirmed invasive status had a mastectomy as an initial therapeutic operation. Non/micro-invasive cancers with a B5a (Non-invasive) core biopsy had an initial mastectomy rate of 21%. This varied from 14% in East of England to 27% in East Midlands and North West. Invasive cancers with a B5a (Non-invasive) core biopsy had the highest initial mastectomy rate (31%). This varied from 10% in Northern Ireland to 47% in East Midlands.

Figure 46 shows that in the UK as a whole, 7% of all cancers with a non-operative diagnosis, which were initially treated with therapeutic breast conserving surgery, were eventually converted to a mastectomy. This varied from 4.6% in Scotland to 9.6% in Northern Ireland.

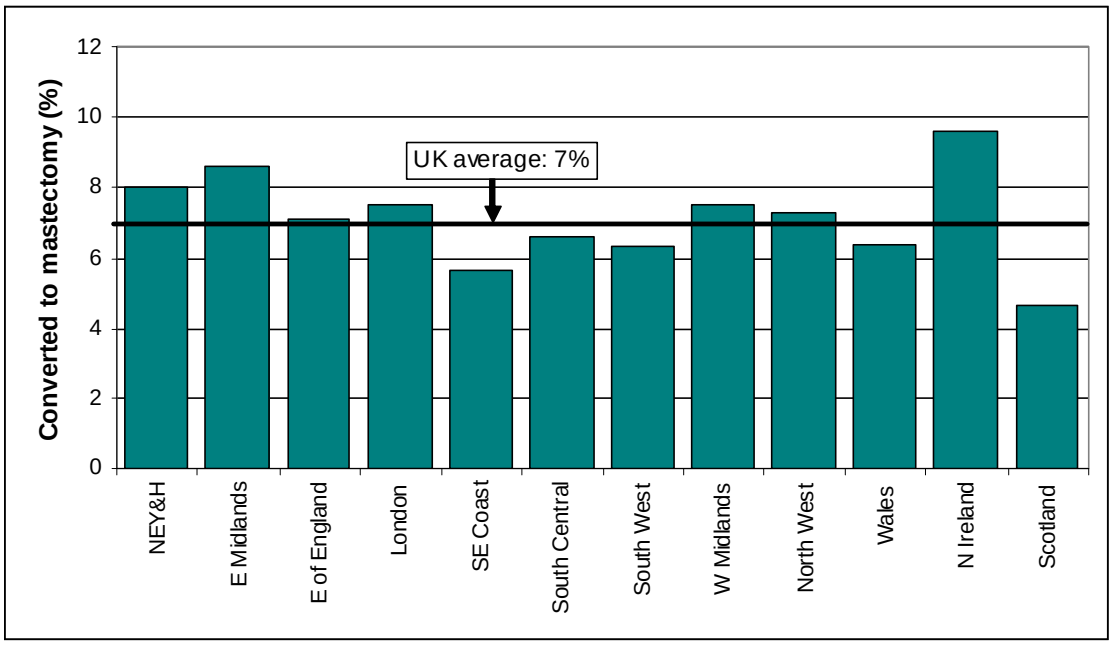

Figure 46: Proportion of cancers which were initially treated with breast conserving surgery and which were eventually converted to a mastectomy

Figure 47 shows the variation in 2009/10 between screening units in the proportion of all cancers with a non-operative diagnosis, which were initially treated with therapeutic breast conserving surgery, which were eventually converted to a mastectomy. In 3 units, the conversion rate to mastectomy was in excess of 15%. All of these were small units with small numbers of cases. In the unit with the highest rate, 5 cases were converted to mastectomies after receiving initial therapeutic breast conserving surgery.

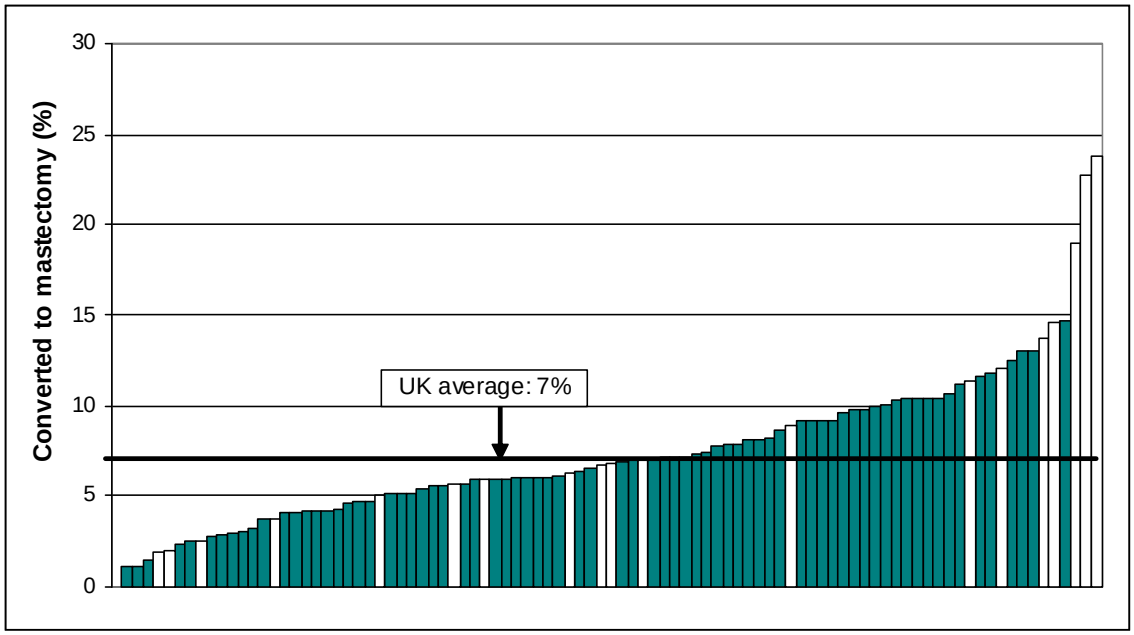

Figure 47: Proportion of cancers in each screening unit which were initially treated with breast conserving surgery and which were eventually converted to a mastectomy
(The 20 smallest units are highlighted in white)

Figure 48 shows how the proportion of all cancers with a non-operative diagnosis, which were initially treated with therapeutic breast conserving surgery and were eventually converted to a mastectomy varied with screening unit over the 3-year period 2007/08-2009/10. The dashed lines are the upper and lower control limits which approximate to the 95% confidence intervals of the average rate of 7.5% (solid line). 18 units had repeat rates above the upper control limit; 4 of these were in North East, Yorkshire & Humber, 4 in North West, 3 in East Midlands, 2 in East of England and 2 in Northern Ireland. Of the 13 units below the lower control limit; 4 were in South East Coast.

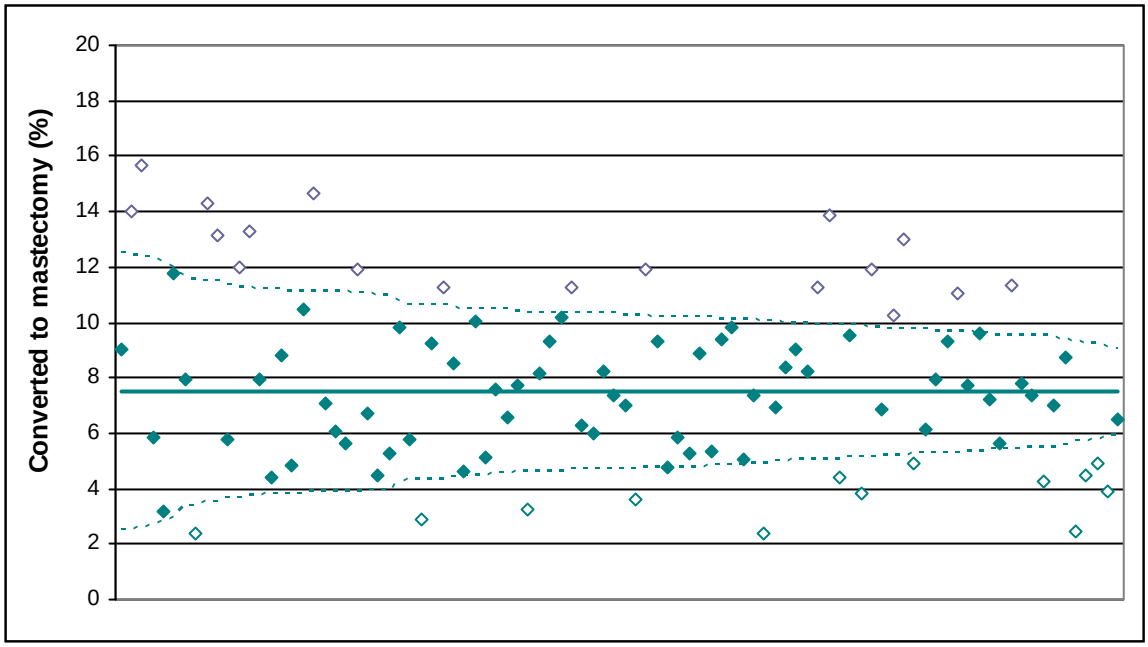

Figure 48: Variation between screening units in the proportion of cancers which were initially treated with breast conserving surgery and which were eventually converted to a mastectomy in 2007/08-2009/10 (open diamonds represent units which lie outside the control limits)

Figure 49 shows the variation between surgeons in the proportion of all cancers with a non-operative diagnosis, which were initially treated with therapeutic breast conserving surgery and were eventually converted to a mastectomy over the 3-year period 2007/08-2009/10. Surgeons who initially treated fewer than 20 cases with conservation surgery over the 3-year period are shaded. The dashed lines in Figure 49 are the upper and lower control limits which approximate to the 95% confidence intervals of the average rate of 7.6% (solid line). Of the 411 surgeons, 367 had 20 or more cases with initial breast conserving surgery. 30 of the 367 surgeons had conversion to mastectomy rates above the upper control limit and 16 had rates below the lower control limit. Regional QA reference centres and regional QA surgeons should review the data for screening units and individual surgeons lying outside (above and below) the control limits in Figure 48 and Figure 49 to ascertain the reasons for their unusual practice.

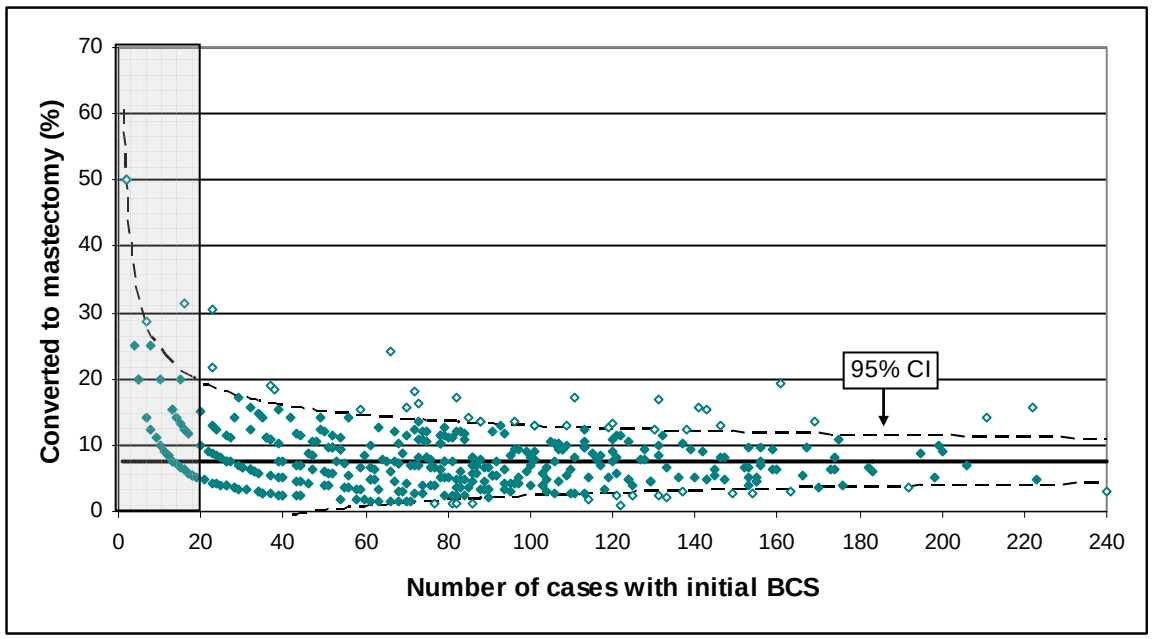

Figure 49: Variation between surgeons in the proportion of cancers which were initially treated with breast conserving surgery and which were eventually converted to a mastectomy in 2007/08-2009/10 (open diamonds represent surgeons which lie outside the control limits)

The following summary table shows the regional variation in the proportion of cancers initially treated with breast conserving surgery that eventually went on to have a mastectomy. In the UK as a whole, 6%

of invasive cancers with a B5b (Invasive) non-operative diagnosis, initially treated with breast conserving surgery, went on to have a mastectomy. 9 (5%) of the 178 surgically treated invasive cancers diagnosed by C5 cytology only, which were initially treated with breast conserving surgery, went on to have a mastectomy. 10% of non/micro-invasive cancers with a B5a (Non-invasive) non-operative diagnosis, initially treated with breast conserving surgery, went on to have a mastectomy. This varied from 7% in Scotland and South East Coast to 15% in Northern Ireland. Invasive cancers with a B5a (Non-invasive) core biopsy had the highest conversion of breast conserving surgery to mastectomy (23%). This varied from 13% in East of England to 44% in Northern Ireland.

INITIALLY TREATED WITH BREAST CONSERVING SURGERY BUT WENT ON TO HAVE A MASTECTOMY

	Invasive cancers						***Non-invasive or micro-invasive cancers***	
	B5b		***C5 only, no B5***		***B5a***		***B5a***	
Region	***No.***	***%***	***No.***	***%***	***No.***	***%***	***No.***	***%***
N East, Yorks & Humber	*79*	*7*	*1*	*14*	*14*	*31*	*25*	*9*
East Midlands	*49*	*7*	*0*	*0*	*9*	*30*	*18*	*11*
East of England	*58*	*6*	*2*	*33*	*7*	*13*	*21*	*9*
London	*53*	*6*	*0*	*0*	*12*	*24*	*28*	*13*
South East Coast	*39*	*5*	*0*	*0*	*6*	*16*	*14*	*7*
South Central	*37*	*5*	*0*	*0*	*6*	*21*	*11*	*10*
South West	*54*	*5*	*0*	*0*	*8*	*17*	*18*	*9*
West Midlands	*56*	*6*	*1*	*14*	*8*	*17*	*21*	*12*
North West	*51*	*5*	*3*	*4*	*16*	*28*	*24*	*12*
Wales	*30*	*5*	*0*	*0*	*6*	*21*	*12*	*8*
Northern Ireland	*13*	*6*	*2*	*7*	*8*	*44*	*7*	*15*
Scotland	*32*	*4*	*0*	*0*	*5*	*24*	*10*	*7*
United Kingdom	***551***	***6***	***9***	***5***	***105***	***23***	***209***	***10***

Shaded if 5% or more above the value for the UK as a whole and more than one cancer is included

KEY FINDINGS:

- 20% of all cancers with a non-operative diagnosis, which were initially treated with breast conserving surgery, had repeat therapeutic operations (breast conserving surgery or mastectomy) to clear margins.
- 13% of all cancers with a non-operative diagnosis, had repeat breast conserving surgery to clear margins. This varied between 10% in Scotland and Northern Ireland and 18% in South East Coast.
- In the 3-year period 2007/08-2009/10, 41 surgeons and 13 screening units had unusually high repeat breast conserving surgery rates. 39 surgeons had unusually low repeat conservation operation rates. Regional QA reference centres and regional QA surgeons should review the data for screening units and individual surgeons with atypical practice.
- 27% of invasive cancers and 20% of non/micro-invasive cancers with a B5a (Non-invasive) core biopsy had repeat therapeutic breast conserving surgery to clear margins.
- 19% of all cancers with a non-operative diagnosis had an initial therapeutic mastectomy at the first operation, and 5% had initial therapeutic breast conserving surgery converted to a mastectomy at a subsequent repeat operation.
- 26 surgically treated invasive cancers diagnosed by C5 cytology only had a mastectomy as their first therapeutic operation. 8 of these cancers were in Northern Ireland. Regional QA reference centres and regional surgical QA co-ordinators should audit these cases.
- 7% of all cancers with a non-operative diagnosis, which were initially treated with therapeutic breast conserving surgery, were eventually converted to a mastectomy. 130 surgeons and 8 screening units had unusually high repeat rates and 16 surgeons and 13 screening units had unusually low rates. Regional QA reference centres and regional QA surgeons should review the data for surgeons and screening units with atypical practice.
- Invasive cancers with a B5a (Non-invasive) core biopsy had the highest conversion of breast conserving surgery to mastectomy (23%). This varied from 13% in East of England to 44% in Northern Ireland.

6.6 Excision Margins

Information on whether or not the radial excision margin was clear of tumour and the closest radial margin distance, were requested for all cancer cases. Scotland was not able to provide this information. Of the 15,613 cancers diagnosed in England, Wales and Northern Ireland in 2009/10, 15,227 had surgery to the breast and were found to be malignant (invasive or non/micro-invasive) at surgery. Of these, 75% had complete margin data for all operations (Table 72). For the first operation, 97% of cases had information on whether or not the radial margin was clear, but only 82% of the cases had the margin distance recorded. The completeness of the margin status data varied from 96% in East of England, London, South Central and North West to 100% in Northern Ireland, and the completeness of the margin distance data varied from 70% in East Midlands to 98% in Northern Ireland (Figure 50).

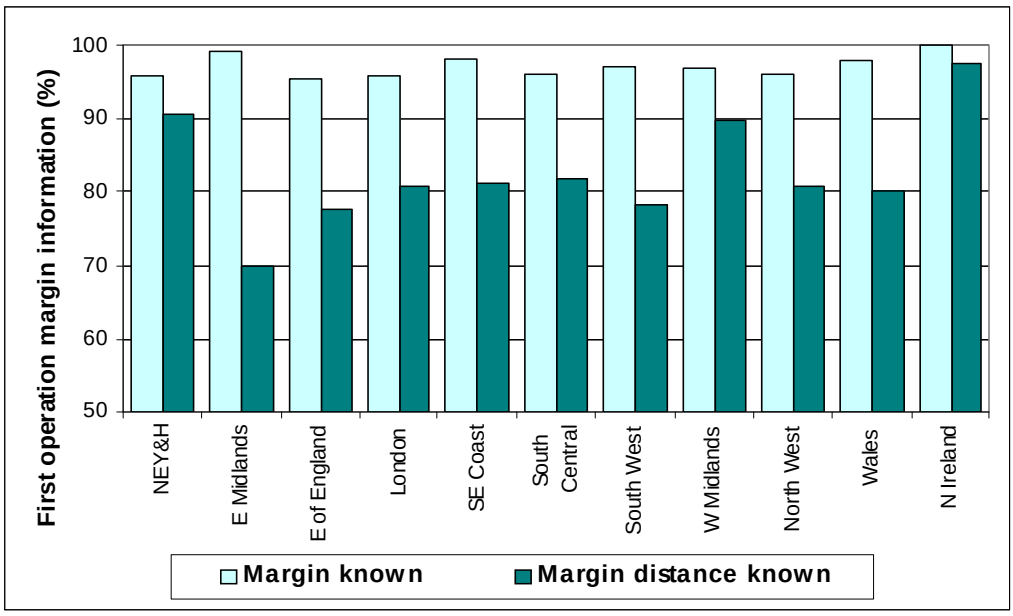

Figure 50 (Table 73): Data completeness for margins at first operation

Of 15,227 cases with surgery to the breast which were malignant at surgery, 11,303 were treated with breast conserving surgery. Of these, 95% (10,710 cases) were recorded as having clear margins at their final operation. 248 cases (2%) were recorded as not having had clear margins at the final operation (Table 74). This varied between 0 cases in Northern Ireland to 5 cases in South East Coast. The final margin status was recorded as unknown for a further 345 cases (3%). This could be because the final operation had benign histology, or because the margin status information was not recorded. Of the 3,924 cases treated with a mastectomy (Table 75), 3,542 (90%) were recorded as having clear margins at their final operation, 60 (2%) were recorded as not having had clear margins at the final operation and the final margin status was recorded as unknown for a further 322 cases (8%). Regional QA reference centres should audit the 308 cases recorded as not having had clear margins at the final operation and the 667 cases where the final margin status was recorded as unknown to ensure that these cancers were not under-treated.

KEY FINDINGS:

- Of the 15,227 cases which had surgery to the breast and were found to be malignant (invasive or non/micro-invasive) at surgery, 75% had complete margin data for all operations.
- For the first operation, 97% of cases had information on whether or not the radial margin was clear, but only 82% of the cases had the margin distance recorded.
- Of the 11,303 cancers treated with breast conserving surgery, 95% were recorded as having clear margins at their final operation. Of the 3,924 cases treated with a mastectomy, 90% were recorded as having clear margins at their final operation.
- Regional QA reference centres should audit the 308 cases recorded as not having had clear margins at the final operation and the 667 cases where the final margin status was recorded as unknown to ensure that these cancers were not under-treated.

CHAPTER 7
THE AXILLA

This chapter draws together information on the increasing use of pre-operative assessment and Sentinel Lymph Node Biopsy (SLNB) to determine axillary nodal status, and data on repeat operations to the axilla which were distributed in other chapters in previous NHSBSP and ABS audits. Overall, of the 13,429 surgically treated invasive cancers included in the audit, 13,216 (97%) had known nodal status (Table 83), and of these 2,858 (22%) were node positive (Table 86).

7.1 Pre-operative Assessment of the Axilla

Quality Objective	**To increase the non-operative diagnosis of axillary node metastases**
Target Standard	**All patients diagnosed with invasive breast cancer undergoing surgical treatment should have a pre-operative axillary ultrasound scan, and if appropriate fine needle aspiration (FNA) or core biopsy should be carried out**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

Scotland was not able to provide information on axillary ultrasound examinations. Data from England, Wales and Northern Ireland for a total of 15,613 cancers (12,506 invasive cancers and 2,974 non-invasive cancers) are included in this section. 9,175 (58%) cases had a record of an axillary ultrasound at assessment, compared to only 44% in 2008/09. Of these, 8,100 (88%) were confirmed after surgery to have an invasive cancer and 1,014 (11%) a non-invasive cancer. Thus, 59% of patients with invasive cancer and 34% with non-invasive cancer had axillary ultrasound recorded. Of the 1,225 invasive cancers with an abnormal axillary ultrasound result recorded, 624 were node positive at surgery giving a positive predictive value of an abnormal ultrasound of 51%.

7.1.1 Pre-operative Diagnosis of Axillary Metastases in Invasive Cancers

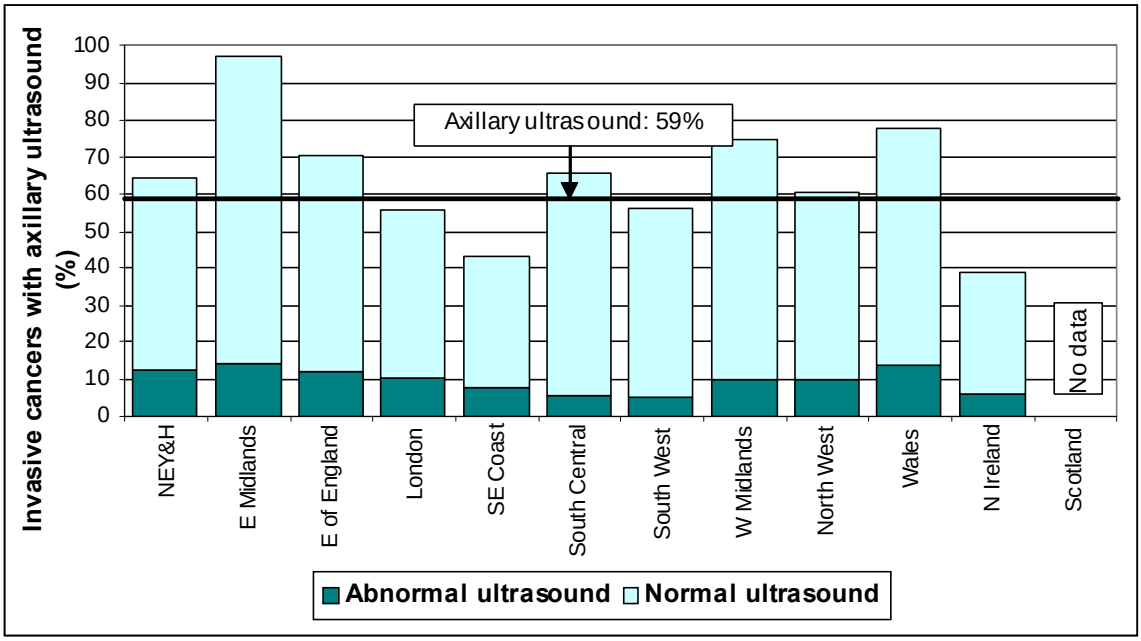

Figure 51 (Tables 76 and 77): Variation between regions in the proportion of invasive cancers with abnormal and normal axillary ultrasound results

Although 59% of invasive cancers had an axillary ultrasound result recorded overall, this varied widely between regions from 39% in Northern Ireland to 97% in East Midlands (Table 76). Overall, 15% of invasive cancers had an abnormal axillary ultrasound result (Table 77); this varied from 8% in South Central and 9% in South West to 19% in North East, Yorkshire & Humber and London. Even greater variations in the proportions of cancers with an axillary result recorded, and with an abnormal ultrasound result were apparent in individual screening units (Figure 52).

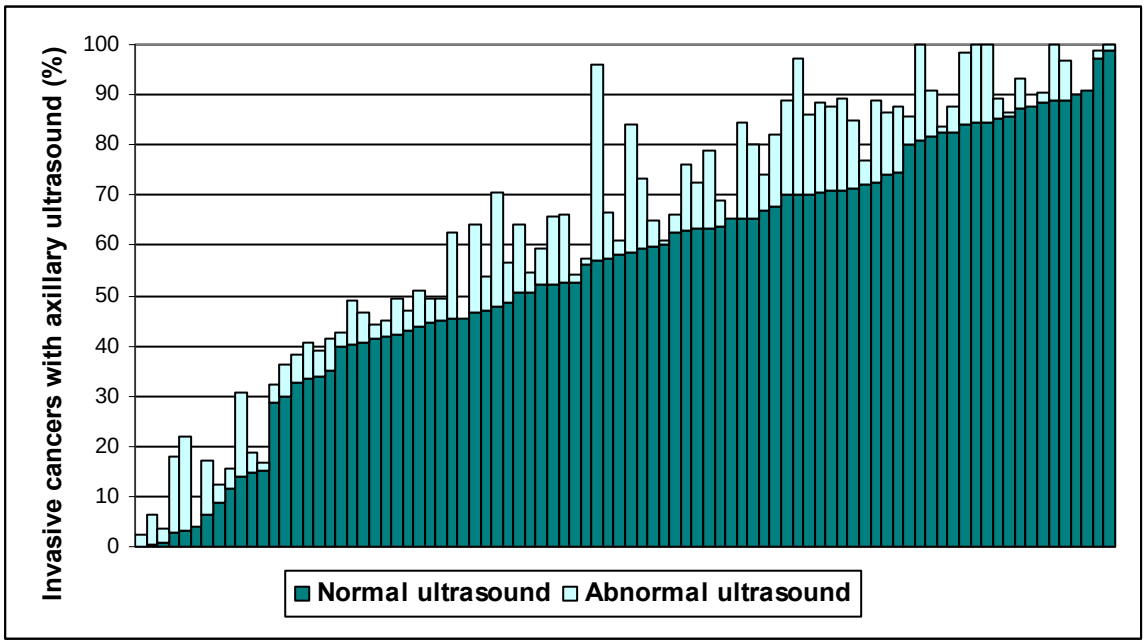

Figure 52: Variation between screening units in the proportion of invasive cancers with abnormal and normal axillary ultrasound results

1,121 (9%) of the 12,506 invasive cancers included in the audit, had an axillary biopsy at assessment. 66 of these had a normal ultrasound result. Regional QA reference centres should audit these cases to determine why the abnormal ultrasound result was apparently not followed up with a biopsy. Of the 1,225 invasive cancers with an abnormal ultrasound result, 1,055 (86%) had an axillary node sample (core biopsy or cytology) taken at assessment (Table 78).

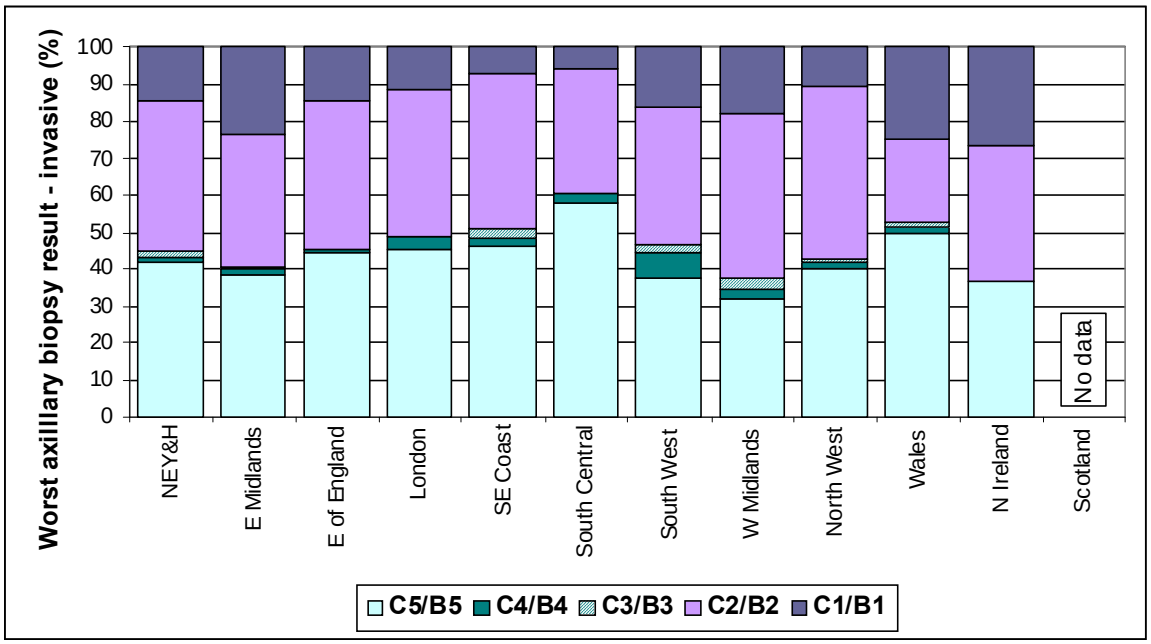

Figure 53 (Table 79): The worst axillary biopsy result for invasive cancers with an abnormal axillary ultrasound result

Of the 1,055 invasive cancers with an abnormal ultrasound result which had an axillary node biopsy,

447 (42%) had a C5/B5 diagnosis, 443 (42%) had C2/B2 to C4/B4 diagnoses, and 165 (16%) had an inadequate or normal sample (C1/B1). The proportion of invasive cancers with a C5/B5 result varied between 32% in West Midlands and 58% in South Central (Figure 53). Of the 447 invasive cancers with a C5/B5 diagnosis, 363 had no neo-adjuvant therapy recorded and had axillary surgery. Of the C5/B5 cases without neo-adjuvant therapy, 347 were node positive at surgery (giving a positive predictive value of a C5/B5 of 96% (Table 80). 39 (67%) of the 58 C5/B5 invasive cancers with neo-adjuvant therapy had positive nodes at surgery.

Of the 363 invasive cancers with a C5/B5 result which did not have neo-adjuvant therapy, 16 (4%) had false positive results, i.e. were found to be node negative at surgery. Regional QA reference centres should audit these cases to determine whether these are data recording errors as was the case for all but one of the false positive cases in the 2008/09 audit. 413 invasive cancers with C2/B2 to C4/B4 diagnoses did not have neo-adjuvant therapy recorded and had axillary assessment at surgery. Of these, 109 (26%) had positive nodes at surgery. 43 (28%) of the 155 cases with a C1/B1 diagnosis which did not have neo-adjuvant therapy had positive nodes at surgery.

In the UK excluding Scotland, of the 2,418 invasive cancers without neo-adjuvant therapy recorded that were confirmed to be node positive on surgery, 361 (15%) had positive nodes diagnosed pre-operatively by means of needle biopsy. This varied from 7% in South Central and South West to 30% in Wales (Table 81). Of the 11,723 invasive cancers without neo-adjuvant therapy that did not have an axillary biopsy before surgery or where it was not known whether an axillary biopsy was taken, 2,132 (18%) had positive nodes found at surgery. This varied from 13% in Wales to 21% in South Central (Table 82).

KEY FINDINGS:

- In the UK excluding Scotland, 9,175 (58%) cases had a record of an axillary ultrasound at assessment. Of these, 88% were confirmed to be invasive after surgery and 11% non-invasive. Overall, 59% of the invasive cancers and 34% of non-invasive cancers had axillary ultrasound recorded.
- Of the 1,225 invasive cancers with an axillary ultrasound result recorded, 624 were node positive at surgery; giving a positive predictive value of an abnormal ultrasound of 51%.
- 15% of the invasive cancers having an axillary ultrasound examination, had an abnormal ultrasound result, and 86% of these had an axillary node sample (core biopsy or cytology).
- Of the 1,055 cancers with an abnormal ultrasound result which had an axillary node biopsy, 42% had a C5/B5 diagnosis. Of these, 84 had neo-adjuvant therapy recorded.
- Of the 363 invasive cancers with a C5/B5 result which did not have neo-adjuvant therapy, 16 (4%) had false positive results, i.e. were found to be node negative at surgery. Regional QA reference centres should audit these cases to determine whether these are data recording errors as was the case for all but one of the false positive cases in the 2008/09 audit.
- Of the 2,418 invasive cancers without neo-adjuvant therapy recorded that were confirmed to be node positive on surgery, 361 (15%) had positive nodes diagnosed pre-operatively by means of needle biopsy.
- Of the 11,723 invasive cancers without neo-adjuvant therapy that did not have an axillary biopsy before surgery or where it was not known whether an axillary biopsy was taken, 2,132 (18%) had positive nodes found at surgery.

7.2 Sentinel Lymph Node Biopsy

Quality Objective	**To minimise morbidity from axillary surgery to obtain staging information**
Outcome Measure	**Sentinel node biopsy using the combined blue dye/radioisotope technique is a recommended axillary staging procedure for the majority of patients with early invasive breast cancer**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

In 2009/10, of the 13,226 invasive cancers with axillary surgery, 8,882 (67%) had a sentinel lymph node biopsy (SLNB) (Table 84). This varied from 41% in Scotland to 83% in Wales. The overall use of SLNB has increased by 9% since 2008/09 as the roll out of the NEW START Programme has continued. A much more variable increase is apparent in individual regions; from 1% in Scotland (41% in 2009/10) and 5% in East of England (63% in 2009/10) to 19% in Northern Ireland (66% in 2009/10).

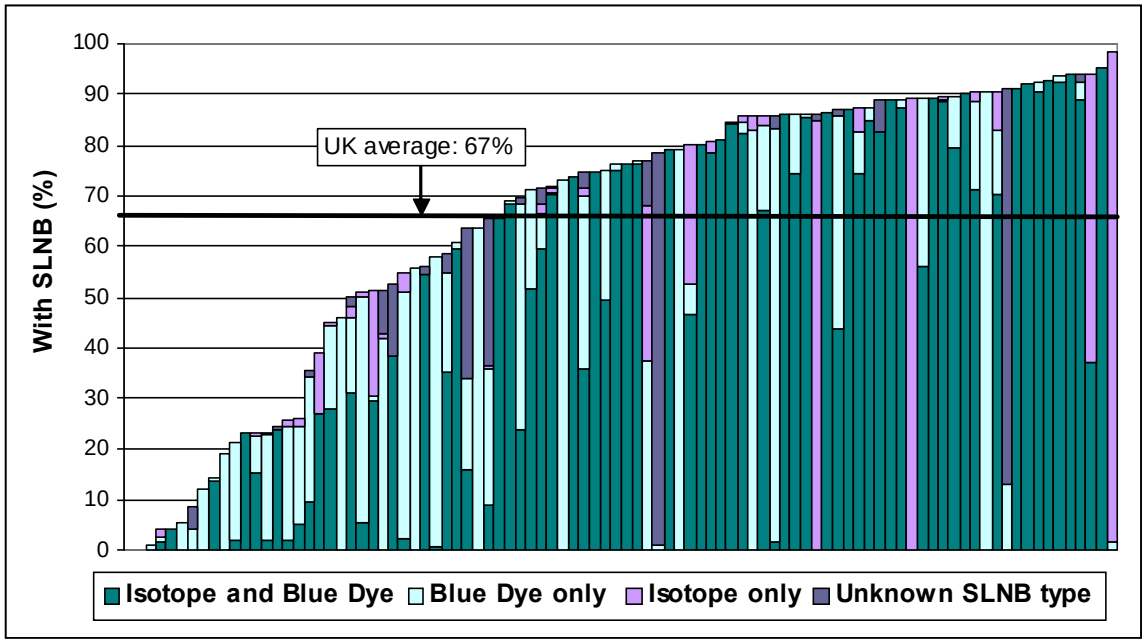

Figure 54: Use of SLNB for invasive breast cancers in each screening unit

The use of SLNB varied even more between screening units (Figure 54) ranging from 0% in two units in Scotland and North West to 99% in a screening unit in East of England. 8 screening units used SLNB for fewer than 20% of their patients with invasive cancer, while in 15 screening units, over 90% of the patients with invasive cancers had a SLNB. Regional QA reference centres and regional surgical QA co-ordinators should ensure that the use of SLNB is being rolled out in all of their screening units.

SENTINEL LYMPH NODE BIOPSY					
		TECHNIQUE USED (%)			
Region	% cases with SLNB	Isotope and blue dye	Blue dye only	Isotope only	SLNB unknown type
N East, Yorks & Humber	*67*	*76*	*21*	*2*	*0*
East Midlands	*67*	*78*	*19*	*3*	*0*
East of England	*63*	*37*	*25*	*30*	*8*
London	*73*	*47*	*43*	*8*	*2*
South East Coast	*62*	*53*	*46*	*0*	*0*
South Central	*71*	*72*	*19*	*7*	*2*
South West	*76*	*78*	*11*	*1*	*10*
West Midlands	*68*	*79*	*18*	*2*	*0*
North West	*71*	*64*	*35*	*1*	*1*
Wales	*83*	*17*	*10*	*1*	*73*
Northern Ireland	*66*	*52*	*18*	*28*	*2*
Scotland	*41*	*99*	*0*	*0*	*0*
United Kingdom	***67***	***63***	***23***	***6***	***8***

The preceding table shows, for the UK as a whole and for each region, the techniques recorded as having been used for the invasive cancers which had a SLNB. Of the 8,882 invasive cases with a

SLNB, 63% were recorded as having had the full dual SLNB procedure using isotope and blue dye. In Scotland 99% of cases had the recommended dual procedure, but in Wales and East of England for only 17% and 37% of cases respectively was the recommended dual procedure recorded as having been used. For 8% of cases in the UK, the SLNB technique used was not specified. The highest percentage of cases with unknown SLNB technique was in Wales (73%) where two screening offices were not notified of the SLNB technique used.

Figure 54 shows that the SLNB technique recorded varied widely between screening units; with some units using the recommended isotope and blue dye method for very few or none of their patients. Regional QA reference centres and regional surgical QA co-ordinators should investigate why some units appear not to be using the recommended full dual SLNB technique.

KEY FINDINGS:

- A sentinel lymph node biopsy (SLNB) procedure was recorded for 8,882 invasive cancers (67%) with axillary surgery. Of these, 63% had the full dual SLNB procedure using isotope and blue dye recorded. This varied from 17% in Wales to 99% in Scotland.
- Although the use of SLNB has increased by 9% since 2008/09, there is still widespread variation. 8 screening units used SLNB for fewer than 20% of their patients with invasive cancer, while in 15 screening units, over 90% of the patients with invasive cancers had a SLNB. Regional QA reference centres and regional surgical QA co-ordinators should ensure that the use of SLNB is being rolled out in all of their screening units.

7.3 Number of Nodes Examined

Quality Objective	**To ensure adequate staging of the axilla in patients with invasive breast cancer**
Minimum Standard	**>90% of women treated for early invasive cancers should have an axillary staging procedure carried out**
Target Standard	**100% of women treated for early invasive cancers should have an axillary staging procedure carried out**

(Quality Assurance Guidelines for Surgeons in Breast Cancer Screening, NHSBSP Publication No 20, 4th Edition, March 2009)

14 YEAR COMPARISON: NODAL STATUS ASSESSED ON THE BASIS OF <4 NODES

Year of data collection	*Number of invasive cancers with known nodal status*	*% with <4 nodes examined*		
		Overall	*With SLNB*	*No SLNB*
1996/97	*4,773*	*10.6*	*-*	*10.6*
1997/98	*5,585*	*9.0*	*-*	*9.0*
*1998/99**	*5,574*	*6.7*	*-*	*6.7*
1999/00	*7,126*	*5.5*	*-*	*5.5*
2000/01	*7,379*	*5.0*	*-*	*5.0*
2001/02	*7,465*	*5.1*	*-*	*5.1*
2002/03	*8,607*	*5.2*	*-*	*5.2*
2003/04	*9,811*	*4.8*	*-*	*4.8*
*2004/05**	*10,322*	*8.6*	*4.1*	*4.5*
2005/06	*12,063*	*13.4*	*8.8*	*4.6*
2006/07	*11,993*	*19.1*	*16.0*	*3.1*
2007/08	*12,850*	*27.3*	*24.0*	*3.3*
2008/09	*13,074*	*35.9*	*33.4*	*2.5*
2009/10	*13,216*	*42.3*	*40.5*	*1.8*

*Data from Scotland and Northern Ireland are absent in 1998/99. Data for 2 units from East of England are absent in 2004/05

The preceding summary table shows that the proportion of invasive cancers for which nodal status was recorded based on the examination of fewer than 4 nodes decreased from 10.6% in 1996/97 to 4.8% in 2003/04. In the most recent 6-year period, this figure has started to rise because of the increased use of SLNB procedures, and in 2009/10 the proportion of cases with fewer than 4 nodes examined was 42.3%. However, when cases with a SLNB are excluded, there is a continuous decrease in the proportion of invasive cancers with nodal status based on the examination of fewer than 4 nodes, and in 2009/10 this applied to only 1.8% of cases.

In the UK in 2009/10, 94% of the 4,344 invasive cancers, which either did not have a SLNB procedure or where it was not known whether or not a SLNB procedure was performed, had 4 or more nodes taken (Table 85). This varied from 81% in Wales to 99% in East Midlands. Figure 55 shows that 37 screening units achieved the 100% target that all their invasive cancers without a SLNB or with unknown an unknown nodal procedure should have at least 4 nodes obtained. 17 screening units did not achieve the 90% minimum standard. Regional QA reference centres and regional surgical QA co-ordinators should audit all the invasive cancers without a SLNB or with an unknown nodal procedure type which had fewer than 4 nodes reported to ensure that the axilla has not been under-treated.

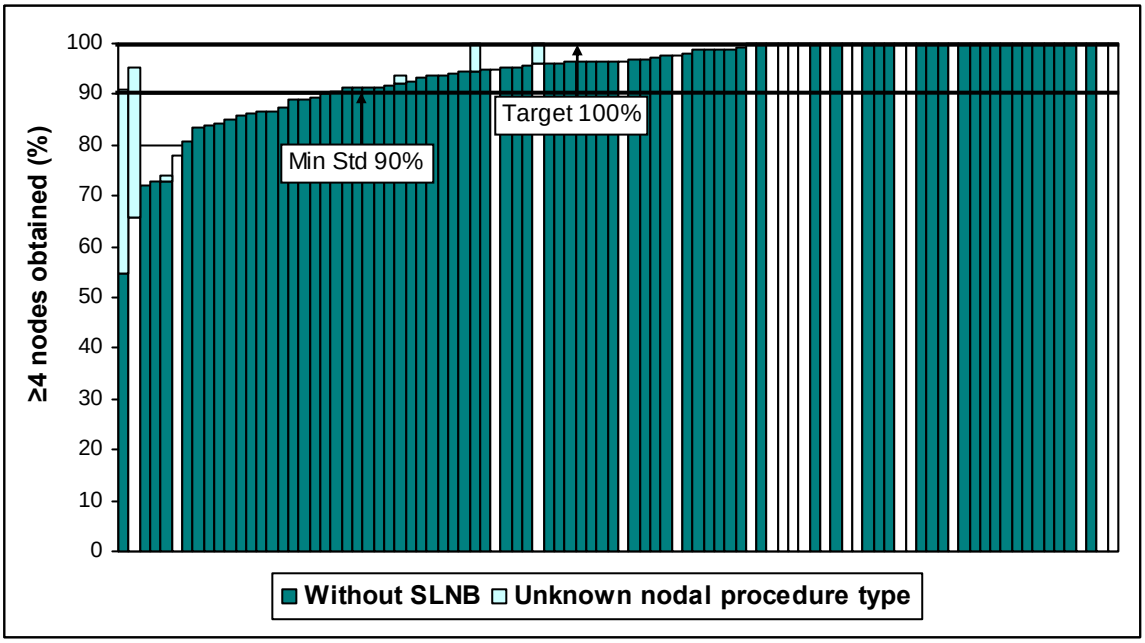

Figure 55: Invasive cancers with at least 4 node obtained presented as a proportion of invasive cancers recorded as without sentinel procedure or with unknown nodal procedure type (The 20 smallest units are highlighted in white)

7.4 Lymph Node Status - Invasive cancers

Of the 13,216 invasive cancers with known nodal status, 2,858 (22%) had positive nodes (Table 86). Table 87 shows that the proportion of cases with positive nodal status (16%) was lower for cases which underwent a SLNB procedure compared with cases which did not have a SLNB procedure (33%). This could be due to the selection of patients for axillary sampling or clearance, who were considered to be of high risk (e.g. high grade, palpable nodes) or who had positive nodes on non-operative ultrasound guided cytology or core biopsy. Of the 1,409 cancers which had their positive nodal status determined from a SLNB procedure, 964 (68%) had a subsequent axillary procedure (Table 88). A further 315 cancers (22%) had four or more nodes taken in the only axillary operation, which indicates that other nodes were taken as well as the sentinel node at this time.

INVASIVE CANCERS WITH INSUFFICIENT NODAL INFORMATION						
	Total invasive cancers with surgery	Unknown nodal status (Table 83)	Negative <4 nodes (Not sentinel procedure – (Table 89)	Positive <4 nodes (Table 89)	Insufficient nodal information	
Region	No.	No.	No.	No.	No.	%
N East, Yorks & Humber	1,707	20	13	27	60	4
East Midlands	978	6	2	17	25	3
East of England	1,286	22	14	9	45	3
London	1,279	42	20	26	88	7
South East Coast	1,092	20	55	9	84	8
South Central	943	25	10	3	38	4
South West	1,277	22	9	5	36	3
West Midlands	1,212	16	17	8	41	3
North West	1,427	23	50	23	96	7
Wales	766	8	21	9	38	5
Northern Ireland	320	1	3	2	6	2
Scotland	1,142	8	11	15	34	3
United Kingdom	**13,429**	**213**	**225**	**153**	**591**	**4**

The preceding summary table shows that of the 13,429 surgically treated invasive cancers, 213 (2%) had unknown nodal status, 225 (2%) had their negative nodal status determined on the basis of 1, 2 or 3 nodes with no known SLNB procedure, and 153 (1%) had their positive nodal status determined on the basis of 1, 2 or 3 nodes using any type of nodal procedure. 591 (4%) of the 13,429 invasive cancers therefore appear to have insufficient nodal information to provide a satisfactory diagnostic work-up. This proportion varied from 2% in Northern Ireland to 8% in South East Coast.

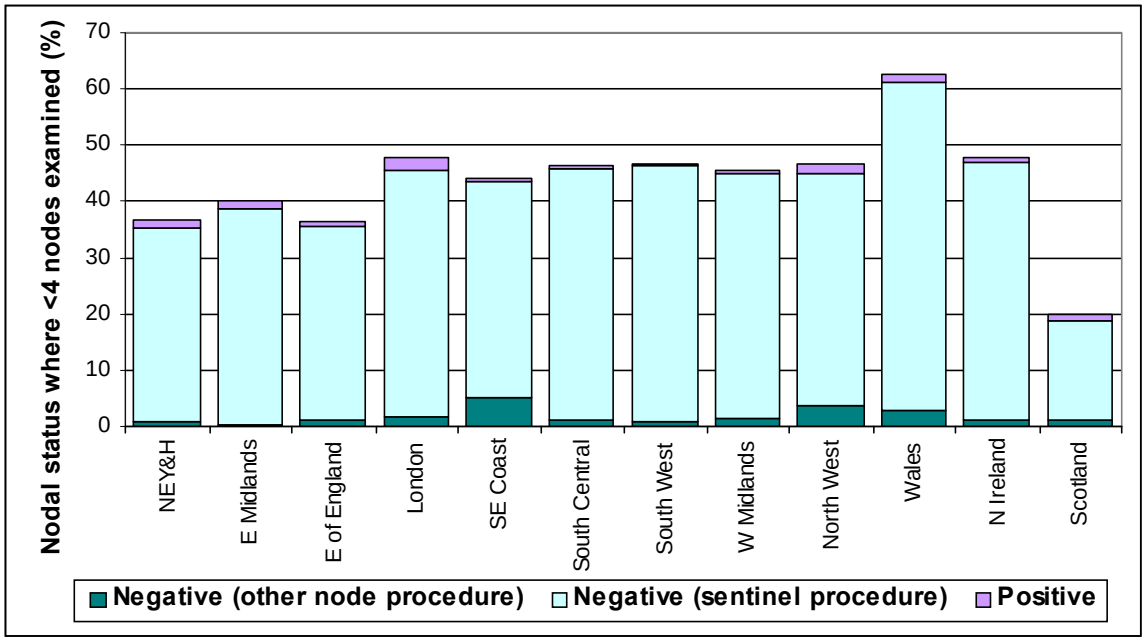

Figure 56 (Table 89): Nodal status for invasive cancers where nodal status was determined on the basis of <4 nodes, expressed as the percentage of invasive cancers with known nodal status

For 138 cases (Table 89), the positive nodal status was determined on the basis of fewer than 4 nodes with a SLNB, and 130 of these cases (Table 88) had no subsequent axillary procedures recorded. 56 (41%) of the 138 cases were in 7 screening units (two in North East, Yorkshire and Humber, and two in London). 19 (15%) of the 130 cancers with no subsequent axillary procedure had an invasive tumour size of less than 10mm, 34 (26%) were Grade I and 28 (22%) were in the Excellent or Good Nottingham Prognostic Index Groups. A further 15 invasive cancers (0.1%) had their positive nodal

status determined on the basis of fewer than 4 nodes without a SLNB procedure. Regional QA reference centres and regional surgical QA co-ordinators should follow up all of the cases where the positive nodal status was determined on the basis of fewer than four nodes to ensure that the axilla has not been under-treated.

Overall, 225 (1.7%) of the invasive cancers for which nodal status was recorded had their negative nodal status determined on the basis of fewer than 4 nodes without a SLNB procedure. Figure 56 shows that this varied from 3 cases (0.9%) in Northern Ireland to 5.1% (55 cancers) in South East Coast. A further 5,208 cancers (39%) had their negative nodal status determined by a SLNB procedure. This varied from 18% in Scotland to 58% in Wales.

Figure 57 shows how the proportion of invasive cancers with unknown nodal status and with negative nodal status determined on the basis of less than 4 nodes without a SLNB or positive nodal status determined on the basis of 1, 2 or 3 nodes using any type of nodal procedure varied in individual screening units. This varied between 0% and 27%. In the UK, 591 (4%) invasive cancers appear to have insufficient nodal information to provide a satisfactory diagnostic work-up. Regional QA reference centres and regional surgical QA co-ordinators should audit all of these cases to ascertain whether the data are a true reflection of clinical practice, as these cancers may have had an inadequate diagnostic work-up.

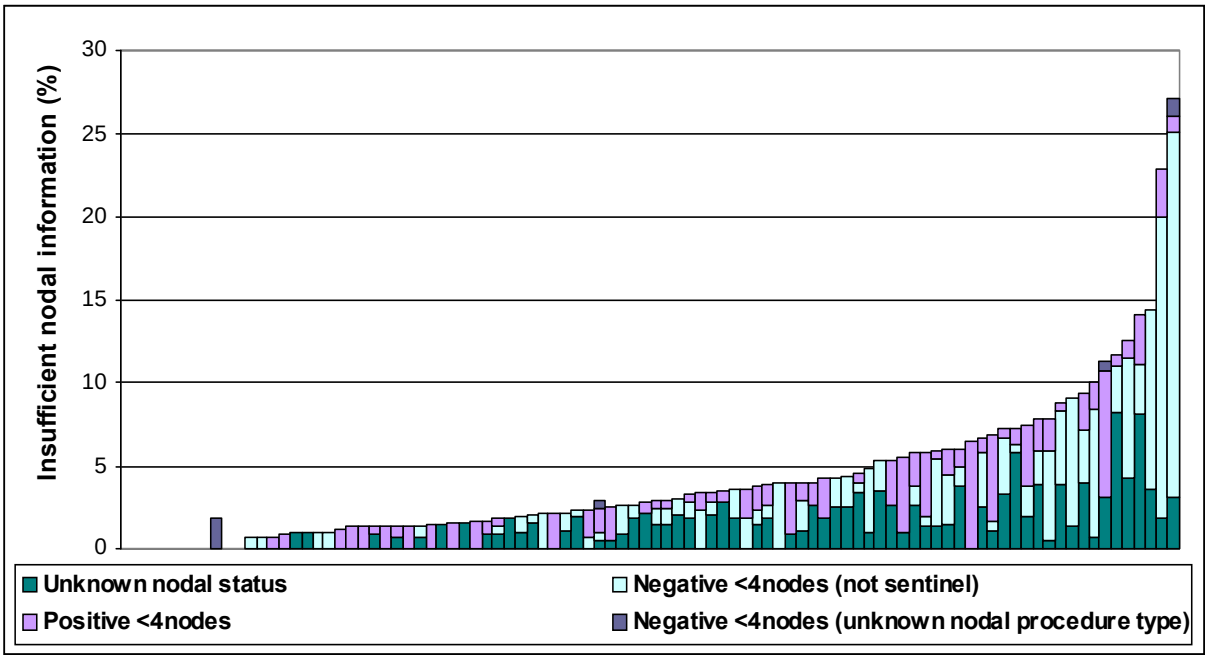

Figure 57: Proportion of invasive cancers with insufficient nodal information in each screening unit

KEY FINDINGS:

- In 2009/10, the proportion of cases with fewer than 4 nodes examined increased to 42.3%. 40.5% of these involved a SLNB procedure, leaving an underlying rate of 1.8% with fewer than 4 nodes examined when a SLNB procedure was not used.
- 94% of the 4,344 invasive cancers, which either did not have a SLNB procedure or where it was not known whether or not a SLNB procedure was performed, had 4 or more nodes taken. This varied from 81% in Wales to 99% in East Midlands. 17 screening units did not meet the 90% minimum standard. Regional QA reference centres and regional surgical QA co-ordinators should audit all the invasive cancers without a SLNB or where the type of axillary procedure used is unknown, which have fewer than 4 nodes reported to ensure that the axilla has not been under-treated.

KEY FINDINGS:

- The proportion of cases with positive nodal status (16%) was lower for cases which underwent a SLNB procedure compared with cases which did not have a SLNB procedure (33%). This could be due to the selection of patients for axillary sampling or clearance, who were thought to be of high risk (e.g. high grade, palpable nodes) or who had positive nodes on non-operative ultrasound guided cytology or core biopsy.
- 138 cancers which had their positive nodal status determined from a SLNB procedure had fewer than 4 nodes taken. 56 (41%) of these cases were in 7 screening units. Of the 130 cases with no subsequent axillary procedure, 15% had an invasive tumour size of 10mm or less, 26% were Grade I, and 22% were in the Excellent or Good NPI Groups.
- A further 15 invasive cancers had their positive nodal status determined on the basis of fewer than 4 nodes without a SLNB procedure. In total, 591 (4%) invasive cancers appear to have insufficient nodal information to provide a satisfactory diagnostic work-up. Regional QA reference centres and regional surgical QA co-ordinators should follow up all of these cases to ensure that the appropriate nodal procedures have been undertaken and that the axilla has not been under-treated.

7.5 Lymph Node Status - Non-invasive Cancers

Although nodal assessment is not always indicated for non-invasive cancers, nodes are usually obtained when a mastectomy is performed, especially if the assessment process provides suspicion of invasive disease. Of the 3,158 surgically treated non-invasive cancers, 30% had known nodal status and 70% had no nodes obtained (Table 90). 84% of the non-invasive cancers treated by mastectomy and 9% of non-invasive cancers treated with breast conserving surgery had known nodal status (Table 91). Of the 943 non-invasive cancers with known nodal status, 9 (1%) had positive nodal status recorded (Table 92). 2 (2%) of the 90 micro-invasive cancers with known nodal status had positive nodal status recorded.

Figure 58 shows that, although in the UK as a whole 84% of non-invasive breast cancers treated with mastectomy had known nodal status, and 64% of non-invasive breast cancers had their nodal status determined on the basis of a SLNB (Table 94), these proportions varied widely between regions. Figure 59 shows that there was even greater variation between screening units. For example, in 9 screening units where the nodal status was known for all cancers, the status was always determined by a SLNB, while in a further 6 units where the nodal status was known for all cancers, the status was always determined without a SLNB.

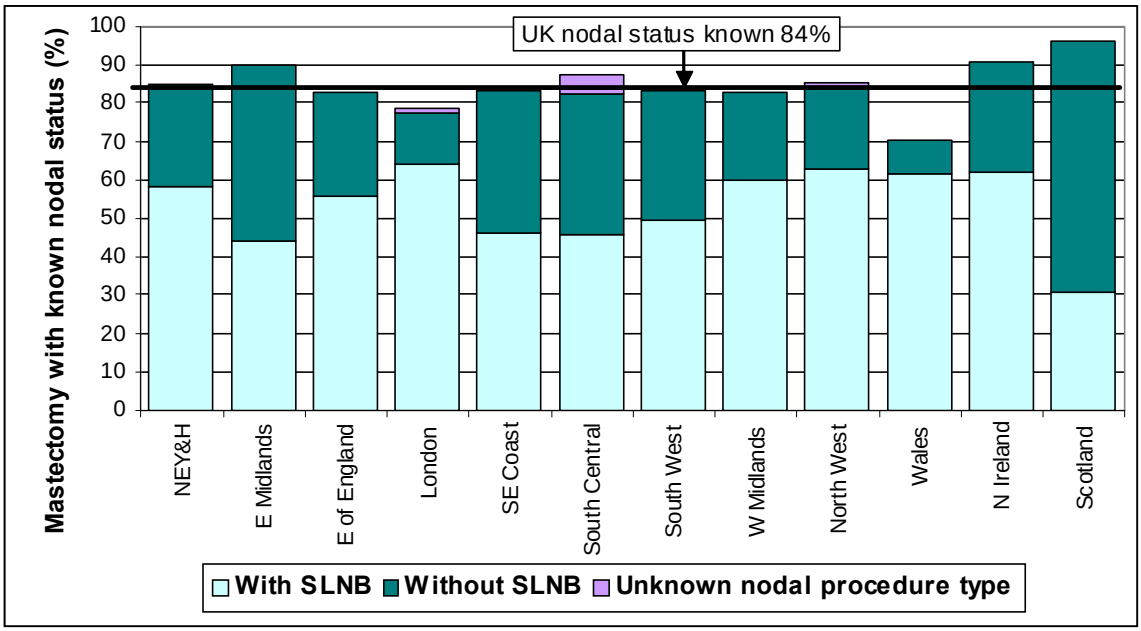

Figure 58 (Table 91 and Table 94): Use of sentinel lymph node biopsy for non-invasive cancers with known nodal status treated with a mastectomy

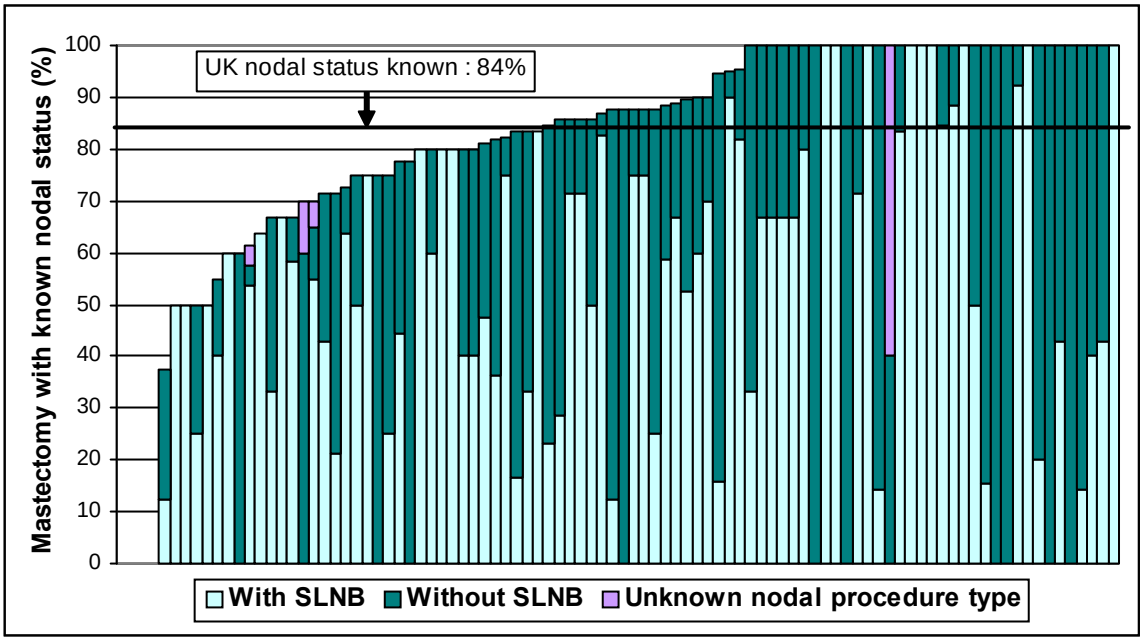

Figure 59: Use of sentinel lymph node biopsy for non-invasive cancers with known nodal status treated with a mastectomy

211 (9%) of non-invasive breast cancers treated with breast conserving surgery had known nodal status, and 85% of these had their nodal status determined on the basis of a SLNB (Table 91). The nodal status of non-invasive cancers was thus more likely to have been determined by SLNB if the cancers were treated with breast conserving surgery than by mastectomy.

Figure 60 shows the variation between regions in the proportion of non-invasive breast cancers treated with breast conserving surgery that had known nodal status. This varied from 2% in Scotland to 16% in Northern Ireland. Figure 61 shows that, compared with non-invasive cancers treated with mastectomy, the variation in practice between screening units was less marked for non-invasive breast cancers treated with breast conserving surgery that had known nodal status; with most units determining the nodal status on the basis of a SLNB. 27 units had no cancers with known nodal status and 9 units did not use SLNB to determine nodal status.

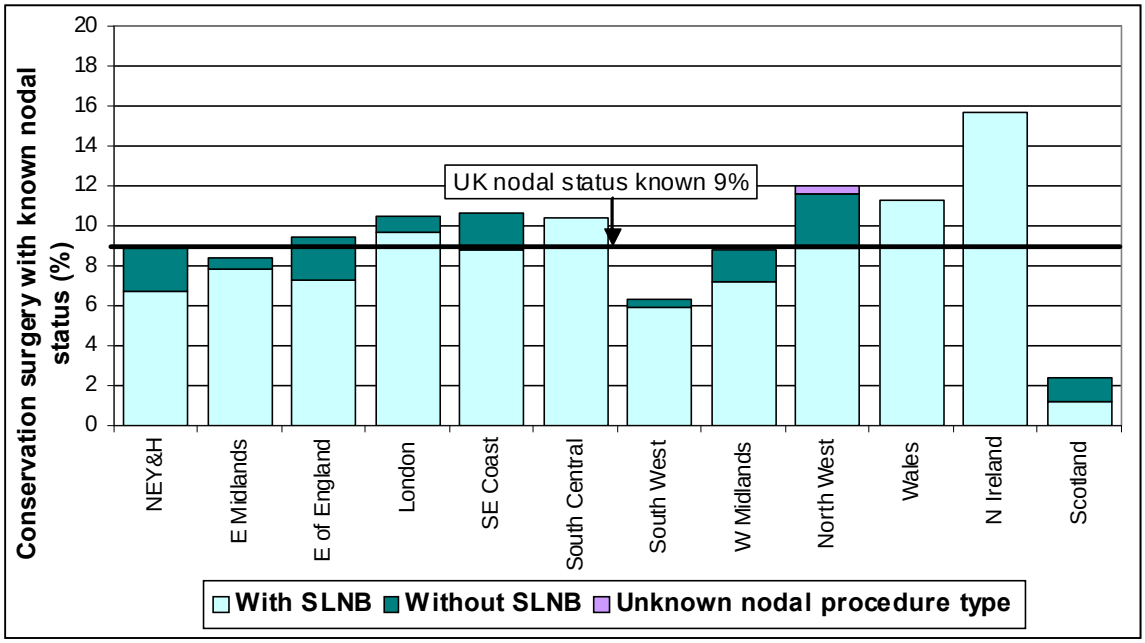

Figure 60 (Table 91 and Table 95): Use of sentinel lymph node biopsy for non-invasive cancers with known nodal status treated with breast conserving surgery

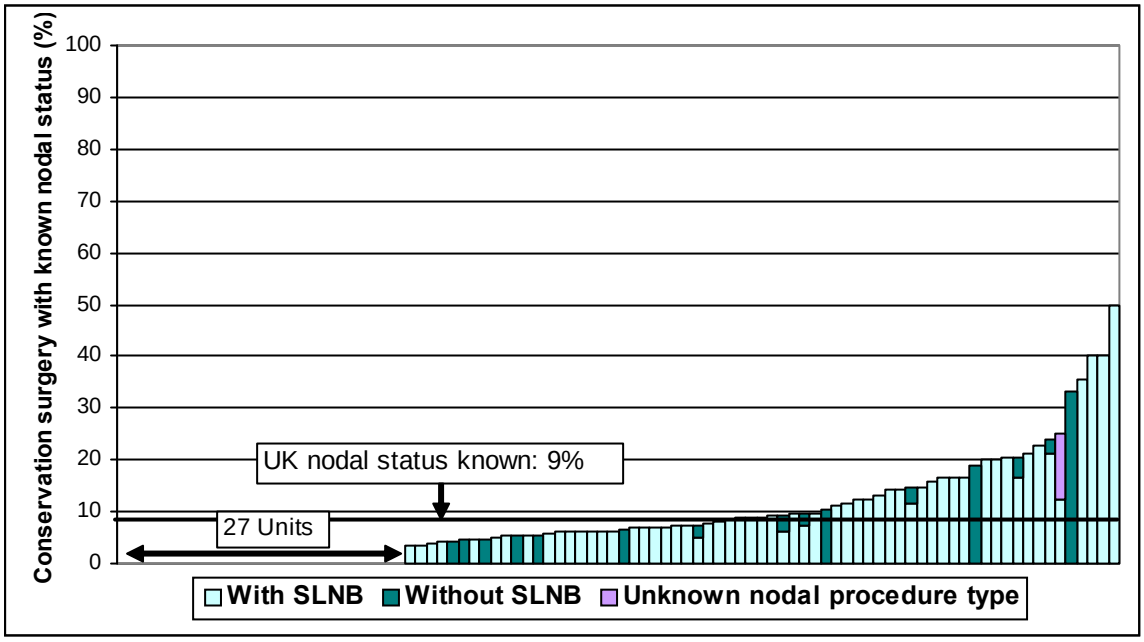

Figure 61: Use of sentinel lymph node biopsy for non-invasive cancers with known nodal status treated with breast conserving surgery

In the UK as a whole the median numbers of nodes taken for non-invasive cancers undergoing breast conserving surgery and mastectomy were 2 and 3 respectively (Table 93). The maximum numbers of nodes taken for cases treated with breast conserving surgery and mastectomy were 15 and 29 respectively. The maximum number of nodes taken for mastectomy cases varied from 8 in Wales to 29 in North East, Yorkshire & Humber. Regional QA reference centres should audit non-invasive cancers where more than 10 nodes were taken to ascertain why the axilla appears to have been over-treated.

KEY FINDINGS:

- Although nodal assessment is not always indicated for non-invasive cancers, 30% of non-invasive cancers had known nodal status. 84% of non-invasive cancers treated with mastectomy had known nodal status, compared with 9% of those treated with breast conserving surgery.
- Of the 943 non-invasive cancers with known nodal status, 9 (1%) had positive nodal status recorded. 2 (2%) of the 90 micro-invasive cancers with known nodal status were positive.
- 64% of non-invasive cancers treated with a mastectomy and 85% of non-invasive cancers treated with breast conserving surgery had their nodal status determined on the basis of a SLNB. The former varied widely between screening units.
- The maximum numbers of nodes taken for non-invasive cancers treated with conservative surgery and mastectomy were 15 and 29 respectively. Regional QA reference centres should audit non-invasive cancers where more than 10 nodes were taken to ascertain why the axilla appears to have been over-treated.

7.6 Invasive Cancers With No Axillary Surgery Recorded

The following summary table shows for each type of non-operative diagnosis, the proportion of invasive cancers in each region with no axillary surgery recorded. 123 invasive cancers (1%) with a B5b (Invasive) non-operative diagnosis had no axillary procedure recorded. 23 of these cancers were in London and 14 in South East Coast and in North West. All invasive cancers diagnosed by C5 cytology only had an axillary procedure recorded. 46 invasive cancers (7%) with a B5a (Non-invasive) non-operative diagnosis had no surgery to the axilla recorded. In addition to these 169 cancers, 17 invasive cancers without a non-operative diagnosis had no surgery to the axilla.

INVASIVE CANCERS WITH NO AXILLARY OPERATION						
	B5b		C5 only, no B5		B5a	
Region	No.	%	No.	%	No.	%
N East, Yorks & Humber	12	1	0	0	2	3
East Midlands	6	1	0	0	0	0
East of England	11	1	0	0	6	8
London	23	2	0	0	6	9
South East Coast	14	1	0	0	6	9
South Central	12	1	0	0	7	15
South West	12	1	0	0	5	8
West Midlands	11	1	0	0	4	6
North West	14	1	0	0	4	5
Wales	2	0	0	0	4	10
Northern Ireland	0	0	0	0	1	5
Scotland	6	1	0	0	1	3
United Kingdom	**123**	**1**	**0**	**0**	**46**	**7**

Shaded if 5% or more above the value for the UK as a whole and more than one cancer is included

The following summary table shows how the number and proportion of invasive cancers with a B5a (Non-invasive) core biopsy which had no axillary operation recorded has varied in each region over the period 2006/07-2009/10. Regional QA reference centres and regional surgical QA co-ordinators should audit all their invasive cancers with no surgery to the axilla recorded to ascertain whether the data for these cases are recorded correctly and, if so, why the nodal status was not determined.

INVASIVE CANCERS WITH A B5A NON-OPERATIVE DIAGNOSIS WITH NO AXILLARY OPERATION								
	2006/07		2007/08		2008/09		2009/10	
Region	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	11	11	4	4	4	4	2	3
East Midlands	1	2	6	10	5	7	0	0
East of England	7	11	6	8	3	4	6	8
London	6	11	7	10	10	15	6	9
South East Coast	11	18	9	11	7	10	6	9
South Central	8	15	3	7	4	10	7	15
South West	8	12	3	4	7	8	5	8
West Midlands	3	5	2	3	2	3	4	6
North West	13	15	6	7	5	6	4	5
Wales	2	4	3	5	3	12	4	10
Northern Ireland	6	50	9	43	0	0	1	5
Scotland	1	2	2	3	3	5	1	3
United Kingdom	**77**	**11**	**60**	**8**	**53**	**7**	**46**	**7**

Shaded if 5% or more above the value for the UK as a whole

KEY FINDINGS:

- Axillary surgery was performed for 99% of invasive cancers with a B5b (Invasive) core biopsy and all invasive cancers diagnosed by C5 cytology only.
- 123 invasive cancers with a B5b (Invasive) core biopsy, 46 invasive cancers with a B5a (Non-invasive) core biopsy and 17 invasive cancers without a non-operative diagnosis had no axillary procedure recorded. In South Central, 15% of B5a (Non-invasive) cancers that were found to be invasive at surgery had no axillary operation recorded. Regional QA reference centres and regional surgical QA co-ordinators should audit the invasive cancers with no surgery to the axilla recorded to ascertain whether the data for these cases are recorded correctly and, if so, why the nodal status was not determined.

7.7 Repeat Operations Involving the Axilla

Repeat therapeutic operations to the axilla may be carried out in the following hypothetical scenarios:

Scenario 1 : Invasion present which was not predicted by the non-operative diagnosis and a repeat operation is undertaken to obtain axillary lymph nodes

- cancers with a B5a (Non-invasive) non-operative diagnosis found to be invasive after surgery where nodes were not taken at first operation
- cancers with a C5 diagnosis where the invasive status could not be predicted and where nodes were not taken at the first operation in line with local protocol

Scenario 2 : Additional therapeutic nodal procedure(s)

- insufficient number of nodes harvested at first operation
- therapeutic clearance of nodes when a number of the nodes taken at the first operation are positive
- clearance of nodes following a positive sentinel lymph node biopsy procedure

The following table summarises how in 2009/10 the proportions of invasive cancers with axillary surgery undertaken in each region at first and repeat operations varied with the non-operative diagnostic result. In the UK as a whole, axillary surgery was performed for 99% of invasive cancers with a B5b (Invasive) core biopsy. Axillary surgery was carried out at the first operation for almost all cases, and only 21 cancers had their axillary surgery at a repeat operation. A similar picture was apparent for invasive cancers diagnosed by C5 cytology only, with only 1 cancer having axillary surgery at a repeat operation.

A high proportion (93%) of invasive cancers with a B5a (Non-invasive) non-operative diagnosis also had axillary surgery. This varied from 85% in South Central (39 cancers) to 100% in East Midlands. However, only 48% (331 cancers) of invasive cancers with a B5a (Non-invasive) non-operative diagnosis had axillary surgery at the first operation, with repeat operations providing nodal data for 46% of these cancers.

PERCENTAGE OF CANCERS WITH AXILLARY SURGERY AT FIRST AND LATER OPERATIONS

	Invasive cancers *(Table 96)*									***Non-invasive or micro-invasive cancers***		
	B5b			**C5 only, no B5**			**B5a**			**B5a**		
Region	***Total***	***1st Op***	***Later Op***	***Total***	***1st Op***	***Later Op***	***Total***	***1st Op***	***Later Op***	***Total***	***1st Op***	***Later Op***
N East, Yorks & Humber	*99*	*99*	*0*	*100*	*88*	*13*	*97*	*54*	*44*	*34*	*27*	*7*
East Midlands	*99*	*99*	*0*	*100*	*100*	*0*	*100*	*54*	*46*	*39*	*31*	*7*
East of England	*99*	*99*	*0*	*100*	*100*	*0*	*92*	*42*	*50*	*30*	*24*	*6*
London	*98*	*97*	*1*	*100*	*100*	*0*	*91*	*48*	*42*	*35*	*30*	*5*
South East Coast	*99*	*98*	*0*	*100*	*100*	*0*	*91*	*48*	*42*	*32*	*25*	*7*
South Central	*99*	*98*	*0*	*100*	*100*	*0*	*85*	*43*	*41*	*37*	*31*	*7*
South West	*99*	*99*	*0*	*100*	*100*	*0*	*92*	*42*	*50*	*29*	*26*	*3*
West Midlands	*99*	*99*	*0*	*100*	*100*	*0*	*94*	*39*	*55*	*37*	*30*	*6*
North West	*99*	*99*	*0*	*100*	*100*	*0*	*95*	*52*	*43*	*40*	*33*	*6*
Wales	*100*	*100*	*0*	*100*	*100*	*0*	*90*	*39*	*51*	*26*	*24*	*3*
Northern Ireland	*100*	*100*	*0*	*100*	*100*	*0*	*95*	*40*	*55*	*46*	*43*	*3*
Scotland	*99*	*99*	*0*	*100*	*100*	*0*	*97*	*69*	*28*	*29*	*23*	*6*
United Kingdom	***99***	***99***	***0***	***100***	***100***	***0***	***93***	***48***	***46***	***34***	***28***	***6***

Shaded if 5% or more above the value for the UK as a whole and more than one cancer is included

7.8 Axillary Surgery for B5a (Non-invasive) Cancers Found to be Invasive at Surgery

Figure 62 shows how the proportion of invasive cancers with a B5a (Non-invasive) non-operative diagnosis having axillary surgery at the first and repeat operations varied in different regions. The proportion of these cancers having their axillary surgery at the first operation was highest in Scotland (69%) and lowest in Wales and West Midlands (39%). In South Central, 15% of B5a (Non-invasive) cancers that were found to be invasive at surgery had no axillary operation recorded. Of the 331 cases with axillary assessment at first operation, 234 (71%) had SLNB performed, compared to 58% of those with axillary assessment at later operation.

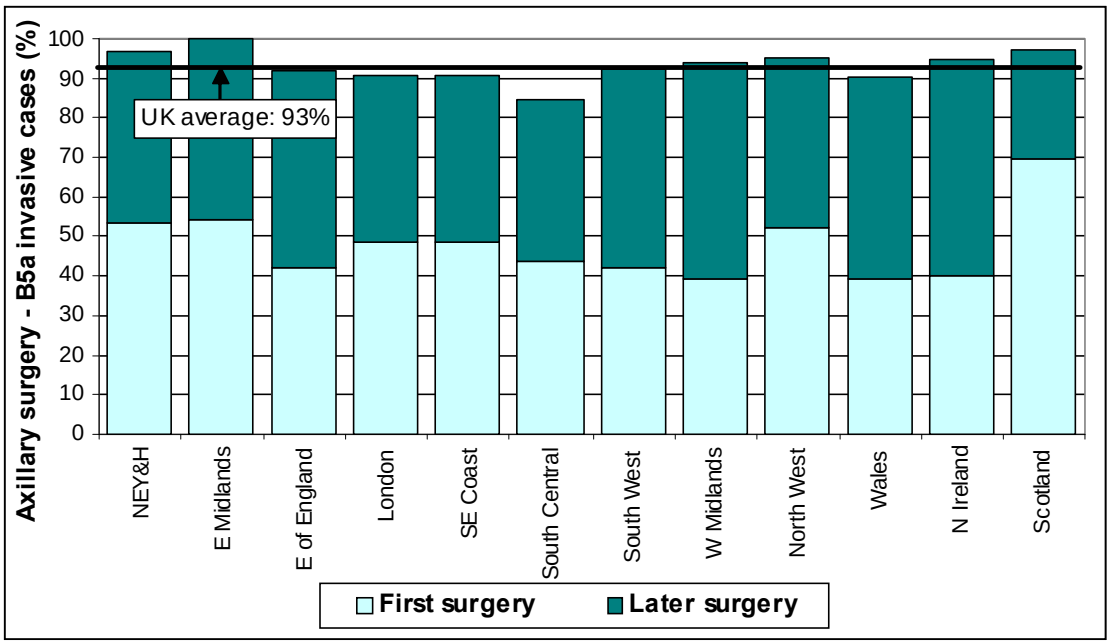

Figure 62 (Table 96): Variation in proportion of invasive cancers with a B5a (Non-invasive) non-operative diagnosis having axillary surgery at first and repeat operations

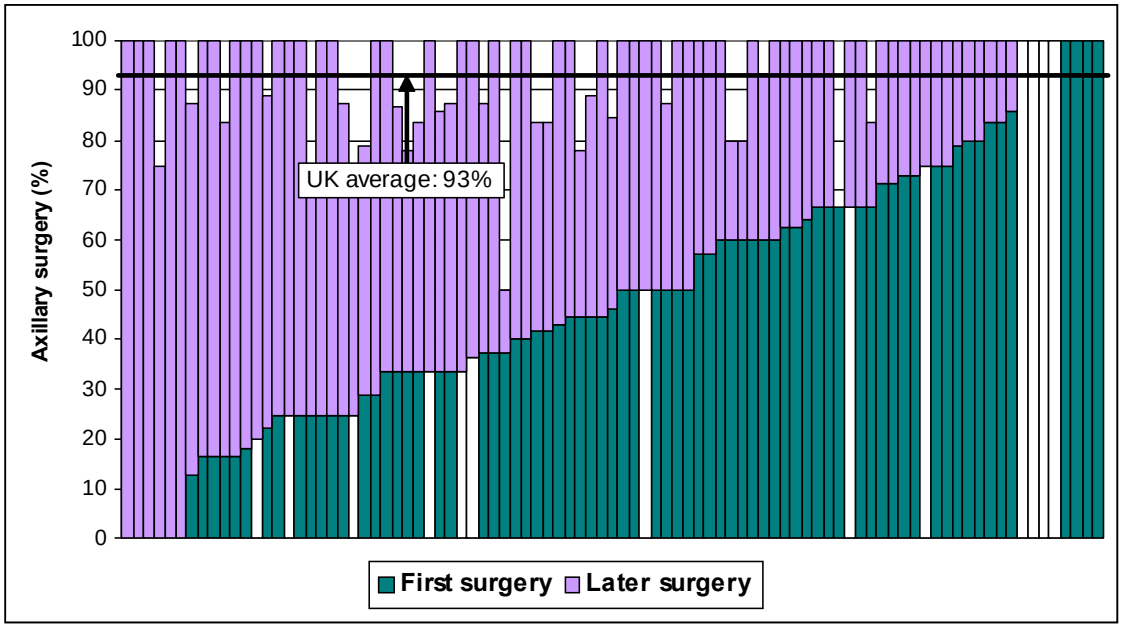

Figure 63: Variation with screening unit in the proportion of invasive cancers with a B5a (Non-invasive) non-operative diagnosis having axillary surgery at first and repeat operations
(13 of the smallest units are highlighted in white - 3 units were excluded as they had no B5a to invasive cancers)

Figure 63 shows the wide variation between screening units in the proportion of invasive cancers with a B5a (Non-invasive) non-operative diagnosis having axillary surgery at the first and repeat operations. The proportion of cancers with a B5a (Non-invasive) non-operative diagnosis that had axillary surgery from 100% in 65 units to less than 70% in 2 units.

The variation between screening units in the proportion of cancers with a B5a (Non-invasive) non-operative diagnosis that had axillary surgery at the first operation in the 3-year period 2007/08-2009/10 is examined in the control chart in Figure 64 in which the dashed lines in are the upper and lower control limits which approximate to the 95% confidence intervals of the average rate (solid line). Six units lie below the lower control limit and have significantly lower rates of axillary surgery at first operation, and 9 units lie above the upper control limit and have significantly higher rates. Of these 15 outliers, 4 are in North West (3 high and 1 low), 4 are in West Midlands (2 high and 2 low) and 3 are in East of England (2 high and 1 low). Regional QA reference centres and their regional surgical QA co-ordinators should investigate the reasons for the unusual clinical practice in the 15 outlier units.

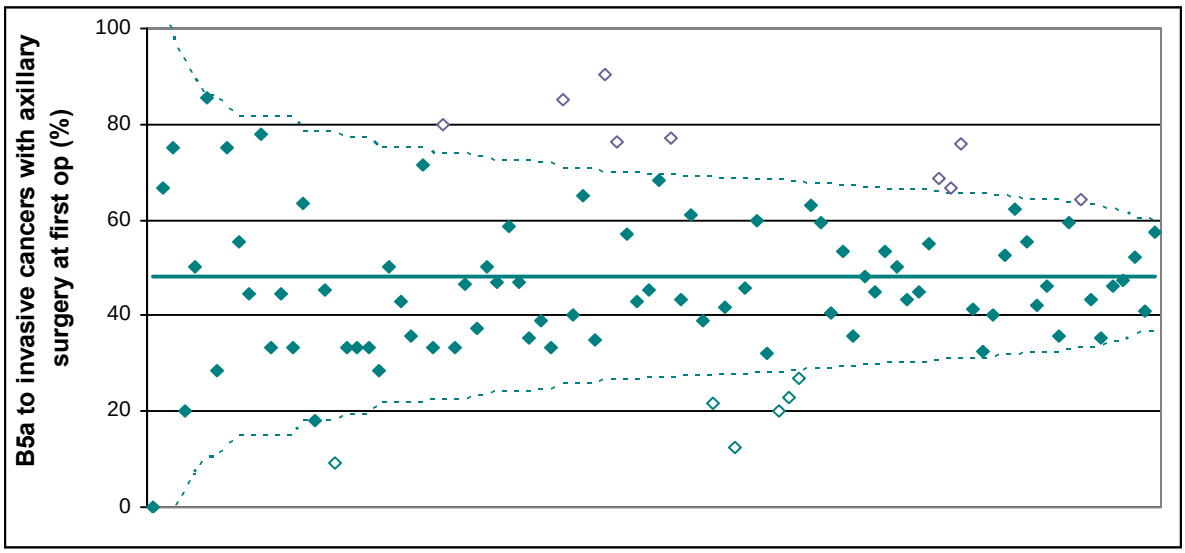

Figure 64: Variation with screening unit in the proportion of invasive cancers with a B5a (Non-invasive) non-operative diagnosis having axillary surgery at first operation in 2007/08-2009/10 (open diamonds represent units which lie outside the control limits)

KEY FINDINGS:

- Although 93% of invasive cancers with a B5a (Non-invasive) diagnosis had axillary surgery, only 331 (48%) of these cancers had their axillary surgery at the first operation; this varied from 39% in Wales and West Midlands to 69% in Scotland.
- Of the 331 cases with axillary assessment at first operation, 71% had SLNB performed, compared to 58% of those with axillary assessment at later operation.
- During the period 2007/08-2009/10, 6 screening units had significantly lower rates of axillary surgery at first operation for invasive cancers with a B5a (Non-invasive) diagnosis, and 9 units had significantly higher rates. Of these 15 outliers, 4 are in North West, 4 are in West Midlands and 3 are in East of England.

7.9 Repeat Operations After a Positive SLNB

Another reason for performing repeat operations to the axilla is if the positive nodal status has been determined on the basis of a SLNB. If this is case, the NHSBSP surgical guidelines state that further axillary treatment should be offered. Figure 65 shows how the proportion of repeat operations to the axilla varied between regions for invasive cancers with positive nodal status. In the UK as a whole, 41% of these cancers had a repeat operation to the axilla. This varied from 30% in London to 53% in South West and West Midlands. 34% of invasive cancers with positive nodal status had a repeat operation to the axilla following a SLNB and 7% after an axillary operation which did not involve a SLNB. Overall in the UK, 83% of repeat operations on the axilla were carried out on invasive cancers with positive nodal status determined on the basis of SLNB (Table 97). This varied between 51% in Scotland and 98% in Wales.

Figure 66 shows that the proportion of repeat operations to the axilla varied between screening units for invasive cancers with positive nodal status, from 0 cases in 3 units to over 60% in 17 units (only 3 of which are small). It is again clear from this figure that, in most screening units, the majority of repeat operations were carried out on invasive cancers with positive nodal status determined on the basis of a SLNB. There were a small number of units with repeat operation rates above the UK average where

the majority of the invasive cancers had their positive nodal status determined without a SLNB or where the nodal procedure was not known. Regional QA reference centres and regional surgical QA co-ordinators should audit these invasive cancers to ensure that the nodal operation data for these cases are recorded correctly and to ascertain why the nodal procedure type was not known.

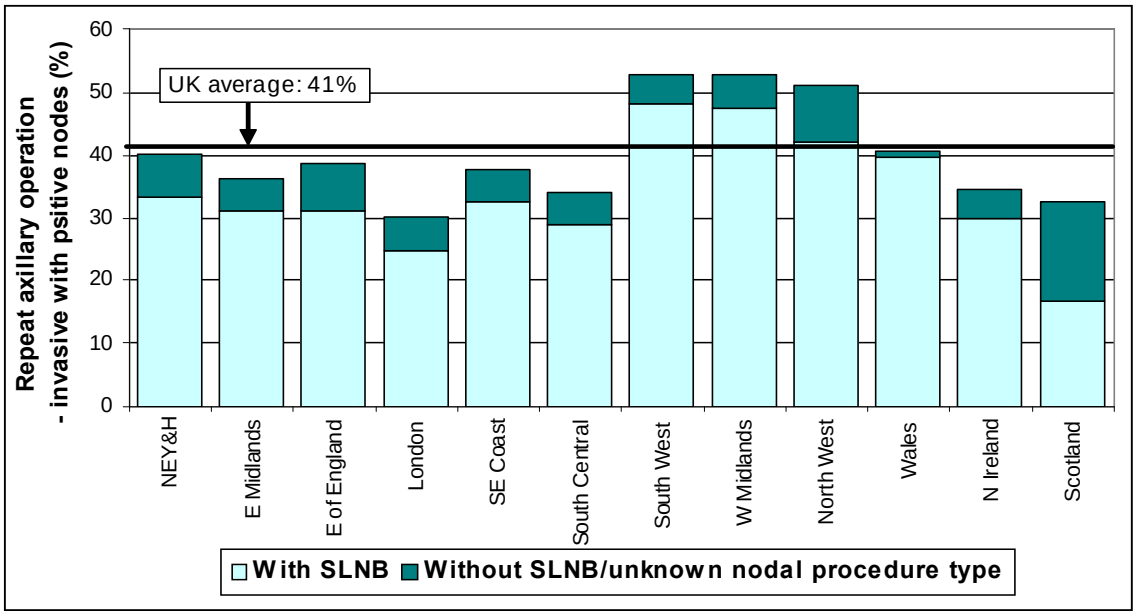

Figure 65 (Table 97): Repeat axillary operations for invasive cancers with positive nodal status

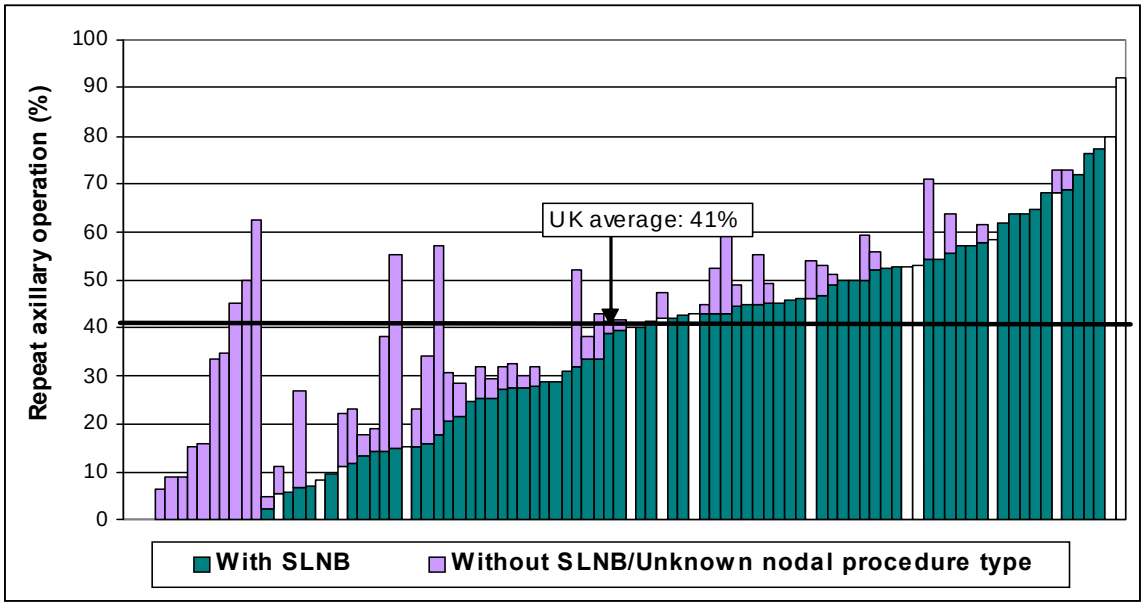

Figure 66: Repeat axillary operations for invasive cancers with positive nodal status by screening unit (14 of the smallest units are highlighted in white)

KEY FINDINGS:

- 41% of invasive cancers with a positive nodal status had a repeat operation to the axilla. This varied from 30% in London to 53% in South West and West Midlands, and from 0% in 3 screening units to over 60% in 17 units.
- 34% of invasive cancers with positive nodal status had a repeat operation to the axilla following a SLNB and 7% after an axillary operation which did not involve a SLNB. Overall in the UK, 83% of repeat operations on the axilla were carried out on invasive cancers with positive nodal status determined on the basis of SLNB. This varied between 51% in Scotland and 98% in Wales.
- In a small number of units with repeat operation rates above the UK average, the majority of the invasive cancers had their positive nodal status determined without a SLNB or using an unknown nodal procedure. Regional QA reference centres should audit these invasive cancers to ensure that the nodal operation data for these cases are recorded correctly and to ascertain why the nodal procedure type was not known.

CHAPTER 8
ADJUVANT THERAPY

Surgeons were asked to supply radiotherapy, chemotherapy and hormonal therapy information for cancers detected through screening between 1 April 2008 and 31 March 2009, the period covered by the previous screening audit. Oestrogen receptor (ER), progesterone receptor (PgR) and Human Epidermal Growth Factor Receptor 2 (HER-2) status were also requested. The cut off point for adjuvant therapy was 31 March 2010, allowing a minimum of 12 months follow up.

Note: Some of these analyses should be treated with caution because it is probably easier to verify that a woman did not receive a given therapy than to provide a complete start date.

8.1 Data Completeness for the Adjuvant Therapy Audit

The 2008/09 NHSBSP audit reported tumour characteristics and primary treatment data for 17,045 screen-detected breast cancers. When data for these cancers were requested for inclusion in this year's adjuvant therapy audit, 33 additional cancers which were not included in the 2008/09 main audit were identified. A further 10 cancers were excluded from the adjuvant therapy audit because they were found not to be breast cancers. Thus, 17,068 cancers were eligible for inclusion in the adjuvant therapy audit. Of these, 100 (1%) had no adjuvant therapy data supplied. 1,294 cancers (8%) were excluded from the audit due to incomplete surgery data, because the woman had had a previous cancer or no adjuvant therapy information were provided. Following these exclusions, 15,674 cancers (92%) were included in the adjuvant therapy audit. Figure 67 shows the variation in data completeness between regions. Scotland and Wales had the highest proportion of eligible cancers (100% and 99% respectively). South East Coast had the lowest proportion of eligible cancers (63%) (Table 98) because 505 cancers were excluded; 38 had previous cancers and 467 had no adjuvant therapy data.

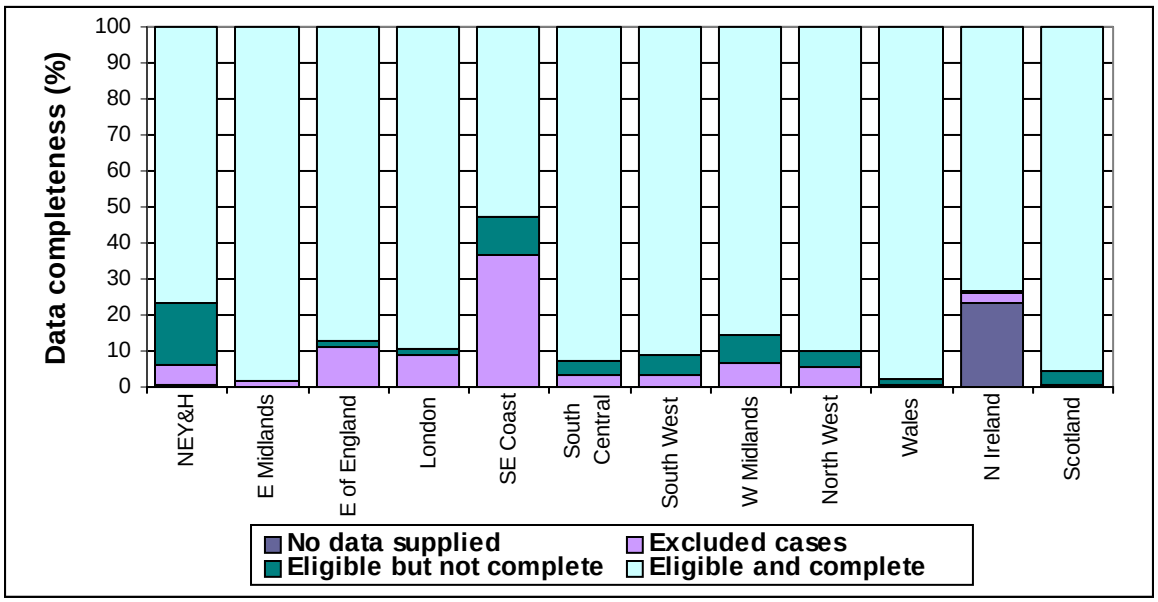

Figure 67 (Table 98): Data completeness of adjuvant audit data

In the UK as a whole, data completeness for radiotherapy, chemotherapy and endocrine therapy was 96%, 99% and 98% respectively for the 15,674 eligible cancers included in the audit for which adjuvant therapy data were supplied. 14,681 (94%) of these cancers had radiotherapy, chemotherapy and endocrine therapy data available (Table 99), compared with 85% in 2007/08. The proportion of cancers with radiotherapy, chemotherapy and endocrine therapy data varied from 82% in North East Yorkshire & Humber to 100% in East Midlands.

8.2 Adjuvant Therapy

In general, invasive cancers received more adjuvant therapy than non-invasive cancers. Of all cancers with known radiotherapy treatment, 10,493 (70%) had radiotherapy recorded by the audit cut off date. 78% of invasive cancers and 41% of non-invasive cancers had radiotherapy recorded (Table 100). 3,142 invasive cancers (26%) and 10 patients with non-invasive cancer had chemotherapy recorded (Table 101). Regional QA reference centres should audit these 10 cases to ascertain if this is a data recording issue.

85% of invasive cancers and 19% of non-invasive cancers received endocrine therapy (Table 102). This difference reflects the relatively low proportion of non-invasive cancers known to be ER positive (45% compared with 89% for invasive cancers), and differing opinions regarding the benefit of offering endocrine therapy to women with non-invasive breast cancer. Compared to 2007/08, there was a 3% decrease in the proportion of patients with non-invasive cancers receiving endocrine therapy. This difference might be expected to increase for cancers detected in 2009/10, following the publication of the *NICE Clinical Guideline 80 Early and locally advanced breast cancer: Diagnosis and treatment* (2009) which states that Tamoxifen should not be offered to women with non-invasive breast cancer.

RADIOTHERAPY TREATMENT			
	Invasive *(Table 104)*	*Non-invasive* *(Table 105)*	*Overall* *(Table 103)*
No surgery	*10%*	*7%*	*10%*
1 operation	*77%*	*41%*	*70%*
>1 operation	*69%*	*36%*	*61%*

The preceding summary table shows that for both invasive and non-invasive cancers, a higher proportion of cancers (8% and 5% respectively) which had only one operation had radiotherapy recorded compared with cancers which had more than one operation. It is possible that some of these cancers may have had involved margins at the first operation, and that the women received radiotherapy to the breast instead of further surgery. 10% of the 206 cancers which did not receive surgery, did have radiotherapy recorded (Table 103). For invasive cancers, 22% of the 9,442 cancers which had one operation, and 36% of the 2,852 cancers which had more than one operation, had chemotherapy recorded (Table 106). 39 invasive cancers which did not have surgery, also had chemotherapy recorded. Regional QA reference centres should audit these cases to ascertain whether this is a data recording issue.

Figure 68 shows how the level of adjuvant therapy recorded for invasive and non-invasive cancers varied with age. Chemotherapy recorded for non-invasive cancers has been excluded because the numbers are small (10 cases) and the accuracy of the data questionable. Endocrine therapy was the main adjuvant therapy for invasive cancers at all ages, followed by radiotherapy. The use of radiotherapy was slightly lower in women aged 52 and under; levelling off at around 80% in women aged 53-64 years, and there was a gradual decrease in then use of radiotherapy for women aged 65 and over. For women with non-invasive cancer, the use of radiotherapy peaked at 48% for women aged 59-61 years and then fell to 32% for those aged older than 70.

Chemotherapy was the least used adjuvant therapy; being recorded for only 25% of women with invasive cancer. This is mainly a reflection of the high proportion of relatively early stage cancers detected by screening. However, there was also a clear decrease in chemotherapy with age; with only 15% of women aged 65-70 years having chemotherapy recorded compared with 35% of women aged 49-55 years. This may be because a higher proportion of younger women have aggressive, fast growing cancers, but may also indicate a reluctance to prescribe chemotherapy to older women where the risk/benefit balance and clinical effectiveness are less clear.

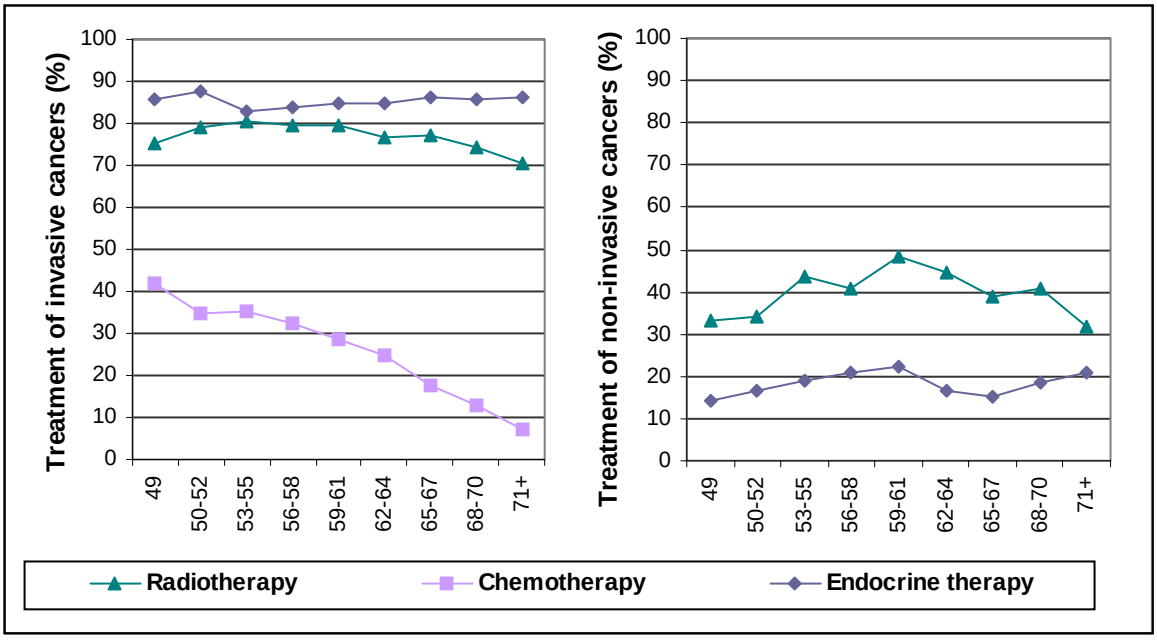

Figure 68 (Table 107 & 108): Percentage of women in each age group who had radiotherapy, chemotherapy and endocrine therapy recorded, for cases with complete adjuvant data

Surgery (ST), radiotherapy (RT) and endocrine therapy (HT) as a combination of treatment was the most common treatment pattern for invasive cancers, with 52% (6,079 cases) receiving this treatment combination (Figure 69). 50% of non-invasive cancers had surgery alone without any adjuvant therapy. The second most commonly used treatment combination, received by 31% of the women with non-invasive cancer, was surgery and radiotherapy. The majority of these women were treated with breast conserving surgery.

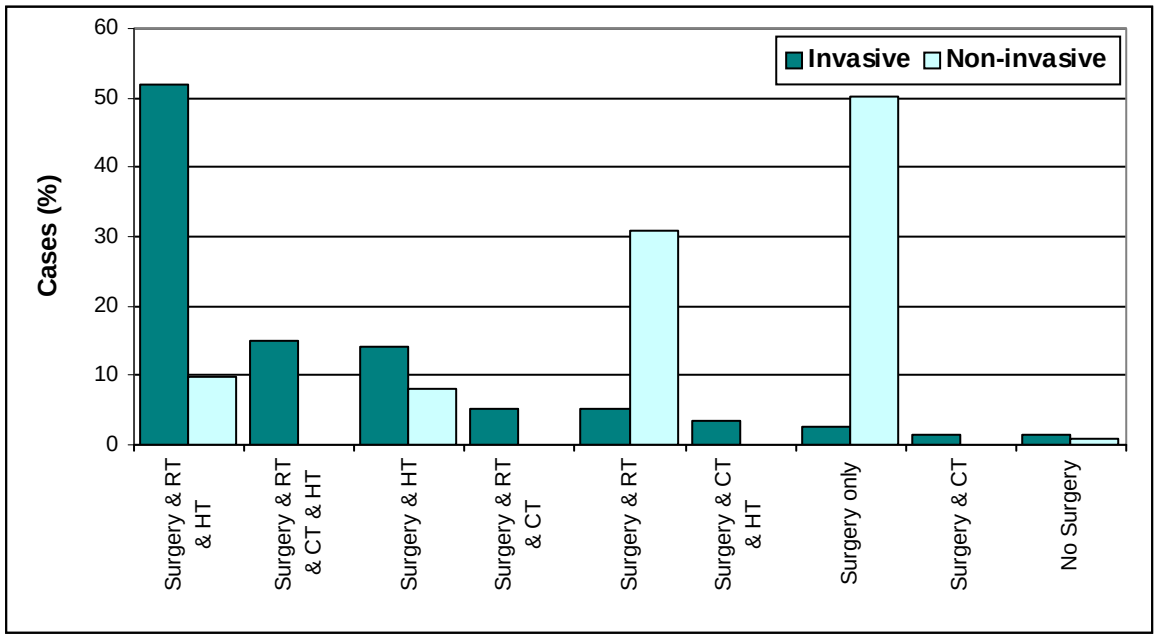

Figure 69 (Tables 109 and 110): Combinations of treatment, expressed as a percentage of cases with complete adjuvant therapy data

KEY FINDINGS:

- 15,674 cases (92% of all cases) were included in the adjuvant therapy audit. Scotland and Wales had the highest proportion of eligible cases (100% and 99% respectively). South East Coast had the lowest proportion of eligible cases with 37% of cases excluded.

KEY FINDINGS:

- 78% of invasive cancers and 41% of non-invasive cancers had radiotherapy recorded. 26% of the invasive cancers and 10 patients with non-invasive cancer had chemotherapy recorded. Regional QA reference centres should audit these 10 cases to ascertain if this is a data recording issue.
- 85% of invasive cancers and 19% of non-invasive cancers had endocrine therapy recorded. There are differing opinions regarding the benefit of offering endocrine therapy to women with non-invasive breast cancer. As *NICE Clinical Guideline 80 Early and locally advanced breast cancer: Diagnosis and treatment (2009)* states that Tamoxifen should not be offered to these women, it will be interesting to see if the proportion of women with non-invasive breast cancer who do receive endocrine therapy decreases in future audits.
- Endocrine therapy was the main treatment recorded for invasive cancers at all ages, followed by radiotherapy. The use of radiotherapy decreased gradually with age for both invasive and non-invasive cancers.
- There was a clear decrease in chemotherapy treatment with age; with only 15% of women aged 65-70 receiving chemotherapy compared with 35% of women aged 49-55. This may be because a higher proportion of younger women have aggressive, fast growing cancers, but may also indicate a reluctance to prescribe chemotherapy to older women where the risk/benefit balance and clinical effectiveness are less clear.

8.3 Waiting Time for Radiotherapy

Tables 111 to 118 show the regional variation in the cumulative percentages of cancers recorded as having various therapies within 14, 30, 60, 90, 120 and 200 days. Cancers which were recorded as having received chemotherapy before or after surgery have been excluded.

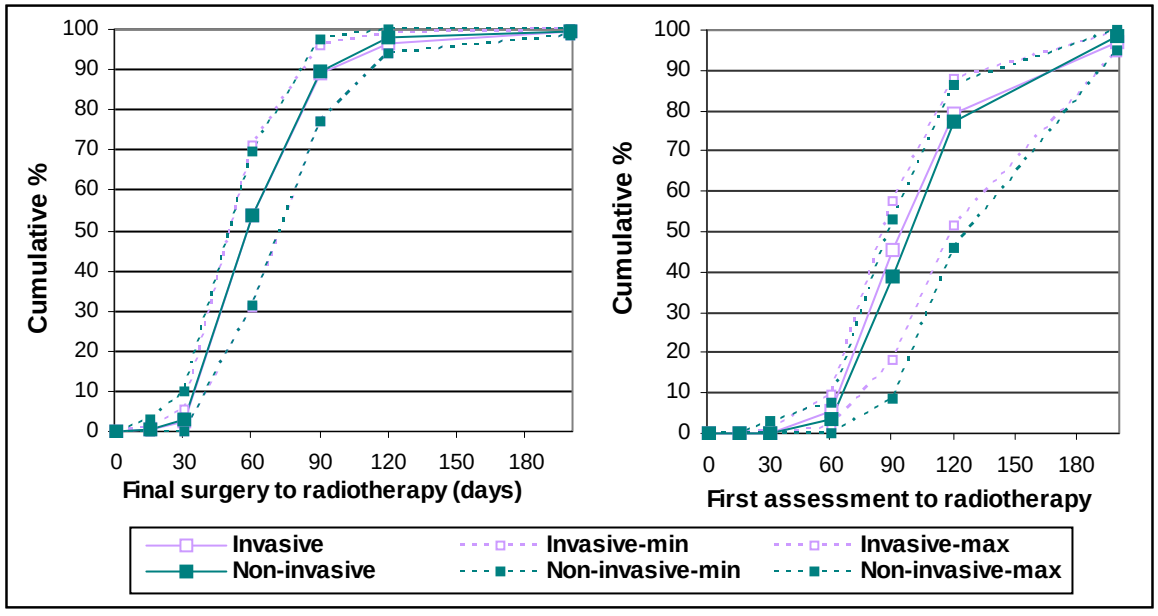

Figure 70 (Tables 115, 116, 117 and 118): The cumulative percentage of cases with surgery and adjuvant radiotherapy, that had radiotherapy recorded up to 200 days after final surgery (left) and first assessment (right)

In Figure 70, the cumulative percentage curves for the UK as a whole are drawn as solid lines and dashed lines represent the regions with the maximum and minimum cumulative percentages at each point. The left hand graph shows the time taken from final surgery to radiotherapy, excluding surgically treated cancers recorded as having received chemotherapy. In the UK as a whole, only 54% of women with invasive or non-invasive breast cancer received radiotherapy within 60 days of their final surgery and 89% within 90 days. 38 women (1%) had not received radiotherapy 200 days after their final surgery. Waiting times for radiotherapy have improved since 2002/03 when only 36% of women received their radiotherapy within 60 days of their final surgery.

The right hand graph in Figure 70 shows that 45% of women with invasive cancer and 39% of women

with non-invasive cancer with radiotherapy recorded had started their radiotherapy within 90 days of their first assessment visit and that 202 women (3%) with invasive cancer and 18 women (2%) with non-invasive cancer had not started radiotherapy even after 200 days. Regional QA reference centres should review the 258 cancers (invasive and non-invasive) which were not treated with chemotherapy and where radiotherapy was not started within 200 days of the final surgery or the first assessment visit.

MEDIAN DAYS BETWEEN THERAPIES – INVASIVE

	Assessment to …				Final surgery to …	
Region	**Diagnostic surgery** (Table 111)	**Therapeutic surgery** (Table 113)	**RT (1 op)***	**RT (>1op)***	**RT (1 op)***	**RT (>1 op)***
N East, Yorks & Humber	36	28	82	116	52	52
East Midlands	28	28	85	125	56	56
East of England	34	28	85	117	57	56
London	39	34	97	140	62	59
South East Coast	52	40	112	160	72	72
South Central	35	30	87	121	55	53
South West	32	31	99	132	68	62
West Midlands	40	27	89	123	58	56
North West	32	28	84	118	55	55
Wales	29	25	92	126	67	68
Northern Ireland	45	21	86	113	67	71
Scotland	44	28	89	120	62	57
United Kingdom	**35**	**29**	**89**	**123**	**58**	**57**

*Excludes cases with chemotherapy Shaded if 5 days or more above the value for the UK as a whole

MEDIAN DAYS BETWEEN THERAPIES – NON-INVASIVE

	Assessment to …				Final surgery to …	
Region	**Diagnostic surgery** (Table 112)	**Therapeutic surgery** (Table 114)	**RT (1 op)***	**RT (>1op)***	**RT (1 op)***	**RT (>1 op)***
N East, Yorks & Humber	33	34	88	114	54	56
East Midlands	36	32	91	116	61	52
East of England	29	29	85	113	56	54
London	41	37	97	126	59	56
South East Coast	49	47	121	134	71	61
South Central	33	35	89	121	56	60
South West	37	37	97	121	64	60
West Midlands	30	31	95	122	60	55
North West	30	31	78	118	49	53
Wales	36	27	95	137	70	66
Northern Ireland	23	24	91	120	68	62
Scotland	34	31	89	114	63	51
United Kingdom	**35**	**34**	**91**	**120**	**59**	**56**

*Excludes cases with chemotherapy Shaded if 5 days or more above the value for the UK as a whole

The preceding summary tables show the median number of days from assessment to diagnostic and therapeutic surgery, from assessment to radiotherapy and from final surgery to radiotherapy in each region for invasive and non-invasive cancers. In general, the waiting times for radiotherapy are slightly longer for non-invasive cancers compared to invasive cancers. For invasive cancers which did not have chemotherapy, the median time between final surgery and radiotherapy was similar for patients

undergoing one or more surgical operations (58 or 57 days respectively) but varied somewhat between regions. The longest waiting times were seen in South East Coast, London and Wales.

In the Cancer Reform Strategy published in December 2007, a radiotherapy waiting times standard was introduced which specifies that the time between the date when a person is determined to be 'fit to treat' after surgery and the start of radiotherapy should be no more than 31 days. If this standard is to be achieved, considerable reductions in the time between final surgery and radiotherapy will be required in all regions.

KEY FINDINGS:

- Overall, 54% of women received radiotherapy within 60 days of their final surgery and 90% within 90 days. 38 women (1%) had not received radiotherapy 200 days after their final surgery.
- Only 45% of women with invasive breast cancer and 39% of women with non-invasive breast cancer had started their radiotherapy within 90 days of their first assessment visit and 202 women (3%) with invasive breast cancer had not started radiotherapy after 200 days. Regional QA reference centres should review all of the cases (invasive and non-invasive) where radiotherapy was not started within 200 days of final surgery.
- For invasive cancers which did not have chemotherapy, the median time between final surgery and radiotherapy was similar for patients undergoing one or more surgical operations (58 or 57 days respectively) but varied somewhat between regions. The longest waiting times were seen in South East Coast, London and Wales.
- In the Cancer Reform Strategy published in December 2007, a new radiotherapy waiting times standard was introduced which specifies that the time between the date when a person is determined to be 'fit to treat' after surgery and the start of radiotherapy should be no more than 31 days. If this standard is to be achieved, considerable reductions in the time between final surgery and radiotherapy will be required in all regions.

8.4 Combinations of Adjuvant Therapy According to Tumour Characteristics

This section examines the combinations of adjuvant therapy given to tumours with various prognostic characteristics. It is clear that different screening units follow different protocols. It is hoped that by presenting analyses for five specific propositions, informative discussions to agree best practice can take place.

8.4.1 Conservation Surgery and Radiotherapy

PROPOSITION 1

Women with invasive breast cancer treated with conservation surgery should normally receive radiotherapy

Of the 14,991 cases with radiotherapy data recorded, 79% were invasive and 20% were non-invasive (Table 119). 8,739 (73%) of the invasive cancers were treated with breast conserving surgery (Table 120). Of these, 538 (6%) did not have adjuvant radiotherapy recorded (Table 121). Figure 71 shows the variation in the proportion of conservatively treated invasive and non-invasive cancers that did not have adjuvant radiotherapy recorded. For invasive cancers, the proportions without radiotherapy recorded varied from 2% in Wales to 13% in South Central.

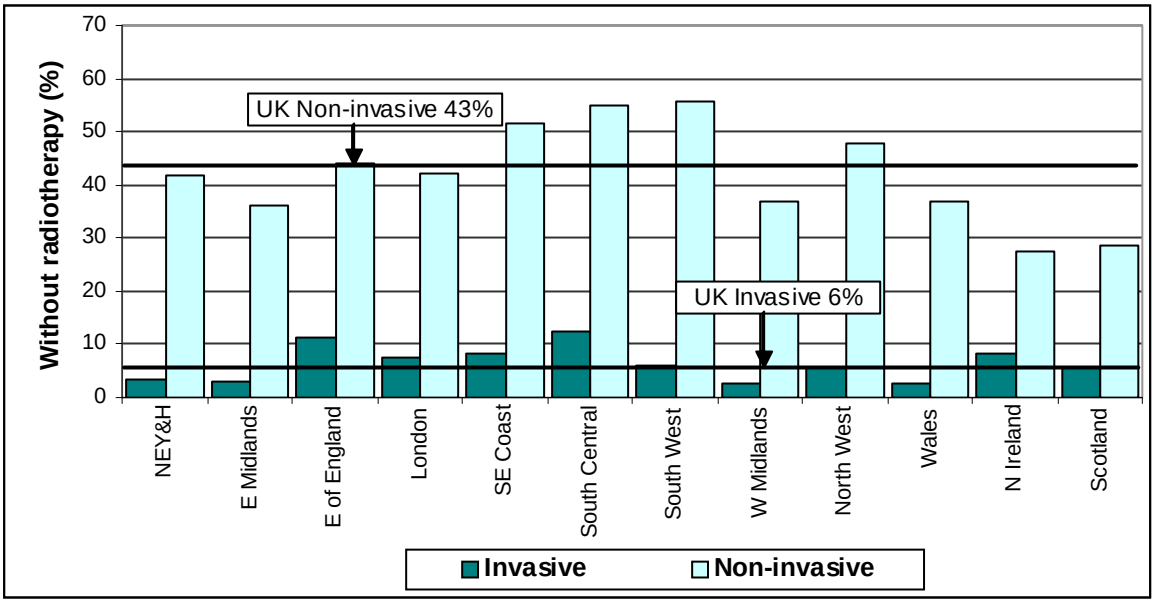

Figure 71 (Tables 121 & 123): The proportion of conservatively treated invasive cancers and non-invasive cancers that did not have radiotherapy recorded

Figure 72 shows the proportion of conservatively treated invasive breast cancers in each screening unit in 2008/09 which did not have radiotherapy recorded. This varied from 0 cancers in 12 units to more than 20% of invasive cancers in 3 screening units. In the UK as a whole, 14% of these conservatively treated invasive cancers which did not receive radiotherapy were larger than 20mm in diameter, 13% were Grade III and 12% were node positive (Table 122).

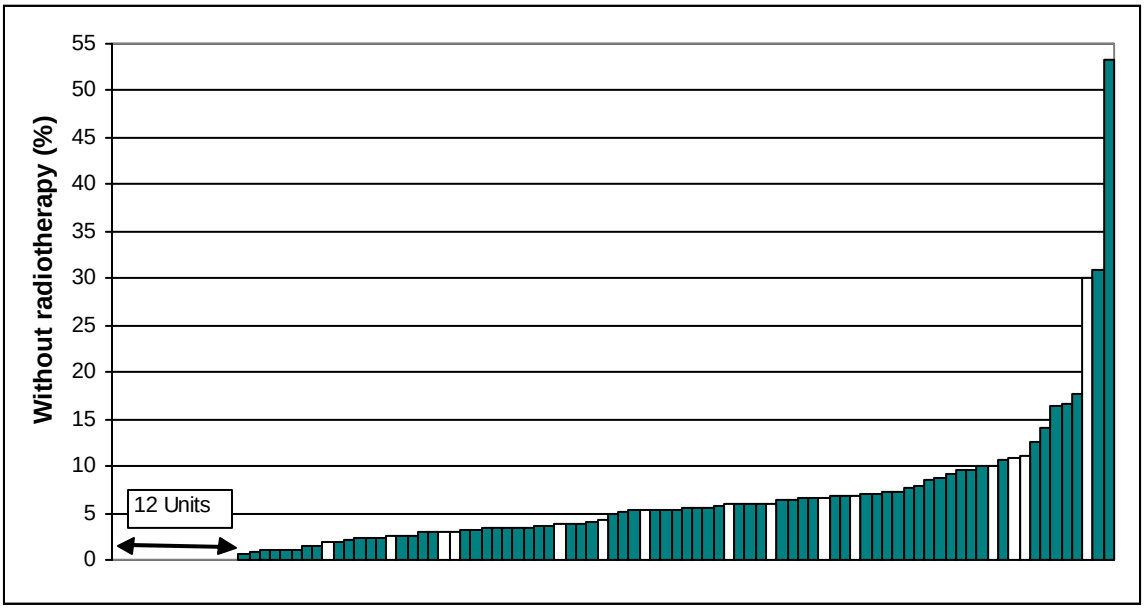

Figure 72: Variation between screening units in the proportion of conservatively treated invasive cancers that did not have radiotherapy recorded (15 of the 20 smallest units are highlighted in white)

The significance of the variation between screening units in the proportion of conservatively treated invasive breast cancers which did not have radiotherapy over the 3-year period 2006/07-2008/09 is examined in the control chart in Figure 73 in which the dashed lines in are the upper and lower control limits which approximate to the 95% confidence intervals of the average rate (solid line). Nineteen units lie above the upper control limit and had significantly lower rates of radiotherapy. Five of these units were in South East Coast, 3 in London and 3 in Scotland. The two units with the highest proportion of cases without radiotherapy were in South Central (46%) and East of England (25%).

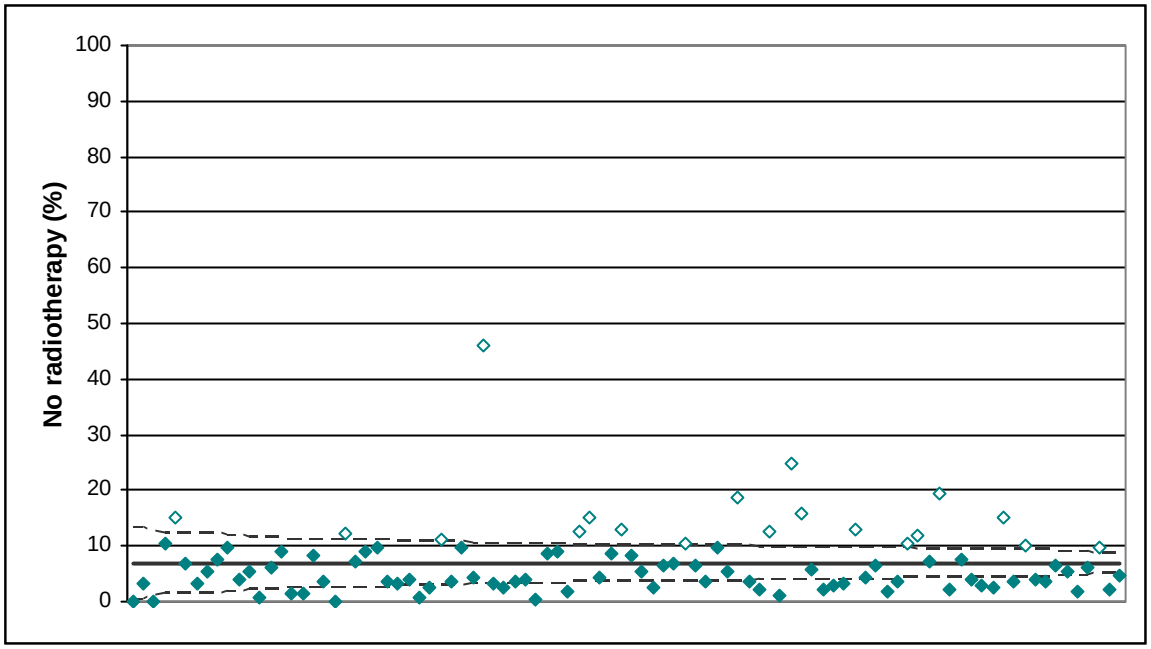

Figure 73: Variation with screening unit in the proportion of invasive cancers treated with breast conserving surgery that did not receive radiotherapy (2006/07-2008/09)
(open diamonds represent units which lie outside the control limits)

Of the 2,069 non-invasive cancers treated with breast conserving surgery, 893 (43%) did not have adjuvant radiotherapy recorded (Table 123). This varied from 28% in Northern Ireland to 56% in South West. Figure 74 shows the proportion of conservatively treated high cytonuclear grade non-invasive cancers and the proportion of conservatively treated non-invasive cancers with size greater than 40mm that did not have radiotherapy recorded. 22% (196) of non-invasive cancers without radiotherapy recorded were high cytonuclear grade (Table 124), and 11 cancers were more than 40mm in diameter (Table 125). Provided that the tumour margins were adequate, it may be acceptable for conservatively treated non-invasive cancers to not receive radiotherapy. However, *NICE Clinical Guideline 80* on the diagnosis and treatment of early and locally advanced breast cancer recommends that adjuvant radiotherapy should be offered to patients with DCIS following adequate breast conserving surgery and the relative risks and benefits discussed.

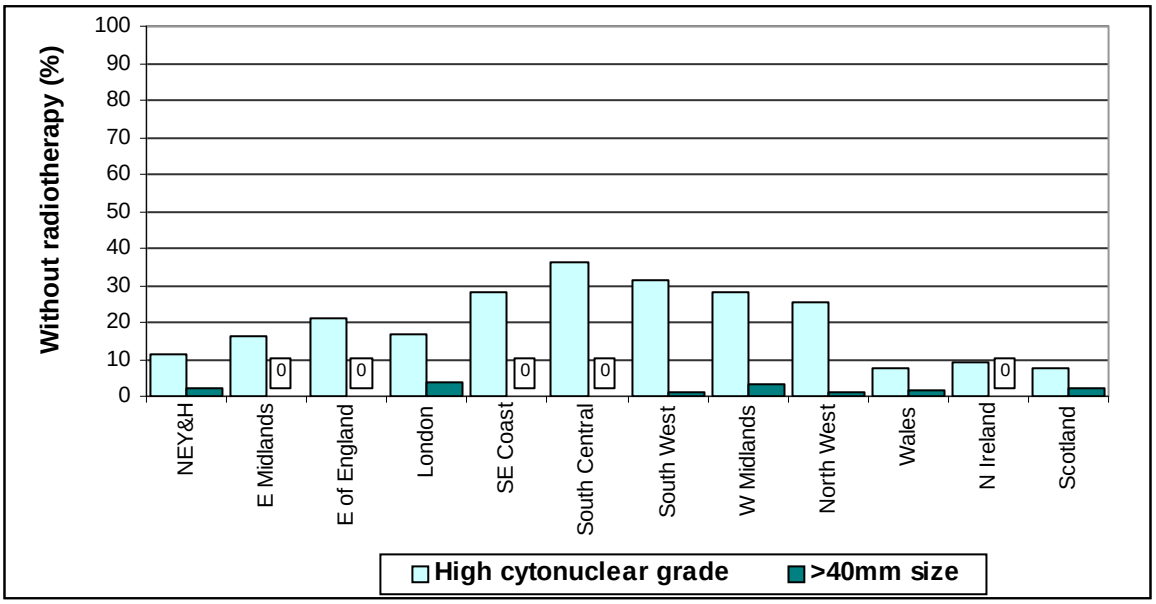

Figure 74 (Tables 124 & 125): The proportion of conservatively treated non-invasive cancers with high cytonuclear grade or size greater than 40mm which did not have radiotherapy recorded

The following summary table shows how the number and proportion of conservatively treated invasive and non-invasive cancers without radiotherapy recorded has varied in each region over the 3-year period from 2006/07 to 2008/09. Throughout the 3-year period, in South East Coast, South Central

and South West, more than 50% of conservatively treated non-invasive cancers do not appear to have received radiotherapy. Given the benefits demonstrated in clinical trials from the provision of radiotherapy to patients treated with breast conserving surgery, regional QA reference centres should audit all conservatively treated invasive breast cancers which did not have radiotherapy recorded to ascertain if this is a true reflection of clinical practice or a data recording issue. Regional QA reference centres should also ascertain each screening unit's policy regarding the provision of radiotherapy to conservatively treated non-invasive breast cancers since there is evidence from clinical trials that this can reduce recurrence rates as well as reducing the time to recurrence.

CONSERVATIVELY TREATED CANCERS WITHOUT RADIOTHERAPY RECORDED

	Invasive						Non-invasive					
	2006/07		2007/08		2008/09		2006/07		2007/08		2008/09	
Region	**No.**	%	**No.**	%	**No.**	%	**No.**	%	**No.**	%	**No.**	%
N East, Yorks & Humber	50	6	57	6	32	3	87	40	115	42	89	42
East Midlands	16	3	14	2	23	3	44	34	49	32	61	36
East of England	45	7	92	12	97	11	71	41	95	48	104	44
London	73	10	58	8	60	8	92	45	82	45	84	42
South East Coast	30	8	26	16	39	8	74	60	29	51	64	52
South Central	78	12	83	13	84	13	89	64	90	64	89	55
South West	62	7	56	6	50	6	120	53	136	59	122	56
West Midlands	23	4	25	3	22	3	42	34	49	34	64	37
North West	118	12	56	6	55	6	93	45	83	43	99	48
Wales	14	3	7	1	14	2	46	41	53	41	54	37
Northern Ireland	7	9	12	8	12	8	7	32	16	41	11	28
Scotland	78	10	62	8	50	6	43	26	45	27	52	29
United Kingdom	**594**	**8**	**548**	**7**	**538**	**6**	**808**	**44**	**842**	**44**	**893**	**43**

Shaded if 5% or more above the value for the UK as a whole

KEY FINDINGS 1:

- 94% of women with invasive cancer treated with breast conserving surgery had radiotherapy recorded, compared to only 57% of women with conservatively treated non-invasive cancers.
- In 2009/10, in three screening units more than 20% of invasive cancers treated with breast conserving surgery did not have radiotherapy recorded. In the 3-year period 2006/07-2008/09, 19 screening units had significantly lower rates of radiotherapy. Five of these units were in South East Coast, three in London and three in Scotland. The two units with the highest proportion of invasive cancers without radiotherapy were in South Central (46%) and East of England (25%).
- 14% of conservatively treated invasive cancers without radiotherapy recorded were larger than 20mm in diameter, 13% were Grade III and 12% were node positive. Given the benefits demonstrated in clinical trials from the provision of radiotherapy to patients treated with breast conservation surgery, regional QA reference centres should audit all conservatively treated invasive breast cancers which did not have radiotherapy recorded to ascertain if this is a true reflection of clinical practice or a data recording issue.
- 196 non-invasive cancers without radiotherapy recorded were high cytonuclear grade and 11 were more than 40mm in diameter. In the 3 year period 2006/07-2008/09, in South East Coast, South Central and South West, more than 50% of conservatively treated non-invasive cancers had no radiotherapy recorded. Provided that the tumour margins were adequate, it may be acceptable for conservatively treated non-invasive cancers to not receive adjuvant radiotherapy. However, regional QA reference centres should ascertain each screening unit's policy regarding the provision of radiotherapy to these cancers as *NICE Clinical Guideline 80* recommends that adjuvant radiotherapy should be offered to patients with DCIS following adequate breast conserving surgery and the relative risks and benefits discussed.

8.4.2 Node Positive Invasive Cancers and Chemotherapy

PROPOSITION 2
Chemotherapy should be considered for invasive cancers with positive nodal status

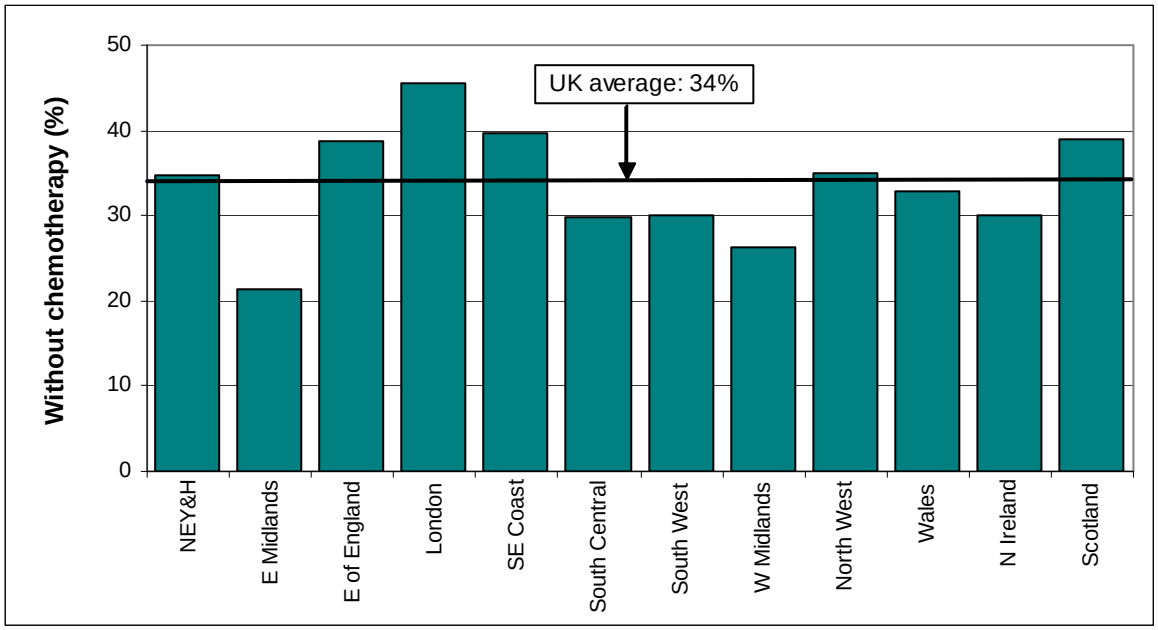

Figure 75 (Table 126): The proportion of node positive invasive cancers that did not have chemotherapy recorded

Of the 15,481 cancers with known chemotherapy data, 2,606 (17%) were node positive invasive cancers (Table 126), of these, 884 (34%) did not have chemotherapy recorded. This varied from 21% in East Midlands to 46% in London (Figure 75). The following table shows how the number and proportion of node positive invasive cancers with no chemotherapy treatment recorded has varied in each region in the 3-year period from 2006/07 to 2008/09. East of England and South East Coast had consistently higher proportions of node positive invasive cancers without chemotherapy. The proportions of these cancers in London and Scotland increased markedly in 2008/09.

NODE POSITIVE INVASIVE CANCERS WITHOUT CHEMOTHERAPY

	2006/07		***2007/08***		***2008/09***	
Region	***No.***	%	***No.***	%	***No.***	%
N East, Yorks & Humber	*131*	*45*	*125*	*37*	*134*	*35*
East Midlands	*56*	*29*	*51*	*28*	*42*	*21*
East of England	*92*	*46*	*113*	*47*	*94*	*39*
London	*75*	*34*	*86*	*33*	*94*	*46*
South East Coast	*77*	*55*	*63*	*40*	*57*	*40*
South Central	*59*	*32*	*60*	*30*	*58*	*30*
South West	*86*	*35*	*87*	*36*	*66*	*30*
West Midlands	*62*	*29*	*63*	*30*	*65*	*26*
North West	*112*	*36*	*118*	*41*	*106*	*35*
Wales	*47*	*36*	*54*	*35*	*46*	*33*
Northern Ireland	*6*	*20*	*8*	*27*	*15*	*30*
Scotland	*72*	*27*	*69*	*28*	*107*	*39*
United Kingdom	***875***	***36***	***897***	***35***	***884***	***34***

Shaded if 5% or more above the value for the UK as a whole

Of the 884 cancers which had no chemotherapy recorded, 121 (14%) were Grade III, 57 (6%) were HER-2 positive, 477 were diagnosed in women aged less than 65 and 407 in women aged 65 or above. The 477 cancers in women aged less than 65 without chemotherapy recorded accounted for only 25% of all node positive invasive cancers with known chemotherapy data in this age group. In

contrast, in the older patients, the 407 cases without chemotherapy recorded constituted 54% of all the node positive invasive cancers. Given the relatively small numbers of cancers involved, all regional QA reference centres and regional surgical QA co-ordinators should audit Grade III and/or HER-2 positive, node positive invasive cancers with no chemotherapy recorded to determine whether the absence of chemotherapy data is a true reflection of clinical practice or a data recording issue.

KEY FINDINGS 2:

- 34% of women with node positive invasive cancer did not have chemotherapy recorded.
- Older women with node positive invasive cancers were less likely to have chemotherapy recorded than younger women; only 25% of women aged less than 65 with node positive invasive cancers did not have chemotherapy recorded compared with 54% of older patients.
- 14% of the 884 node positive invasive cancers which had no chemotherapy were Grade III and 6% were HER-2 positive. Given the relatively small numbers of cancers involved, all regional QA reference centres and regional surgical QA co-ordinators should audit Grade III and/or HER-2 positive, node positive invasive cancers with no chemotherapy recorded to determine whether the absence of chemotherapy treatment data is a true reflection of clinical practice or a data recording issue.

8.4.3 ER Status and Endocrine Therapy

PROPOSITION 3

Endocrine therapy (e.g. Tamoxifen) is only beneficial to women with ER positive invasive cancers and to women with ER negative, PgR positive invasive cancers

Of the 15,373 cancers with complete endocrine therapy data included in the adjuvant therapy analysis, 12,368 (80%) were ER positive, 1,569 (10%) ER negative and for 1,436 (9%) either the ER status were not tested or the ER status was unknown (Table 128). 89% of the ER positive cancers with known endocrine therapy data were invasive and 11% non-invasive (Table 129).

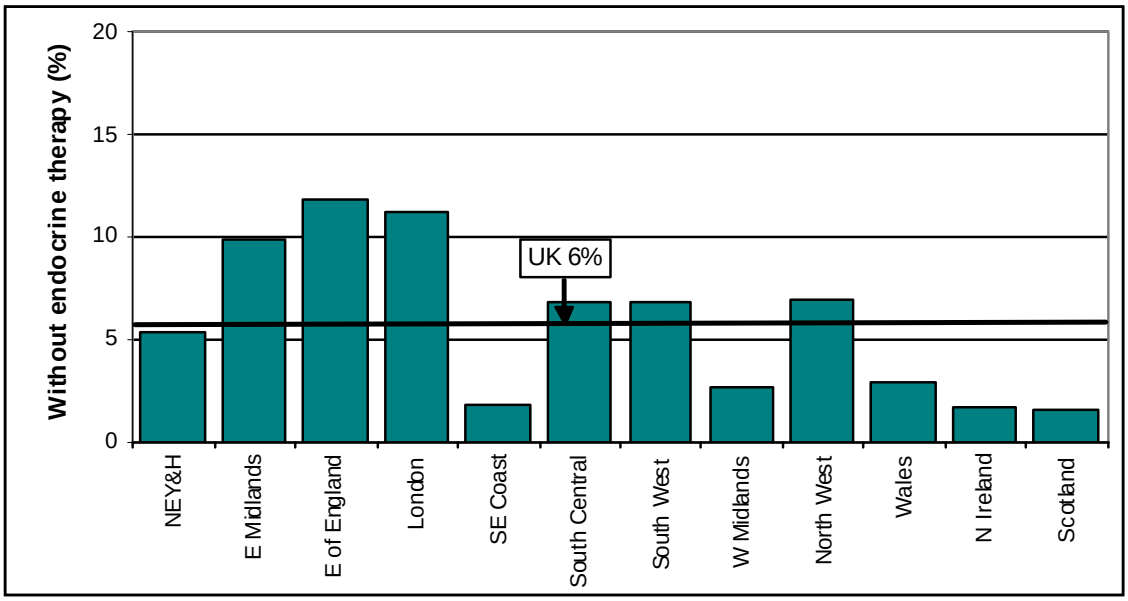

Figure 76 (Table 130): Variation in proportion of ER positive, invasive cancers that did not have endocrine therapy recorded

In the UK as a whole, 689 (6%) ER positive invasive cancers had no endocrine therapy recorded (Figure 76). The proportion of ER positive invasive cancers that did not have endocrine therapy recorded varied from 2% in South East Coast, Northern Ireland and Scotland to 12% in East of England. 17% of the ER positive invasive cancers that did not have endocrine therapy recorded were Grade III, 18% were node positive and 16% were larger than 20mm in diameter (Table 131).

Figure 77 shows how the proportion of ER positive cancers in the Excellent Prognostic Group (EPG) treated with endocrine therapy varied between screening units from 4% and 9% in two screening units in East Midlands to 100% in 41 screening units. In 7 screening units, more than 20% of the ER positive cancers that did not receive endocrine therapy were Grade III, node positive and/or >20mm diameter tumours. Three of these units were in East of England.

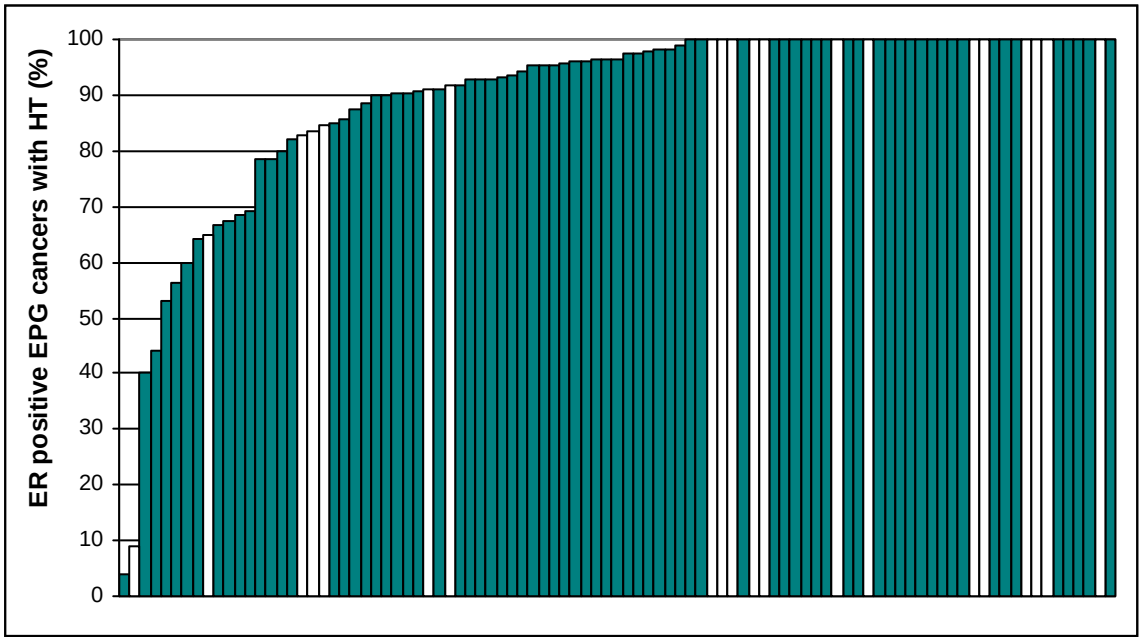

Figure 77: Variation between screening units in the proportion of ER positive, EPG cancers that had endocrine therapy (HT) recorded (the 20 smallest units are highlighted in white)

ER POSITIVE INVASIVE CANCERS WITHOUT ENDOCRINE THERAPY RECORDED

	2006/07		2007/08		2008/09	
Region	**No.**	%	**No.**	%	**No.**	%
N East, Yorks & Humber	35	3	32	2	81	5
East Midlands	98	12	66	8	96	10
East of England	80	10	128	14	124	12
London	30	4	73	8	105	11
South East Coast	8	2	33	6	10	2
South Central	28	4	45	6	55	7
South West	34	3	29	3	66	7
West Midlands	20	3	8	1	26	3
North West	129	11	85	7	86	7
Wales	77	13	19	3	20	3
Northern Ireland	0	0	1	1	3	2
Scotland	11	1	9	1	17	2
United Kingdom	**550**	**6**	**528**	**5**	**689**	**6**

Shaded if 5% or more above the value of the UK as a whole

The preceding summary table shows in the 3-year period 2006/07-2008/09, the proportion of ER positive invasive cancers in each region without endocrine therapy recorded. In Wales and North West this has decreased markedly. In East of England and East Midlands, it has remained relatively high and in London it has increased. Regional QA reference centres and regional surgical QA co-ordinators where the proportion of ER positive invasive cancers without endocrine therapy recorded is 5% or more in excess of the UK average should audit their cases to determine whether the absence of endocrine therapy data is a true reflection of clinical practice or a data recording issue.

In the UK as a whole, 35 (63%) ER negative, PgR positive invasive cancers did not have endocrine therapy recorded (Table 132) and 122 ER negative cancers (8%) did have endocrine therapy recorded (Table 133). 21 of the latter were PgR positive invasive cancers (Table 132). Regional QA reference centres and regional surgical QA co-ordinators should determine the reasons why endocrine therapy

was not given to ER negative cancers which were PgR positive, and why endocrine therapy does appear to have been given to ER/PgR negative cancers.

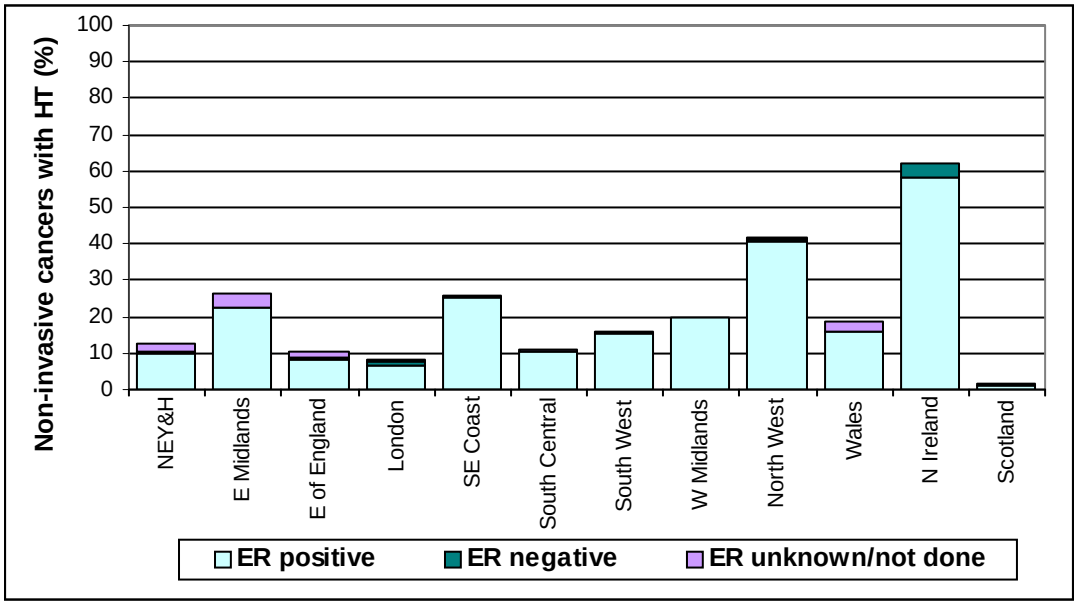

Figure 78 (Table 134): Variation in the ER status of the non-invasive cancers that had endocrine therapy (HT) recorded

The proportion of non-invasive cancers with endocrine therapy recorded varied markedly between regions in 2008/09 from 2% in Scotland to 62% in Northern Ireland (Figure 78 & Table 134). Of the 549 non-invasive cancers with known ER status with endocrine therapy recorded, 503 were ER positive and 8 were ER negative. A further 38 non-invasive cancers with unknown ER status also had endocrine therapy recorded. In the UK as a whole, the proportion of ER positive non-invasive cancers with endocrine therapy recorded decreased from 45% in 2007/08 to 38% in 2008/09 (Table 135). Similar decreases occurred in most regions; the exceptions being North West and Wales where 10% and 17% increases were apparent. 807 ER positive, non-invasive cancers did not have endocrine therapy recorded (Table 135). Given the potential side effects of endocrine treatment, regional QA reference centres and regional surgical QA co-ordinators should determine the reasons why endocrine therapy appears to have been given to non-invasive cancers with unknown or negative ER/PgR status.

KEY FINDINGS 3:

- The decision to give endocrine therapy did appear to depend to a large extent on ER and PgR status. However, 689 ER positive, invasive cancers and 35 ER negative, PgR positive invasive cancers did not have endocrine therapy recorded.
- 17% of the ER positive invasive cancers not treated with endocrine therapy were Grade III, 18% were node positive and 16% were >20mm in diameter. In 7 screening units, more than 20% of the ER positive cancers that did not receive endocrine therapy were Grade III, node positive and/or >20mm diameter tumours. Three of these units were in East of England. Regional QA reference centres and regional surgical QA co-ordinators should audit ER and PgR positive invasive cancers to determine whether the absence of endocrine therapy data is a true reflection of clinical practice or a data recording issue.
- The proportion of non-invasive cancers with endocrine therapy recorded varied markedly between regions from 2% in Scotland to 62% in Northern Ireland. The proportion of ER positive non-invasive cancers with endocrine therapy recorded decreased overall from 45% in 2007/08 to 38% in 2008/09. Similar decreases occurred in most regions; the exceptions being North West and Wales where 10% and 17% increases were apparent.
- Given the potential side effects of endocrine treatment, regional QA reference centres and regional surgical QA co-ordinators should determine the reasons why endocrine therapy appears to have been given to invasive and non-invasive with unknown ER or negative ER/PgR status.

8.4.4 ER Negative Invasive Cancers and Chemotherapy

PROPOSITION 4
Chemotherapy should be considered as a treatment for ER negative invasive cancers

Chemotherapy should be considered for ER negative invasive breast cancers, but its use represents a balance between toxicity and benefit. Of the 15,481 cancers with known chemotherapy data, 294 (2%) were recorded as ER negative, node positive invasive cancers and 883 (6%) were recorded as ER negative, node negative invasive cancers (Table 136). Of the 294 ER negative, node positive invasive cancers, 43 (15%) did not receive chemotherapy. Eight of these cancers were in London, 9 in South West and 9 in North West.

Of the 43 ER negative, node positive invasive cancers which had no chemotherapy recorded, 28 (65%) were Grade III, 8 (19%) were HER-2 positive, 22 were diagnosed in women aged less than 65 and 21 in women aged 65 or above. Although these numbers are similar, the 22 cases diagnosed in women aged less than 65 were only 11% of the ER negative, node positive invasive cancers in this age group; while the 21 cases in women aged 65 and above were 24% of the ER negative, node positive invasive cancers in the older patients.

Of the 883 ER negative, node negative invasive cancers, 372 (42%) did not have chemotherapy recorded (Table 138). This varied from 23% in Northern Ireland to 58% in Wales. Thus, in most regions, nodal status was taken into account when deciding whether ER negative cancers received chemotherapy. Nodal status made the least difference in South West where the highest proportion of ER negative, node negative cancers had chemotherapy recorded. In the UK as a whole, 79% of the 511 ER negative, node negative invasive cancers given chemotherapy were Grade III (Table 139), 180 (35%) were HER-2 positive, 416 (81%) were diagnosed in women aged less than 65 and 95 (19%) in women aged 65 or above.

The following summary table shows how the number and proportion of ER negative, node positive invasive cancers with no chemotherapy recorded has varied in each region in the 3-year period 2006/07-2008/09. Given the relatively small numbers of cancers involved, all regional QA reference centres and regional surgical QA co-ordinators should audit these cases to determine whether the absence of chemotherapy treatment data is a true reflection of clinical practice or a data recording issue.

ER NEGATIVE NODE POSITIVE INVASIVE CANCERS WITHOUT CHEMOTHERAPY RECORDED

	2006/07		2007/08		2008/09	
Region	**No.**	%	**No.**	%	**No.**	%
N East, Yorks & Humber	8	20	3	8	5	11
East Midlands	2	7	1	5	1	4
East of England	7	33	4	19	3	13
London	1	5	0	0	8	28
South East Coast	4	31	3	18	0	0
South Central	0	0	3	19	2	8
South West	5	19	5	19	9	33
West Midlands	7	27	6	15	2	6
North West	2	5	2	7	9	22
Wales	3	25	3	13	0	0
Northern Ireland	0	0	1	25	0	0
Scotland	5	16	2	8	4	15
United Kingdom	**44**	**16**	**33**	**12**	**43**	**15**

Shaded if 5% or more above the value for the UK as a whole

KEY FINDINGS 4:

- 15% of women with ER negative, node positive invasive cancers did not have chemotherapy recorded compared to 42% of ER negative, node negative invasive cancers. This suggests that nodal status was taken into account when deciding whether women would benefit from chemotherapy.

KEY FINDINGS 4:

- Of the 43 ER negative, node positive invasive cancers which had no chemotherapy recorded, 28 (65%) were Grade III, 8 (19%) were HER-2 positive, 22 were diagnosed in women aged less than 65 (11% of those with ER negative node positive cancers) and 21 in women aged 65 or above (24%of those with ER negative node positive cancers).
- Given the relatively small numbers of cancers involved, all regional QA reference centres and regional surgical QA co-ordinators should audit the ER negative, node positive invasive cancers with no chemotherapy recorded to determine whether the absence of chemotherapy treatment data is a true reflection of clinical practice or a data recording issue.

8.4.5 HER-2 Status and Chemotherapy

PROPOSITION 5
Chemotherapy should be considered as a treatment for HER-2 positive invasive cancers

NICE Clinical Guideline 80 Early and locally advanced breast cancer: diagnosis and treatment (2009) states that, given the poor prognosis associated with HER-2 positivity, patients with HER-2 positive tumours who have satisfactory cardiac function should be offered Trastuzumab (Herceptin) after their surgery, chemotherapy and radiotherapy treatment has been completed. This proposition is therefore designed to examine the proportion of patients who may not be eligible to have Trastuzumab (Herceptin) because they have not had chemotherapy as a first line adjuvant therapy.

In the UK as a whole, HER-2 status was known for 11,696 (94%) of invasive cancers. Of these, 1,407 were HER-2 positive and had chemotherapy data available. For 635 (45%) of these cases, no chemotherapy treatment was recorded (Table 140). This varied between 23% in West Midlands and 74% in London (Figure 79). In the UK as a whole, 12% of the HER-2 positive cases with no chemotherapy recorded were greater than 20mm in diameter, 25% were Grade III, 9% were node positive and 34% were in the MPG1, MPG2 or PPG groups (Tables 141 and 142). Older women were less likely to receive chemotherapy; 60% of the women aged less than 65 with HER-2 positive invasive cancers received chemotherapy, compared to 38% of women aged 65 and over.

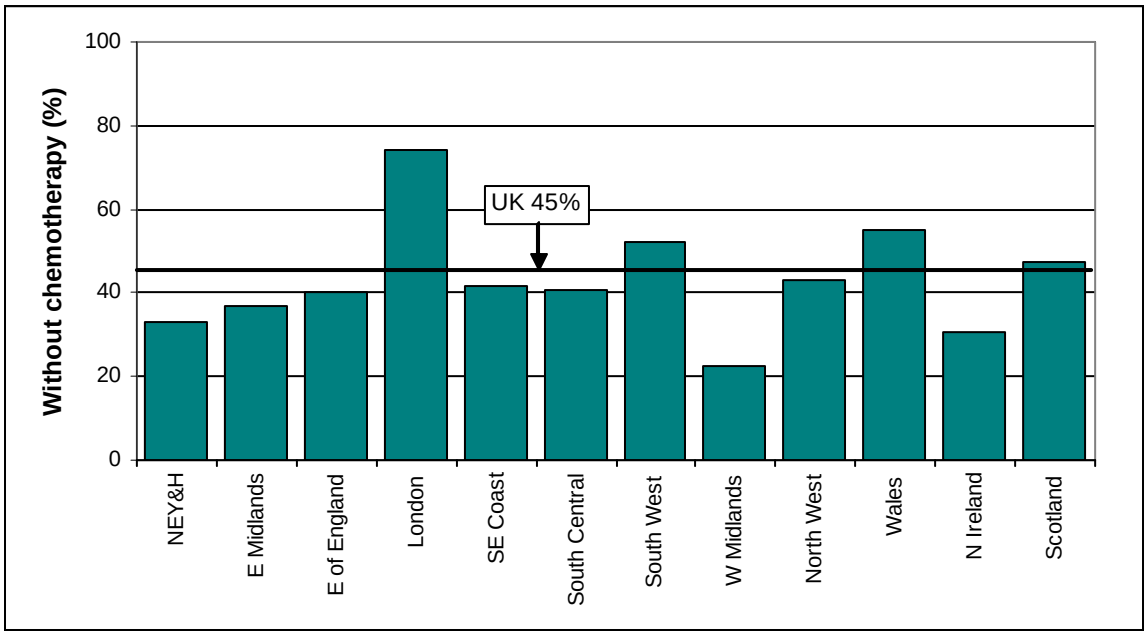

Figure 79 (Table 140): Proportion of HER-2 positive invasive cancers that did not receive chemotherapy

Figure 80 shows how the proportion of HER-2 positive invasive cancers that did not have chemotherapy recorded varied between individual screening units. In 5 units, all HER-2 positive invasive cancers had chemotherapy recorded, and in 7 units more than 70% of these cancers had no chemotherapy recorded. Given that Trastuzumab (Herceptin) is only usually prescribed for HER-2

positive patients who have already received chemotherapy, regional QA reference centres and regional surgical QA co-ordinators should audit HER-2 positive cases with no chemotherapy recorded to determine whether the absence of chemotherapy treatment data is a true reflection of clinical practice or a data recording issue.

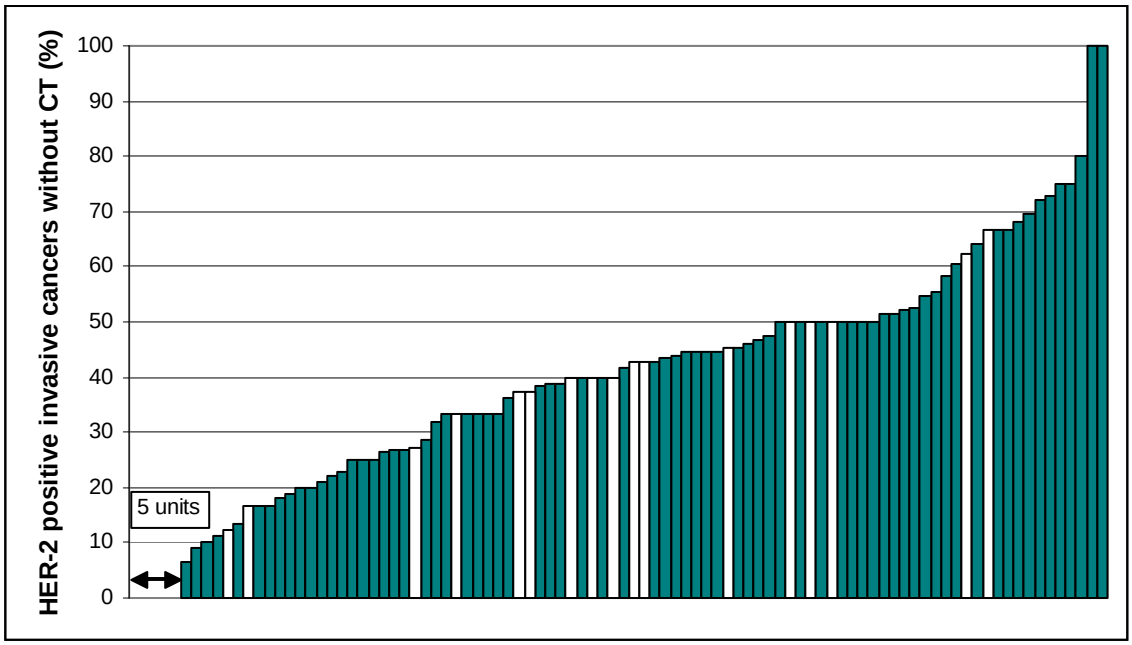

Figure 80: Variation between screening units in the proportion of HER-2 positive invasive cancers that did not have chemotherapy recorded (17 of the 20 smallest units are highlighted in white)

KEY FINDINGS 5:

- 635 (45%) HER-2 positive cases did not have chemotherapy recorded. In the UK as a whole, 12% of these cases were greater than 20mm in diameter, 25% were Grade III, 9% were node positive and 34% were in the MPG1, MPG2 or PPG groups.
- In 5 screening units, all HER-2 positive invasive cancers had chemotherapy recorded, whilst in 7 units more than 70% of these cancers had no chemotherapy recorded.
- Given that Trastuzumab (Herceptin) is only usually prescribed for HER-2 positive patients who have already received chemotherapy, regional QA reference centres and regional surgical QA co-ordinators should audit HER-2 positive cases with no chemotherapy recorded to determine whether the absence of chemotherapy treatment data is a true reflection of clinical practice or a data recording issue.

8.4.6 Summary

The following table provides a summary of the proportion of cancers in each region which did not appear to receive treatment consistent with propositions 1 to 5 presented in this chapter. Regions where the proportions of cancers that appear to have been treated in a manner inconsistent with each proposition were 5% or more in excess of the UK average are shaded. Regional QA reference centres and regional surgical QA co-ordinators should determine firstly whether these inconsistencies are apparent for all or a small number of their screening units, and secondly whether the results are a true reflection of clinical practice or whether they are due to data recording issues.

If the latter is the case, more robust data collection and validation processes should be implemented by the affected screening units, and improved data checking procedures implemented by the regional QA reference centre. If the inconsistencies are due to clinical practice which is not consistent with national guidance, the reasons that surgeons and their multi-disciplinary teams are not following the guidance should be investigated and changes in practice implemented where necessary.

SUMMARY OF PROPOSITIONS 1, 2, 3, 4 and 5

	Proposition 1		Proposition 2	Proposition 3			Proposition 4	Proposition 5
	Invasive conservation surgery no RT (Table 121)	Non-invasive conservation surgery no RT (Table 123)	Node positive invasive no CT (Table 126)	ER positive invasive no HT (Table 130)	ER negative PgR positive invasive no HT (Table 132)	ER negative with HT (Table 133)	ER negative invasive no CT (Table 137)	HER-2 positive invasive cancers no CT (Table 140)
Region	%	%	%	%	%	%	%	%
NEY&H	3	42	35	5	33	9	29	33
East Midlands	3	36	21	10	100	0	30	37
E of England	11	44	39	12	33	14	37	40
London	8	42	46	11	50	13	50	74
SE Coast	8	52	40	2	100	4	46	42
South Central	13	55	30	7	100	8	36	40
South West	6	56	30	7	100	10	43	52
West Midlands	3	37	26	3	25	2	23	23
North West	6	48	35	7	90	6	38	43
Wales	2	37	33	3	50	4	49	55
N Ireland	8	28	30	2	50	16	19	31
Scotland	6	29	39	2	25	10	31	48
UK	**6**	**43**	**34**	**6**	**63**	**8**	**36**	**45**

Shaded if 5% or more above the value for the UK as a whole

CHAPTER 9
SURVIVAL ANALYSIS

UK NHS Breast Screening Programme data for women with breast cancers detected by screening between 1 April 1992 and 31 March 1993 were combined with data recorded by regional cancer registries to analyse breast cancer survival. All cases were followed up to the study end date of 31 March 2010, enabling survival for a period of up to 17 years post diagnosis to be calculated. 15-year relative survival has been calculated for this report. By liaising with the cancer registries serving their population, all regional QA reference centres were able to provide complete data for this analysis.

Age at diagnosis, invasive grade, invasive tumour size and nodal status were requested from the screening services for cases detected in 1992/93. Date of death and underlying cause of death were obtained from cancer registries and the Office for National Statistics (ONS). Tumour characteristics and death information for earlier years were collected in previous audits.

9.1 Survival Analysis Methods

Relative survival is defined as the observed survival in the patient group divided by the expected survival of the general population, matched by age and sex. The cumulative relative survival is interpreted as the proportion surviving a given interval after diagnosis in the hypothetical situation that breast cancer is the only possible cause of death. A population without breast cancer would have a relative survival rate of 100%. Relative survival was calculated, using the statistical package STATA.

Cumulative relative survival probabilities for women in the general UK population were calculated using the Ederer II method with probability of life tables supplied by the Government's Actuary Department. For each relative survival rate, 95% confidence intervals were approximated as twice the standard error. Relative survival curves were tested for statistically significant differences using likelihood ratio tests for inequality.

9.2 Eligibility and Data Completeness of Cases Included in the Survival Analysis

Details of 7,025 breast cancers detected by screening between 1 April 1992 and 31 March 1993 were submitted to the survival audit. Of the 7,025 cancers submitted, 319 cancers (5%) were excluded for one of the following reasons:

- Unknown invasive status (18 cases)
- Case not registered at the regional cancer registry or registered with an unknown diagnosis date (190 cases)
- Screen-detected cancer not confirmed to be the first primary breast tumour (111 cases)

The diagnosis date recorded at the cancer registry was taken for the survival analysis, unless it was incomplete or later than the screening surgery date, in which case the screening surgery date was used. This can occur where the cancer registry has incomplete data for the cancer, for example a registration based only on a death certificate.

The following summary table shows that the proportion of cases that were eligible for analysis varied between 89% in South West and 98% in East of England and London. The highest numbers of unregistered cases were in South West (76 cases), North East, Yorkshire & Humber (44 cases) and East Midlands (26 cases) which together account for 77% of the 190 unregistered cases. Only 59% of the cases had complete invasive size, grade and/or nodal status data. The highest proportions of cases with unknown invasive size, grade and/or nodal status were in South East Coast (57%) and South West (56%).

DATA COMPLETENESS FOR THE 1992/93 SURVIVAL AUDIT									
	Not registered		Cases not confirmed to be primary breast cancers**		Incomplete size, grade or nodal status for invasive cancers		Eligible cases		Total number of cases
Region	No.	%	No.	%	No.	%	No.	%	
N East, Yorks & Humber	44	4	24	2	386	39	922	93	990
East Midlands	26	5	2	0	147	28	490	95	518
East of England	9	1	7	1	322	49	642	98	658
London	5	1	4	1	307	46	650	98	662
South East Coast	5	1	6	1	314	57	536	97	552
South Central	0	0	12	3	149	37	391	97	403
South West	76	11	5	1	401	56	640	89	722
West Midlands	0	0	20	4	258	47	534	96	554
North West	7	1	18	2	413	53	747	96	776
Wales	3	1	6	1	58	14	400	96	415
Northern Ireland	4	3	1	1	37	28	127	96	132
Scotland	11	2	6	1	123	19	626	97	643
United Kingdom	**190**	**3**	**111**	**2**	**2915**	**41**	**6705**	**95**	**7025**

**confirmed to be a recurrence or where the cancer diagnosis date at the cancer registry is outside the audit period

9.3 Cause of Death

The main advantage of calculating relative rather than cause-specific survival is that knowledge of the cause of death is not required. However, the underlying cause of death was requested from ONS for cases diagnosed in England, and for the cases (around 450 cases) that were not matched with ONS records, cause of death from the National Cancer Data Repository (NCDR) data set was used. For the Celtic countries, cause of death information was obtained from the cancer registries.

Overall, 43% of the 1,997 deaths among the 5,573 women with invasive breast cancer were recorded as being due to breast cancer, 19% were due to another type of cancer and 27% were due to non-cancer related causes. Death cause was unknown for 210 women (11%). There were variations in the proportions of women with invasive cancer recorded as dying from each cause of death in each region (Table 143). The proportion of breast cancer deaths varied from 63% in West Midlands to 20% in Wales.

Table 144 shows that there were 28 deaths (26%) recorded amongst the 107 women with micro-invasive breast cancer detected by screening in 1992/93. 5 were from the breast cancer, 11 from another cancer and 12 are non-cancer death. Of the 225 deaths (22%) in the 1,025 women with non-invasive breast cancer, 51 (23%) were recorded as being due to breast cancer, 74 (33%) were from a cancer other than breast cancer and 85 (38%) were non-cancer deaths (Table 145). The breast cancer deaths in the women with non-invasive breast cancer were due to invasive recurrences of the non-invasive breast cancers included in the 1992/93 cohort.

9.4 15-Year Relative Survival Rates for Cancers Diagnosed in 1992/93

Figure 81 shows that the overall 15-year relative survival of women with invasive breast cancers diagnosed in the UK in 1992/93 was 83.0%. Although 15-year relative survival rates varied from 77.8% in East Midlands and Scotland to 91.5% in Northern Ireland, there is no significant difference between the UK average and the relative survival rates in each region or Celtic countries.

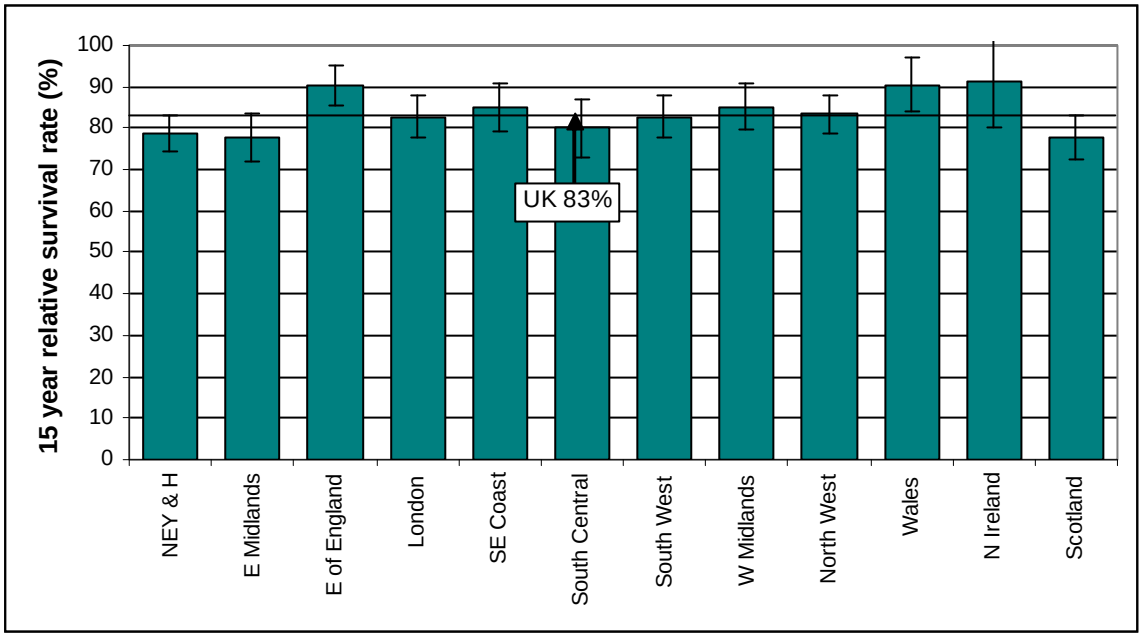

Figure 81 (Table 146): 15-year relative survival for women with screen-detected invasive breast cancer diagnosed in 1992/93

The following summary table shows the 5-year relative survival rates from past NHSBSP and ABS audit reports. 5-year relative survival for women with screen-detected invasive breast cancer has improved significantly from 93.5% in 1992/93 to 97.1% in 2002/03.

7 YEAR SUMMARY OF 5-YEAR RELATIVE SURVIVAL RATES INVASIVE BREAST CANCER

Audit year	*Number of cases*	*5-year relative survival rate*
Mar 1992 – Apr 1993	*6,706*	*93.5 (92.6,94.3)*
Mar 1996 – Apr 1997	*5,445*	*95.4 (94.6,96.2)*
Mar 1997 – Apr 1998	*5,313*	*95.7 (94.9,96.5)*
Mar 1998 – Apr 1999	*6,898*	*95.8 (95.1,96.5)*
Mar 1999 – Apr 2000	*6,761*	*96.5 (95.8,97.2)*
Mar 2000 – Apr 2001	*7,007*	*96.4 (95.8,97.1)*
Mar 2001 – Apr 2002	*8,943*	*97.2 (96.6,97.8)*
Mar 2002 – Apr 2003	*8,131*	*97.1 (96.5,97.7)*

9.5 Variation in 15-Year Relative Survival with Tumour Characteristics

The following table shows the characteristics of the 6,706 cancers included in the audit. 91% of the 5,573 invasive cancers were diagnosed in women aged 50-64 years, 76% were less than or equal to 20mm in diameter, 65% were Grade I or Grade II, 42% were node negative, 27% were in the Excellent (EPG) and Good (GPG) Prognostic Groups and only 4% in the Poor Prognostic Group (PPG).

Parameter		Cancers included in each analysis group 1992/93	
		Number	%
Invasive status	Invasive	5573	83
	Non-invasive	1025	15
	Micro-invasive	107	2
	Total	6705	100
Age group (invasive cancers only)	<50	87	2
	50-52	763	14
	53-55	924	17
	56-58	1024	18
	59-61	1134	20
	62-64	1238	22
	65+	403	7
	Total	5573	100
Invasive cancer size	<15mm	2672	48
	15-≤20mm	1561	28
	>20-≤35mm	842	15
	>35-≤50mm	132	2
	>50mm	62	1
	Unknown	304	6
	Total	5573	100
Invasive grade	Grade I	1552	28
	Grade II	2059	37
	Grade III	870	15
	Not assessable	154	3
	Unknown	938	17
	Total	5573	100
Nodal status (invasive cancers only)	Negative	2347	42
	Positive	1010	18
	Unknown	2216	40
	Total	5573	100
NPI group (invasive cancers only)	EPG	633	11
	GPG	884	16
	MPG1	706	13
	MPG2	334	6
	PPG	214	4
	Unknown	2802	50
	Total	5573	100

9.5.1 Variation in 5-Year Relative Survival with Invasive Status

The following table shows the 5-year, 10-year and 15-year relative survival rates for women with breast cancer diagnosed in 1992/93. The upper confidence intervals of the relative survival rates for women with non-invasive breast cancer have exceeded 100%. This indicates that their chance of survival is no worse than that of the UK female population as a whole.

EFFECT OF INVASIVE CANCER STATUS ON RELATIVE SURVIVAL RATES			
	5-year	10-year	15-year
Invasive	93.5 (92.6,94.3)	87.9 (86.7,89.1)	83.0 (81.5,84.5)
Micro-invasive	98.3 (91.6,101.5)	92.9 (83.6,99.1)	90.9 (79.7,99.3)
Non-invasive	100.5 (99.0,101.5)	99.8 (97.5,101.7)	99.5 (96.4,102.2)

9.5.2 Variation in Relative Survival of Invasive Cancers with Age Group

Table 147 and Figure 82 show the variation with age at diagnosis in the 5-year, 10-year and 15-year relative survival rates for women diagnosed with primary invasive breast cancer. There is no statistically significant difference in the relative survival rates for women in the different age bands.

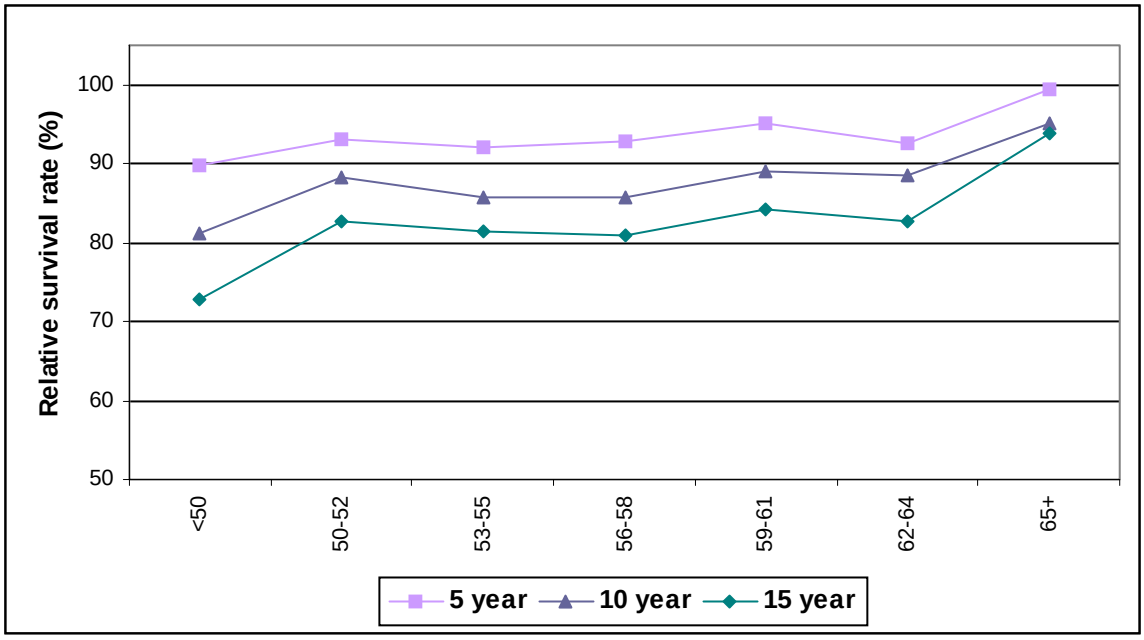

Figure 82 (Table 147): Variation in relative survival rates with age for women with screen-detected invasive breast cancer

The comparatively high relative survival of women aged 65 and over, is similar to that seen in previous audits for invasive cancers diagnosed via screening and may be due to a number of factors. Firstly, it is possible that routine follow-up appointments result in the earlier identification of other health problems in women diagnosed with early stage breast cancer than in women of the same age in the general population. Secondly, women over 65 years of age who self-refer for breast screening may be from a more affluent socio-economic group and therefore have better overall health than the general population as a whole.

9.5.3 Variation in 15-Year Relative Survival of Invasive Cancers with Tumour Size, Grade and Nodal Status

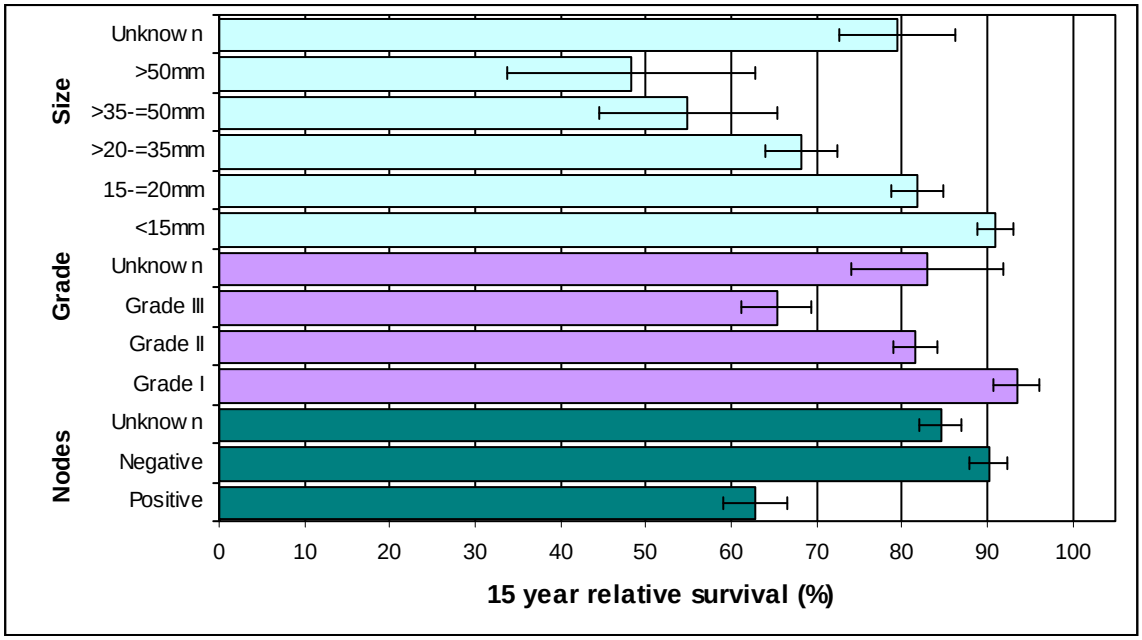

Figure 83 (Tables 148, 149 & 150): Variation in 15-year relative survival with nodal status, grade and size for women with screen-detected invasive breast cancer detected in 1992/93

Figure 83 shows how 15-year relative survival rates for women diagnosed with invasive breast cancer in 1992/93 vary with tumour size, grade and nodal status. The 15-year relative survival of women with less than 15mm diameter cancers is 91.0% (95% CI 88.9%-93.0%) compared with a 15-year relative

survival rate of 48.2% (95% CI 33.6%-62.4%) for women with tumours with a diameter greater than 50mm. At 93.5% (95% CI 90.8%-96.0%), the 15-year relative survival rate is also significantly higher for women with Grade I cancers (28% of the cohort) compared with women with Grade III cancers (15% of the cohort) whose 15-year relative survival is 65.3% (95% CI 61.1%-69.3%). Finally, at 90.1% (95% CI 87.9%-92.3%), the 15-year relative survival for women with node negative cancers (42% of the cohort) is higher than for the women with node positive cancers (18% of the cohort) whose 15-year relative survival is 62.8% (95% CI 59.0%-66.5%).

9.5.4 Variation in 5-Year Relative Survival of Invasive Cancers with NPI Group

The 5-year relative survival rates for women with cancers in the Excellent Prognostic Group (EPG) and Good Prognostic Group (GPG) diagnosed in 1992/93 are 100.1% (95% CI 98.0%-101.5%) and 98.6% (95% CI 96.8%-100%) respectively. At 92.4% (95% CI 89.6%-94.6%), the 5-year relative survival rate for the 13% of women with cancers in the Moderate Prognostic Group 1 (MPG1) is significantly worse than that of women with cancers in the EPG and GPG groups. The 5-year relative survival rates for women with the 6% of cancers in the Moderate Prognostic Group 2 (MPG2) and the 4% of women with cancers in the Poor Prognostic Group (PPG) is even lower at 83.6% (95% CI 78.7%-87.7%) and 58.5% (95% CI 51.3%-65.1%) respectively.

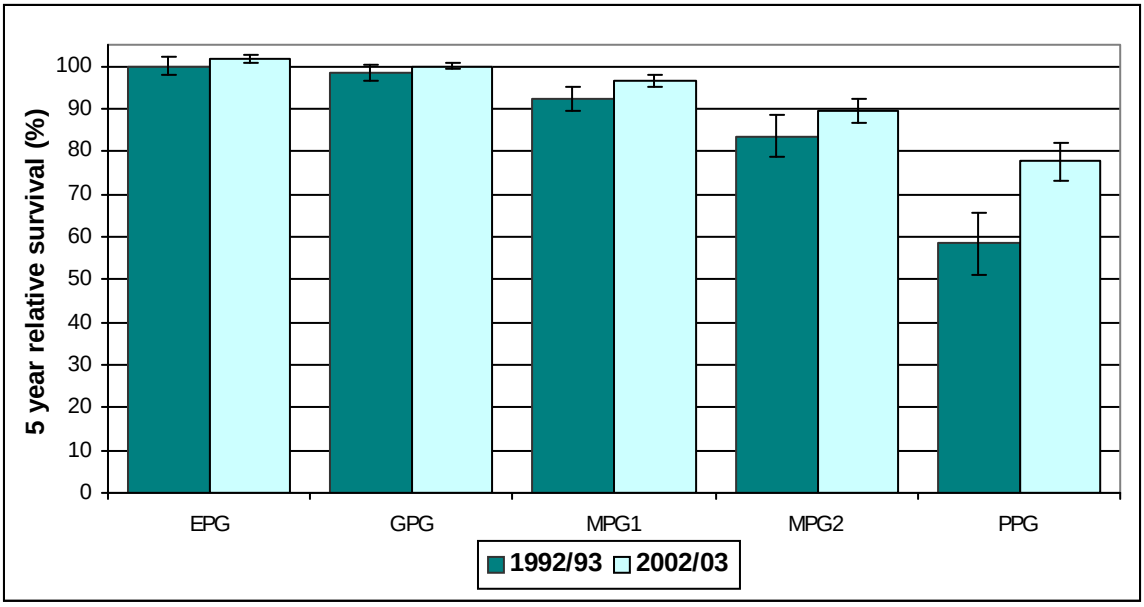

Figure 84 (Table 151): Comparison of 5-year relative survival with NPI group for women with screen-detected invasive breast cancer diagnosed in 1992/93 and 2002/03

Figure 84 shows how 5-year relative survival rates for women diagnosed with invasive breast cancers in 1992/93 and 2002/03 vary with NPI score at diagnosis. Only 6% of the 2002/03 cases have an unknown NPI while 50% of the 1992/93 cases have an unknown NPI. This is mainly due to missing nodal status data; in part because nodes were not routinely assessed in 1992/93 (40% had unknown nodal status).

There has been no significant change in the 5-year relative survival rate for EPG and GPG cancers in the 10 years between 1992/93 and 2002/03; the main reason for the good survival of these cancers being their early stage at diagnosis. There are, however, marked and statistically significant increases in the 5-year relative survival rates for MPG1 (4% increase), MPG2 (6% increase) and PPG (19% increase) cancers between the two audit years. These improvements in survival, particularly the 19% increase in the PPG cancers are almost certainly due to the development and use of new adjuvant treatments.

KEY FINDINGS:

- Of the 7,025 cancers submitted to the survival analysis for the period 1 April 1992 to 31 March 1993, 190 (3%) were excluded because they were not registered at the cancer registries. A further 111 cancers (2%) were excluded because they were not confirmed to be primary tumours and 18 because their invasive status was not known.
- 15-year relative survival for women with screen-detected invasive breast cancer diagnosed in 1992/93 is 83.0%. This varies from 77.8% in East Midlands and Scotland to 91.5% in Northern Ireland. However, there is no significant difference between the UK average and the relative survival rates in each region.
- 5-year relative survival for women with screen-detected invasive breast cancer has improved significantly from 93.5% in 1992/93 to 97.1% in 2002/03.
- The 15-year relative survival of women with less than 15mm diameter invasive breast cancers is 91.0% compared with a 15-year relative survival rate of 48.2% for women with tumours with a diameter greater than 50mm.
- At 93.5%, the 15-year relative survival rate is also significantly higher for women with Grade I cancers (28% of the cohort) compared with women with Grade III cancers (15% of the cohort) whose 15-year relative survival is 65.3%.
- At 90.1%, the 15-year relative survival for women with node negative cancers (42% of the cohort) is higher than for the women with node positive cancers (18% of the cohort) whose 15-year relative survival is 62.8%.
- 5-year relative survival rates for women with cancers in the Excellent Prognostic Group (EPG) and Good Prognostic Group (GPG) diagnosed in 1992/93 are 100.1% and 98.6% respectively.
- At 92.4%, the 5-year relative survival rate for the 13% of women with cancers in the Moderate Prognostic Group 1 (MPG1) is significantly worse than that of women with cancers in the EPG and GPG groups.
- The 5-year relative survival rates for women with the 6% of cancers in the Moderate Prognostic Group 2 (MPG2) and the 4% of women with cancers in the Poor Prognostic Group (PPG) are even lower at 83.6% and 58.5% respectively.
- There are marked and statistically significant increases in the 5-year relative survival rates for MPG1 (4% increase), MPG2 (6% increase) and PPG (19% increase) cancers between 1992/93 and 2002/03. These improvements in survival, particularly the 19% increase in the PPG cancers, are almost certainly due to the development and use of new adjuvant treatments.

APPENDIX A: TIMETABLE OF EVENTS

NHSBSP and ABS AUDIT OF SCREEN DETECTED BREAST CANCERS FOR THE YEAR OF SCREENING 1 APRIL 2009 - 31 MARCH 2010

AUDIT TIMETABLE	
Date	**Event**
20th May 2010	Audit group meet to plan the 2009/10 audit.
8th June 2010	Draft timetable and new data item list emailed to Audit Group, QA Reference Centres (QARCs) and Cancer Registries for comments. Email QA Reference Centres regarding the plan to run adjuvant and survival crystal reports.
10th – 16th June	QA Co-ordinators discuss draft timetable and new data item list with their QA Surgeon, QA Director and QA Data Managers. Return comments to the West Midlands Cancer Intelligence Unit (WMCIU) by 16th June.
2nd July 2010	Audit documents sent to QA Surgeons, QA Directors and QA Co-ordinators. QA Co-ordinators liaise with lead surgeons, data managers and screening office managers on methods used to collect data. Survival and adjuvant audit data collection can begin immediately. Main audit data can be collected as soon as the screening office computer system is ready to provide a KC62 return for 2009/10.
30th July 2010	Suggested deadline for QARCs to request survival audit data from Cancer Registries.
27th August	Suggested deadline for Cancer Registries to provide data to the QARCs for the survival audit.
22nd Sept (Thursday)	**Deadline for receipt of survival data from QARCs at the WMCIU.**
23rd – 1st Oct 2010	All QARCs to ensure that an appropriate member of staff is available to respond to any queries from the WMCIU regarding the survival audit.
20th Sept 2010	Deadline for follow-up report to Julietta Patnick and Neil Rothnie
12th Nov 2010	Suggested deadline for main and adjuvant audit data to be provided to QARCs with the signature of the lead breast surgeon to confirm that the data are correct. *An earlier deadline may be set by the QARC due to local issues, eg. QA Team requirements.*
15th Nov 10– 6th Jan 11	QARCs validate audit data and collate into the main and adjuvant spreadsheets provided. QARCs ensure that all cases are coded correctly, that all internal data checks are resolved and that there are no anomalies in the data.
7th Jan 2011 (Friday)	**Deadline for receipt of main and adjuvant audit data from QARCs at the WMCIU.**
10th – 21st Jan 2011	All QARCs to ensure that an appropriate member of staff is available to respond to queries from the WMCIU. The WMCIU liaises with QARCs to ensure data are complete, correct and surgically confirmed. It will not be possible to incorporate new or late data after this stage.
4th Feb 2011	First draft audit booklet emailed to Audit group for comments
23rd Feb 2011	Audit booklet tables (first draft) emailed QA Reference Centres for information. *All draft data should be marked "Not for circulation" to avoid unpublished data getting into the public domain.*
18th April 2011	Deadline for receipt of the audit booklet at the printers.
16th – 17th May 2011	2011 ABS conference (Manchester)
17th May 2011	Wash-up meeting (Manchester)

APPENDIX B: BREAST AUDIT QUESTIONNAIRE WITH GUIDANCE NOTES

NHSBSP & ABS AUDIT OF WOMEN WITH SCREEN-DETECTED BREAST CANCERS DETECTED FOLLOWING INVITATION BETWEEN 1 APRIL 2009 AND 31 MARCH 2010

PLEASE SUPPLY DATA FOR WOMEN OF ALL AGES WITH SCREEN-DETECTED BREAST CANCERS WITH FIRST OFFERED APPOINTMENT FROM 1 APRIL 2009 - 31 MARCH 2010 INCLUSIVE ACCORDING TO THE REGIONAL BOUNDARIES EXTANT AT 1 APRIL 2010

This document accompanies the MS Excel spreadsheet designed to record NHSBSP & ABS breast screening audit main surgical data and screening surgical caseload data which has been prepared by the West Midlands Cancer Intelligence Unit (WMCIU).

It is the responsibility of the QA co-ordinator to organise data collection at unit level, on paper and/or using copies of the spreadsheet. Regional data should be sent to WMCIU in electric format using the spreadsheet containing the check programme. Although there is an explanation column for special cases that contain errors in this spreadsheet, it is only for regional recording use and the WMCIU does not need to know details of individual cases. However, we would ask for an indication that those cases were being checked. **All data sent to WMCIU should be password protected and sent via nhs.net email accounts.**

Named breast screening unit data will be available in Excel format on the NBSS website. The 20 smallest screening units according to the number of women screened will be highlighted.

Each surgeon should be identified by their GMC code in order to audit screening caseload accurately. The unique identifying number known as the "Sx" number is required for data validation and matching purposes.

The deadline for submission of regional data by the regional QA co-ordinator to the WMCIU is 7 January 2011

****

UNIT:

REGION:

****

SURGICAL CONFIRMATION

I confirm that these data are an accurate record for the above unit

Signed (Lead Surgeon):

Print name:

Date:

DEFINITIONS AND GUIDANCE NOTES

Bilateral and multiple cancers*:* The KC62 report only counts one cancer per woman. Cancers included in the NHSBSP & ABS breast audit should be counted in the same way so that the total number of cancers in the breast screening audit equals the total number of cancers counted on the KC62 report for 2009/10. If bilateral or multiple cancers have been detected, the KC62 software selects the worst prognosis cancer. The same rules should be applied for the audit. All data for bilateral cases should be taken from the cancer included in the KC62.

Diagnosis on radiological and/or clinical grounds only: Cancers diagnosed with neither C5 nor B5 nor malignant diagnostic open biopsy should not be included in the audit. Enter the total number of such cancers in the preliminary data table.

Non-operative diagnosis for cancers: NHSBSP policy defines non-operative diagnosis as diagnosis by C5 cytology and/or B5 core biopsy only. These cancers appear in KC62 C18 L24.

Malignant diagnostic open biopsies: Cancers diagnosed by neither C5 nor B5 will have had a diagnostic open biopsy with an outcome of cancer. These cancers appear in KC62 C24 L24, which includes some cancers with operations which were both diagnostic and therapeutic. If the diagnostic open biopsy was treatment, and was the only operation, then the total number of therapeutic operations is zero.

Cytology and core biopsy: Codes used on the NHSBSP pathology reporting forms.
If cytology was carried out please indicate the highest (worst) cytology result in the "worst cytology". If no cytology was carried out enter NONE. If core biopsy was carried out please indicate the highest (worst) core biopsy result in the "worst core biopsy" column. If no core biopsy was carried out enter NONE. If a B5 result was obtained but the malignancy type (B5a or B5b) is micro-invasive, unknown or not assessable enter B5c in the "worst core biopsy" column. The number of visits to an assessment clinic (excluding results clinics) in order to undergo core biopsy or cytology procedures should be recorded.

Axillary Ultrasound: To determine if ultrasound was used to assess the axilla. The data should be inputted in the spreadsheet as N=Normal, A=Abnormal, NP=Not performed and U=Unknown.

Pre-operative lymph node biopsy: To determine if a biopsy was performed on suspicious nodes at assessment. The worst lymph node biopsy result at assessment should be recorded as C1,C2,C3,C4,C5,B1,B2,B3,B4.B5A,B5B,B5U, NP=not performed, U=unknown. For cases with a C5 and B5 result, the core biopsy result should be recorded because it is the most accurate result.

Neo-adjuvant treatment: Neo-adjuvant chemotherapy, neo-adjuvant herceptin and neo-adjuvant hormone therapy should be recorded as yes, no or unknown. If neo-adjuvant treatment is regularly recorded on NBSS then assume all cases with no neo-adjuvant information are recorded as no.

Hormone receptor status: ER, PgR and HER2 status are now recorded in the main audit. ER and PgR status should be recorded as P=positive, N=negative and U=unknown. Her2 status should be recorded as P=positive, N=negative, B=Borderline and U=Unknown. These data should come from surgery specimen information. If the patient has no surgery or the results are not recorded under surgery, then the core biopsy or wide bore needle (WBN) results may be used. For patients with bilateral cancers then the result from the worst prognosis cancer is used.

Invasive status:
Invasive status of the surgical specimen*:* the worst invasive status diagnosed at surgery/surgeries.
Final invasive status*:* this takes into account the non-operative diagnosis and the final decision of the MDT (in some cases).

For example:
A case with B5b (Invasive) non-operative diagnosis but with a non-invasive surgical specimen diagnosis will have 'N' in the invasive status of the surgical specimen column and 'I' in the final invasive status column.

A case with the invasive component taken out at mammotome and with a benign surgical specimen diagnosis will have 'B' in the invasive status of the surgical specimen column and 'I' (if MDT agree) in the final invasive status column.

Note that a cancer with no surgery has the final invasive status taken from the core biopsy (B5a non-invasive, B5b invasive) and the invasive status of the surgical specimen would be 'U'.

Invasive status coding rules:

<u>B5b diagnosis but non-invasive at surgery</u>
Final invasive status: invasive
Invasive size: unknown
Whole size: non-invasive size at surgery
Invasive grade: core biopsy invasive grade

<u>B5b diagnosis but micro-invasive at surgery</u>
Final invasive status: invasive
Invasive size: unknown
Whole size: non-invasive and micro-invasive size at surgery
Inv grade: core biopsy invasive grade

<u>B5 (a or b or c) diagnosis but benign surgery</u>
If the case is proven to be a cancer case (i.e. not false positive)
Final invasive status: according to the core biopsy result.
All sizes: unknown
Grade: core biopsy grade

<u>No surgery or unknown surgery</u>
All sizes: unknown
Grade: unknown
(because we do not need the info for this audit)

Lobular in situ neoplasia (LISN): All women with non-invasive cancer, including those with LISN, should be included in Part C of the audit. It is accepted that for LISN the grade and size are not assessable.

Micro-invasive cancer: Non-invasive cancer with possible micro-invasion should be included in Part A and Part C of the audit. Cancers which are definitely micro-invasive should only appear in Part A.

Screening surgical caseload: To each cancer in Part A assign the GMC code of the consultant surgeon. Women with no GMC code assigned (e.g. because the woman refused treatment) should be recorded as having no surgical referral in the surgical caseload audit. If the woman was under the care of more than one consultant surgeon for her diagnostic and therapeutic surgery, enter GMC codes for each of the surgeons in Part A (separated by semicolons) and count the woman in the caseload for each surgeon in the surgical caseload audit. By assigning a GMC code to each cancer in Part A, each consultant surgeon can be credited with their total UK NHSBSP screening caseload.

Reasons for low caseload: An explanation is required for surgeons who have screening caseload <10 in 2009/10. Explanations given at unit level may become redundant when caseloads are collated at regional and then at national level.

First surgery date: The first surgery date given should be the first overall, whether this surgery was diagnostic or therapeutic.

Reconstruction surgery: Surgery which is only for the purpose of reconstruction should be excluded when calculating the date of final surgery. For women undergoing mastectomy, the surgeon should indicate whether there was immediate reconstruction.

Surgery for benign conditions: Surgery for benign conditions should be excluded when calculating the total number of therapeutic operations.

Type of operation/treatment: An operation is a visit to theatre, at which one or more procedures are intended to be carried out. For this audit, code each diagnostic or therapeutic operation to the primary tumour (up to a maximum of 5) according to whether conservation surgery or mastectomy was carried out, with or without an axillary procedure. Exclude reconstruction alone. Conservation surgery can be wide local excision, repeat excision, localisation biopsy etc. If a case had only 2 operations, code the 3rd, 4th and 5th operation as no surgery (NS).

Diagnostic and therapeutic operations: The number of operations will be calculated by the WMCIU. A woman with screen-detected breast cancer who did not have a non-operative diagnosis (C5 or B5) must have had a diagnostic open biopsy to be included in this audit. All other operations (including axillary procedures), are considered to be therapeutic for this audit. If the diagnostic open biopsy was treatment, and was the only operation, then the total number of therapeutic operations is zero.

Nodal status: Nodal status refers to **axillary lymph nodes only.** The number of nodes obtained at each operation (visit to theatre) and the number of nodes which are found to be positive is requested. The number of nodes obtained will be 0 in many cases. In instances where an axillary procedure has been undertaken but no nodes obtained, the number of nodes obtained should be recorded as zero. It is recommended that these cases are reviewed by the QARC and the classification confirmed with the responsible surgeon. Incidental nodes may be obtained at operations where no axillary procedure is recorded. These should be recorded in the nodal columns but all such anomalies should be checked before submission. If a case had only 2 operations, code the nodal columns for the 3rd, 4th and 5th operation as no surgery (NS).

Sentinel lymph nodes:
You are required to input the specific type of sentinel node biopsy procedure should be inputted for each case. This information is included in the main crystal report. You should only record the type of procedure for the first axillary operation.

Example 1: A patient had C at the 1st operation, then C+AX at the 2nd operation. Her first axillary operation is a sentinel biopsy with blue dye only. For this case, the sentinel procedure type should be 'SD'

Example 2: A patient had C+AX at the 1st operation, then M+AX at the 2nd operation. Her first axillary operation is a sentinel biopsy with isotope only and 2nd axillary is a level 1 clearance. For this case, the Sentinel procedure type should be 'SI'.

Sentinel procedure type *(SD,SI,SX,SB,AY,O,NL,U):*
SD=Sentinel biopsy with blue dye
SI=Sentinel biopsy with radioisotope
SX=Sentinel biopsy with blue dye and isotope
SB=Unknown type of sentinel biopsy
AY=4 node sampling with blue dye,
O=Other axillary procedures
NL=No axillary treatment
U=No info about axillary assessment

Margins: The excision distance field is the closest margin in mm. If the margin is reached and no distance is given on the pathology report, input 0 in the margin distance field.

For cases where the margin is not clear in the final operation the cases should be checked by examining the pathology report. If the closest margin is not the radial margin, the data on NBSS should be updated to 'not involved'. If the closest margin is the radial margin and it is involved, an explanation for why a further operation to clear margins was not undertaken should be provided in the comments column. This process may result in the identification of additional operations that have been undertaken to clear involved radial margins. In which case, the additional operation should be added to the table in Part A.

DATA CHECKS

The Regional QA Co-ordinator should work with screening office managers on data quality issues. A number of data checks have been incorporated into the spreadsheet. Please consult the user guide for the data check programme. References to the KC62 Table T column and line numbers are given for information.

Case Check The total number of cancers should equal KC62 C25 L36 and be equal to the number of invasive cancers (KC62 C35 L36) plus the number of micro-invasive cancers (KC62 C28 L36) plus the number of non-invasive cancers (KC62 C27 L36) plus the number of cancers with invasive status unknown (KC62 C26 L36).

Caseload Check In the screening surgical caseload audit, the total number of cancers should equal the total caseload plus the total number of women with no surgical referral minus the total number of women treated by two surgeons. This formula is different if any woman is treated by more than 2 surgeons.

The Regional QA Co-ordinator must ensure that all records are cleared of errors, except special cases with explanations.

Queries
Any queries about the NHSBSP and ABS screening audit should be directed to:

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NHSBSP & ABS BREAST SCREENING AUDIT 2009/10

PRELIMINARY DATA SHEET

Unit Name	Number of women screened (KC62 C3 L12)	Number of women with radiological/clinical diagnosis only (KC62 C13 L24)	Number benign diagnostic open biopsies (KC62 C22 L24 + KC62 C23 L24)	Does your screening service use Intra-operative assessment of SLN? (Y/N) If yes, please provide start date	Number of cytology false positive cases (CQA report)	Number of core biopsy false positive cases (BQA report)

PART A1: TO BE COMPLETED FOR ALL CANCERS (KC62 C25 L36)

Col. G - GMC Code (enter GMC code of the consultant surgeon or NoRef=No consultant surgeon). If the woman was treated by more than one consultant surgeon enter all GMC codes, separated by **semicolons**. Cases with no surgery (NS) still usually are assigned to a consultant surgeon.
Dates - Enter dates in dd/mm/yyyy format. EC=Early Recall. U=Unknown
Col. O - Number of visit refers to FNA Date and Core Date in the crystal report. If biopsy/cyt performed on the same date, count as 1 visit.
Col. Q – Worst lymph node biopsy result takes into account the cytology and core biopsy results. If a patient has a C5 and B5 the record the core biopsy result.

{C} **Sx Number**	*{G}* **Consultant surgeon GMC Code** *(No shared cases)* *(Code, NoRef)*	*{H}* **Date of birth** *(dd/mm /yyyy)*	*{I}* **Date of first offered appt** *(dd/mm/yyyy)*	*{J}* **Screen date** *(dd/mm/yyyy, EC,U)*	*{K}* **Date of last read** *(dd/mm/yyyy, EC,U)*	*{L}* **First assessment date** *(dd/mm/yyyy, U)*	*{M}* **Side (left or right)** *(L,R)*	*{N}* **Worst cytology**	*{O}* **Worst core biopsy**	*{P}* **Number of visits for cytology/ core biopsy** *(exclude results clinic)* *(U,0,1,2,.)*	*{Q}* **Axillary Ultra-sound** *(N,A, NP,U)*	*{R}* **Worst lymph node biopsy result at assessment** *(C1,C2,C3,C4,C5 B1,B2,B3,B4, B5a,B5b,B5c, NP,U)* *(see above)*

Col. U - Type of treatment refer to the final concluded treatment type of all treatment involved (C=Conservation surgery, M=Mastectomy, NS=No surgery, U=Unknown)
Col. V - Immediate Reconstruction - to be completed by the surgeon for mastectomies only. Enter X if type of treatment not M.
Col. W - Invasive status of the surgical specimen refers to the worst invasive status at surgery/surgeries. I = invasive, M = micro-invasive, N = non-invasive, B = benign histology, U = unknown/no information/no surgery.
Col. X - Invasive status of the cancer; taking into account the non-operative diagnosis, surgery and MDT decisions.

{C} **Sx Number**	*{S}* **Neo-adjuvant chemo therapy** *(Y,N,U)*	*{T}* **Neo-adjuvant herceptin** *(Y,N,U)*	*{U}* **Neo-adjuvant hormone therapy** *(Y,N,U)*	*{V}* **Type of surgical Treatment** *(C,M,NS,U)*	*{W}* **Immediate reconstruction** *(only for M =Mastectomy) (Y,N,U,X)*	*-Invasive status- {X}* **Invasive status of the surgical specimen** *(I,M,N,B,U)*	*{Y}* **Final Invasive status** *(I,M,N,U)*	*{Z}* **LCIS only** *(Y/N)*	*{AA}* **ER status** *(P,N,U)*	*{AB}* **PgR status** *(P,N,U)*	*{AC}* **HER2 status** *(P,N,U)*

PART A2: TO BE COMPLETED FOR ALL CANCERS (KC62 C25 L36)

For each operation (visit to theatre) – intended surgery, ignoring reconstruction, enter the most appropriate from the following list (C=Conservation surgery, M=Mastectomy, AX=Axillary procedure, C+AX, M+AX, NS=No surgery, U=Unknown)
Conservation surgery can be wide local excision (WLE), repeat excision, localisation biopsy etc
(e.g. a diagnostic open biopsy on one day followed at a later date by a mastectomy where axillary surgery was done. It should be coded 1st=C, 2nd=M+AX, 3rd=NS, 4th=NS, 5th=NS)

{C} **Sx Number**	*{AD}* **First surgery date** *(diag or therapeutic)* *(dd/mm/yyyy,NS,U)*	*{AE}* **Final surgery date** *(excl reconstruction only)* *(dd/mm/yyyy,NS,U)*	*{AF}* **First operation type** *(diag or therapeutic)* *(C,M,AX, C+AX,M+AX, NS,U)*	*{AG}* **Second operation type** *(C,M,AX, C+AX,M+AX, NS,U)*	*{AH}* **Third operation type** *(C,M,AX, C+AX,M+AX, NS,U)*	*{AI}* **Fourth operation type** *(C,M,AX, C+AX,M+AX, NS,U)*	*{AJ}* **Fifth operation type** *(C,M,AX, C+AX,M+AX, NS,U)*

PART A3: TO BE COMPLETED FOR ALL CANCERS (KC62 C25 L36)

Coding: NS, U, 0,1,2,…The number of nodes obtained at each operation (visit to theatre) is requested. This will be 0 in many cases, even if an axillary procedure is recorded as part of the operation type. Incidental nodes may be obtained at operations where no axillary procedure is recorded. These should be recorded in the nodal columns but all such anomalies should be checked and flagged before the spreadsheet is submitted.
If a case had only 2 operations, code the nodal columns for the 3rd, 4th and 5th operation as no surgery (NS).

Sentinel procedure type *(SD,SI,SX,SB,AY,O,NL,U): SD=Sentinel biopsy with blue dye, SI=Sentinel biopsy with radioisotope, SX=Sentinel biopsy with blue dye and isotope, SB=Unknown type of sentinel biopsy, AY=4 node sampling with blue dye, O=Other axillary procedures, NL= No axillary treatment, U=No info about axillary assessment*

	1st operation (diagnostic or therapeutic)		**2nd operation**		**3rd operation**		**4th operation**		**5th operation**		*{AU}* **Sentinel Procedure Type** *(SD,SI,SX,SB, AY,O,NL,U)*
{C} **Sx Number**	*{AK}* **Total nodes obtained** *(NS,U, 0,1,2,..)*	*{AL}* **Number nodes positive** *(NS,U, 0,1,2,..)*	*{AM}* **Total nodes obtained** *(NS,U, 0,1,2,..)*	*{AN}* **Number nodes positive** *(NS,U, 0,1,2,..)*	*{AO}* **Total nodes obtained** *(NS,U, 0,1,2,..)*	*{AP}* **Number nodes positive** *(NS,U, 0,1,2,..)*	*{AQ}* **Total nodes obtained** *(NS,U, 0,1,2,..)*	*{AR}* **Number nodes positive** *(NS,U, 0,1,2,..)*	*{AS}* **Total nodes obtained** *(NS,U, 0,1,2,..)*	*{AT}* **Number nodes positive** *(NS,U, 0,1,2,..)*	

PART A4: TO BE COMPLETED FOR ALL CANCERS (KC62 C25 L36)

Excision margins (N=Not to margin, R=Reaches radial margin, U=Uncertain/Not Specified, NS = No surgery)
Excision distance (enter distance to excision margin in millimeters, U=Unknown, NS = No surgery)

{C} **Sx Number**	**1st operation (diagnostic or therapeutic)**		**2nd operation**		**3rd operation**		**4th operation**		**5th operation**	
	{AV} **Excision margins** *(N,R,U,NS)*	*{AW}* **Excision distance** *(distance in mm, U,NS)*	*{AX}* **Excision margins** *(N,R,U,NS)*	*{AY}* **Excision distance** *(distance in mm, U,NS)*	*{AZ}* **Excision margins** *(N,R,U,NS)*	*{BA}* **Excision distance** *(distance in mm, U,NS)*	*{BB}* **Excision margins** *(N,R,U,NS)*	*{BC}* **Excision distance** *(distance in mm, U,NS)*	*{BD}* **Excision margins** *(N,R,U,NS)*	*{BE}* **Excision distance** *(distance in mm, U,NS)*

PART B: TO BE COMPLETED FOR <u>INVASIVE CANCERS ONLY</u> (KC62 C35 L36)

Col. BF - Invasive size of tumour (enter size in millimetres, U = Unknown)
Col. BG - Whole size of tumour (enter size in millimetres, U = Unknown). Whole tumour size includes any surrounding DCIS
Col. BH - Invasive grade – Bloom & Richardson (I, II, III, NA=Not assessable or U=Unknown. Enter X if not invasive)

{C} **Sx Number**	*{BH}* **Invasive size of tumour**	*{BI}* **Whole size of tumour** *(including surrounding DCIS)*	*{BJ}* **Invasive grade** *(I,II,III, NA,U)*

PART C: TO BE COMPLETED FOR <u>NON-INVASIVE CANCERS ONLY</u> (KC62 C27 L36)

Col. BK – Cytonuclear grade (H = High grade, I = Intermediate grade, L = Low grade, NA = Not assessable, U = Unknown)
Col. BL - Pathological size (enter size in millimetres, NA = Not assessable, U = Unknown)

{C} **Sx Number**	*-Non Invasive-* *{BM}* **Cytonuclear grade** *(H,I,L,NA,U)*	*{BN}* **Pathological size** *(size (mm), NA,U)*

SCREENING SURGICAL CASELOAD AUDIT
Please fill in Part A first.

Screening surgical caseload should be calculated by summing the number of times each GMC code appears in Part A.
In rare cases where there is no surgeon, the GMC code for the case should be coded as “NoRef” in Part A, and counted on the top line.
Cases treated by more than one surgeon should be counted in each surgeon’s Shared Cases field. For example if Surgeon A & B shared 1 case, input ‘1’ in both fields of Surgeon A and B.

GMC Code	**Screening caseload (from Part A)**	**Shared Cases**	**If caseload <10 was this because: (write Y in the first applicable reason)**							
			Other breast caseload > 30 per year	**Joined NHSBSP 2009/10**	**Left NHSBSP 2009/10**	**Surgeon is a plastic surgeon**	**Surgeon operated in private practice**	**Surgeon from other region**	**No information available for surgeon**	**Other reason (text)**
NoRef										

APPENDIX C: ADJUVANT THERAPY AUDIT DATA FORM WITH GUIDANCE NOTES

NHSBSP & ABS ADJUVANT AUDIT FOR WOMEN WITH SCREEN-DETECTED BREAST CANCERS DETECTED BETWEEN 1 APRIL 2008 AND 31 MARCH 2009

PLEASE SUPPLY DATA FOR WOMEN OF ALL AGES WITH SCREEN-DETECTED BREAST CANCER WITH FIRST OFFERED SCREENING APPOINTMENT FROM 1 APRIL 2008 TO 31 MARCH 2009 INCLUSIVE ACCORDING TO THE REGIONAL BOUNDARIES EXTANT FROM 1 APRIL 2010

This document accompanies the MS Excel spreadsheet designed to record NHSBSP & ABS breast audit adjuvant therapy data which has been prepared by the West Midlands Cancer Intelligence Unit (WMCIU). The spreadsheet contains data validation checks.

The NHSBSP & ABS Screening Audit Steering Group expects each consultant surgeon to collect adjuvant therapy data for the list of cases supplied by the screening office or regional QA reference centre. The QA Co-ordinator will organise collation of these data. A box is provided for the signature of the surgeon to verify that these data are correct.

Data will be presented by region and breast screening unit. The unique identifying number known as the "Sx" number is required for data validation and matching purposes.

The deadline for submission of regional data by the regional QA Co-ordinator to the WMCIU is 7 January 2011

DEFINITIONS AND GUIDANCE NOTES

Audit cut-off date: If a woman has not received radiotherapy or chemotherapy or hormonal therapy before 31 March 2010 then it should be assumed for the purposes of this audit that she has not had this treatment. This cut off date allows at least 1 year follow up for all cases.

Bilateral and multiple cancers*:* The KC62 report only counts one cancer per woman. Cancers included in the NHSBSP & ABS screening audit should be counted in the same way so that the number of cancers in the audit equals the number counted on the KC62 report. If bilateral or multiple cancers have been detected, the KC62 selects the worst prognosis cancer. If a non-invasive and an invasive tumour have been detected, the KC62 report counts the invasive tumour only. The same rules should be applied for the audit.

Diagnosis on radiological and/or clinical grounds only: Cancers diagnosed with neither C5 nor B5 nor malignant diagnostic open biopsy should not be included in the audit.

First surgery date: The first surgery date given should be for the first operation, whether this surgery was diagnostic or therapeutic.

Reconstruction surgery: Surgery which is only for the purpose of reconstruction should be excluded when calculating the date of final surgery.

Surgery for benign conditions: Surgery for benign conditions should be excluded when calculating the dates of first and final surgery.

MATCHING TO TUMOUR DATA

The 2008/09 screen-detected cancers in each region need to be downloaded using the adjuvant audit crystal reports. The downloaded data should be matched with the main data submitted to the WMCIU last year to check for any extra cases. If there are any extra cases, the main data for these cases should be provided so that the WMCIU can conduct a complete analysis on all the adjuvant cases provided.

Your spreadsheet should include all cases for which the date of first offered screening appointment is from 1 April 2008 to 31 March 2009. Cases with no data supplied should have 'NDS' on any column of the cases.

The WMCIU should be advised of any changes in the region or unit code assigned to each screening unit's cases.

DATA CHECKS

The following checks are included in the Excel spreadsheet

Checks 1-3 (Assessment to surgery)	If the number of days from assessment to first surgery, assessment to final surgery or first to final surgery cannot be calculated, #VALUE! will appear. For cases with only one surgery, first to final surgery (so first surgery equals final surgery) should display 0. All cases where the number of days is negative should be checked.
Check 4 (Assessment to radiotherapy)	If the number of days from assessment to radiotherapy cannot be calculated, #VALUE! will appear. If the number of days is negative, the date of radiotherapy has been entered as before the date of assessment. All such cases should be checked to confirm that the patient received radiotherapy for a previous cancer.
Data check summary	Minimum, maximum, averages and quartiles of the number of days in each data check are provided in the spreadsheet.

Queries

Any queries about the adjuvant audit should be directed to:

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The University of Birmingham
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NHSBSP & ABS ADJUVANT THERAPY AUDIT - TO BE COMPLETED FOR ALL CANCERS WITH DATE OF FIRST OFFERED APPOINTMENT FROM 1 APRIL 2008 TO 31 MARCH 2009 INCLUSIVE

UNIT:

{D} **Sx Number**	*{E}* **Date of First Offered Appointment** (dd/mm/yyyy)	*{F}* **First Assessment Date** (dd/mm/yyyy,U)	*{G}* **First Surgery Date** *(diagnostic or therapeutic)* (dd/mm/yyyy,NS,U)	*{H}* **Final Surgery Date** *(excl reconstruction only)* (dd/mm/yyyy,NS,U)	*{I}* **Date of Birth** (dd/mm/yyyy)	*{J}* **Consultant Surgeon**

ADJUVANT THERAPY AUDIT - TO BE COMPLETED FOR ALL CANCERS WITH DATE OF FIRST OFFERED APPOINTMENT FROM 1 APRIL 2008 TO 31 MARCH 2009 INCLUSIVE

Enter dates in dd/mm/yyyy format (e.g. 01/04/2008) or U=Unknown, NS=No surgery, NRT=No radiotherapy,
Chemotherapy. Hormonal therapy: Y = therapy given before 31/03/10, N = No therapy given before 31/03/10, U=Unknown
ER Status, PgR Status, Cerb-B2/HER-2 (P = Positive, N = Negative, U = Unknown) to be completed according to local definitions.
(Cerb-B2/Her-2+ if immunohistochemistry 3+ or FISH +)
Previous cancer? : Y if the patient has a previous cancer affecting adjuvant treatment decisions (eg. already on CT for another cancer)

	To aid data collection by the consultant surgeon. Do not send to WMCIU			*See above for coding – to be completed according to local definitions*						
{D} **Sx Number**	*{K}* **Name**	*{L}* **NHS Number**	*{M}* **Hospital Number**	*{N}* **RT Start Date** (dd/mm/yyyy, NRT,U)	*{O}* **CT** (Y,N,U)	*{P}* **HT (eg. Tamoxifen)** (Y,N,U)	*{Q}* **ER Status** *(P,N,U)*	*{R}* **PgR Status** *(P,N,U)*	*{S}* **Cerb-B2/ HER-2** *(P,N,U)*	*{T}* **Previous Cancer?** *(Y)*

I confirm the data above are correct and as complete as possible **Signature (Surgeon):**
Print Name:
Date:

APPENDIX D: SURVIVAL AUDIT DATA COLLECTION SHEET WITH GUIDANCE NOTES

NHSBSP & ABS SURVIVAL AUDIT FOR WOMEN WITH SCREEN-DETECTED BREAST CANCER DETECTED BETWEEN 1 APRIL 1992 AND 31 MARCH 1993

The completed spreadsheets should be submitted by the Breast Screening QA Reference Centre to the WMCIU by 22 September 2010.

Aim:

To combine NHS Breast Screening Programme (NHSBSP) data for women with breast cancers detected by screening between 1 April 1992 and 31 March 1993 with data recorded by regional cancer registries to enable analysis of breast cancer survival for a period of up to 15 years post-diagnosis. Where tumour size, grade and nodal status are available the survival profiles according to prognostic characteristics will be examined. The audit will continue to demonstrate effective information exchange between the NHSBSP and regional cancer registries.

Study population:

All women with breast cancers detected by the NHSBSP and screened between 1 April 1992 and 31 March 1993 should be included in the audit.

Core patient and tumour data should be extracted from the screening service computer systems and matched with records held by regional cancer registries. Cancer registries should indicate if the cancers are not recorded in the cancer registry database (see additional guidance attached). Cancer registries should also identify deaths in these women and confirm that death data are complete to 31 December 2009. If the latter is not the case, an alternative date to which survival can be calculated should be provided.

Data collection:

A MS Excel spreadsheet to record survival audit data has been designed by the West Midlands Cancer Intelligence Unit and provided to each breast screening quality assurance reference centre. QA reference centres should liaise with cancer registries to complete the audit spreadsheets:

A paper representation of the format used in the spreadsheets is provided and may be used as the basis for a data collection form. Crystal reports designed by Mrs Margot Wheaton may be used to collect data from screening offices that use the NBSS computer system.

Overall responsibility for regional data collection remains with the QA Co-ordinator.

DATA TO BE COLLECTED FROM SCREENING SERVICES AND COLLATED BY BREAST SCREENING QUALITY ASSURANCE REFERENCE CENTRES

For cancers detected by screening between 1 April 1992 and 31 March 1993, the following data should be extracted from breast screening computer systems:

- Forename — for use within region only
- Surname — for use within region only
- Address — for use within region only
- Postcode — for use within region only
- NHS number — New NHS number
- Date of birth — (dd/mm/yyyy) necessary for age calculations
- Sx No. (Screening Office Number) — for checking data and matching queries
- Date of first surgery — (dd/mm/yyyy, NS, U) a proxy for date of diagnosis, to help match cases at the cancer registry and to identify possible recurrences and/or multiple primary breast cancers
- Invasive status — Invasive/Micro-invasive/Non-invasive/Unknown

For invasive cancers only (enter X if the case is not invasive):

- Tumour size — invasive size in mm, 'U' for unknown
- Tumour grade — Bloom & Richardson I, II, III, NA or 'U' for unknown
- Total number of lymph nodes — total number, 0 if no nodes obtained, 'U' if unknown
- Number of positive lymph nodes — total number, 0 if node negative, 'U' if unknown

The region, breast screening unit and cancer registry should be added to each case.

DATA TO BE COLLECTED FROM REGIONAL CANCER REGISTRIES

Regional cancer registries will be asked by the QA reference centers to match breast cancers detected following screening between 1 April 1992 and 31 March 1993 with data held on the cancer registration systems using name, NHS number, address, postcode, date of birth, and date of first surgery (as a proxy for date of diagnosis).

Cancer registries have been asked to supply the earliest date of diagnosis for any invasive breast cancer diagnosed for the screening patient in the date of diagnosis column. If the screening case is non-invasive or micro-invasive and no other invasive cancer has been diagnosed before 1992, then the date of diagnosis of this non-invasive/micro-invasive screening case will be recorded.

All cases thought to be 'alive' should be submitted by cancer registries to Demographics Batch Service (DBS) to obtain any date of death not recorded at the cancer registry.

The following data items are required from the cancer registry for all breast cancers detected following screening between 1 April 1992 and 31 March 1993.

- Registration number — the unique registration number for the breast cancer should be added.
- Not registered — For tumours not registered indicate NR in the appropriate column. Please note that this field refers to tumours, not patients
- Date of diagnosis — dd/mm/yyyy of the specific tumour (U if unknown)
- Date of death — dd/mm/yyyy of the patient (leave blank if no death)

The censor date for the survival audit has been set at **31 December 2009**. The cancer registry should confirm to the QA reference centre that death data are complete to **31 December 2009**, or provide an alternative date to which survival time can be calculated.

DATA VALIDATION

A number of data checks have been incorporated into the spreadsheet.

Check 1 (Age at Diagnosis)	If the age at diagnosis cannot be calculated, #VALUE! will appear. If the age at diagnosis is negative, the date of diagnosis has been entered as before the date of birth. All such cases should be checked.
Check 2 (Dates)	All the date columns (Date of Birth, Date of first surgery, Date of diagnosis and Date of death, as the order of flags) should be input in a date format, which is dd/mm/yyyy. In some QA reference centres and cancer registries, dates are downloaded from other databases and the dates are in a text format, although it looks like a date format. This check reveals this format difference which human eye cannot see. If the input is wrong or in a wrong format, the check result will show 'Check'.
Check 3 (Nodes)	If the total number of nodes and/or the number of positive nodes are wrong or not in numerical format, the check will flag up as 'Wrong data type'. This also checks if the total number of nodes is less than the number of positive nodes.
Check 4 (Invasive size)	If the invasive size is wrong or not in numerical format, the check will flag up as 'Size-Wrong data type'
Check 5 (Invasive Status)	If invasive status is blank or wrong codes are used, this check will flag up as 'Enter invasive status'

QUERIES

Any queries about the survival audit should be directed to:

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SURVIVAL AUDIT: SCREENING OFFICE DATA FOR CASES DETECTED IN 1992/93

Region:
Screening Unit:
Cancer Registry:

Date of first surgery (dd/mm/yyyy, NS = No surgery, U = Unknown)
Invasive status (I = Invasive, M = Micro-invasive, N = Non-invasive, U = Unknown)
Invasive Size (size in mm, U = unknown. Enter X if not invasive)
Tumour grade – Bloom & Richardson (I, II, III, NA = Not assessable or U = Unknown. Enter X if not invasive)
Total number of axillary nodes obtained (total number, zero if no nodes obtained, U = Unknown. Enter X if not invasive)
Number of positive axillary nodes (number positive, zero if node negative, U = Unknown. Enter X if not invasive)

												Invasive Cancers Only			
{C} **Sx No.**	*{D}* **Fore-name**	*{E}* **Sur-name**	*{F}* **Address Line1**	*{G}* **Address Line2**	*{H}* **Address Line3**	*{I}* **Address Line4**	*{J}* **Post Code**	*{K}* **NHS Number**	*{L}* **Date of Birth** dd/mm/yyyy	*{M}* **Date of First Surgery** (dd/mm/yyyy, NS, U)	{O} **Invasive Status** (I,M,N,U)	{P} **Invasive Size** (size (mm), U,X)	{Q} **Tumour Grade** (I,II,III, NA,U,X)	{R} **Total Nodes Obtained** (0, 1, 2, .., U,X)	{S} **Number Positive Nodes** (0, 1, 2, .., U,X)

SURVIVAL AUDIT: CANCER REGISTRY DATA FOR CASES DETECTED IN 1992/93

Region:
Screening Unit:
Cancer Registry: **Data complete to: 31/12/2009**

{C} **Sx No. (Screening Office Number)**	[T] **Cancer Registry**	{U} **Cancer Registration Number**	{V} **Not Registered** (NR)	{W} **Date of Diagnosis** (dd/mm/yyyy)	{X} **Date of Death** (dd/mm/yyyy)

ADDITIONAL GUIDANCE

Non-registered cases

A case should be recorded as a non-registered case (NR) if

1. the patient is not registered on the cancer registry database
2. the patient is registered, but the screen-detected breast cancer is not registered.

Date of diagnosis

Cancer registries have been asked to fill in the date of diagnosis column with the earliest date of diagnosis for any invasive breast cancer diagnosed for the screening patient. If the screening case is non-invasive or micro-invasive and no other invasive cancer has been diagnosed before 1992, then the date of diagnosis of the screening case will be recorded.

Example 1:
The patient (with an invasive breast cancer diagnosed in the audit period) in the survival spreadsheet is recorded in the cancer registry database. The earliest invasive breast cancer for that patient was diagnosed in 1990, and there was also an invasive breast cancer diagnosed in 1992/93 which matches the characteristics of the cancer on the spreadsheet.
For this case:
Not registered (NR) column: is blank
Date of diagnosis: the invasive cancer diagnosed in 1990.

Example 2:
The patient (with an invasive breast cancer diagnosed in the audit period) in the survival spreadsheet is recorded in the cancer registry database. The earliest breast cancer for that patient was diagnosed in 1988, and this was a non-invasive breast cancer. The patient also had an invasive breast cancer diagnosed in 1992/93 which matches the characteristics of the one on the spreadsheet.
For this case:
Not registered (NR) column: is blank
Date of diagnosis: the invasive cancer diagnosed in 1992/93.

Example 3:
The patient (with a non-invasive breast cancer diagnosed in the audit period) in the survival spreadsheet is recorded in the cancer registry database. In the CR database, she had a non-invasive breast cancer diagnosed in 1992/93 and there have been no other previous breast cancers recorded for this patient.
For this case:
Not registered (NR) column: is blank
Date of diagnosis: the non-invasive breast cancer in 1992/93.

Example 4:
The patient (with a non-invasive breast cancer diagnosed in the audit period) in the survival spreadsheet is recorded in the cancer registry database, but this specific cancer is not found in the cancer registry records. From the records, this patient had an invasive breast cancer in 1985.
For this case:
Not registered (NR) column: Not registered

Date of diagnosis: the invasive cancer diagnosed in 1985.

APPENDIX E: MAIN AUDIT DATA TABLES (1 - 97)

DATA FROM THE 2009/10 AUDIT OF SCREEN-DETECTED BREAST CANCERS IN WOMEN ALL AGES FOR THE PERIOD 1 APRIL 2009 – 31 MARCH 2010

Table 1 : Number and invasive status of screen-detected breast cancers and total women screened

Region	Invasive		Micro-invasive		Non-invasive		Status unknown		Total		Total women screened	Micro/ Non-invasive cancer rate	Invasive cancer rate	Invasive <15mm rate
	No.	%	No.	%	No.	%	No.	%	No.	%				
N East, Yorks & Humber	1748	81	22	1	390	18	2	0	2162	100	273202	1.5	6.4	3.5
East Midlands	997	79	10	1	253	20	0	0	1260	100	162318	1.6	6.1	3.6
East of England	1310	80	17	1	319	19	0	0	1646	100	202756	1.7	6.5	3.4
London	1310	79	12	1	343	21	3	0	1668	100	215867	1.6	6.1	2.7
South East Coast	1109	79	10	1	288	20	0	0	1407	100	165966	1.8	6.7	3.5
South Central	960	83	5	0	193	17	2	0	1160	100	147090	1.3	6.5	3.1
South West	1289	80	15	1	298	19	1	0	1603	100	202971	1.5	6.4	3.4
West Midlands	1228	81	12	1	274	18	0	0	1514	100	193172	1.5	6.4	3.5
North West	1449	80	15	1	341	19	0	0	1805	100	231483	1.5	6.3	3.0
Wales	782	79	5	1	202	20	0	0	989	100	108988	1.9	7.2	3.9
Northern Ireland	324	81	2	1	73	18	0	0	399	100	56446	1.3	5.7	3.2
Scotland	1166	83	12	1	222	16	0	0	1400	100	172930	1.4	6.7	3.6
United Kingdom	**13672**	**80**	**137**	**1**	**3196**	**19**	**8**	**0**	**17013**	**100**	**2133189**	**1.6**	**6.4**	**3.4**
Isle of Man	24	83	1	3	4	14	0	0	29	100	4302	1.2	5.6	3.5

Table 2 : Age at first offered screening appointment

Region	<50		50-64		65-70		71-75		76+		Total	>65	
	No.	%	No.	%	No.	%	No.	%	No.	%		No.	%
N East, Yorks & Humber	36	2	1430	66	553	26	98	5	45	2	2162	696	32
East Midlands	29	2	826	66	333	26	51	4	21	2	1260	405	32
East of England	11	1	1106	67	400	24	76	5	53	3	1646	529	32
London	46	3	1123	67	399	24	67	4	33	2	1668	499	30
South East Coast	65	5	878	62	372	26	64	5	28	2	1407	464	33
South Central	21	2	758	65	307	26	40	3	34	3	1160	381	33
South West	33	2	1027	64	433	27	75	5	35	2	1603	543	34
West Midlands	44	3	948	63	424	28	69	5	29	2	1514	522	34
North West	52	3	1164	64	471	26	82	5	36	2	1805	589	33
Wales	19	2	595	60	286	29	60	6	29	3	989	375	38
Northern Ireland	7	2	270	68	120	30	1	0	1	0	399	122	31
Scotland	0	0	928	66	369	26	68	5	35	3	1400	472	34
United Kingdom	**363**	**2**	**11053**	**65**	**4467**	**26**	**751**	**4**	**379**	**2**	**17013**	**5597**	**33**
Isle of Man	1	3	16	55	10	34	1	3	1	3	29	12	41

Table 3 : Cancers diagnosed on radiological/clinical grounds only

Region	Total cancers including radiological/clinical cancers	Cancers diagnosed on radiological/clinical grounds only	
		No.	%
N East, Yorks & Humber	2162	1	0.05
East Midlands	1260	2	0.16
East of England	1646	1	0.06
London	1668	0	0.00
South East Coast	1407	1	0.07
South Central	1160	0	0.00
South West	1603	1	0.06
West Midlands	1514	0	0.00
North West	1805	0	0.00
Wales	989	0	0.00
Northern Ireland	399	0	0.00
Scotland	1400	0	0.00
United Kingdom	**17013**	**6**	**0.04**

Table 4 : Non-operative diagnosis rate											
	Total cancers	C5 only		C5 & B5		B5 only		Non-operative diagnosis		No non-operative diagnosis	
Region		No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	2162	11	1	352	16	1737	80	2100	97	62	3
East Midlands	1260	4	0	9	1	1205	96	1218	97	42	3
East of England	1646	8	0	19	1	1536	93	1563	95	83	5
London	1668	13	1	49	3	1522	91	1584	95	84	5
South East Coast	1407	10	1	29	2	1294	92	1333	95	74	5
South Central	1160	13	1	56	5	1017	88	1086	94	74	6
South West	1603	22	1	49	3	1453	91	1524	95	79	5
West Midlands	1514	8	1	5	0	1442	95	1455	96	59	4
North West	1805	91	5	92	5	1545	86	1728	96	77	4
Wales	989	3	0	8	1	937	95	948	96	41	4
Northern Ireland	399	37	9	155	39	191	48	383	96	16	4
Scotland	1400	3	0	201	14	1144	82	1348	96	52	4
United Kingdom	**17013**	**223**	**1**	**1024**	**6**	**15023**	**88**	**16270**	**96**	**743**	**4**

Table 5 : Non-operative diagnosis rate (invasive cancers)											
	Total cancers	C5 only		C5 & B5		B5 only		Non-operative diagnosis		No non-operative diagnosis	
Region		No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1748	8	0	324	19	1404	80	1736	99	12	1
East Midlands	997	4	0	9	1	976	98	989	99	8	1
East of England	1310	8	1	19	1	1258	96	1285	98	25	2
London	1310	10	1	49	4	1228	94	1287	98	23	2
South East Coast	1109	9	1	28	3	1049	95	1086	98	23	2
South Central	960	13	1	56	6	863	90	932	97	28	3
South West	1289	19	1	47	4	1198	93	1264	98	25	2
West Midlands	1228	8	1	5	0	1193	97	1206	98	22	2
North West	1449	87	6	90	6	1244	86	1421	98	28	2
Wales	782	3	0	8	1	759	97	770	98	12	2
Northern Ireland	324	36	11	150	46	134	41	320	99	4	1
Scotland	1166	1	0	192	16	962	83	1155	99	11	1
United Kingdom	**13672**	**206**	**2**	**977**	**7**	**12268**	**90**	**13451**	**98**	**221**	**2**

Table 6 : Non-operative diagnosis rate (non-invasive cancers)											
	Total cancers	C5 only		C5 & B5		B5 only		Non-operative diagnosis		No non-operative diagnosis	
Region		No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	390	2	1	23	6	315	81	340	87	50	13
East Midlands	253	0	0	0	0	220	87	220	87	33	13
East of England	319	0	0	0	0	261	82	261	82	58	18
London	343	0	0	0	0	284	83	284	83	59	17
South East Coast	288	1	0	1	0	236	82	238	83	50	17
South Central	193	0	0	0	0	148	77	148	77	45	23
South West	298	2	1	2	1	240	81	244	82	54	18
West Midlands	274	0	0	0	0	238	87	238	87	36	13
North West	341	4	1	2	1	288	84	294	86	47	14
Wales	202	0	0	0	0	174	86	174	86	28	14
Northern Ireland	73	1	1	5	7	55	75	61	84	12	16
Scotland	222	2	1	9	4	170	77	181	82	41	18
United Kingdom	**3196**	**12**	**0**	**42**	**1**	**2629**	**82**	**2683**	**84**	**513**	**16**

Table 7 : Invasive status of the diagnostic core biopsy							
	Total Cancers with B5	B5a (Non-invasive)		B5b (Invasive)		B5c (Micro-invasive, Not Assessable or Unknown)	
Region		No.	%	No.	%	No.	%
N East, Yorks & Humber	2089	420	20	1644	79	25	1
East Midlands	1214	283	23	925	76	6	0
East of England	1555	347	22	1194	77	14	1
London	1571	359	23	1209	77	3	0
South East Coast	1323	310	23	1007	76	6	0
South Central	1073	194	18	867	81	12	1
South West	1502	315	21	1179	78	8	1
West Midlands	1447	306	21	1131	78	10	1
North West	1637	386	24	1246	76	5	0
Wales	945	219	23	726	77	0	0
Northern Ireland	346	82	24	264	76	0	0
Scotland	1345	222	17	1114	83	9	1
United Kingdom	**16047**	**3443**	**21**	**12506**	**78**	**98**	**1**

Table 8 : B5a (Non-invasive) core biopsy: histological status after surgery												
	Invasive		Micro-invasive		Non-invasive		Benign		Unknown		Total with surgery	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	71	17	21	5	309	74	3	1	13	3	417	100
East Midlands	57	21	9	3	205	74	6	2	0	0	277	100
East of England	74	22	16	5	244	71	9	3	0	0	343	100
London	66	18	10	3	266	75	15	4	0	0	357	100
South East Coast	66	22	9	3	222	73	7	2	0	0	304	100
South Central	46	24	4	2	140	73	2	1	1	1	193	100
South West	64	21	14	4	230	74	4	1	0	0	312	100
West Midlands	64	21	7	2	232	76	2	1	0	0	305	100
North West	88	23	13	3	272	71	6	2	2	1	381	100
Wales	41	19	4	2	165	77	5	2	0	0	215	100
Northern Ireland	20	25	2	2	57	70	2	2	0	0	81	100
Scotland	36	16	10	5	172	79	1	0	0	0	219	100
United Kingdom	**693**	**20**	**119**	**3**	**2514**	**74**	**62**	**2**	**16**	**0**	**3404**	**100**

Benign cases have non-invasive disease reported in the non-operative core biopsy but no malignant disease found in the surgical specimen

Table 9 : B5b (Invasive) core biopsy: histological status after surgery												
	Invasive		Micro-invasive		Non-invasive		Benign		Unknown		Total with surgery	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1580	99	4	0	9	1	3	0	5	0	1601	100
East Midlands	892	98	1	0	8	1	5	1	0	0	906	100
East of England	1155	99	2	0	7	1	6	1	0	0	1170	100
London	1147	98	5	0	10	1	9	1	0	0	1171	100
South East Coast	982	99	0	0	7	1	1	0	0	0	990	100
South Central	844	99	2	0	2	0	0	0	2	0	850	100
South West	1146	98	7	1	9	1	4	0	1	0	1167	100
West Midlands	1108	99	2	0	1	0	2	0	2	0	1115	100
North West	1206	99	1	0	8	1	3	0	6	0	1224	100
Wales	703	99	3	0	2	0	2	0	0	0	710	100
Northern Ireland	259	100	0	0	0	0	1	0	0	0	260	100
Scotland	1074	99	0	0	8	1	0	0	3	0	1085	100
United Kingdom	**12096**	**99**	**27**	**0**	**71**	**1**	**36**	**0**	**19**	**0**	**12249**	**100**

Benign cases have invasive disease reported in the non-operative core biopsy but no malignant disease found in the surgical specimen

Table 10 : C5 cytology only: histological status after surgery												
	Invasive		Micro-invasive		Non-invasive		Benign		Unknown		Total with surgery	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	8	80	0	0	2	20	0	0	0	0	10	100
East Midlands	4	100	0	0	0	0	0	0	0	0	4	100
East of England	8	100	0	0	0	0	0	0	0	0	8	100
London	10	91	0	0	0	0	1	9	0	0	11	100
South East Coast	9	90	0	0	1	10	0	0	0	0	10	100
South Central	13	100	0	0	0	0	0	0	0	0	13	100
South West	19	90	0	0	2	10	0	0	0	0	21	100
West Midlands	8	100	0	0	0	0	0	0	0	0	8	100
North West	87	96	0	0	4	4	0	0	0	0	91	100
Wales	3	100	0	0	0	0	0	0	0	0	3	100
Northern Ireland	36	97	0	0	1	3	0	0	0	0	37	100
Scotland	1	33	0	0	2	67	0	0	0	0	3	100
United Kingdom	**206**	**94**	**0**	**0**	**12**	**5**	**1**	**0**	**0**	**0**	**219**	**100**

Benign cases have non-invasive disease reported in the non-operative core biopsy but no malignant disease found in the surgical specimen

Table 11 : Number of visits for cytology/core biopsy for all cancers														
	0		1		2		3+		Unknown		Total		Repeat (2+) visit for core/cyt	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	3	0	1910	88	233	11	16	1	0	0	2162	100	249	12
East Midlands	0	0	1065	85	174	14	21	2	0	0	1260	100	195	15
East of England	2	0	1542	94	99	6	3	0	0	0	1646	100	102	6
London	1	0	1443	87	207	12	17	1	0	0	1668	100	224	13
South East Coast	1	0	1096	78	297	21	13	1	0	0	1407	100	310	22
South Central	0	0	1014	87	137	12	9	1	0	0	1160	100	146	13
South West	0	0	1311	82	272	17	20	1	0	0	1603	100	292	18
West Midlands	0	0	1320	87	182	12	12	1	0	0	1514	100	194	13
North West	0	0	1534	85	258	14	13	1	0	0	1805	100	271	15
Wales	2	0	916	93	67	7	4	0	0	0	989	100	71	7
Northern Ireland	0	0	378	95	18	5	3	1	0	0	399	100	21	5
Scotland	1	0	1321	94	77	6	1	0	0	0	1400	100	78	6
United Kingdom	**10**	**0**	**14850**	**87**	**2021**	**12**	**132**	**1**	**0**	**0**	**17013**	**100**	**2153**	**13**

Table 12 : C5 and/or B5 at first visit versus overall non-operative rate (invasive cancers)					
	1 C5/B5		Non-operative diagnosis rate		% increase between 1 visit and repeat visits
Region	No.	%	No.	%	
N East, Yorks & Humber	1575	90	1736	99	9
East Midlands	897	90	989	99	9
East of England	1223	93	1285	98	5
London	1151	88	1287	98	10
South East Coast	880	79	1086	98	19
South Central	840	88	932	97	10
South West	1089	84	1264	98	14
West Midlands	1092	89	1206	98	9
North West	1247	86	1421	98	12
Wales	728	93	770	98	5
Northern Ireland	306	94	320	99	4
Scotland	1115	96	1155	99	3
United Kingdom	**12143**	**89**	**13451**	**98**	**10**

Table 13 : C5 and/or B5 at first visit versus overall non-operative rate (non/micro invasive cancers)					
	1 C5/B5		Non-operative diagnosis rate		% increase between 1 visit and repeat visits
Region	No.	%	No.	%	
N East, Yorks & Humber	294	71	362	88	17
East Midlands	150	57	229	87	30
East of England	246	73	278	83	10
London	227	64	294	83	19
South East Coast	167	56	247	83	27
South Central	123	62	153	77	15
South West	167	53	259	83	29
West Midlands	194	68	249	87	19
North West	228	64	307	86	22
Wales	162	78	178	86	8
Northern Ireland	57	76	63	84	8
Scotland	173	74	193	82	9
United Kingdom	**2188**	**66**	**2812**	**84**	**19**

Table 14 : Status of diagnostic open biopsies									
	Benign		Malignant		Total		Total women screened	Benign biopsy rate	Malignant biopsy rate
Region	No.	%	No.	%	No.	%			
N East, Yorks & Humber	175	74	62	26	237	100	273202	0.64	0.23
East Midlands	101	71	42	29	143	100	162318	0.62	0.26
East of England	166	67	83	33	249	100	202756	0.82	0.41
London	232	73	84	27	316	100	215867	1.07	0.39
South East Coast	151	67	74	33	225	100	165966	0.91	0.45
South Central	109	60	74	40	183	100	147090	0.74	0.50
South West	152	66	79	34	231	100	202971	0.75	0.39
West Midlands	134	69	59	31	193	100	193172	0.69	0.31
North West	188	71	77	29	265	100	231483	0.81	0.33
Wales	110	73	41	27	151	100	108988	1.01	0.38
Northern Ireland	31	66	16	34	47	100	56446	0.55	0.28
Scotland	132	72	52	28	184	100	172930	0.76	0.30
United Kingdom	**1681**	**69**	**743**	**31**	**2424**	**100**	**2133189**	**0.79**	**0.35**

Table 15 : Number of clients with proven false positive C5 or B5 non-operative diagnosis				
	False positive C5 (CQA Report)		False positive B5 (BQA Report)	
Region	No.	Per 100,000 screened	No.	Per 100,000 screened
N East, Yorks & Humber	0	0	3	1.10
East Midlands	0	0	0	0.00
East of England	0	0	0	0.00
London	0	0	0	0.00
South East Coast	0	0	0	0.00
South Central	0	0	1	0.68
South West	0	0	0	0.00
West Midlands	0	0	0	0.00
North West	0	0	4	1.73
Wales	0	0	0	0.00
Northern Ireland	0	0	3	5.31
Scotland	0	0	2	1.16
United Kingdom	**0**	**0**	**13**	**0.61**

Table 16 : Invasive status of malignant diagnostic open biopsies									
Region	Total malignant open biopsies	Invasive		Micro-invasive		Non-invasive		Status unknown	
		No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	62	12	19	0	0	50	81	0	0
East Midlands	42	8	19	1	2	33	79	0	0
East of England	83	25	30	0	0	58	70	0	0
London	84	23	27	2	2	59	70	0	0
South East Coast	74	23	31	1	1	50	68	0	0
South Central	74	28	38	0	0	45	61	1	1
South West	79	25	32	0	0	54	68	0	0
West Midlands	59	22	37	1	2	36	61	0	0
North West	77	28	36	2	3	47	61	0	0
Wales	41	12	29	1	2	28	68	0	0
Northern Ireland	16	4	25	0	0	12	75	0	0
Scotland	52	11	21	0	0	41	79	0	0
United Kingdom	**743**	**221**	**30**	**8**	**1**	**513**	**69**	**1**	**0**

Table 17 : Non-operative history for invasive cancers with malignant open biopsy									
Region	Total malignant open biopsies	No non-operative procedures		Cytology only		Core biopsy only		Both cytology and core biopsy	
		No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	12	1	8	0	0	11	92	0	0
East Midlands	8	0	0	0	0	8	100	0	0
East of England	25	1	4	4	16	19	76	1	4
London	23	1	4	0	0	22	96	0	0
South East Coast	23	0	0	0	0	22	96	1	4
South Central	28	7	25	0	0	21	75	0	0
South West	25	1	4	2	8	22	88	0	0
West Midlands	22	1	5	1	5	20	91	0	0
North West	28	2	7	3	11	21	75	2	7
Wales	12	1	8	0	0	11	92	0	0
Northern Ireland	4	0	0	0	0	4	100	0	0
Scotland	11	0	0	0	0	8	73	3	27
United Kingdom	**221**	**15**	**7**	**10**	**5**	**189**	**86**	**7**	**3**

Table 18 : Non-operative history for micro/non-invasive cancers with malignant open biopsy									
Region	Total malignant open biopsies	No non-operative procedures		Cytology only		Core biopsy only		Both cytology and core biopsy	
		No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	50	2	4	0	0	34	68	14	28
East Midlands	34	0	0	0	0	30	88	4	12
East of England	58	1	2	0	0	56	97	1	2
London	61	0	0	1	2	57	93	3	5
South East Coast	51	1	2	1	2	48	94	1	2
South Central	45	0	0	0	0	44	98	1	2
South West	54	0	0	1	2	52	96	1	2
West Midlands	37	1	3	0	0	36	97	0	0
North West	49	0	0	1	2	45	92	3	6
Wales	29	1	3	0	0	26	90	2	7
Northern Ireland	12	1	8	0	0	8	67	3	25
Scotland	41	1	2	2	5	34	83	4	10
United Kingdom	**521**	**8**	**2**	**6**	**1**	**470**	**90**	**37**	**7**

Table 19 : Highest cytology and core biopsy result prior to malignant diagnostic open biopsies (invasive cancers)											
Region	Total malignant open biopsies	No non-operative procedures		C4, B4 or both		C3, B3 or both		C2, B2 or both		C1, B1 or both	
		No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	12	1	8	4	33	5	42	1	8	1	8
East Midlands	8	0	0	4	50	4	50	0	0	0	0
East of England	25	1	4	9	36	12	48	1	4	2	8
London	23	1	4	6	26	11	48	3	13	2	9
South East Coast	23	0	0	7	30	11	48	3	13	2	9
South Central	28	7	25	12	43	7	25	0	0	2	7
South West	25	1	4	7	28	10	40	6	24	1	4
West Midlands	22	1	5	10	45	6	27	4	18	1	5
North West	28	2	7	8	29	13	46	2	7	3	11
Wales	12	1	8	2	17	5	42	1	8	3	25
Northern Ireland	4	0	0	1	25	3	75	0	0	0	0
Scotland	11	0	0	4	36	5	45	2	18	0	0
United Kingdom	**221**	**15**	**7**	**74**	**33**	**92**	**42**	**23**	**10**	**17**	**8**

Table 20 : Highest cytology and core biopsy result prior to malignant diagnostic open biopsies (micro/non-invasive cancers)											
Region	Total malignant open biopsies	No non-operative procedures		C4, B4 or both		C3, B3 or both		C2, B2 or both		C1, B1 or both	
		No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	50	2	4	12	24	34	68	2	4	0	0
East Midlands	34	0	0	11	32	19	56	3	9	1	3
East of England	58	1	2	20	34	34	59	1	2	2	3
London	61	0	0	12	20	45	74	3	5	1	2
South East Coast	51	1	2	18	35	31	61	1	2	0	0
South Central	45	0	0	16	36	24	53	0	0	5	11
South West	54	0	0	27	50	23	43	3	6	1	2
West Midlands	37	1	3	15	41	18	49	2	5	1	3
North West	49	0	0	14	29	31	63	2	4	2	4
Wales	29	1	3	9	31	16	55	0	0	3	10
Northern Ireland	12	1	8	2	17	8	67	0	0	1	8
Scotland	41	1	2	10	24	24	59	4	10	2	5
United Kingdom	**521**	**8**	**2**	**166**	**32**	**307**	**59**	**21**	**4**	**19**	**4**

Table 21: Data completeness for non-invasive cancers (cases with surgery only)							
Region	Unknown cytonuclear grade		Unknown size		Unknown cytonuclear grade and/or size		Total with surgery
	No.	%	No.	%	No.	%	No.
N East, Yorks & Humber	19	5	38	10	38	10	387
East Midlands	5	2	11	4	11	4	247
East of England	9	3	20	6	22	7	315
London	6	2	27	8	31	9	342
South East Coast	15	5	23	8	24	9	282
South Central	11	6	17	9	19	10	192
South West	7	2	13	4	17	6	295
West Midlands	2	1	8	3	8	3	273
North West	7	2	23	7	23	7	336
Wales	1	1	10	5	11	6	198
Northern Ireland	1	1	8	11	8	11	72
Scotland	1	0	3	1	3	1	219
United Kingdom	**84**	**3**	**201**	**6**	**215**	**7**	**3158**

Table 22 : Cytonuclear grade of surgically treated non-invasive cancers												
	High		Intermediate		Low		Not assessable		Unknown		Total non-invasive with surgery	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	200	52	126	33	40	10	2	1	19	5	387	100
East Midlands	142	57	81	33	19	8	0	0	5	2	247	100
East of England	179	57	84	27	34	11	9	3	9	3	315	100
London	178	52	85	25	52	15	21	6	6	2	342	100
South East Coast	161	57	75	27	30	11	1	0	15	5	282	100
South Central	112	58	43	22	20	10	6	3	11	6	192	100
South West	160	54	91	31	33	11	4	1	7	2	295	100
West Midlands	167	61	72	26	25	9	7	3	2	1	273	100
North West	195	58	99	29	32	10	3	1	7	2	336	100
Wales	109	55	56	28	28	14	4	2	1	1	198	100
Northern Ireland	38	53	18	25	15	21	0	0	1	1	72	100
Scotland	136	62	59	27	8	4	15	7	1	0	219	100
United Kingdom	**1777**	**56**	**889**	**28**	**336**	**11**	**72**	**2**	**84**	**3**	**3158**	**100**

Table 23 : Size of non-invasive cancers												
	<15mm		15-≤40mm		>40 mm		Size not assessable		Size unknown		Total non-invasive with surgery	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	145	37	155	40	47	12	2	1	38	10	387	100
East Midlands	84	34	128	52	24	10	0	0	11	4	247	100
East of England	128	41	134	43	24	8	9	3	20	6	315	100
London	124	36	123	36	51	15	17	5	27	8	342	100
South East Coast	114	40	105	37	40	14	0	0	23	8	282	100
South Central	62	32	83	43	25	13	5	3	17	9	192	100
South West	120	41	120	41	38	13	4	1	13	4	295	100
West Midlands	90	33	128	47	45	16	2	1	8	3	273	100
North West	111	33	147	44	52	15	3	1	23	7	336	100
Wales	90	45	70	35	24	12	4	2	10	5	198	100
Northern Ireland	29	40	30	42	5	7	0	0	8	11	72	100
Scotland	90	41	89	41	31	14	6	3	3	1	219	100
United Kingdom	**1187**	**38**	**1312**	**42**	**406**	**13**	**52**	**2**	**201**	**6**	**3158**	**100**

Table 24 : Invasive size of surgically treated invasive breast cancers																
	<10mm		10-<15mm		15-≤20mm		>20-≤35mm		>35-≤50mm		>50mm		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	442	26	518	30	352	21	280	16	51	3	39	2	25	1	1707	100
East Midlands	276	28	313	32	204	21	134	14	25	3	10	1	16	2	978	100
East of England	337	26	360	28	309	24	204	16	39	3	19	1	18	1	1286	100
London	297	23	296	23	305	24	253	20	62	5	29	2	37	3	1279	100
South East Coast	280	26	309	28	256	23	175	16	46	4	18	2	8	1	1092	100
South Central	198	21	255	27	251	27	176	19	40	4	15	2	8	1	943	100
South West	339	27	352	28	286	22	213	17	46	4	18	1	23	2	1277	100
West Midlands	309	25	364	30	292	24	178	15	42	3	19	2	8	1	1212	100
North West	300	21	392	27	348	24	286	20	54	4	24	2	23	2	1427	100
Wales	211	28	211	28	185	24	109	14	25	3	15	2	10	1	766	100
Northern Ireland	77	24	104	33	69	22	60	19	5	2	4	1	1	0	320	100
Scotland	287	25	341	30	253	22	181	16	41	4	23	2	16	1	1142	100
United Kingdom	**3353**	**25**	**3815**	**28**	**3110**	**23**	**2249**	**17**	**476**	**4**	**233**	**2**	**193**	**1**	**13429**	**100**

Table 25 : Whole size of invasive breast cancers																
	<10mm		10-<15mm		15-≤20mm		>20-≤35mm		>35-≤50mm		>50mm		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	250	15	406	24	392	23	392	23	110	6	92	5	65	4	1707	100
East Midlands	179	18	287	29	220	22	200	20	50	5	32	3	10	1	978	100
East of England	212	16	317	25	315	24	306	24	78	6	40	3	18	1	1286	100
London	167	13	256	20	326	25	326	25	107	8	66	5	31	2	1279	100
South East Coast	168	15	267	24	279	26	248	23	85	8	42	4	3	0	1092	100
South Central	102	11	218	23	256	27	232	25	68	7	39	4	28	3	943	100
South West	205	16	298	23	318	25	309	24	79	6	46	4	22	2	1277	100
West Midlands	186	15	307	25	313	26	274	23	79	7	44	4	9	1	1212	100
North West	195	14	342	24	365	26	362	25	94	7	48	3	21	1	1427	100
Wales	130	17	183	24	188	25	155	20	44	6	29	4	37	5	766	100
Northern Ireland	55	17	88	28	71	22	77	24	18	6	10	3	1	0	320	100
Scotland	164	14	311	27	289	25	255	22	64	6	48	4	11	1	1142	100
United Kingdom	**2013**	**15**	**3280**	**24**	**3332**	**25**	**3136**	**23**	**876**	**7**	**536**	**4**	**256**	**2**	**13429**	**100**

Table 26 : Whole size of invasive cancers with invasive size <15mm														
	Whole size <15mm		Whole size 15-≤20mm		Whole size >20-≤35mm		Whole size >35-≤50mm		Whole size >50mm		Whole size unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	655	68	120	13	90	9	39	4	27	3	29	3	960	100
East Midlands	462	78	52	9	47	8	12	2	16	3	0	0	589	100
East of England	528	76	72	10	69	10	14	2	11	2	3	0	697	100
London	420	71	74	12	60	10	20	3	16	3	3	1	593	100
South East Coast	432	73	76	13	49	8	15	3	17	3	0	0	589	100
South Central	320	71	55	12	40	9	14	3	14	3	10	2	453	100
South West	501	73	100	14	60	9	19	3	10	1	1	0	691	100
West Midlands	492	73	83	12	71	11	14	2	11	2	2	0	673	100
North West	533	77	79	11	49	7	16	2	12	2	3	0	692	100
Wales	310	73	41	10	40	9	11	3	5	1	15	4	422	100
Northern Ireland	143	79	15	8	15	8	4	2	4	2	0	0	181	100
Scotland	473	75	77	12	46	7	16	3	15	2	1	0	628	100
United Kingdom	**5269**	**74**	**844**	**12**	**636**	**9**	**194**	**3**	**158**	**2**	**67**	**1**	**7168**	**100**

Table 27 : Grade of invasive cancers												
	Grade I		Grade II		Grade III		Not assessable		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	450	26	905	53	339	20	3	0	10	1	1707	100
East Midlands	284	29	523	53	170	17	0	0	1	0	978	100
East of England	302	23	685	53	286	22	6	0	7	1	1286	100
London	327	26	692	54	247	19	5	0	8	1	1279	100
South East Coast	235	22	603	55	246	23	5	0	3	0	1092	100
South Central	224	24	484	51	225	24	7	1	3	0	943	100
South West	356	28	658	52	235	18	6	0	22	2	1277	100
West Midlands	329	27	596	49	279	23	3	0	5	0	1212	100
North West	417	29	715	50	286	20	4	0	5	0	1427	100
Wales	206	27	424	55	131	17	2	0	3	0	766	100
Northern Ireland	72	23	181	57	66	21	1	0	0	0	320	100
Scotland	280	25	572	50	276	24	5	0	9	1	1142	100
United Kingdom	**3482**	**26**	**7038**	**52**	**2786**	**21**	**47**	**0**	**76**	**1**	**13429**	**100**

Table 28 : Data completeness for invasive cancers (with surgery)									
	Unknown invasive size		Unknown nodal status		Unknown grade		Unknown NPI*		Total invasive
Region	No.	%	No.	%	No.	%	No.	%	
N East, Yorks & Humber	25	1.5	20	1.2	10	0.6	45	2.6	1707
East Midlands	16	1.6	6	0.6	1	0.1	22	2.2	978
East of England	18	1.4	22	1.7	7	0.5	45	3.5	1286
London	37	2.9	42	3.3	8	0.6	74	5.8	1279
South East Coast	8	0.7	20	1.8	3	0.3	32	2.9	1092
South Central	8	0.8	25	2.7	3	0.3	35	3.7	943
South West	23	1.8	22	1.7	22	1.7	62	4.9	1277
West Midlands	8	0.7	16	1.3	5	0.4	26	2.1	1212
North West	23	1.6	23	1.6	5	0.4	49	3.4	1427
Wales	10	1.3	8	1.0	3	0.4	20	2.6	766
Northern Ireland	1	0.3	1	0.3	0	0.0	3	0.9	320
Scotland	16	1.4	8	0.7	9	0.8	29	2.5	1142
United Kingdom	**193**	**1.4**	**213**	**1.6**	**76**	**0.6**	**442**	**3.3**	**13429**

* NPI is unknown if size, grade or nodal status are unknown or grade if not assessable

Table 29 : NPI Group of invasive cancers												
	EPG		GPG		MPG1		MPG2		PPG		Total with known NPI	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	370	22	601	36	403	24	174	10	114	7	1662	100
East Midlands	242	25	379	40	216	23	72	8	47	5	956	100
East of England	237	19	482	39	306	25	130	10	86	7	1241	100
London	240	20	438	36	308	26	134	11	85	7	1205	100
South East Coast	185	17	405	38	287	27	109	10	74	7	1060	100
South Central	179	20	306	34	251	28	116	13	56	6	908	100
South West	283	23	461	38	286	24	117	10	68	6	1215	100
West Midlands	276	23	427	36	301	25	122	10	60	5	1186	100
North West	307	22	493	36	350	25	148	11	80	6	1378	100
Wales	179	24	283	38	180	24	67	9	37	5	746	100
Northern Ireland	57	18	135	43	71	22	33	10	21	7	317	100
Scotland	226	20	402	36	270	24	122	11	93	8	1113	100
United Kingdom	**2781**	**21**	**4812**	**37**	**3229**	**25**	**1344**	**10**	**821**	**6**	**12987**	**100**

Table 30 : ER status							
	Positive		Negative		Not done or Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	1771	82	245	11	146	7	2162
East Midlands	1004	80	109	9	147	12	1260
East of England	1265	77	139	8	242	15	1646
London	1277	77	146	9	245	15	1668
South East Coast	1124	80	129	9	154	11	1407
South Central	911	79	123	11	126	11	1160
South West	1320	82	143	9	140	9	1603
West Midlands	1224	81	137	9	153	10	1514
North West	1524	84	157	9	124	7	1805
Wales	734	74	91	9	164	17	989
Northern Ireland	331	83	47	12	21	5	399
Scotland	1121	80	154	11	125	9	1400
United Kingdom	**13606**	**80**	**1620**	**10**	**1787**	**11**	**17013**

Table 31 : ER status (invasive cancers)							
	Positive		Negative		Not done or Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	1557	89	181	10	10	1	1748
East Midlands	909	91	85	9	3	0	997
East of England	1173	90	121	9	16	1	1310
London	1172	89	119	9	19	1	1310
South East Coast	997	90	97	9	15	1	1109
South Central	852	89	104	11	4	0	960
South West	1170	91	114	9	5	0	1289
West Midlands	1119	91	107	9	2	0	1228
North West	1321	91	117	8	11	1	1449
Wales	691	88	85	11	6	1	782
Northern Ireland	289	89	34	10	1	0	324
Scotland	1019	87	129	11	18	2	1166
United Kingdom	**12269**	**90**	**1293**	**9**	**110**	**1**	**13672**

Table 32 : ER status (non-invasive cancers)							
	Positive		Negative		Not done or Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	204	52	55	14	131	34	390
East Midlands	92	36	22	9	139	55	253
East of England	86	27	16	5	217	68	319
London	101	29	24	7	218	64	343
South East Coast	123	43	29	10	136	47	288
South Central	56	29	18	9	119	62	193
South West	145	49	26	9	127	43	298
West Midlands	101	37	27	10	146	53	274
North West	197	58	35	10	109	32	341
Wales	42	21	6	3	154	76	202
Northern Ireland	42	58	11	15	20	27	73
Scotland	95	43	22	10	105	47	222
United Kingdom	**1284**	**40**	**291**	**9**	**1621**	**51**	**3196**

Table 33 : PgR status							
	Positive		Negative		Not done or Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	655	30	314	15	1193	55	2162
East Midlands	280	22	122	10	858	68	1260
East of England	454	28	221	13	971	59	1646
London	1069	64	273	16	326	20	1668
South East Coast	827	59	216	15	364	26	1407
South Central	642	55	218	19	300	26	1160
South West	702	44	241	15	660	41	1603
West Midlands	552	36	207	14	755	50	1514
North West	1267	70	326	18	212	12	1805
Wales	301	30	141	14	547	55	989
Northern Ireland	217	54	80	20	102	26	399
Scotland	737	53	220	16	443	32	1400
United Kingdom	**7703**	**45**	**2579**	**15**	**6731**	**40**	**17013**

Table 34 : PgR status of invasive cancers with negative ER status							
	Positive		Negative		Not done or Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	5	3	138	76	38	21	181
East Midlands	4	5	49	58	32	38	85
East of England	5	4	89	74	27	22	121
London	10	8	103	87	6	5	119
South East Coast	6	6	81	84	10	10	97
South Central	4	4	98	94	2	2	104
South West	7	6	89	78	18	16	114
West Midlands	3	3	96	90	8	7	107
North West	5	4	105	90	7	6	117
Wales	1	1	71	84	13	15	85
Northern Ireland	0	0	30	88	4	12	34
Scotland	7	5	98	76	24	19	129
United Kingdom	**57**	**4**	**1047**	**81**	**189**	**15**	**1293**

Table 35 : HER-2 status for invasive cancers									
	Positive		Negative		Borderline		Not done or Unknown		Total
Region	No.	%	No.	%	No.	%	No.	%	
N East, Yorks & Humber	195	11	1468	84	20	1	65	4	1748
East Midlands	87	9	895	90	0	0	15	2	997
East of England	142	11	1102	84	28	2	38	3	1310
London	131	10	1011	77	59	5	109	8	1310
South East Coast	102	9	922	83	14	1	71	6	1109
South Central	110	11	739	77	46	5	65	7	960
South West	222	17	1017	79	12	1	38	3	1289
West Midlands	122	10	1048	85	27	2	31	3	1228
North West	145	10	1224	84	60	4	20	1	1449
Wales	71	9	686	88	0	0	25	3	782
Northern Ireland	29	9	274	85	19	6	2	1	324
Scotland	115	10	1021	88	0	0	30	3	1166
United Kingdom	**1471**	**11**	**11407**	**83**	**285**	**2**	**509**	**4**	**13672**

Table 36 : Size, grade and nodal status for invasive cancers with HER2 testing not done or unknown							
	Total HER2 unknown/not done	<10mm invasive size		Grade I		Negative nodal status	
Region		No	%	No	%	No	%
N East, Yorks & Humber	65	25	38	17	26	41	63
East Midlands	15	6	40	5	33	12	80
East of England	38	15	39	3	8	20	53
London	109	31	28	21	19	75	69
South East Coast	71	19	27	14	20	49	69
South Central	65	17	26	21	32	54	83
South West	38	17	45	10	26	31	82
West Midlands	31	17	55	7	23	21	68
North West	20	6	30	3	15	9	45
Wales	25	15	60	10	40	22	88
Northern Ireland	2	0	0	0	0	1	50
Scotland	30	2	7	5	17	12	40
United Kingdom	**509**	**170**	**33**	**116**	**23**	**347**	**68**

Table 37 : Treatment for non-invasive breast cancers										
	Conservation surgery		Mastectomy		No surgery		Unknown		Total	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	282	72	105	27	3	1	0	0	390	100
East Midlands	166	66	81	32	6	2	0	0	253	100
East of England	245	77	70	22	4	1	0	0	319	100
London	247	72	94	27	1	0	1	0	343	100
South East Coast	217	75	65	23	6	2	0	0	288	100
South Central	135	70	57	30	1	1	0	0	193	100
South West	222	74	73	24	3	1	0	0	298	100
West Midlands	181	66	92	34	1	0	0	0	274	100
North West	225	66	111	33	5	1	0	0	341	100
Wales	151	75	47	23	4	2	0	0	202	100
Northern Ireland	51	70	21	29	1	1	0	0	73	100
Scotland	167	75	52	23	3	1	0	0	222	100
United Kingdom	**2289**	**72**	**868**	**27**	**38**	**1**	**1**	**0**	**3196**	**100**

Table 38 : Treatment for micro-invasive breast cancers										
	Conservation surgery		Mastectomy		No surgery		Unknown		Total	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	13	59	9	41	0	0	0	0	22	100
East Midlands	4	40	6	60	0	0	0	0	10	100
East of England	14	82	3	18	0	0	0	0	17	100
London	5	42	7	58	0	0	0	0	12	100
South East Coast	7	70	3	30	0	0	0	0	10	100
South Central	2	40	3	60	0	0	0	0	5	100
South West	9	60	6	40	0	0	0	0	15	100
West Midlands	8	67	4	33	0	0	0	0	12	100
North West	6	40	9	60	0	0	0	0	15	100
Wales	3	60	2	40	0	0	0	0	5	100
Northern Ireland	1	50	1	50	0	0	0	0	2	100
Scotland	10	83	2	17	0	0	0	0	12	100
United Kingdom	**82**	**60**	**55**	**40**	**0**	**0**	**0**	**0**	**137**	**100**

Table 39 : Treatment for non-invasive breast cancers size >40mm								
	Conservation surgery		Mastectomy		Unknown		Total	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	7	15	40	85	0	0	47	100
East Midlands	4	17	20	83	0	0	24	100
East of England	3	13	21	88	0	0	24	100
London	10	20	41	80	0	0	51	100
South East Coast	11	28	29	73	0	0	40	100
South Central	4	16	21	84	0	0	25	100
South West	8	21	30	79	0	0	38	100
West Midlands	5	11	40	89	0	0	45	100
North West	12	23	40	77	0	0	52	100
Wales	4	17	20	83	0	0	24	100
Northern Ireland	3	60	2	40	0	0	5	100
Scotland	7	23	24	77	0	0	31	100
United Kingdom	**78**	**19**	**328**	**81**	**0**	**0**	**406**	**100**

Table 40 : Treatment of high cytonuclear grade non-invasive cancers (>40mm)								
	Conservation surgery		Mastectomy		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	6	15	33	85	0	0	39	100
East Midlands	3	17	15	83	0	0	18	100
East of England	2	11	16	89	0	0	18	100
London	3	9	30	91	0	0	33	100
South East Coast	8	28	21	72	0	0	29	100
South Central	3	15	17	85	0	0	20	100
South West	4	15	23	85	0	0	27	100
West Midlands	5	14	30	86	0	0	35	100
North West	8	21	31	79	0	0	39	100
Wales	4	19	17	81	0	0	21	100
Northern Ireland	2	50	2	50	0	0	4	100
Scotland	3	14	18	86	0	0	21	100
United Kingdom	**51**	**17**	**253**	**83**	**0**	**0**	**304**	**100**

Table 41 : Treatment of non-invasive cancers with unknown cytonuclear grade and unknown size (benign surgery cases excluded)								
	Conservation surgery		Mastectomy		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	16	89	2	11	0	0	18	100
East Midlands	3	100	0	0	0	0	3	100
East of England	6	100	0	0	0	0	6	100
London	1	50	0	0	1	50	2	100
South East Coast	12	100	0	0	0	0	12	100
South Central	3	33	6	67	0	0	9	100
South West	2	100	0	0	0	0	2	100
West Midlands	2	100	0	0	0	0	2	100
North West	7	100	0	0	0	0	7	100
Wales	0	-	0	-	0	-	0	-
Northern Ireland	1	100	0	0	0	0	1	100
Scotland	0	-	0	-	0	-	0	-
United Kingdom	**53**	**85**	**8**	**13**	**1**	**2**	**62**	**100**

Benign cases have non-invasive disease reported in the non-operative core biopsy but no malignant disease found in the surgical specimen

Table 42 : Treatment for invasive breast cancers										
	Conservation surgery		Mastectomy		No Surgery		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1191	68	514	29	41	2	2	0	1748	100
East Midlands	696	70	282	28	19	2	0	0	997	100
East of England	970	74	316	24	24	2	0	0	1310	100
London	971	74	301	23	31	2	7	1	1310	100
South East Coast	842	76	250	23	17	2	0	0	1109	100
South Central	717	75	226	24	17	2	0	0	960	100
South West	1022	79	255	20	12	1	0	0	1289	100
West Midlands	931	76	281	23	16	1	0	0	1228	100
North West	1034	71	393	27	22	2	0	0	1449	100
Wales	587	75	179	23	16	2	0	0	782	100
Northern Ireland	247	76	73	23	4	1	0	0	324	100
Scotland	861	74	276	24	24	2	5	0	1166	100
United Kingdom	**10069**	**74**	**3346**	**24**	**243**	**2**	**14**	**0**	**13672**	**100**

Table 43 : Mastectomy rate with invasive tumour size										
	<15mm		15-≤20mm		>20-≤35mm		>35-≤50mm		>50mm	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	202	21	92	26	130	46	42	82	38	97
East Midlands	121	21	64	31	60	45	22	88	10	100
East of England	109	16	78	25	76	37	29	74	17	89
London	98	17	57	19	75	30	36	58	26	90
South East Coast	94	16	58	23	51	29	31	67	16	89
South Central	86	19	38	15	62	35	24	60	13	87
South West	99	14	47	16	68	32	23	50	13	72
West Midlands	99	15	69	24	61	34	32	76	19	100
North West	142	21	80	23	105	37	34	63	24	100
Wales	66	16	44	24	40	37	16	64	12	80
Northern Ireland	23	13	18	26	25	42	3	60	4	100
Scotland	91	14	59	23	75	41	27	66	21	91
United Kingdom	**1230**	**17**	**704**	**23**	**828**	**37**	**319**	**67**	**213**	**91**

Table 44 : Mastectomy rate for <15mm invasive cancers by whole tumour size										
	Whole Size <15mm		Whole size 15-≤20mm		Whole size >20-≤35mm		Whole size >35-≤50mm		Whole size >50mm	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	83	13	24	20	36	40	26	67	24	89
East Midlands	52	11	17	33	26	55	10	83	16	100
East of England	52	10	15	21	22	32	10	71	9	82
London	38	9	9	12	19	32	15	75	15	94
South East Coast	36	8	14	18	18	37	12	80	14	82
South Central	37	12	9	16	14	35	12	86	12	86
South West	54	11	16	16	11	18	10	53	7	70
West Midlands	41	8	14	17	22	31	10	71	10	91
North West	74	14	21	27	22	45	12	75	11	92
Wales	34	11	8	20	8	20	5	45	4	80
Northern Ireland	9	6	2	13	5	33	3	75	4	100
Scotland	39	8	11	14	16	35	10	63	15	100
United Kingdom	**549**	**10**	**160**	**19**	**219**	**34**	**135**	**70**	**141**	**89**

Table 45 : Immediate reconstruction with mastectomy (all cancers)								
	Immediate reconstruction		No immediate reconstruction		Unknown		Total mastectomies	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	71	11	550	88	7	1	628	100
East Midlands	73	20	271	73	25	7	369	100
East of England	99	25	284	73	6	2	389	100
London	80	20	322	80	0	0	402	100
South East Coast	97	31	220	69	1	0	318	100
South Central	48	17	217	76	21	7	286	100
South West	85	25	248	74	1	0	334	100
West Midlands	99	26	251	67	27	7	377	100
North West	100	19	367	72	46	9	513	100
Wales	26	11	202	89	0	0	228	100
Northern Ireland	9	9	86	91	0	0	95	100
Scotland	52	16	277	84	1	0	330	100
United Kingdom	**839**	**20**	**3295**	**77**	**135**	**3**	**4269**	**100**

Table 46 : Invasive status of cancers which had immediate reconstruction with mastectomy										
	Invasive		Micro-invasive		Non-invasive		Unknown		Immediate Reconstruction	
Region	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	49	69	1	1	21	30	0	0	71	100
East Midlands	49	67	1	1	23	32	0	0	73	100
East of England	74	75	1	1	24	24	0	0	99	100
London	50	63	0	0	30	38	0	0	80	100
South East Coast	64	66	1	1	32	33	0	0	97	100
South Central	30	63	0	0	18	38	0	0	48	100
South West	47	55	3	4	35	41	0	0	85	100
West Midlands	51	52	1	1	47	47	0	0	99	100
North West	65	65	2	2	33	33	0	0	100	100
Wales	17	65	1	4	8	31	0	0	26	100
Northern Ireland	4	44	1	11	4	44	0	0	9	100
Scotland	37	71	0	0	15	29	0	0	52	100
United Kingdom	**537**	**64**	**12**	**1**	**290**	**35**	**0**	**0**	**839**	**100**

Table 47 : Any neo-adjuvant therapy							
	Had treatment		Did not have treatment		Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	58	3	2104	97	0	0	2162
East Midlands	29	2	1231	98	0	0	1260
East of England	58	4	1588	96	0	0	1646
London	67	4	1597	96	4	0	1668
South East Coast	71	5	1336	95	0	0	1407
South Central	32	3	1128	97	0	0	1160
South West	58	4	1545	96	0	0	1603
West Midlands	38	3	1476	97	0	0	1514
North West	130	7	1622	90	53	3	1805
Wales	28	3	961	97	0	0	989
Northern Ireland	3	1	396	99	0	0	399
Scotland	54	4	1346	96	0	0	1400
United Kingdom	**626**	**4**	**16330**	**96**	**57**	**0**	**17013**

Table 48 : Neo-adjuvant chemotherapy							
	Had treatment		Did not have treatment		Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	25	1	2137	99	0	0	2162
East Midlands	25	2	1235	98	0	0	1260
East of England	35	2	1611	98	0	0	1646
London	45	3	1619	97	4	0	1668
South East Coast	24	2	1383	98	0	0	1407
South Central	29	3	1131	98	0	0	1160
South West	26	2	1577	98	0	0	1603
West Midlands	12	1	1502	99	0	0	1514
North West	48	3	1704	94	53	3	1805
Wales	9	1	980	99	0	0	989
Northern Ireland	2	1	397	99	0	0	399
Scotland	18	1	1382	99	0	0	1400
United Kingdom	**298**	**2**	**16658**	**98**	**57**	**0**	**17013**

Table 49 : Neo-adjuvant herceptin							
	Had treatment		Did not have treatment		Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	1	0	2161	100	0	0	2162
East Midlands	0	0	1260	100	0	0	1260
East of England	2	0	1644	100	0	0	1646
London	4	0	1660	100	4	0	1668
South East Coast	0	0	1407	100	0	0	1407
South Central	0	0	1160	100	0	0	1160
South West	3	0	1600	100	0	0	1603
West Midlands	1	0	1513	100	0	0	1514
North West	6	0	1746	97	53	3	1805
Wales	0	0	989	100	0	0	989
Northern Ireland	0	0	399	100	0	0	399
Scotland	0	0	1400	100	0	0	1400
United Kingdom	**17**	**0**	**16939**	**100**	**57**	**0**	**17013**

Table 50 : Neo-adjuvant endocrine therapy							
	Had treatment		Did not have treatment		Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	36	2	2126	98	0	0	2162
East Midlands	4	0	1256	100	0	0	1260
East of England	25	2	1621	98	0	0	1646
London	22	1	1642	98	4	0	1668
South East Coast	48	3	1359	97	0	0	1407
South Central	5	0	1155	100	0	0	1160
South West	34	2	1569	98	0	0	1603
West Midlands	26	2	1488	98	0	0	1514
North West	101	6	1651	91	53	3	1805
Wales	19	2	970	98	0	0	989
Northern Ireland	1	0	398	100	0	0	399
Scotland	37	3	1363	97	0	0	1400
United Kingdom	**358**	**2**	**16598**	**98**	**57**	**0**	**17013**

Table 51 : Waiting time - date of last read to first surgery - all cancers (including neo-adjuvant cases)												
	Total	<14 days		<31 days		<45 days		<62 days		<90 days		
Region	cancers	No	%	No	%	No	%	No	%	No	%	
N East, Yorks & Humber	2110	1	0	541	26	1404	67	1922	91	2061	98	
East Midlands	1232	3	0	339	28	870	71	1124	91	1186	96	
East of England	1605	6	0	498	31	1156	72	1464	91	1547	96	
London	1621	5	0	216	13	791	49	1345	83	1531	94	
South East Coast	1379	3	0	114	8	493	36	1094	79	1293	94	
South Central	1135	6	1	278	24	679	60	996	88	1091	96	
South West	1583	0	0	234	15	907	57	1376	87	1524	96	
West Midlands	1489	10	1	366	25	1040	70	1340	90	1445	97	
North West	1776	8	0	420	24	1186	67	1599	90	1732	98	
Wales	967	11	1	334	35	674	70	871	90	946	98	
Northern Ireland	389	7	2	198	51	341	88	383	98	387	99	
Scotland	-	-	-	-	-	-	-	-	-	-	-	
United Kingdom	15286	60	0	3538	23	9541	62	13514	88	14743	96	

*Scotland did not provide date of last read

Table 52 : Waiting time - date of last read to first therapeutic surgery - cases with a non-op diagnosis (including neo-adjuvant cases)											
	Total	<14 days		<31 days		<45 days		<62 days		<90 days	
Region	cancers	No	%	No	%	No	%	No	%	No	%
N East, Yorks & Humber	2050	1	0	532	26	1379	67	1877	92	2005	98
East Midlands	1190	3	0	329	28	846	71	1087	91	1147	96
East of England	1525	6	0	478	31	1109	73	1396	92	1470	96
London	1539	5	0	202	13	755	49	1290	84	1460	95
South East Coast	1306	3	0	112	9	481	37	1050	80	1230	94
South Central	1061	6	1	274	26	650	61	945	89	1026	97
South West	1506	0	0	225	15	869	58	1312	87	1450	96
West Midlands	1431	10	1	354	25	1008	70	1291	90	1392	97
North West	1699	8	0	401	24	1140	67	1535	90	1660	98
Wales	926	11	1	324	35	653	71	840	91	909	98
Northern Ireland	373	7	2	193	52	328	88	367	98	371	99
Scotland	-	-	-	-	-	-	-	-	-	-	-
United Kingdom	14606	60	0	3424	23	9218	63	12990	89	14120	97

*Scotland did not provide date of last read

Table 53 : Waiting time - date of last read to first diagnostic surgery - cases without a non-op diagnosis (including neo-adjuvant cases)											
	Total	<14 days		<31 days		<45 days		<62 days		<90 days	
Region	cancers	No	%	No	%	No	%	No	%	No	%
N East, Yorks & Humber	60	0	0	9	15	25	42	45	75	56	93
East Midlands	42	0	0	10	24	24	57	37	88	39	93
East of England	80	0	0	20	25	47	59	68	85	77	96
London	82	0	0	14	17	36	44	55	67	71	87
South East Coast	73	0	0	2	3	12	16	44	60	63	86
South Central	74	0	0	4	5	29	39	51	69	65	88
South West	77	0	0	9	12	38	49	64	83	74	96
West Midlands	58	0	0	12	21	32	55	49	84	53	91
North West	77	0	0	19	25	46	60	64	83	72	94
Wales	41	0	0	10	24	21	51	31	76	37	90
Northern Ireland	16	0	0	5	31	13	81	16	100	16	100
Scotland	-	-	-	-	-	-	-	-	-	-	-
United Kingdom	680	0	0	114	17	323	48	524	77	623	92

*Scotland did not provide date of last read

Table 54 : Waiting time - date of last read to first surgery (all cancers) (excluding cases with neo-adjuvant therapy)												
	Total	≤14 days		≤31 days		≤45 days		≤62 days		≤90 days		Median
Region	cancers	No	%	No	%	No	%	No	%	No	%	days
N East, Yorks & Humber	2078	2	0	537	26	1392	67	1903	92	2041	98	40
East Midlands	1209	3	0	338	28	869	72	1123	93	1184	98	38
East of England	1559	6	0	494	32	1150	74	1454	93	1535	98	36
London	1575	5	0	213	14	781	50	1324	84	1508	96	46
South East Coast	1316	3	0	106	8	470	36	1058	80	1256	95	50
South Central	1112	6	1	276	25	676	61	990	89	1085	98	42
South West	1530	0	0	232	15	894	58	1354	88	1497	98	43
West Midlands	1463	9	1	366	25	1031	70	1329	91	1431	98	38
North West	1664	8	0	401	24	1118	67	1513	91	1638	98	41
Wales	957	11	1	334	35	671	70	866	90	940	98	37
Northern Ireland	388	7	2	198	51	341	88	383	99	387	100	31
Scotland	-	-	-	-	-	-	-	-	-	-	-	-
United Kingdom	**14851**	**60**	**0**	**3495**	**24**	**9393**	**63**	**13297**	**90**	**14502**	**98**	**41**

*Scotland did not provide date of last read

Table 55 : Waiting time - date of last read to first therapeutic surgery - cases with a non-op diagnosis (excluding cases with neo-adjuvant therapy)												
	Total	≤14 days		≤31 days		≤45 days		≤62 days		≤90 days		Median
Region	cancers	No	%	No	%	No	%	No	%	No	%	days
N East, Yorks & Humber	2016	1	0	527	26	1365	68	1856	92	1983	98	40
East Midlands	1167	3	0	328	28	845	72	1086	93	1145	98	38
East of England	1479	6	0	474	32	1103	75	1386	94	1458	99	36
London	1493	5	0	199	13	745	50	1269	85	1437	96	46
South East Coast	1243	3	0	104	8	458	37	1014	82	1193	96	50
South Central	1039	6	1	272	26	647	62	939	90	1020	98	41
South West	1453	0	0	223	15	856	59	1290	89	1423	98	42
West Midlands	1404	9	1	354	25	999	71	1280	91	1377	98	38
North West	1591	8	1	385	24	1076	68	1453	91	1570	99	40
Wales	916	11	1	324	35	650	71	835	91	903	99	37
Northern Ireland	372	7	2	193	52	328	88	367	99	371	100	31
Scotland*	-	-	-	-	-	-	-	-	-	-	-	-
United Kingdom	**14173**	**59**	**0**	**3383**	**24**	**9072**	**64**	**12775**	**90**	**13880**	**98**	**41**

*Scotland did not provide date of last read

Table 56 : Waiting time - date of last read to first diagnostic surgery - cases without a non-op diagnosis (excluding cases with neo-adjuvant therapy)												
	Total	≤14 days		≤31 days		≤45 days		≤62 days		≤90 days		Median
Region	cancers	No	%	No	%	No	%	No	%	No	%	days
N East, Yorks & Humber	62	1	2	10	16	27	44	47	76	58	94	48
East Midlands	42	0	0	10	24	24	57	37	88	39	93	43
East of England	80	0	0	20	25	47	59	68	85	77	96	39.5
London	82	0	0	14	17	36	44	55	67	71	87	50.5
South East Coast	73	0	0	2	3	12	16	44	60	63	86	60
South Central	73	0	0	4	5	29	40	51	70	65	89	50
South West	77	0	0	9	12	38	49	64	83	74	96	46
West Midlands	59	0	0	12	20	32	54	49	83	54	92	42
North West	73	0	0	16	22	42	58	60	82	68	93	44
Wales	41	0	0	10	24	21	51	31	76	37	90	44
Northern Ireland	16	0	0	5	31	13	81	16	100	16	100	33.5
Scotland	-	-	-	-	-	-	-	-	-	-	-	-
United Kingdom	**678**	**1**	**0**	**112**	**17**	**321**	**47**	**522**	**77**	**622**	**92**	**47**

*Scotland did not provide date of last read

Table 57 : Proportion of women referred to consultant surgeons according to annual caseload of surgeon											
	Total (referred)	<10 cases		10-19 cases		20-29 cases		30-99 cases		100+ cases	
Region		No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	2144	66	3	141	7	420	20	1413	66	104	5
East Midlands	1260	22	2	52	4	144	11	1107	84	0	0
East of England	1641	37	2	86	5	103	6	1415	86	0	0
London	1630	126	8	207	12	237	14	992	59	106	6
South East Coast	1402	61	4	83	6	79	6	1179	84	0	0
South Central	1149	30	3	17	1	101	9	1010	87	0	0
South West	1599	22	1	66	4	254	16	1180	73	104	6
West Midlands	1502	38	3	173	12	166	11	1125	75	0	0
North West	1790	89	5	83	5	329	18	1085	61	204	11
Wales	989	10	1	10	1	0	0	969	98	0	0
Northern Ireland	399	18	5	47	12	79	20	255	64	0	0
Scotland	1400	60	4	134	10	0	0	1025	73	181	13
United Kingdom	**16905**	**466**	**3**	**997**	**6**	**1876**	**11**	**13005**	**76**	**700**	**4**

Table 58 : Annual screening surgical caseload per surgeon (2007/08 – 2009/10)											
	Total surgeons	<10 cases		10-19 cases		20-29 cases		30-99 cases		100+ cases	
Region		No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	86	36	42	10	12	7	8	32	37	1	1
East Midlands	55	23	42	6	11	6	11	20	36	0	0
East of England	81	43	53	7	9	3	4	28	35	0	0
London	102	57	56	16	16	12	12	16	16	1	1
South East Coast	74	46	62	4	5	4	5	20	27	0	0
South Central	61	33	54	7	11	2	3	19	31	0	0
South West	62	24	39	6	10	7	11	25	40	0	0
West Midlands	61	22	36	7	11	6	10	26	43	0	0
North West	79	31	39	13	16	9	11	25	32	1	1
Wales	23	6	26	3	13	0	0	13	57	1	4
Northern Ireland	17	5	29	3	18	4	24	5	29	0	0
Scotland	-	-	-	-	-	-	-	-	-	-	-
United Kingdom	**558**	**188**	**34**	**78**	**14**	**60**	**11**	**228**	**41**	**4**	**1**

Table 59 : Explanations for surgeons treating less than 10 screening cases (2007/08 – 2009/10)									
Region	Number surgeons with caseload <10	Other caseload >30 year	Joined NHSBSP	Left NHSBSP	Plastic surgeon	Private practice	Surgeon from other region	No information	Other
N East, Yorks & Humber	36	9	3	6	2	1	11	3	1
East Midlands	23	8	1	0	1	1	11	1	0
East of England	43	4	0	0	5	7	21	6	0
London	57	15	0	5	7	13	15	1	1
South East Coast	46	4	4	4	1	1	29	3	0
South Central	33	3	1	1	5	5	15	2	1
South West	24	2	0	1	1	2	14	3	1
West Midlands	22	9	2	1	3	2	3	1	1
North West	31	14	1	1	1	1	6	5	2
Wales	6	2	0	0	1	0	3	0	0
Northern Ireland	5	1	2	0	0	0	0	1	1
Scotland	-	-	-	-	-	-	-	-	-
United Kingdom	**188**	**58**	**11**	**14**	**25**	**17**	**35**	**23**	**5**

Table 60 : Annual screening surgical caseload per surgeon (2009/10)											
	Total surgeons	<10 cases		10-19 cases		20-29 cases		30-99 cases		100+ cases	
Region		No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	74	19	26	9	12	17	23	28	38	1	1
East Midlands	40	9	23	4	10	6	15	21	53	0	0
East of England	53	15	28	6	11	4	8	28	53	0	0
London	89	44	49	14	16	10	11	20	22	1	1
South East Coast	52	23	44	6	12	3	6	20	38	0	0
South Central	42	17	40	1	2	4	10	20	48	0	0
South West	52	11	21	5	10	10	19	25	48	1	2
West Midlands	58	15	26	11	19	7	12	25	43	0	0
North West	67	24	36	6	9	14	21	21	31	2	3
Wales	23	5	22	1	4	0	0	17	74	0	0
Northern Ireland	14	3	21	3	21	3	21	5	36	0	0
Scotland	48	16	33	10	21	0	0	21	44	1	2
United Kingdom	**544**	**138**	**25**	**69**	**13**	**76**	**14**	**255**	**47**	**6**	**1**

The surgeons in each region are credited with their total UK screening caseload.

Surgeons working in more than one region appear in each of these regions' figures.

Table 61 : Screening cases per surgeon					
Region	**Total surgeons**	**Mean**	**Minimum**	**Median**	**Maximum**
N East, Yorks & Humber	74	29	1	24	104
East Midlands	40	33	1	32	92
East of England	53	31	1	33	85
London	89	19	1	11	106
South East Coast	52	27	1	13	98
South Central	42	28	1	27.5	86
South West	52	31	1	29.5	104
West Midlands	58	26	1	22	75
North West	67	27	1	22	104
Wales	23	43	1	47	90
Northern Ireland	14	29	4	25	81
Scotland	48	29	1	17	181
United Kingdom	**544**	**31**	**1**	**29**	**181**

Table 62 : Number of surgeons treating each woman									
	Total cancers	**Number of women treated by…**							
		No referral		**1 surgeon**		**2 surgeons**		**3+ surgeons**	
Region		**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	2162	18	1	2144	99	0	0	0	0
East Midlands	1260	0	0	1198	95	59	5	3	0
East of England	1646	5	0	1641	100	0	0	0	0
London	1668	38	2	1592	95	38	2	0	0
South East Coast	1407	5	0	1402	100	0	0	0	0
South Central	1160	11	1	1140	98	9	1	0	0
South West	1603	4	0	1573	98	25	2	1	0
West Midlands	1514	12	1	1502	99	0	0	0	0
North West	1805	15	1	1790	99	0	0	0	0
Wales	989	0	0	989	100	0	0	0	0
Northern Ireland	399	0	0	399	100	0	0	0	0
Scotland	1400	0	0	1400	100	0	0	0	0
United Kingdom	**17013**	**108**	**1**	**16770**	**99**	**131**	**1**	**4**	**0**

Table 63 : Explanations for surgeons treating less than 10 screening cases in 2009/10									
Region	**Number surgeons with caseload <10**	**Other caseload >30 year**	**Joined NHSBSP**	**Left NHSBSP**	**Plastic surgeon**	**Private practice**	**Surgeon from other region**	**No infor-mation**	**Other**
N East, Yorks & Humber	19	4	2	0	1	0	7	3	2
East Midlands	9	3	1	0	2	0	2	0	1
East of England	15	2	0	0	1	1	9	1	1
London	44	7	3	5	6	11	11	0	1
South East Coast	23	3	1	2	0	0	17	0	0
South Central	17	0	0	0	4	2	10	0	1
South West	11	1	0	0	1	3	5	1	0
West Midlands	15	6	0	1	1	1	5	0	1
North West	24	14	2	1	1	1	2	0	3
Wales	5	1	0	0	0	0	3	1	0
Northern Ireland	3	1	2	0	0	0	0	0	0
Scotland	16	7	1	1	0	0	0	0	7
United Kingdom	**138**	**45**	**11**	**8**	**16**	**13**	**23**	**6**	**16**

Table 64 : Repeat operations of surgically treated invasive and non/micro-invasive cancers without a non-op diagnosis						
	Invasive			Non/micro-invasive		
Region	**Total**	**Re-op**	**%**	**Total**	**Re-op**	**%**
N East, Yorks & Humber	12	12	100	50	25	50
East Midlands	8	6	75	34	19	56
East of England	25	20	80	58	21	36
London	23	16	70	61	21	34
South East Coast	23	23	100	51	22	43
South Central	28	23	82	45	18	40
South West	25	21	84	54	24	44
West Midlands	22	20	91	37	19	51
North West	28	23	82	49	24	49
Wales	12	12	100	29	18	62
Northern Ireland	4	4	100	12	6	50
Scotland	11	9	82	41	10	24
United Kingdom	**221**	**189**	**86**	**521**	**227**	**44**

Table 65 : Repeat operations of surgically treated invasive and non/micro-invasive cancers						
	Invasive			Non/micro-invasive		
Region	**Total**	**Re-op**	**%**	**Total**	**Re-op**	**%**
N East, Yorks & Humber	1707	398	23	409	108	26
East Midlands	978	192	20	257	77	30
East of England	1286	335	26	332	106	32
London	1279	300	23	354	80	23
South East Coast	1092	288	26	292	94	32
South Central	943	230	24	197	56	28
South West	1277	347	27	310	91	29
West Midlands	1212	298	25	285	99	35
North West	1427	334	23	351	90	26
Wales	766	167	22	203	71	35
Northern Ireland	320	74	23	74	21	28
Scotland	1142	220	19	231	42	18
United Kingdom	**13429**	**3183**	**24**	**3295**	**935**	**28**

Table 66 : Number of therapeutic operations (invasive cancers) with initial BCS and a non-operative diagnosis														
	1		2		3		4+		Unknown		Total cancers		Repeat 2+ ops	
Region	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**
N East, Yorks & Humber	960	76	288	23	21	2	2	0	0	0	1271	100	311	24
East Midlands	579	78	155	21	13	2	0	0	0	0	747	100	168	22
East of England	743	73	248	24	21	2	2	0	0	0	1014	100	271	27
London	756	75	236	23	15	1	3	0	0	0	1010	100	254	25
South East Coast	628	72	217	25	20	2	5	1	0	0	870	100	242	28
South Central	552	75	166	23	17	2	1	0	0	0	736	100	184	25
South West	772	73	262	25	27	3	2	0	0	0	1063	100	291	27
West Midlands	728	75	216	22	23	2	6	1	0	0	973	100	245	25
North West	825	76	245	23	10	1	0	0	0	0	1080	100	255	24
Wales	472	78	124	20	11	2	1	0	0	0	608	100	136	22
Northern Ireland	200	75	64	24	2	1	0	0	0	0	266	100	66	25
Scotland	704	80	168	19	12	1	0	0	0	0	884	100	180	20
United Kingdom	**7919**	**75**	**2389**	**23**	**192**	**2**	**22**	**0**	**0**	**0**	**10522**	**100**	**2603**	**25**

Table 67 : Number of therapeutic operations (non/micro-invasive cancers) with initial BCS and a non-operative diagnosis														
	1		2		3		4+		Unknown		Total cancers		Repeat 2+ ops	
Region	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**
N East, Yorks & Humber	205	74	61	22	10	4	1	0	0	0	277	100	72	26
East Midlands	103	64	50	31	8	5	0	0	0	0	161	100	58	36
East of England	150	66	70	31	5	2	2	1	0	0	227	100	77	34
London	169	75	47	21	8	4	1	0	0	0	225	100	56	25
South East Coast	125	65	52	27	11	6	5	3	0	0	193	100	68	35
South Central	76	67	33	29	3	3	1	1	0	0	113	100	37	33
South West	141	70	49	24	9	4	3	1	0	0	202	100	61	30
West Midlands	116	63	59	32	7	4	1	1	0	0	183	100	67	37
North West	155	72	54	25	5	2	0	0	0	0	214	100	59	28
Wales	93	65	46	32	3	2	1	1	0	0	143	100	50	35
Northern Ireland	32	68	14	30	1	2	0	0	0	0	47	100	15	32
Scotland	118	79	32	21	0	0	0	0	0	0	150	100	32	21
United Kingdom	1483	69	567	27	70	3	15	1	0	0	2135	100	652	31

Table 68 : Number of therapeutic operations for invasive cancers with B5b (invasive) core biopsy result												
	1		2		3+		Unknown		Total		Repeat (2+) rate	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	1268	79	316	20	17	1	2	0	1603	100	333	21
East Midlands	752	83	143	16	11	1	0	0	906	100	154	17
East of England	905	77	249	21	16	1	0	0	1170	100	265	23
London	922	78	235	20	14	1	7	1	1178	100	249	21
South East Coast	759	77	210	21	21	2	0	0	990	100	231	23
South Central	672	79	161	19	17	2	0	0	850	100	178	21
South West	885	76	257	22	24	2	0	0	1166	100	281	24
West Midlands	882	79	207	19	26	2	0	0	1115	100	233	21
North West	985	81	230	19	8	1	0	0	1223	100	238	19
Wales	580	82	120	17	10	1	0	0	710	100	130	18
Northern Ireland	210	81	49	19	1	0	0	0	260	100	50	19
Scotland	895	82	179	16	11	1	5	0	1090	100	190	17
United Kingdom	**9715**	**79**	**2356**	**19**	**176**	**1**	**14**	**0**	**12261**	**100**	**2532**	**21**

Table 69 : Number of therapeutic operations for invasive cancers with C5 (no B5) cytology result												
	1		2		3+		Unknown		Total		Repeat (2+) rate	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	5	63	3	38	0	0	0	0	8	100	3	38
East Midlands	4	100	0	0	0	0	0	0	4	100	0	0
East of England	4	50	2	25	2	25	0	0	8	100	4	50
London	10	100	0	0	0	0	0	0	10	100	0	0
South East Coast	9	100	0	0	0	0	0	0	9	100	0	0
South Central	11	85	2	15	0	0	0	0	13	100	2	15
South West	16	84	2	11	1	5	0	0	19	100	3	16
West Midlands	6	75	2	25	0	0	0	0	8	100	2	25
North West	66	76	21	24	0	0	0	0	87	100	21	24
Wales	3	100	0	0	0	0	0	0	3	100	0	0
Northern Ireland	32	89	4	11	0	0	0	0	36	100	4	11
Scotland	1	100	0	0	0	0	0	0	1	100	0	0
United Kingdom	**167**	**81**	**36**	**17**	**3**	**1**	**0**	**0**	**206**	**100**	**39**	**19**

Table 70 : Number of therapeutic operations for invasive cancers with B5a (non-invasive) core biopsy result												
	1		2		3+		Unknown		Total		Repeat (2+) rate	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	23	32	43	61	5	7	0	0	71	100	48	68
East Midlands	27	47	29	51	1	2	0	0	57	100	30	53
East of England	29	39	39	53	6	8	0	0	74	100	45	61
London	31	47	28	42	7	11	0	0	66	100	35	53
South East Coast	33	50	29	44	4	6	0	0	66	100	33	50
South Central	21	46	23	50	2	4	0	0	46	100	25	54
South West	24	38	36	56	4	6	0	0	64	100	40	63
West Midlands	21	33	39	61	4	6	0	0	64	100	43	67
North West	36	41	50	57	2	2	0	0	88	100	52	59
Wales	16	39	23	56	2	5	0	0	41	100	25	61
Northern Ireland	4	20	15	75	1	5	0	0	20	100	16	80
Scotland	17	47	18	50	1	3	0	0	36	100	19	53
United Kingdom	**282**	**41**	**372**	**54**	**39**	**6**	**0**	**0**	**693**	**100**	**411**	**59**

Table 71 : Number of therapeutic operations for non-invasive or micro-invasive cancers with B5a (non-invasive) core biopsy result												
	1		2		3+		Unknown		Total		Repeat (2+) rate	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	267	77	69	20	10	3	0	0	346	100	79	23
East Midlands	163	74	49	22	8	4	0	0	220	100	57	26
East of England	186	69	76	28	7	3	0	0	269	100	83	31
London	232	79	50	17	9	3	1	0	292	100	59	20
South East Coast	167	70	55	23	16	7	0	0	238	100	71	30
South Central	111	76	32	22	4	3	0	0	147	100	36	24
South West	181	73	55	22	12	5	0	0	248	100	67	27
West Midlands	163	68	70	29	8	3	0	0	241	100	78	32
North West	227	77	61	21	5	2	0	0	293	100	66	23
Wales	121	70	49	28	4	2	0	0	174	100	53	30
Northern Ireland	46	75	14	23	1	2	0	0	61	100	15	25
Scotland	152	83	31	17	0	0	0	0	183	100	31	17
United Kingdom	**2016**	**74**	**611**	**23**	**84**	**3**	**1**	**0**	**2712**	**100**	**695**	**26**

Table 72 : Data completeness of margin information				
Region	**Total cases with surgery to the breast**	**Complete margin data**	**% complete margin data**	**Not complete margin data**
N East, Yorks & Humber	2103	1770	84	333
East Midlands	1222	805	66	417
East of England	1603	1142	71	461
London	1601	1130	71	471
South East Coast	1376	997	72	379
South Central	1137	864	76	273
South West	1578	1150	73	428
West Midlands	1490	1199	80	291
North West	1767	1340	76	427
Wales	959	647	67	312
Northern Ireland	391	344	88	47
Scotland	-	-	-	-
UK	**15227**	**11388**	**75**	**3839**

Table 73 : Number of cases with known margin information for first operation					
Region	Total cases with surgery to the breast	Known margin		Known distance	
		No.	%	No.	%
N East, Yorks & Humber	2103	2014	96	1904	91
East Midlands	1222	1213	99	855	70
East of England	1603	1531	96	1247	78
London	1601	1535	96	1296	81
South East Coast	1376	1349	98	1118	81
South Central	1137	1091	96	933	82
South West	1578	1533	97	1237	78
West Midlands	1490	1443	97	1339	90
North West	1767	1699	96	1430	81
Wales	959	939	98	768	80
Northern Ireland	391	391	100	382	98
Scotland	-	-	-	-	-
UK	**15227**	**14738**	**97**	**12509**	**82**

Table 74 : Margin information of final operations for cases treated by breast conserving surgery (BCS)							
Region	Total cases with surgery	Margin clear		Margin not clear		Margin unknown	
		No.	%	No.	%	No.	%
N East, Yorks & Humber	1477	1361	92	20	1	96	6
East Midlands	856	841	98	12	1	3	0
East of England	1217	1158	95	26	2	33	3
London	1202	1086	90	42	3	74	6
South East Coast	1058	998	94	48	5	12	1
South Central	851	800	94	21	2	30	4
South West	1244	1193	96	33	3	18	1
West Midlands	1115	1070	96	16	1	29	3
North West	1255	1186	95	25	2	44	4
Wales	732	726	99	5	1	1	0
Northern Ireland	296	291	98	0	0	5	2
Scotland	-	-	-	-	-	-	-
UK	**11303**	**10710**	**95**	**248**	**2**	**345**	**3**

Table 75 : Margin information of final operations for cases treated by mastectomy							
Region	Total cases with surgery	Margin clear		Margin not clear		Margin unknown	
		No.	%	No.	%	No.	%
N East, Yorks & Humber	626	552	88	9	1	65	10
East Midlands	366	366	100	0	0	0	0
East of England	386	352	91	5	1	29	8
London	399	360	90	3	1	36	9
South East Coast	318	275	86	16	5	27	8
South Central	286	247	86	8	3	31	11
South West	334	306	92	7	2	21	6
West Midlands	375	339	90	3	1	33	9
North West	512	455	89	7	1	50	10
Wales	227	207	91	2	1	18	8
Northern Ireland	95	83	87	0	0	12	13
Scotland	-	-	-	-	-	-	-
UK	3924	3542	90	60	2	322	8

Table 76 : Axillary ultrasound record for invasive cancers							
	Had axillary ultrasound		Did not have axillary ultrasound		Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	1126	64	617	35	5	0	1748
East Midlands	971	97	26	3	0	0	997
East of England	922	70	376	29	12	1	1310
London	727	55	553	42	30	2	1310
South East Coast	479	43	630	57	0	0	1109
South Central	626	65	324	34	10	1	960
South West	723	56	556	43	10	1	1289
West Midlands	919	75	303	25	6	0	1228
North West	874	60	566	39	9	1	1449
Wales	607	78	139	18	36	5	782
Northern Ireland	126	39	198	61	0	0	324
Scotland*	-	-	-	-	-	-	-
United Kingdom	**8100**	**59**	**4288**	**31**	**118**	**1**	**12506**

*Scotland did not supply any axillary ultrasound information

Table 77 : Axillary ultrasound result for invasive cancers					
	Normal		Abnormal		Total
Region	No.	%	No.	%	
N East, Yorks & Humber	910	81	216	19	1126
East Midlands	830	85	141	15	971
East of England	765	83	157	17	922
London	592	81	135	19	727
South East Coast	396	83	83	17	479
South Central	576	92	50	8	626
South West	659	91	64	9	723
West Midlands	802	87	117	13	919
North West	735	84	139	16	874
Wales	503	83	104	17	607
Northern Ireland	107	85	19	15	126
Scotland*	-	-	-	-	-
United Kingdom	**6875**	**85**	**1225**	**15**	**8100**

*Excluded cases from Scotland

Table 78 : Axillary biopsy for invasive cancers with an abnormal axillary ultrasound result							
	Had axillary biopsy		Did not have axillary biopsy		Unknown		Total
Region	No.	%	No.	%	No.	%	
N East, Yorks & Humber	215	100	1	0	0	0	216
East Midlands	138	98	3	2	0	0	141
East of England	115	73	42	27	0	0	157
London	121	90	13	10	1	1	135
South East Coast	83	100	0	0	0	0	83
South Central	33	66	17	34	0	0	50
South West	43	67	21	33	0	0	64
West Midlands	78	67	39	33	0	0	117
North West	113	81	26	19	0	0	139
Wales	97	93	7	7	0	0	104
Northern Ireland	19	100	0	0	0	0	19
Scotland*	-	-	-	-	-	-	-
United Kingdom	**1055**	**86**	**169**	**14**	**1**	**0**	**1225**

*Excluded cases from Scotland

Table 79 : Worst axillary biopsy result for invasive cancer cases with an abnormal axillary ultrasound result											
	C1/B1		C2/B2		C3/B3		C4/B4		C5/B5		Total
Region	No.	%	No.	%	No.	%	No.	%	No.	%	
N East, Yorks & Humber	31	14	87	40	4	2	3	1	90	42	215
East Midlands	33	24	49	36	1	1	2	1	53	38	138
East of England	17	15	46	40	0	0	1	1	51	44	115
London	14	12	48	40	0	0	4	3	55	45	121
South East Coast	6	7	35	42	2	2	2	2	38	46	83
South Central	2	6	11	33	0	0	1	3	19	58	33
South West	7	16	16	37	1	2	3	7	16	37	43
West Midlands	14	18	35	45	2	3	2	3	25	32	78
North West	12	11	53	47	1	1	2	2	45	40	113
Wales	24	25	22	23	1	1	2	2	48	49	97
Northern Ireland	5	26	7	37	0	0	0	0	7	37	19
Scotland*	-	-	-	-	-	-	-	-	-	-	-
United Kingdom	**165**	**16**	**409**	**39**	**12**	**1**	**22**	**2**	**447**	**42**	**1055**

*Excluded cases from Scotland

Table 80: Positive predictive value of the axillary biopsy results for invasive cancers with an abnormal axillary ultrasound result										
	C1/B1		C2/B2		C3/B3		C4/B4		C5/B5	
Region	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	6	20	21	25	3	100	3	100	74	93
East Midlands	7	23	10	21	1	100	0	0	41	100
East of England	3	19	10	22	0	-	0	-	39	100
London	3	27	13	31	0	-	2	50	39	91
South East Coast	5	100	8	25	1	100	1	50	30	100
South Central	1	100	3	27	0	-	1	100	12	92
South West	1	14	1	6	1	100	1	50	12	100
West Midlands	4	29	9	27	0	0	2	100	21	91
North West	3	25	9	19	0	0	2	100	30	91
Wales	8	35	5	24	0	0	0	0	42	100
Northern Ireland	2	40	2	29	0	-	0	-	7	100
Scotland*	-	-	-	-	-	-	-	-	-	-
United Kingdom	**43**	**28**	**91**	**24**	**6**	**60**	**12**	**100**	**347**	**96**

*Excluded cases from Scotland
*Excluded cases with neo-adjuvant therapy

Table 81 : Positive predictivity for invasive cancers with positive nodal status			
	Total with positive nodal status	Had positive pre-op ax assessment	
Region		No	%
N East, Yorks & Humber	378	74	20
East Midlands	173	41	24
East of England	257	39	15
London	250	46	18
South East Coast	231	30	13
South Central	204	14	7
South West	224	15	7
West Midlands	223	21	9
North West	265	31	12
Wales	144	43	30
Northern Ireland	69	7	10
Scotland	-	-	-
United Kingdom	**2418**	**361**	**15**

*Excluded cases from Scotland
*Excluded cases with neo-adjuvant therapy

Table 82 : Nodal positivity for invasive cancers without neo-adjuvant therapy and without/with unknown pre-op axillary assessment			
Region	Total without/unknown pre-op ax	Positive nodal status	
		No	%
N East, Yorks & Humber	1454	271	19
East Midlands	828	114	14
East of England	1115	205	18
London	1058	176	17
South East Coast	940	186	20
South Central	868	183	21
South West	1153	204	18
West Midlands	1087	187	17
North West	1182	218	18
Wales	652	87	13
Northern Ireland	299	58	19
Scotland	-	-	-
United Kingdom	**11723**	**2132**	**18**

*Excluded cases from Scotland

*Excluded cases with neo-adjuvant therapy

Table 83 : Availability of lymph node status for invasive cancers									
Region	Total invasive cancers with surgery	Nodal status known		Nodes obtained but status unknown		No nodes obtained		Unknown if nodes obtained	
		No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1707	1687	99	0	0	15	1	5	0
East Midlands	978	972	99	0	0	6	1	0	0
East of England	1286	1264	98	0	0	22	2	0	0
London	1279	1237	97	0	0	33	3	9	1
South East Coast	1092	1072	98	0	0	20	2	0	0
South Central	943	918	97	0	0	25	3	0	0
South West	1277	1255	98	0	0	21	2	1	0
West Midlands	1212	1196	99	0	0	16	1	0	0
North West	1427	1404	98	0	0	23	2	0	0
Wales	766	758	99	0	0	8	1	0	0
Northern Ireland	320	319	100	0	0	1	0	0	0
Scotland	1142	1134	99	0	0	8	1	0	0
United Kingdom	**13429**	**13216**	**98**	**0**	**0**	**198**	**1**	**15**	**0.1**

Table 84 : Sentinel lymph node procedure for invasive cancers with axillary surgery								
Region	With SLNB		Without SLNB		Unknown nodal procedure type		Total	
	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1128	67	562	33	1	0	1691	100
East Midlands	653	67	319	33	0	0	972	100
East of England	800	63	465	37	1	0	1266	100
London	907	73	331	27	1	0	1239	100
South East Coast	665	62	407	38	0	0	1072	100
South Central	657	71	248	27	15	2	920	100
South West	952	76	301	24	5	0	1258	100
West Midlands	812	68	384	32	0	0	1196	100
North West	998	71	404	29	2	0	1404	100
Wales	633	83	127	17	0	0	760	100
Northern Ireland	209	66	109	34	1	0	319	100
Scotland	468	41	661	59	0	0	1129	100
United Kingdom	**8882**	**67**	**4318**	**33**	**26**	**0**	**13226**	**100**

Table 85 : Number of nodes taken for invasive cases without SLNB/ with unknown nodal procedure type									
Region	Total with axillary surgery	0 node obtained		1,2,3 nodes obtained		≥4nodes obtained		Unknown	
		No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	563	1	0	16	3	544	97	2	0
East Midlands	319	0	0	2	1	317	99	0	0
East of England	466	1	0	15	3	450	97	0	0
London	332	0	0	21	6	311	94	0	0
South East Coast	407	0	0	59	14	348	86	0	0
South Central	263	2	1	10	4	251	95	0	0
South West	306	1	0	10	3	295	96	0	0
West Midlands	384	0	0	16	4	368	96	0	0
North West	406	0	0	50	12	356	88	0	0
Wales	127	1	1	23	18	103	81	0	0
Northern Ireland	110	0	0	4	4	106	96	0	0
Scotland	661	0	0	12	2	649	98	0	0
United Kingdom	**4344**	**6**	**0**	**238**	**5**	**4098**	**94**	**2**	**0**

Table 86 : Nodal status of invasive cancers with known status					
Region	Total known nodal status	Positive		Negative	
		No.	%	No.	%
N East, Yorks & Humber	1687	394	23	1293	77
East Midlands	972	180	19	792	81
East of England	1264	286	23	978	77
London	1237	269	22	968	78
South East Coast	1072	252	24	820	76
South Central	918	217	24	701	76
South West	1255	243	19	1012	81
West Midlands	1196	233	19	963	81
North West	1404	297	21	1107	79
Wales	758	146	19	612	81
Northern Ireland	319	70	22	249	78
Scotland	1134	271	24	863	76
United Kingdom	**13216**	**2858**	**22**	**10358**	**78**

Table 87 : Nodal status of invasive cancers with/without SLNB								
	With SLNB				Without SLNB			
	Positive		Negative		Positive		Negative	
Region	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	196	17	931	83	198	35	361	64
East Midlands	88	13	565	87	92	29	227	71
East of England	137	17	662	83	148	32	316	68
London	120	13	785	87	149	45	182	55
South East Coast	117	18	548	82	135	33	272	67
South Central	113	17	544	83	101	41	146	59
South West	140	15	810	85	101	34	199	66
West Midlands	136	17	675	83	97	25	288	75
North West	166	17	832	83	131	32	273	68
Wales	80	13	551	87	66	52	61	48
Northern Ireland	29	14	180	86	40	37	69	63
Scotland	87	19	381	81	184	28	482	73
United Kingdom	**1409**	**16**	**7464**	**84**	**1442**	**33**	**2876**	**67**

Table 88 : Number of nodes obtained for invasive cancers with positive nodal status determined from SLNB										
	1-<4 nodes obtained					4+ nodes obtained				
	1 Ax op		2+ Ax ops			1 Ax op		2+ Ax ops		
Region	No.	%	No.	%	Total	No.	%	No.	%	Total
N East, Yorks & Humber	23	96	1	4	24	42	24	130	76	172
East Midlands	14	82	3	18	17	18	25	53	75	71
East of England	7	88	1	13	8	41	32	88	68	129
London	25	100	0	0	25	29	31	66	69	95
South East Coast	5	100	0	0	5	30	27	82	73	112
South Central	2	67	1	33	3	48	44	62	56	110
South West	4	100	0	0	4	19	14	117	86	136
West Midlands	7	88	1	13	8	18	14	110	86	128
North West	23	100	0	0	23	18	13	125	87	143
Wales	6	86	1	14	7	16	22	57	78	73
Northern Ireland	1	100	0	0	1	7	25	21	75	28
Scotland	13	100	0	0	13	29	39	45	61	74
United Kingdom	**130**	**94**	**8**	**6**	**138**	**315**	**25**	**956**	**75**	**1271**

Table 89 : Status of invasive cases with <4 nodes obtained													
	Total with nodal status known	Nodal status determined on basis of <4 nodes		Positive sentinel procedure(s)		Positive (Other)		Negative sentinel procedure(s)		Negative (Other)		Unknown status	
Region		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1687	619	36.7	24	1.4	3	0.2	579	34.3	13	0.8	0	0
East Midlands	972	392	40.3	17	1.7	0	0.0	373	38.4	2	0.2	0	0
East of England	1264	457	36.2	8	0.6	1	0.1	434	34.3	14	1.1	0	0
London	1237	588	47.5	25	2.0	1	0.1	542	43.8	20	1.6	0	0
South East Coast	1072	472	44.0	5	0.5	4	0.4	408	38.1	55	5.1	0	0
South Central	918	424	46.2	3	0.3	0	0.0	411	44.8	10	1.1	0	0
South West	1255	584	46.5	4	0.3	1	0.1	570	45.4	9	0.7	0	0
West Midlands	1196	545	45.6	8	0.7	0	0.0	520	43.5	17	1.4	0	0
North West	1404	653	46.5	23	1.6	0	0.0	580	41.3	50	3.6	0	0
Wales	758	473	62.4	7	0.9	2	0.3	443	58.4	21	2.8	0	0
Northern Ireland	319	152	47.6	1	0.3	1	0.3	147	46.1	3	0.9	0	0
Scotland	1134	227	20.0	13	1.1	2	0.2	201	17.7	11	1.0	0	0
United Kingdom	**13216**	**5586**	**42.3**	**138**	**1.0**	**15**	**0.1**	**5208**	**39.4**	**225**	**1.7**	**0**	**0**

Table 90 : Availability of lymph node status for non-invasive cancers									
	Total non-invasive cancers	Nodal status known		Nodes obtained but status unknown		No nodes obtained		Unknown if nodes obtained	
Region		No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	387	114	29	0	0	273	71	0	0
East Midlands	247	87	35	0	0	160	65	0	0
East of England	315	81	26	0	0	233	74	1	0
London	342	100	29	0	0	239	70	3	1
South East Coast	282	77	27	0	0	205	73	0	0
South Central	192	64	33	0	0	128	67	0	0
South West	295	75	25	0	0	220	75	0	0
West Midlands	273	92	34	0	0	181	66	0	0
North West	336	122	36	0	0	214	64	0	0
Wales	198	50	25	0	0	148	75	0	0
Northern Ireland	72	27	38	0	0	45	63	0	0
Scotland	219	54	25	0	0	165	75	0	0
United Kingdom	**3158**	**943**	**30**	**0**	**0**	**2211**	**70**	**4**	**0**

Table 91 : Treatment for non-invasive cancers with known nodal status						
	With known nodal status		Total Conservation	With known nodal status		Total mastectomy
Region	No.	%		No.	%	
N East, Yorks & Humber	25	9	282	89	85	105
East Midlands	14	8	166	73	90	81
East of England	23	9	245	58	83	70
London	26	11	247	74	79	94
South East Coast	23	11	217	54	83	65
South Central	14	10	135	50	88	57
South West	14	6	222	61	84	73
West Midlands	16	9	181	76	83	92
North West	27	12	225	95	86	111
Wales	17	11	151	33	70	47
Northern Ireland	8	16	51	19	90	21
Scotland	4	2	167	50	96	52
United Kingdom	**211**	**9**	**2289**	**732**	**84**	**868**

Table 92 : Nodal status of non-invasive cancers					
	Total known nodal status	Positive		Negative	
Region		No.	%	No.	%
N East, Yorks & Humber	114	1	1	113	99
East Midlands	87	0	0	87	100
East of England	81	1	1	80	99
London	100	1	1	99	99
South East Coast	77	2	3	75	97
South Central	64	0	0	64	100
South West	75	0	0	75	100
West Midlands	92	1	1	91	99
North West	122	1	1	121	99
Wales	50	0	0	50	100
Northern Ireland	27	2	7	25	93
Scotland	54	0	0	54	100
United Kingdom	**943**	**9**	**1**	**934**	**99**

Table 93 : Mean, median & maximum number of nodes obtained (non-invasive cancers)							
	Total with nodal status known	Conservation			Mastectomy		
Region		Mean	Median	Maximum	Mean	Median	Maximum
N East, Yorks & Humber	114	3	3	8	4	3	29
East Midlands	87	3	3	7	4	4	15
East of England	81	3	2	7	4	3	15
London	100	3	2	15	3	3	9
South East Coast	77	3	3	8	4	3	17
South Central	64	3	2	13	4	3.5	13
South West	75	2	1	4	4	3	13
West Midlands	92	3	3	10	3	3	11
North West	122	3	3	7	4	3	17
Wales	50	2	2	4	3	2	8
Northern Ireland	27	2	2	4	5	2	23
Scotland	54	3	3	5	4	4	9
United Kingdom	**943**	**3**	**2**	**15**	**4**	**3**	**29**

Table 94 : Sentinel lymph node procedure for non-invasive cancers with a mastectomy and known nodal status									
	With SLNB		Without SLNB		Unknown SLNB		Total non-invasive cancers with surgery	Total with known nodal status	% determined on basis of SLNB
Region	No.	%	No.	%	No.	%			
N East, Yorks & Humber	61	58	28	27	0	0.0	105	89	69
East Midlands	36	44	37	46	0	0.0	81	73	49
East of England	39	56	19	27	0	0.0	70	58	67
London	60	64	13	14	1	1.1	94	74	81
South East Coast	30	46	24	37	0	0.0	65	54	56
South Central	26	46	21	37	3	5.3	57	50	52
South West	36	49	25	34	0	0.0	73	61	59
West Midlands	55	60	21	23	0	0.0	92	76	72
North West	70	63	23	21	2	1.8	111	95	74
Wales	29	62	4	9	0	0.0	47	33	88
Northern Ireland	13	62	6	29	0	0.0	21	19	68
Scotland	16	31	34	65	0	0.0	52	50	32
United Kingdom	**471**	**54**	**255**	**29**	**6**	**0.7**	**868**	**732**	**64**

Table 95 : Sentinel lymph node procedure for non-invasive cancers with conservation surgery and known nodal status									
	With SLNB		Without SLNB		Unknown SLNB		Total non-invasive cancers with surgery	Total with known nodal status	% determined on basis of SLNB
Region	No.	%	No.	%	No.	%			
N East, Yorks & Humber	19	7	6	2	0	0.0	282	25	76
East Midlands	13	8	1	1	0	0.0	166	14	93
East of England	18	7	5	2	0	0.0	245	23	78
London	24	10	2	1	0	0.0	247	26	92
South East Coast	19	9	4	2	0	0.0	217	23	83
South Central	14	10	0	0	0	0.0	135	14	100
South West	13	6	1	0	0	0.0	222	14	93
West Midlands	13	7	3	2	0	0.0	181	16	81
North West	20	9	6	3	1	0.4	225	27	74
Wales	17	11	0	0	0	0.0	151	17	100
Northern Ireland	8	16	0	0	0	0.0	51	8	100
Scotland	2	1	2	1	0	0.0	167	4	50
United Kingdom	**180**	**8**	**30**	**1**	**1**	**0.0**	**2289**	**211**	**85**

Table 96: Proportion of invasive cancers with axillary surgery at the first and later operation (excluding no surgery/unknown surgery cases)																		
	B5b						C5 only						B5a					
	Total B5b	% had Ax	Ax in 1st op		Ax in later op		Total C5	% had Ax	Ax in 1st op		Ax in later op		Total B5a	% had Ax	Ax in 1st op		Ax in later op	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1601	99	1588	99	1	0	8	100	7	88	1	13	71	97	38	54	31	44
East Midlands	906	99	900	99	0	0	4	100	4	100	0	0	57	100	31	54	26	46
East of England	1170	99	1159	99	0	0	8	100	8	100	0	0	74	92	31	42	37	50
London	1171	98	1141	97	7	1	10	100	10	100	0	0	66	91	32	48	28	42
South East Coast	990	99	975	98	1	0	9	100	9	100	0	0	66	91	32	48	28	42
South Central	850	99	837	98	1	0	13	100	13	100	0	0	46	85	20	43	19	41
South West	1166	99	1152	99	2	0	19	100	19	100	0	0	64	92	27	42	32	50
West Midlands	1115	99	1104	99	0	0	8	100	8	100	0	0	64	94	25	39	35	55
North West	1223	99	1205	99	4	0	87	100	87	100	0	0	88	95	46	52	38	43
Wales	710	100	707	100	1	0	3	100	3	100	0	0	41	90	16	39	21	51
Northern Ireland	260	100	260	100	0	0	36	100	36	100	0	0	20	95	8	40	11	55
Scotland	1085	99	1075	99	4	0	1	100	1	100	0	0	36	97	25	69	10	28
United Kingdom	**12247**	**99**	**12103**	**99**	**21**	**0**	**206**	**100**	**205**	**100**	**1**	**0**	**693**	**93**	**331**	**48**	**316**	**46**

Table 97 : Repeat axillary operations for invasive cancers with positive nodal status							
Region	Re ax op & with SLNB		Re ax op & without/unknown SLNB		Total invasive with positive nodal status	Total with repeat axillary operation	% repeat operation after SLNB
	No	%	No	%			
N East, Yorks & Humber	131	33	28	7	394	159	82
East Midlands	56	31	9	5	180	65	86
East of England	89	31	22	8	286	111	80
London	66	25	15	6	269	81	81
South East Coast	82	33	13	5	252	95	86
South Central	63	29	11	5	217	74	85
South West	117	48	11	5	243	128	91
West Midlands	111	48	12	5	233	123	90
North West	125	42	27	9	297	152	82
Wales	58	40	1	1	146	59	98
Northern Ireland	21	30	3	4	70	24	88
Scotland	45	17	43	16	271	88	51
United Kingdom	**964**	**34**	**195**	**7**	**2858**	**1159**	**83**

APPENDIX F: ADJUVANT THERAPY DATA TABLES (98 – 142)

ADJUVANT THERAPY AUDIT WITH TUMOUR DATA FROM THE 2008/09 AUDIT OF SCREEN-DETECTED BREAST CANCERS

Table 98 : 2008/09 cases supplied to the NHSBSP adjuvant audit

Region	Total Cancers	No data supplied		Excluded cases		Total Eligible		Complete data*	
		No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	2288	17	1	127	6	2144	94	1757	77
East Midlands	1366	0	0	25	2	1341	98	1341	98
East of England	1708	0	0	188	11	1520	89	1486	87
London	1491	0	0	136	9	1355	91	1336	90
South East Coast	1368	0	0	505	37	863	63	723	53
South Central	1178	0	0	39	3	1139	97	1095	93
South West	1468	0	0	51	3	1417	97	1336	91
West Midlands	1479	0	0	97	7	1382	93	1263	85
North West	1856	0	0	101	5	1755	95	1668	90
Wales	992	0	0	7	1	985	99	969	98
Northern Ireland	357	83	23	11	3	263	74	261	73
Scotland	1517	0	0	7	0	1510	100	1446	95
United Kingdom	**17068**	**100**	**1**	**1294**	**8**	**15674**	**92**	**14681**	**86**

* cases which are eligible and with complete RT, CT and HT data

Table 99 : Data completeness for adjuvant therapy

Region	Total Eligible	Complete RT		Complete CT		Complete HT		Complete RT,CT & HT	
		No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	2144	1782	83	2109	98	2113	99	1757	82
East Midlands	1341	1341	100	1341	100	1341	100	1341	100
East of England	1520	1499	99	1514	100	1510	99	1486	98
London	1355	1352	100	1340	99	1340	99	1336	99
South East Coast	863	760	88	852	99	795	92	723	84
South Central	1139	1130	99	1131	99	1103	97	1095	96
South West	1417	1374	97	1393	98	1387	98	1336	94
West Midlands	1382	1340	97	1316	95	1338	97	1263	91
North West	1755	1723	98	1729	99	1701	97	1668	95
Wales	985	981	100	983	100	974	99	969	98
Northern Ireland	263	262	100	263	100	262	100	261	99
Scotland	1510	1447	96	1510	100	1509	100	1446	96
United Kingdom	**15674**	**14991**	**96**	**15481**	**99**	**15373**	**98**	**14681**	**94**

Table 100 : Radiotherapy

Region	Invasive					Non-invasive					Overall				
	RT		No RT		Invasive total	RT		No RT		Non-invasive total	RT		No RT		Overall total
	No.	%	No.	%		No.	%	No.	%		No.	%	No.	%	
NEYH	1083	76	340	24	1423	130	38	215	62	345	1220	68	562	32	1782
East Midlands	799	75	269	25	1068	107	41	153	59	260	914	68	427	32	1341
East of England	865	75	286	25	1151	132	40	195	60	327	1009	67	490	33	1499
London	807	76	252	24	1059	119	42	162	58	281	932	69	420	31	1352
South East Coast	468	80	117	20	585	62	36	108	64	170	533	70	227	30	760
South Central	674	75	221	25	895	77	34	147	66	224	755	67	375	33	1130
South West	874	82	197	18	1071	97	33	195	67	292	978	71	396	29	1374
West Midlands	934	84	174	16	1108	113	51	107	49	220	1052	79	288	21	1340
North West	1049	75	342	25	1391	109	35	202	65	311	1168	68	555	32	1723
Wales	605	80	152	20	757	95	43	127	57	222	702	72	279	28	981
Northern Ireland	160	77	48	23	208	31	58	22	42	53	191	73	71	27	262
Scotland	905	77	276	23	1181	130	50	131	50	261	1039	72	408	28	1447
United Kingdom	**9223**	**78**	**2674**	**22**	**11897**	**1202**	**41**	**1764**	**59**	**2966**	**10493**	**70**	**4498**	**30**	**14991**

Table 101 : Chemotherapy															
	Invasive					Non-invasive					Overall				
	CT		No CT		Invasive total	CT		No CT		Non-invasive total	CT		No CT		Overall total
Region	No.	%	No.	%		No.	%	No.	%		No.	%	No.	%	
NEYH	474	28	1238	72	1712	1	0	381	100	382	475	23	1634	77	2109
East Midlands	281	26	787	74	1068	1	0	259	100	260	282	21	1059	79	1341
East of England	276	24	887	76	1163	1	0	329	100	330	281	19	1233	81	1514
London	206	20	843	80	1049	0	0	279	100	279	207	15	1133	85	1340
South East Coast	139	21	525	79	664	0	0	183	100	183	139	16	713	84	852
South Central	237	26	661	74	898	2	1	220	99	222	239	21	892	79	1131
South West	279	26	809	74	1088	1	0	293	100	294	281	20	1112	80	1393
West Midlands	335	31	732	69	1067	0	0	235	100	235	335	25	981	75	1316
North West	369	26	1030	74	1399	3	1	305	99	308	373	22	1356	78	1729
Wales	166	22	593	78	759	0	0	222	100	222	166	17	817	83	983
Northern Ireland	59	28	150	72	209	0	0	53	100	53	59	22	204	78	263
Scotland	321	26	910	74	1231	1	0	273	100	274	322	21	1188	79	1510
United Kingdom	**3142**	**26**	**9165**	**74**	**12307**	**10**	**0**	**3031**	**100**	**3041**	**3159**	**20**	**12322**	**80**	**15481**

Table 102 : Endocrine therapy															
	Invasive					Non-invasive					Overall				
	HT		No HT		Invasive total	HT		No HT		Non-invasive total	HT		No HT		Overall total
Region	No.	%	No.	%		No.	%	No.	%		No.	%	No.	%	
NEYH	1472	86	247	14	1719	49	13	330	87	379	1526	72	587	28	2113
East Midlands	873	82	195	18	1068	69	27	191	73	260	948	71	393	29	1341
East of England	940	81	223	19	1163	33	10	292	90	325	977	65	533	35	1510
London	852	81	197	19	1049	23	8	256	92	279	878	66	462	34	1340
South East Coast	565	91	57	9	622	47	28	121	72	168	615	77	180	23	795
South Central	765	86	129	14	894	25	13	174	87	199	792	72	311	28	1103
South West	919	84	181	16	1100	47	17	229	83	276	971	70	416	30	1387
West Midlands	954	87	142	13	1096	46	20	182	80	228	1004	75	334	25	1338
North West	1156	84	228	16	1384	130	44	166	56	296	1294	76	407	24	1701
Wales	670	89	86	11	756	42	19	174	81	216	712	73	262	27	974
Northern Ireland	184	88	25	12	209	33	63	19	37	52	218	83	44	17	262
Scotland	1108	90	123	10	1231	5	2	268	98	273	1115	74	394	26	1509
United Kingdom	**10458**	**85**	**1833**	**15**	**12291**	**549**	**19**	**2402**	**81**	**2951**	**11050**	**72**	**4323**	**28**	**15373**

Table 103 : Radiotherapy by number of operations									
	Had RT		Total No Surgery	1 operation		Total 1 op	> 1 operation		Total Re-op
Region	No.	%		No.	%		No.	%	
N East, Yorks & Humber	2	6	32	946	60	1575	272	51	537
East Midlands	3	17	18	706	70	1013	205	66	310
East of England	2	9	23	775	69	1116	232	61	381
London	1	4	28	718	73	983	213	62	344
South East Coast	0	0	10	426	64	665	107	57	188
South Central	1	8	13	601	68	878	153	62	248
South West	1	6	16	737	71	1031	240	65	370
West Midlands	6	32	19	801	79	1020	245	71	343
North West	2	14	14	910	69	1310	256	59	431
Wales	1	8	12	547	76	724	154	62	249
Northern Ireland	0	-	0	152	75	202	39	64	61
Scotland	1	5	21	849	71	1191	189	63	298
United Kingdom	**20**	**10**	**206**	**8168**	**70**	**11708**	**2305**	**61**	**3760**

Table 104 : Radiotherapy by number of operations for invasive cancers									
Region	Had RT		Total No Surgery	1 operation		Total 1 op	> 1 operation		Total Re-op
	No.	%		No.	%		No.	%	
N East, Yorks & Humber	2	8	25	843	66	1285	238	56	425
East Midlands	3	20	15	626	75	830	170	76	223
East of England	2	10	21	668	78	859	195	67	289
London	1	4	24	629	81	781	177	69	255
South East Coast	0	0	7	383	72	534	85	63	134
South Central	0	0	12	546	77	712	128	72	178
South West	1	7	14	665	81	818	208	75	276
West Midlands	5	31	16	719	85	849	210	78	268
North West	2	18	11	820	77	1071	227	67	338
Wales	1	9	11	468	82	569	136	75	181
Northern Ireland	0	-	0	131	78	169	29	73	40
Scotland	1	5	21	738	76	965	166	68	245
United Kingdom	**18**	**10**	**177**	**7236**	**77**	**9442**	**1969**	**69**	**2852**

Table 105 : Radiotherapy by number of operations for non-invasive cancers									
Region	Had RT		Total No Surgery	1 operation		Total 1 op	> 1 operation		Total Re-op
	No.	%		No.	%		No.	%	
N East, Yorks & Humber	0	0	5	101	36	284	29	28	104
East Midlands	0	0	3	74	42	176	33	41	81
East of England	0	0	2	95	40	239	37	42	88
London	0	0	4	86	44	196	33	40	83
South East Coast	0	0	3	40	32	126	22	41	54
South Central	1	100	1	54	34	161	22	34	64
South West	0	0	2	69	33	208	28	32	88
West Midlands	1	33	3	80	49	163	32	46	69
North West	0	0	3	83	37	226	26	31	84
Wales	0	0	1	77	50	153	18	26	68
Northern Ireland	0	-	0	21	66	32	10	48	21
Scotland	0	-	0	109	49	223	21	41	51
United Kingdom	**2**	**7**	**27**	**889**	**41**	**2187**	**311**	**36**	**855**

Table 106 : Chemotherapy by number of operations for invasive cancers									
Region	Had CT		Total No Surgery	1 operation		Total 1 op	> 1 operation		Total Re-op
	No.	%		No.	%		No.	%	
N East, Yorks & Humber	2	8	25	306	24	1285	166	39	425
East Midlands	9	60	15	188	23	830	84	38	223
East of England	3	14	21	171	20	859	102	35	289
London	3	13	24	136	17	781	67	26	255
South East Coast	4	57	7	91	17	534	44	33	134
South Central	2	17	12	168	24	712	67	38	178
South West	3	21	14	176	22	818	100	36	276
West Midlands	6	38	16	215	25	849	114	43	268
North West	3	27	11	250	23	1071	116	34	338
Wales	1	9	11	100	18	569	65	36	181
Northern Ireland	0	-	0	43	25	169	16	40	40
Scotland	3	14	21	235	24	965	83	34	245
United Kingdom	**39**	**22**	**177**	**2079**	**22**	**9442**	**1024**	**36**	**2852**

Table 107 : Invasive cancers with adjuvant therapy by age							
	Radiotherapy		Chemotherapy		Endocrine Therapy		Total
Age group	No.	%	No.	%	No.	%	
<=48	6	60	6	60	8	80	10
49	123	75	68	42	140	86	163
50-52	1174	79	520	35	1305	88	1488
53-55	889	80	390	35	913	83	1105
56-58	1092	79	448	33	1154	84	1375
59-61	1434	79	516	29	1535	85	1808
62-64	1449	77	471	25	1606	85	1890
65-67	1268	77	293	18	1421	86	1645
68-70	1082	74	187	13	1250	86	1455
71+	535	71	54	7	655	86	758
Total	**9052**	**77**	**2953**	**25**	**9987**	**85**	**11697**

* with completed data only

Table 108 : Non-invasive cancers with adjuvant therapy by age					
	Radiotherapy		Endocrine Therapy		Total non-invasive
Age group	No.	%	No.	%	
<=48	2	29	0	0	7
49	21	33	9	14	63
50-52	174	34	83	16	507
53-55	134	44	58	19	308
56-58	146	41	75	21	358
59-61	216	48	99	22	449
62-64	176	44	66	17	396
65-67	129	39	50	15	331
68-70	122	41	55	18	301
71+	44	32	29	21	138
Total	**1164**	**41**	**524**	**18**	**2858**

Table 109 : Combinations of adjuvant therapy for invasive cancers with complete data																			
	No surgery		Surgery only		Surgery & RT		Surgery & CT		Surgery & HT		Surgery & RT & CT		Surgery & RT & HT		Surgery & CT & HT		Surgery & RT & CT & HT		Total
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
NEYH	23	2	24	2	34	2	20	1	214	15	91	6	743	53	59	4	205	15	1413
East Midlands	15	1	35	3	90	8	13	1	171	16	51	5	485	45	38	4	170	16	1068
East of England	20	2	55	5	85	7	24	2	152	13	51	4	567	50	35	3	153	13	1142
London	24	2	47	4	78	7	16	2	133	13	42	4	562	54	30	3	115	11	1047
South East Coast	1	0	9	2	18	3	4	1	82	15	19	3	325	58	18	3	81	15	557
South Central	11	1	17	2	50	6	12	1	156	18	47	5	423	48	24	3	147	17	887
South West	14	1	27	3	74	7	13	1	110	10	58	5	567	54	29	3	164	16	1056
West Midlands	12	1	13	1	33	3	11	1	109	11	69	7	560	54	29	3	198	19	1034
North West	11	1	44	3	66	5	26	2	202	15	85	6	679	50	55	4	185	14	1353
Wales	11	1	12	2	37	5	7	1	95	13	29	4	435	58	25	3	100	13	751
Northern Ireland	0	0	1	0	4	2	2	1	39	19	18	9	105	50	6	3	33	16	208
Scotland	21	2	10	1	23	2	10	1	186	16	62	5	628	53	50	4	191	16	1181
United Kingdom	**163**	**1**	**294**	**3**	**592**	**5**	**158**	**1**	**1649**	**14**	**622**	**5**	**6079**	**52**	**398**	**3**	**1742**	**15**	**11697**

Table 110 : Combinations of adjuvant therapy for non-invasive cancers with complete data																			
	No surgery		Surgery only		Surgery & RT		Surgery & CT		Surgery & HT		Surgery & RT & CT		Surgery & RT & HT		Surgery & CT & HT		Surgery & RT & CT & HT		Total
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
NEYH	5	2	182	55	111	34	1	0	17	5	0	0	15	5	0	0	0	0	331
East Midlands	3	1	129	50	59	23	0	0	21	8	0	0	48	18	0	0	0	0	260
East of England	2	1	173	54	116	36	0	0	17	5	0	0	14	4	1	0	0	0	323
London	4	1	151	55	100	36	0	0	4	1	0	0	18	6	0	0	0	0	277
South East Coast	1	1	75	47	42	26	0	0	26	16	0	0	17	11	0	0	0	0	161
South Central	0	0	109	55	63	32	1	1	15	8	0	0	9	5	0	0	1	1	198
South West	2	1	152	57	69	26	1	0	30	11	0	0	15	6	0	0	0	0	269
West Midlands	3	1	98	45	74	34	0	0	7	3	0	0	35	16	0	0	0	0	217
North West	3	1	127	43	38	13	0	0	60	20	1	0	63	21	1	0	1	0	294
Wales	1	0	101	47	72	33	0	0	21	10	0	0	21	10	0	0	0	0	216
Northern Ireland	0	0	9	17	10	19	0	0	12	23	0	0	21	40	0	0	0	0	52
Scotland	0	0	128	49	126	48	0	0	2	1	1	0	3	1	0	0	0	0	260
United Kingdom	**24**	**1**	**1434**	**50**	**880**	**31**	**3**	**0.1**	**232**	**8**	**2**	**0.1**	**279**	**10**	**2**	**0.1**	**2**	**0.1**	**2858**

Table 111 : Time from assessment to first diagnostic surgery (invasive cancers with no non-operative diagnosis)													
	≤ 14 days		≤ 30 days		≤ 60 days		≤ 90 days		≤ 120 days		≤ 200 days		Median
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
N East, Yorks & Humber	2	8	7	28	22	88	25	100	25	100	25	100	36
East Midlands	2	10	12	60	18	90	19	95	19	95	20	100	28
East of England	1	3	13	41	31	97	32	100	32	100	32	100	34
London	3	14	6	27	19	86	20	91	21	95	22	100	38.5
South East Coast	0	0	0	0	6	55	10	91	11	100	11	100	52
South Central	0	0	11	44	19	76	20	80	22	88	25	100	35
South West	2	7	13	48	24	89	27	100	27	100	27	100	32
West Midlands	0	0	8	35	20	87	20	87	21	91	23	100	40
North West	1	3	14	45	31	100	31	100	31	100	31	100	32
Wales	1	10	6	60	8	80	10	100	10	100	10	100	29
Northern Ireland	0	0	0	0	1	100	1	100	1	100	1	100	45
Scotland	0	0	7	39	14	78	17	94	18	100	18	100	43.5
United Kingdom	**12**	**5**	**97**	**40**	**213**	**87**	**232**	**95**	**238**	**97**	**245**	**100**	**35**

Table 112 : Time from assessment to first diagnostic surgery (non-invasive cancers with no non-operative diagnosis)													
	≤ 14 days		≤ 30 days		≤ 60 days		≤ 90 days		≤ 120 days		≤ 200 days		Median
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
N East, Yorks & Humber	1	3	16	47	33	97	34	100	34	100	34	100	32.5
East Midlands	2	5	14	36	38	97	39	100	39	100	39	100	36
East of England	1	1	36	51	62	89	68	97	68	97	70	100	29
London	2	4	16	32	38	76	49	98	50	100	50	100	40.5
South East Coast	0	0	6	16	29	76	34	89	38	100	38	100	49
South Central	1	3	15	41	34	92	36	97	37	100	37	100	33
South West	0	0	20	36	45	82	52	95	54	98	55	100	37
West Midlands	7	18	20	51	32	82	38	97	39	100	39	100	30
North West	0	0	26	52	45	90	46	92	49	98	50	100	30
Wales	0	0	7	35	17	85	20	100	20	100	20	100	35.5
Northern Ireland	1	9	8	73	10	91	11	100	11	100	11	100	23
Scotland	2	5	16	43	34	92	36	97	36	97	37	100	34
United Kingdom	**17**	**4**	**200**	**42**	**417**	**87**	**463**	**96**	**475**	**99**	**480**	**100**	**35**

Table 113 : Time from assessment to first therapeutic surgery (invasive cancers with non-operative diagnosis)													
	≤ 14 days		≤ 30 days		≤ 60 days		≤ 90 days		≤ 120 days		≤ 200 days		Median
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	
N East, Yorks & Humber	102	6	975	58	1609	95	1658	98	1660	99	1676	99	28
East Midlands	98	9	603	58	953	92	984	95	991	96	1005	97	28
East of England	97	9	658	59	1048	94	1078	97	1089	98	1103	99	28
London	42	4	424	42	928	92	973	96	981	97	1000	99	34
South East Coast	8	1	126	19	585	89	640	97	650	99	655	100	40
South Central	60	7	437	51	817	94	844	98	847	98	862	100	30
South West	51	5	525	49	1006	94	1046	98	1051	99	1061	99	31
West Midlands	82	7	700	64	1043	95	1078	99	1086	99	1091	100	27
North West	98	7	837	61	1333	97	1360	99	1363	99	1371	99	28
Wales	93	13	507	69	728	98	739	100	739	100	739	100	25
Northern Ireland	65	31	168	81	201	97	204	98	205	99	206	99	21
Scotland	143	12	724	61	1123	94	1160	97	1171	98	1186	99	28
United Kingdom	**939**	**8**	**6684**	**55**	**11374**	**94**	**11764**	**98**	**11833**	**98**	**11955**	**99**	**29**

Table 114 : Time from assessment to first therapeutic surgery (non-invasive cancers with non-operative diagnosis)													
	≤ 14 days		≤ 30 days		≤ 60 days		≤ 90 days		≤ 120 days		≤ 200 days		Median
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	
N East, Yorks & Humber	11	3	144	41	323	91	346	98	353	100	353	100	34
East Midlands	17	8	106	49	201	92	214	98	217	100	218	100	32
East of England	15	6	142	55	242	94	254	99	255	99	257	100	29
London	9	4	67	29	197	86	224	98	228	100	229	100	37
South East Coast	1	1	21	15	114	80	138	97	141	99	142	100	46.5
South Central	8	4	69	37	172	91	182	97	186	99	187	99	34.5
South West	3	1	83	34	210	87	232	96	238	99	240	100	37
West Midlands	10	5	96	50	182	94	189	98	191	99	192	99	31
North West	10	4	129	50	240	92	256	98	260	100	260	100	31
Wales	25	12	119	59	189	94	199	99	199	99	200	100	27
Northern Ireland	6	14	31	74	41	98	42	100	42	100	42	100	24
Scotland	19	8	118	50	220	93	235	99	236	100	237	100	31
United Kingdom	**134**	**5**	**1125**	**44**	**2331**	**91**	**2511**	**98**	**2546**	**99**	**2557**	**100**	**34**

Table 115 : Time from final surgery to radiotherapy (excluding neo-adjuvant therapy cases and cases with chemotherapy) - invasive													
	≤ 14 days		≤ 30 days		≤ 60 days		≤ 90 days		≤ 120 days		≤ 200 days		Median
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	
N East, Yorks & Humber	1	0	27	4	540	71	720	95	740	98	754	99	52
East Midlands	0	0	13	2	343	60	553	96	570	99	575	100	56
East of England	4	1	14	2	382	58	586	90	629	96	652	100	56.5
London	10	2	36	6	309	48	557	86	619	96	643	99	61
South East Coast	0	0	3	2	60	31	150	77	182	94	191	98	71.5
South Central	5	1	14	3	281	59	412	87	452	95	473	99	55
South West	2	0	11	2	268	41	532	82	620	96	645	99	67
West Midlands	1	0	15	2	340	54	592	95	617	99	623	100	58
North West	2	0	32	4	471	61	704	92	753	98	765	100	55
Wales	0	0	1	0	163	34	392	83	462	98	473	100	67
Northern Ireland	0	0	0	0	49	45	97	89	103	94	109	100	67
Scotland	3	0	7	1	323	50	576	89	615	95	639	98	61
United Kingdom	**28**	**0**	**173**	**3**	**3529**	**54**	**5871**	**89**	**6362**	**97**	**6542**	**99**	**58**

Table 116 : Time from final surgery to radiotherapy (excluding neo-adjuvant therapy cases and cases with chemotherapy) – non-invasive													
	≤ 14 days		≤ 30 days		≤ 60 days		≤ 90 days		≤ 120 days		≤ 200 days		Median
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
N East, Yorks & Humber	0	0	2	2	87	70	122	98	124	99	124	99	54
East Midlands	0	0	1	1	60	56	102	95	106	99	107	100	57
East of England	2	2	5	4	77	59	120	92	129	99	130	100	55
London	0	0	12	10	64	54	92	77	112	94	117	98	58
South East Coast	1	3	2	6	11	31	27	77	34	97	35	100	70
South Central	0	0	2	3	43	57	72	96	74	99	75	100	56
South West	0	0	0	0	42	43	82	85	93	96	96	99	62
West Midlands	0	0	4	4	57	53	98	91	106	98	108	100	57.5
North West	1	1	6	6	74	69	98	92	106	99	107	100	49
Wales	0	0	0	0	30	32	82	86	92	97	95	100	70
Northern Ireland	0	0	0	0	13	42	26	84	31	100	31	100	67
Scotland	0	0	2	2	62	48	115	89	127	98	129	100	62
United Kingdom	**4**	**0**	**36**	**3**	**620**	**54**	**1036**	**89**	**1134**	**98**	**1154**	**100**	**58**

Table 117 : Time from assessment to radiotherapy (excluding cases with chemotherapy) - invasive													
	≤ 14 days		≤ 30 days		≤ 60 days		≤ 90 days		≤ 120 days		≤ 200 days		Median
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
N East, Yorks & Humber	0	0	1	0	67	9	440	58	654	86	743	98	84
East Midlands	0	0	0	0	24	4	296	51	484	84	566	98	90
East of England	0	0	1	0	46	7	328	50	541	83	628	96	90
London	0	0	4	1	32	5	223	34	454	70	615	95	102
South East Coast	0	0	0	0	3	2	35	18	100	52	186	96	119
South Central	0	0	4	1	32	7	235	49	378	79	462	97	91
South West	0	0	0	0	15	2	217	33	462	71	624	96	104
West Midlands	0	0	0	0	28	4	274	44	514	82	621	99	94
North West	0	0	1	0	73	10	399	52	650	85	754	98	89
Wales	0	0	0	0	13	3	184	39	365	77	468	99	96
Northern Ireland	0	0	0	0	7	6	59	54	96	88	105	96	90
Scotland	0	0	1	0	15	2	300	46	520	80	615	94	93
United Kingdom	**0**	**0**	**12**	**0**	**355**	**5**	**2990**	**45**	**5218**	**79**	**6387**	**97**	**93**

Table 118 : Time from assessment to radiotherapy (excluding cases with chemotherapy) – non-invasive													
	≤ 14 days		≤ 30 days		≤ 60 days		≤ 90 days		≤ 120 days		≤ 200 days		Median
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
N East, Yorks & Humber	0	0	1	1	1	1	56	44	109	87	124	98	94
East Midlands	0	0	0	0	1	1	40	37	87	81	107	100	98
East of England	0	0	0	0	8	6	61	47	106	81	128	98	94
London	0	0	0	0	9	8	35	29	77	65	113	95	109
South East Coast	0	0	1	3	1	3	3	9	16	46	35	100	124
South Central	0	0	0	0	3	4	31	41	58	76	76	100	96.5
South West	0	0	0	0	1	1	29	30	71	73	94	97	110
West Midlands	0	0	0	0	2	2	40	37	83	76	107	98	99
North West	0	0	0	0	8	7	57	53	90	84	107	100	86
Wales	0	0	0	0	4	4	33	35	71	75	94	99	102
Northern Ireland	0	0	0	0	0	0	12	39	23	74	31	100	105
Scotland	0	0	0	0	4	3	57	44	104	81	128	99	96
United Kingdom	**0**	**0**	**2**	**0**	**42**	**4**	**454**	**39**	**895**	**77**	**1144**	**98**	**98**

Table 119 : Invasive status of cancers with known radiotherapy data										
	Invasive		Micro-invasive		Non-invasive		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1423	80	11	1	345	19	3	0	1782	100
East Midlands	1068	80	13	1	260	19	0	0	1341	100
East of England	1151	77	17	1	327	22	4	0	1499	100
London	1059	78	12	1	281	21	0	0	1352	100
South East Coast	585	77	5	1	170	22	0	0	760	100
South Central	895	79	11	1	224	20	0	0	1130	100
South West	1071	78	11	1	292	21	0	0	1374	100
West Midlands	1108	83	10	1	220	16	2	0	1340	100
North West	1391	81	20	1	311	18	1	0	1723	100
Wales	757	77	2	0	222	23	0	0	981	100
Northern Ireland	208	79	1	0	53	20	0	0	262	100
Scotland	1181	82	5	0	261	18	0	0	1447	100
United Kingdom	**11897**	**79**	**118**	**1**	**2966**	**20**	**10**	**0**	**14991**	**100**

Table 120 : Treatment of invasive cancers with known radiotherapy data										
	Conservation surgery		Mastectomy		No Surgery		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	975	69	425	30	23	2	0	0	1423	100
East Midlands	727	68	326	31	15	1	0	0	1068	100
East of England	864	75	266	23	20	2	1	0	1151	100
London	795	75	236	22	24	2	4	0	1059	100
South East Coast	466	80	118	20	1	0	0	0	585	100
South Central	670	75	213	24	12	1	0	0	895	100
South West	847	79	207	19	14	1	3	0	1071	100
West Midlands	848	77	246	22	13	1	1	0	1108	100
North West	979	70	400	29	11	1	1	0	1391	100
Wales	567	75	179	24	11	1	0	0	757	100
Northern Ireland	143	69	65	31	0	0	0	0	208	100
Scotland	858	73	301	25	21	2	1	0	1181	100
United Kingdom	**8739**	**73**	**2982**	**25**	**165**	**1**	**11**	**0**	**11897**	**100**

Table 121 : Radiotherapy for invasive cancers treated by breast conservation surgery						
	Radiotherapy		No radiotherapy		Total	
Region	No.	%	No.	%	No.	%
N East, Yorks & Humber	943	97	32	3	975	100
East Midlands	704	97	23	3	727	100
East of England	767	89	97	11	864	100
London	735	92	60	8	795	100
South East Coast	427	92	39	8	466	100
South Central	586	87	84	13	670	100
South West	797	94	50	6	847	100
West Midlands	826	97	22	3	848	100
North West	924	94	55	6	979	100
Wales	553	98	14	2	567	100
Northern Ireland	131	92	12	8	143	100
Scotland	808	94	50	6	858	100
United Kingdom	**8201**	**94**	**538**	**6**	**8739**	**100**

Table 122 : Invasive cancers treated by breast conservation surgery without radiotherapy							
		>20mm		Grade III		Nodal status positive	
Region	Total	No	%	No	%	No	%
North, Yorks & Humber	32	4	13	4	13	3	9
East Midlands	23	0	0	1	4	2	9
East of England	97	16	16	26	27	15	15
London	60	14	23	6	10	9	15
South East Coast	39	5	13	4	10	5	13
South Central	84	4	5	1	1	2	2
South West	50	8	16	4	8	8	16
West Midlands	22	2	9	2	9	2	9
North West	55	9	16	12	22	9	16
Wales	14	2	14	3	21	2	14
Northern Ireland	12	3	25	1	8	2	17
Scotland	50	8	16	4	8	4	8
United Kingdom	**538**	**75**	**14**	**68**	**13**	**63**	**12**

Table 123 : Radiotherapy for non-invasive cancers treated by breast conservation surgery						
	Radiotherapy		No radiotherapy		Total	
Region	No.	%	No.	%	No.	%
N East, Yorks & Humber	124	58	89	42	213	100
East Midlands	107	64	61	36	168	100
East of England	131	56	104	44	235	100
London	115	58	84	42	199	100
South East Coast	60	48	64	52	124	100
South Central	73	45	89	55	162	100
South West	97	44	122	56	219	100
West Midlands	109	63	64	37	173	100
North West	108	52	99	48	207	100
Wales	93	63	54	37	147	100
Northern Ireland	29	73	11	28	40	100
Scotland	130	71	52	29	182	100
United Kingdom	**1176**	**57**	**893**	**43**	**2069**	**100**

Table 124 : Cytonuclear grade of non-invasive cancers treated by breast conservation surgery without radiotherapy												
	High		Intermediate		Low		Not assessable		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	10	11	45	51	28	31	0	0	6	7	89	100
East Midlands	10	16	34	56	14	23	3	5	0	0	61	100
East of England	22	21	38	37	22	21	8	8	14	13	104	100
London	14	17	27	32	32	38	11	13	0	0	84	100
South East Coast	18	28	27	42	9	14	0	0	10	16	64	100
South Central	32	36	31	35	19	21	4	4	3	3	89	100
South West	38	31	41	34	29	24	8	7	6	5	122	100
West Midlands	18	28	21	33	14	22	3	5	8	13	64	100
North West	25	25	41	41	23	23	0	0	10	10	99	100
Wales	4	7	30	56	16	30	3	6	1	2	54	100
Northern Ireland	1	9	6	55	3	27	0	0	1	9	11	100
Scotland	4	8	25	48	12	23	7	13	4	8	52	100
United Kingdom	**196**	**22**	**366**	**41**	**221**	**25**	**47**	**5**	**63**	**7**	**893**	**100**

Table 125 : Size of non-invasive cancers treated by conservation surgery without radiotherapy												
	<15mm		15-≤40mm		>40mm		Not assessable		Unknown		Total	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	59	66	15	17	2	2	0	0	13	15	89	100
East Midlands	34	56	16	26	0	0	3	5	8	13	61	100
East of England	61	59	15	14	0	0	6	6	22	21	104	100
London	41	49	20	24	3	4	10	12	10	12	84	100
South East Coast	43	67	9	14	0	0	0	0	12	19	64	100
South Central	50	56	29	33	0	0	3	3	7	8	89	100
South West	80	66	23	19	1	1	6	5	12	10	122	100
West Midlands	32	50	16	25	2	3	2	3	12	19	64	100
North West	59	60	24	24	1	1	0	0	15	15	99	100
Wales	37	69	10	19	1	2	3	6	3	6	54	100
Northern Ireland	8	73	2	18	0	0	0	0	1	9	11	100
Scotland	31	60	14	27	1	2	4	8	2	4	52	100
United Kingdom	**535**	**60**	**193**	**22**	**11**	**1**	**37**	**4**	**117**	**13**	**893**	**100**

Table 126 : Chemotherapy for node positive invasive cancers						
	Chemotherapy		No chemotherapy		Total	
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**
N East, Yorks & Humber	252	65	134	35	386	100
East Midlands	155	79	42	21	197	100
East of England	149	61	94	39	243	100
London	112	54	94	46	206	100
South East Coast	87	60	57	40	144	100
South Central	137	70	58	30	195	100
South West	153	70	66	30	219	100
West Midlands	183	74	65	26	248	100
North West	197	65	106	35	303	100
Wales	94	67	46	33	140	100
Northern Ireland	35	70	15	30	50	100
Scotland	168	61	107	39	275	100
United Kingdom	**1722**	**66**	**884**	**34**	**2606**	**100**

Table 127 : Nodal status positive invasive cancers without chemotherapy					
	Total	Grade III		HER2 positive	
Region	**No**	**No**	**%**	**No**	**%**
North, Yorks & Humber	134	19	14	6	4
East Midlands	42	5	12	1	2
East of England	94	13	14	3	3
London	94	14	15	13	14
South East Coast	57	4	7	1	2
South Central	58	6	10	3	5
South West	66	9	14	6	9
West Midlands	65	9	14	1	2
North West	106	16	15	8	8
Wales	46	4	9	2	4
Northern Ireland	15	4	27	0	0
Scotland	107	18	17	13	12
United Kingdom	**884**	**121**	**14**	**57**	**6**

Table 128 : ER status of all cases with complete endocrine therapy data								
	ER Positive		ER Negative		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1733	82	238	11	142	7	2113	100
East Midlands	1084	81	120	9	137	10	1341	100
East of England	1127	75	140	9	243	16	1510	100
London	1050	78	138	10	152	11	1340	100
South East Coast	664	84	77	10	54	7	795	100
South Central	890	81	97	9	116	11	1103	100
South West	1101	79	161	12	125	9	1387	100
West Midlands	1112	83	151	11	75	6	1338	100
North West	1421	84	195	11	85	5	1701	100
Wales	732	75	79	8	163	17	974	100
Northern Ireland	221	84	37	14	4	2	262	100
Scotland	1233	82	136	9	140	9	1509	100
United Kingdom	**12368**	**80**	**1569**	**10**	**1436**	**9**	**15373**	**100**

Table 129 : Invasive status of ER positive cases with known endocrine therapy data										
	Invasive		Micro-invasive		Non-invasive		Unknown		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1533	88	4	0	195	11	1	0	1733	100
East Midlands	967	89	3	0	114	11	0	0	1084	100
East of England	1044	93	8	1	73	6	2	0	1127	100
London	931	89	6	1	113	11	0	0	1050	100
South East Coast	571	86	2	0	91	14	0	0	664	100
South Central	811	91	2	0	77	9	0	0	890	100
South West	962	87	7	1	132	12	0	0	1101	100
West Midlands	977	88	7	1	128	12	0	0	1112	100
North West	1231	87	13	1	177	12	0	0	1421	100
Wales	687	94	0	0	45	6	0	0	732	100
Northern Ireland	180	81	1	0	40	18	0	0	221	100
Scotland	1103	89	5	0	125	10	0	0	1233	100
United Kingdom	**10997**	**89**	**58**	**0**	**1310**	**11**	**3**	**0**	**12368**	**100**

Table 130 : Endocrine therapy for ER positive invasive cancers						
	Endocrine therapy		No endocrine therapy		Total	
Region	No.	%	No.	%	No.	%
N East, Yorks & Humber	1452	95	81	5	1533	100
East Midlands	871	90	96	10	967	100
East of England	920	88	124	12	1044	100
London	826	89	105	11	931	100
South East Coast	561	98	10	2	571	100
South Central	756	93	55	7	811	100
South West	896	93	66	7	962	100
West Midlands	951	97	26	3	977	100
North West	1145	93	86	7	1231	100
Wales	667	97	20	3	687	100
Northern Ireland	177	98	3	2	180	100
Scotland	1086	98	17	2	1103	100
United Kingdom	**10308**	**94**	**689**	**6**	**10997**	**100**

Table 131 : ER positive invasive cancers without endocrine therapy							
Region	Total cases	>20mm		Grade III		Nodal status positive	
		No.	%	No.	%	No.	%
N East, Yorks & Humber	81	13	16	21	26	18	22
East Midlands	96	1	1	3	3	0	0
East of England	124	30	24	25	20	28	23
London	105	18	17	19	18	13	12
South East Coast	10	1	10	2	20	2	20
South Central	55	11	20	9	16	14	25
South West	66	9	14	14	21	14	21
West Midlands	26	0	0	1	4	1	4
North West	86	23	27	16	19	27	31
Wales	20	0	0	1	5	2	10
Northern Ireland	3	1	33	2	67	0	0
Scotland	17	6	35	4	24	6	35
United Kingdom	**689**	**113**	**16**	**117**	**17**	**125**	**18**

Table 132 : Endocrine therapy for ER negative, PgR positive invasive cancers						
Region	Endocrine therapy		No endocrine therapy		Total	
	No.	%	No.	%	No.	%
N East, Yorks & Humber	6	67	3	33	9	100
East Midlands	0	0	6	100	6	100
East of England	2	67	1	33	3	100
London	3	50	3	50	6	100
South East Coast	0	0	1	100	1	100
South Central	0	0	3	100	3	100
South West	0	0	4	100	4	100
West Midlands	3	75	1	25	4	100
North West	1	10	9	90	10	100
Wales	2	50	2	50	4	100
Northern Ireland	1	50	1	50	2	100
Scotland	3	75	1	25	4	100
United Kingdom	**21**	**38**	**35**	**63**	**56**	**100**

Table 133 : Endocrine therapy for all ER negative cancers						
Region	Endocrine therapy		No endocrine therapy		Total	
	No.	%	No.	%	No.	%
N East, Yorks & Humber	22	9	216	91	238	100
East Midlands	0	0	120	100	120	100
East of England	19	14	121	86	140	100
London	18	13	120	87	138	100
South East Coast	3	4	74	96	77	100
South Central	8	8	89	92	97	100
South West	16	10	145	90	161	100
West Midlands	3	2	148	98	151	100
North West	11	6	184	94	195	100
Wales	3	4	76	96	79	100
Northern Ireland	6	16	31	84	37	100
Scotland	13	10	123	90	136	100
United Kingdom	**122**	**8**	**1447**	**92**	**1569**	**100**

Table 134 : ER status for non-invasive cancers with endocrine therapy								
	ER positive		ER negative		ER Not done or Unknown		Total*	
Region	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	38	10	3	1	8	2	49	12
East Midlands	59	23	0	0	10	4	69	27
East of England	28	9	0	0	5	2	33	10
London	19	7	2	1	2	1	23	8
South East Coast	46	25	0	0	1	1	47	26
South Central	24	11	0	0	1	0	25	11
South West	46	15	0	0	1	0	47	16
West Midlands	46	20	0	0	0	0	46	20
North West	128	41	1	0	1	0	130	42
Wales	35	16	0	0	7	3	42	19
Northern Ireland	31	58	2	4	0	0	33	62
Scotland	3	1	0	0	2	1	5	2
United Kingdom	**503**	**16**	**8**	**0**	**38**	**1**	**549**	**18**

*Number of non-invasive cancers with endocrine therapy as a percentage of the number of non-invasive cancers

Table 135 : Endocrine therapy for ER positive non-invasive cancers						
	Endocrine therapy		No endocrine therapy		Total	
Region	No.	%	No.	%	No.	%
N East, Yorks & Humber	38	19	157	81	195	100
East Midlands	59	52	55	48	114	100
East of England	28	38	45	62	73	100
London	19	17	94	83	113	100
South East Coast	46	51	45	49	91	100
South Central	24	31	53	69	77	100
South West	46	35	86	65	132	100
West Midlands	46	36	82	64	128	100
North West	128	72	49	28	177	100
Wales	35	78	10	22	45	100
Northern Ireland	31	78	9	23	40	100
Scotland	3	2	122	98	125	100
United Kingdom	**503**	**38**	**807**	**62**	**1310**	**100**

Table 136 : Invasive status, nodal status and ER status of cancers with known chemotherapy data														
	Invasive						Micro-invasive		Non-invasive		Invasive status unknown		Total	
	ER negative Node negative		ER negative Node positive		Other									
Region	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	132	6	46	2	1534	73	12	1	382	18	3	0	2109	100
East Midlands	67	5	23	2	978	73	13	1	260	19	0	0	1341	100
East of England	84	6	23	2	1056	70	17	1	329	22	5	0	1514	100
London	65	5	29	2	955	71	12	1	279	21	0	0	1340	100
South East Coast	41	5	8	1	615	72	5	1	183	21	0	0	852	100
South Central	55	5	24	2	819	72	11	1	222	20	0	0	1131	100
South West	92	7	27	2	969	70	11	1	294	21	0	0	1393	100
West Midlands	81	6	31	2	955	73	12	1	235	18	2	0	1316	100
North West	109	6	41	2	1249	72	21	1	308	18	1	0	1729	100
Wales	55	6	11	1	693	70	2	0	222	23	0	0	983	100
Northern Ireland	22	8	4	2	183	70	1	0	53	20	0	0	263	100
Scotland	80	5	27	2	1124	74	5	0	274	18	0	0	1510	100
United Kingdom	**883**	**6**	**294**	**2**	**11130**	**72**	**122**	**1**	**3041**	**20**	**11**	**0**	**15481**	**100**

Table 137 : Chemotherapy for ER negative invasive cancers						
	Chemotherapy		No chemotherapy		Total	
Region	No.	%	No.	%	No.	%
N East, Yorks & Humber	130	71	52	29	182	100
East Midlands	67	70	29	30	96	100
East of England	69	63	41	37	110	100
London	51	50	51	50	102	100
South East Coast	29	54	25	46	54	100
South Central	51	64	29	36	80	100
South West	69	57	52	43	121	100
West Midlands	88	77	26	23	114	100
North West	95	63	57	38	152	100
Wales	35	51	33	49	68	100
Northern Ireland	21	81	5	19	26	100
Scotland	74	69	33	31	107	100
United Kingdom	**779**	**64**	**433**	**36**	**1212**	**100**

Table 138 : Chemotherapy for ER negative node positive and negative invasive cancers										
	Node positive					Node negative				
	Chemotherapy		No chemotherapy		Total	Chemotherapy		No chemotherapy		Total
Region	No.	%	No.	%		No.	%	No.	%	
N East, Yorks & Humber	41	89	5	11	46	87	66	45	34	132
East Midlands	22	96	1	4	23	41	61	26	39	67
East of England	20	87	3	13	23	48	57	36	43	84
London	21	72	8	28	29	28	43	37	57	65
South East Coast	8	100	0	0	8	18	44	23	56	41
South Central	22	92	2	8	24	29	53	26	47	55
South West	18	67	9	33	27	50	54	42	46	92
West Midlands	29	94	2	6	31	58	72	23	28	81
North West	32	78	9	22	41	61	56	48	44	109
Wales	11	100	0	0	11	23	42	32	58	55
Northern Ireland	4	100	0	0	4	17	77	5	23	22
Scotland	23	85	4	15	27	51	64	29	36	80
United Kingdom	**251**	**85**	**43**	**15**	**294**	**511**	**58**	**372**	**42**	**883**

Table 139 : Grade of ER negative node negative invasive cancers given chemotherapy										
	Grade I		Grade II		Grade III		Unknown or Not assessable		Total	
Region	No.	%	No.	%	No.	%	No.	%	No.	%
N East, Yorks & Humber	1	1	19	22	67	77	0	0	87	100
East Midlands	0	0	5	12	36	88	0	0	41	100
East of England	0	0	11	23	37	77	0	0	48	100
London	0	0	6	21	22	79	0	0	28	100
South East Coast	0	0	2	11	16	89	0	0	18	100
South Central	0	0	5	17	23	79	1	3	29	100
South West	0	0	14	28	36	72	0	0	50	100
West Midlands	1	2	12	21	44	76	1	2	58	100
North West	1	2	13	21	47	77	0	0	61	100
Wales	0	0	6	26	17	74	0	0	23	100
Northern Ireland	0	0	0	0	15	88	2	12	17	100
Scotland	1	2	5	10	45	88	0	0	51	100
United Kingdom	**4**	**1**	**98**	**19**	**405**	**79**	**4**	**1**	**511**	**100**

Table 140 : Chemotherapy for HER-2 positive invasive cancers						
	Chemotherapy		No Chemotherapy		Total	
Region	No.	%	No.	%	No.	%
N East, Yorks & Humber	126	67	62	33	188	100
East Midlands	56	63	33	37	89	100
East of England	75	60	50	40	125	100
London	45	26	128	74	173	100
South East Coast	35	58	25	42	60	100
South Central	53	60	36	40	89	100
South West	81	48	89	52	170	100
West Midlands	85	77	25	23	110	100
North West	101	57	77	43	178	100
Wales	31	45	38	55	69	100
Northern Ireland	9	69	4	31	13	100
Scotland	75	52	68	48	143	100
United Kingdom	**772**	**55**	**635**	**45**	**1407**	**100**

Table 141 : HER-2 positive invasive cancers without chemotherapy							
		>20mm		Grade III		Nodal status positive	
Region	Total cases	No.	%	No.	%	No.	%
North, Yorks & Humber	62	8	13	22	35	6	10
East Midlands	33	2	6	9	27	1	3
East of England	50	10	20	15	30	3	6
London	128	22	17	15	12	13	10
South East Coast	25	2	8	8	32	1	4
South Central	36	6	17	10	28	3	8
South West	89	4	4	15	17	6	7
West Midlands	25	2	8	7	28	1	4
North West	77	11	14	19	25	8	10
Wales	38	5	13	16	42	2	5
Northern Ireland	4	0	0	3	75	0	0
Scotland	68	6	9	17	25	13	19
United Kingdom	**635**	**78**	**12**	**156**	**25**	**57**	**9**

Table 142 : NPI groups of HER-2 positive invasive cancers without chemotherapy											
		EPG		GPG		MPG1		MPG2		PPG	
Region	Total	No	%	No	%	No	%	No	%	No	%
North, Yorks & Humber	62	3	5	29	47	21	34	3	5	3	5
East Midlands	33	2	6	21	64	9	27	0	0	1	3
East of England	50	0	0	31	62	14	28	4	8	1	2
London	128	31	24	55	43	24	19	3	2	4	3
South East Coast	25	4	16	11	44	8	32	0	0	1	4
South Central	36	6	17	16	44	8	22	5	14	1	3
South West	89	24	27	37	42	18	20	3	3	0	0
West Midlands	25	2	8	15	60	5	20	2	8	0	0
North West	77	7	9	34	44	17	22	8	10	2	3
Wales	38	4	11	12	32	16	42	2	5	0	0
Northern Ireland	4	0	0	1	25	3	75	0	0	0	0
Scotland	68	4	6	33	49	19	28	5	7	3	4
United Kingdom	**635**	**87**	**14**	**295**	**46**	**162**	**26**	**35**	**6**	**16**	**3**

APPENDIX G: SURVIVAL ANALYSIS DATA TABLES (143-151)

DATA OBTAINED FROM THE SURVIVAL AUDIT OF SCREEN-DETECTED BREAST CANCERS FOR CANCERS DIAGNOSED BETWEEN 1 APRIL 1992 AND 31 MARCH 1993

Table 143 : Cause of death of eligible invasive cancers with death before 31/03/2010

	Breast cancer		Other cancer		Non-cancer		Unknown		Total deaths		
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**Total**
N East, Yorks & Humber	146	47	64	21	82	26	18	6	310	40	777
East Midlands	64	37	25	15	50	29	32	19	171	41	422
East of England	63	42	29	19	45	30	13	9	150	28	527
London	69	34	46	23	60	30	27	13	202	37	547
South East Coast	50	34	26	18	32	22	40	27	148	34	429
South Central	56	47	18	15	31	26	13	11	118	39	301
South West	77	39	31	16	49	25	40	20	197	37	531
West Midlands	96	63	14	9	38	25	5	3	153	33	466
North West	90	41	41	19	68	31	20	9	219	35	626
Wales	19	20	43	46	32	34	0	0	94	29	326
Northern Ireland	17	55	11	35	2	6	1	3	31	30	105
Scotland	105	51	40	20	58	28	1	0	204	40	516
United Kingdom	**852**	**43**	**388**	**19**	**547**	**27**	**210**	**11**	**1997**	**36**	**5573**

Table 144 : Cause of death of eligible micro-invasive cancers with death before 31/03/2010

	Breast cancer		Other cancer		Non-cancer		Unknown		Total deaths		
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**Total**
N East, Yorks & Humber	0	0	3	60	2	40	0	0	5	28	18
East Midlands	0	0	0	0	2	100	0	0	2	25	8
East of England	0	0	1	100	0	0	0	0	1	13	8
London	0	0	2	100	0	0	0	0	2	25	8
South East Coast	1	25	2	50	1	25	0	0	4	67	6
South Central	0	-	0	-	0	-	0	-	0	0	5
South West	3	60	0	0	2	40	0	0	5	23	22
West Midlands	0	-	0	-	0	-	0	-	0	0	4
North West	0	0	1	33	2	67	0	0	3	43	7
Wales	0	0	2	50	2	50	0	0	4	31	13
Northern Ireland	0	-	0	-	0	-	0	-	0	-	0
Scotland	1	50	0	0	1	50	0	0	2	25	8
United Kingdom	**5**	**18**	**11**	**39**	**12**	**43**	**0**	**0**	**28**	**26**	**107**

Table 145 : Cause of death of eligible non-invasive cancers with death before 31/03/2010

	Breast cancer		Other cancer		Non-cancer		Unknown		Total deaths		
Region	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**Total**
N East, Yorks & Humber	8	24	12	35	12	35	2	6	34	27	127
East Midlands	2	25	1	13	3	38	2	25	8	13	60
East of England	3	20	7	47	3	20	2	13	15	14	107
London	2	14	5	36	4	29	3	21	14	15	95
South East Coast	3	12	9	36	10	40	3	12	25	25	101
South Central	6	27	8	36	8	36	0	0	22	26	85
South West	6	43	2	14	6	43	0	0	14	16	87
West Midlands	3	23	5	38	5	38	0	0	13	20	64
North West	5	17	6	21	16	55	2	7	29	25	114
Wales	2	15	4	31	6	46	1	8	13	21	61
Northern Ireland	2	40	1	20	2	40	0	0	5	23	22
Scotland	9	27	14	42	10	30	0	0	33	32	102
United Kingdom	**51**	**23**	**74**	**33**	**85**	**38**	**15**	**7**	**225**	**22**	**1025**

Table 146 : Relative survival by region – primary invasive cancers only			
Region	**5 year**	**10 year**	**15 year**
N East, Yorks & Humber	90.8 (88.1,93.1)	85.7 (82.2,88.8)	78.6 (74.4,82.6)
East Midlands	92.4 (88.8,95.3)	85.7 (80.8,89.9)	77.8 (71.8,83.2)
East of England	96.6 (93.9,98.6)	92.4 (88.5,95.7)	90.4 (85.6,94.8)
London	93.2 (90.1,95.7)	87.2 (82.9,90.9)	82.8 (77.6,87.5)
South East Coast	93.2 (89.6,95.9)	87.0 (82.2,91.1)	84.8 (79.0,90.0)
South Central	92.7 (88.4,95.9)	83.7 (77.8,88.7)	80.1 (73.2,86.3)
South West	94.6 (91.6,97.0)	88.6 (84.4,92.2)	82.8 (77.6,87.5)
West Midlands	94.3 (91.1,96.8)	89.0 (84.7,92.8)	85.2 (79.8,90.0)
North West	95.5 (92.9,97.6)	90.5 (86.8,93.7)	83.4 (78.7,87.7)
Wales	97.0 (93.5,99.5)	95.2 (90.3,99.0)	90.5 (84.2,96.0)
Northern Ireland	95.5 (87.9,99.7)	93.2 (83.7,99.6)	91.5 (80.1,100.3)
Scotland	89.3 (85.8,92.2)	82.0 (77.5,86.0)	77.8 (72.5,82.7)
United Kingdom	**93.5 (92.6,94.3)**	**87.9 (86.7,89.1)**	**83.0 (81.5,84.5)**

Table 147 : Relative survival by age for primary invasive cancers			
Age	**5 year**	**10 year**	**15 year**
<50	89.9 (80.9,95.1)	81.2 (70.6,88.8)	72.8 (61.1,82.2)
50-52	93.0 (90.7,94.9)	88.3 (85.4,90.8)	82.7 (79.2,85.8)
53-55	92.0 (89.8,93.8)	85.6 (82.7,88.2)	81.5 (78.1,84.6)
56-58	92.8 (90.7,94.6)	85.8 (82.9,88.3)	80.9 (77.5,84.1)
59-61	95.0 (93.1,96.7)	89.0 (86.2,91.5)	84.3 (80.8,87.6)
62-64	92.6 (90.4,94.5)	88.6 (85.7,91.4)	82.6 (78.8,86.2)
65+	99.4 (95.4,102.4)	95.0 (88.8,100.4)	93.8 (85.3,101.7)
All invasive cancers	**93.5 (92.6,94.3)**	**87.9 (86.7,89.1)**	**83.0 (81.5,84.5)**

Table 148 : Relative survival by invasive tumor size for primary invasive cancers			
Size	**5 year**	**10 year**	**15 year**
<15mm	97.1 (96.0,98.1)	94.6 (93.0,96.1)	91.0 (88.9,93.0)
15-≤20mm	94.5 (92.8,95.9)	87.7 (85.3,89.9)	81.8 (78.8,84.6)
>20-≤35mm	86.5 (83.7,89.1)	74.4 (70.7,77.8)	68.3 (64.0,72.3)
>35-≤50mm	73.5 (64.6,80.8)	63.8 (53.9,72.5)	55.0 (44.5,64.9)
>50mm	67.2 (53.4,78.1)	55.1 (40.9,68.0)	48.2 (33.6,62.4)
Unknown	90.3 (85.8,93.9)	85.0 (79.2,89.8)	79.5 (72.6,85.6)
All invasive cancers	**93.5 (92.6,94.3)**	**87.9 (86.7,89.1)**	**83.0 (81.5,84.5)**

Table 149 : Relative survival by grade for primary invasive cancers			
Grade	**5 year**	**10 year**	**15 year**
I	99.1 (97.9,100.2)	97.0 (95.0,98.7)	93.5 (90.8,96.0)
II	93.4 (91.9,94.7)	87.4 (85.3,89.4)	81.6 (79.0,84.1)
III	81.9 (78.9,84.6)	71.3 (67.6,74.7)	65.3 (61.1,69.3)
Not assessable	94.9 (88.9,98.7)	94.6 (87.2,99.9)	96.5 (87.6,103.3)
Unknown	94.9 (92.8,96.7)	88.4 (85.3,91.2)	83.0 (79.1,86.6)
All invasive cancers	**93.5 (92.6,94.3)**	**87.9 (86.7,89.1)**	**83.0 (81.5,84.5)**

Table 150 : Relative survival by nodal status for primary invasive cancers			
Nodal status	**5 year**	**10 year**	**15 year**
Positive	81.1 (78.3,83.7)	70.1 (66.7,73.4)	62.8 (59.0,66.5)
Negative	97.0 (95.8,98.0)	93.5 (91.8,95.1)	90.1 (87.9,92.3)
Unknown	95.4 (94.0,96.5)	90.0 (88.0,91.8)	84.6 (82.1,86.9)
All invasive cancers	**93.5 (92.6,94.3)**	**87.9 (86.7,89.1)**	**83.0 (81.5,84.5)**

Table 151 : Relative survival by NPI prognostic group for primary invasive cancers			
NPI group	**5 year**	**10 year**	**15 year**
EPG	100.1 (98.0,101.5)	99.7 (96.7,102.2)	96.2 (91.9,99.9)
GPG	98.6 (96.8,100.0)	94.8 (92.0,97.3)	93.4 (89.8,96.7)
MPG1	92.4 (89.6,94.6)	86.4 (82.7,89.6)	80.6 (76.1,84.7)
MPG2	83.6 (78.7,87.7)	69.6 (63.5,75.1)	56.1 (49.5,62.5)
PPG	58.5 (51.3,65.1)	40.9 (33.8,48.0)	36.0 (28.8,43.5)
Unknown	94.6 (93.3,95.6)	89.3 (87.6,90.9)	84.2 (82.0,86.3)
All invasive cancers	**93.5 (92.6,94.3)**	**87.9 (86.7,89.1)**	**83.0 (81.5,84.5)**

Produced by the West Midlands NHS Breast and Cervical Screening Quality Assurance Reference Centre