Breast Screening Programme
Quality Statement for 2016-17

Published 31 January 2018

This document is designed to accompany the main publication document and includes contextual information, the methods used to compile the statistics and other background information readers may find useful.
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This is a National Statistics publication

National Statistics status means that official statistics meet the highest standards of trustworthiness, quality and public value.

All official statistics should comply with all aspects of the Code of Practice for Official Statistics. They are awarded National Statistics status following an assessment by the Authority’s regulatory arm. The Authority considers whether the statistics meet the highest standards of Code compliance, including the value they add to public decisions and debate.

It is NHS Digital’s responsibility to maintain compliance with the standards expected of National Statistics. If we become concerned about whether these statistics are still meeting the appropriate standards, we will discuss any concerns with the Authority promptly. National Statistics status can be removed at any point when the highest standards are not maintained, and reinstated when standards are restored.


ISBN: 978-1-78734-229-3

This report may be of interest to members of the public, policy officials and other stakeholders to make local and national comparisons and to monitor the quality and effectiveness of services.
Introduction

The publication ‘Breast Screening Programme, England’ has been in existence for a number of years and publications are available on the NHS Digital and Department of Health websites dating back to 1997-98. The report was originally published by the Department of Health Statistics Division. With the establishment of NHS Digital, responsibility for the publication transferred in 2005.

The Breast Screening Programme, England, Statistics for 2016-17 presents information about the NHS Breast Screening Programme (NHSBSP) in England in 2016-17 and includes data on women invited for breast screening, coverage, uptake of invitations, outcomes of screening and cancers detected.

The statistics in this report are used to inform policy and to monitor the quality and effectiveness of screening services.

Where appendices are referred to in this Quality Statement, they can be found in the separate Appendices document, available through the following link:

http://digital.nhs.uk/pubs/brstscreen1617

1.1 Data Sources

The statistics are derived from information that is routinely collected by NHS Cancer Screening Programmes for the operation of the screening programme, including for quality assurance and performance management purposes.

Information on the NHS Breast Screening Programme is supplied from the following NHS Digital central return data sets:

- KC62 – Information on invitations, uptake and outcomes from all 80 breast screening units across England.
- KC63 – Information on the population coverage of the programme from all 152 Upper Tier Local Authorities.

Data have been provided annually since 1988-89 through the KC62 and since 1994-95 through the KC63. The data from the KC62 and KC63 are received in aggregate form each year by NHS Digital.

A number of changes were made to the KC62 and KC63 central return data sets (effective from 1 October 2013) to take account of recent changes in policy that have been implemented within the NHS Breast Screening Programme. These policy changes relate to the extension of the screening age range and the screening of women who are at higher risk (see Appendix A in the separate appendices document). The KC63 return was also amended to enable the...

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1 Since 2004-05 this bulletin has been published by NHS Digital. Previous editions published by the Department of Health, can be found at:
collection of data at Upper Tier LA level following changes in the NHS structure (see section 1.7 on the ‘Impact of NHS Re-organisation’ for more information).

The NHS Data Model and Dictionary Service contain more information on the KC62 and KC63 central return data sets including guidance on content, completion and definitions. Links to the returns are given below:

**KC62**

**KC63**

Further information on the underlying sources of information can be found in NHS Digital’s List of Administrative Sources, available through the following link:


The KC62 and KC63 datasets are returned at the end of each financial year. The KC62 data comes to NHS Digital via a bespoke NHS Digital data collection system to which all BSU’s submit. A number of at-source validations are carried out before submissions can be finalised. The KC63 data comes from NHS Digital’s NHAIS² (Exeter) system from which aggregate LA level reports are produced.

The Screening Quality Assurance Services (SQASs) are responsible for quality assuring the screening programme including the KC62 and KC63 data sets before final submission. Further validation and quality assurance checks are carried out at NHS Digital as part of the publication process.

Regional QA Managers at the SQASs are asked to check some of the tables produced for publication by NHS Digital as part of the validation process.

For more information on this process, please see Annex A which is a copy of a briefing paper compiled by Public Health England (PHE) which details the collection and assurance of breast screening data.

### 1.2 Methods Used to Compile the Statistics

NHS Digital validates and analyses the KC62 and KC63 data using automated processes developed in SQL³ and SAS⁴ as well as spreadsheets (Microsoft Excel).

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² National Health Application & Infrastructure Services (NHAIS).
³ Structured Query Language (SQL) is a programming language designed for managing data in relational database management systems.
⁴ Statistical Analysis System (SAS) is an integrated system of software products which enables functions such as data management, statistical analysis and quality improvement.
Most of the figures presented in the report and data tables are in the form of simple counts, percentages (rounded to one decimal place) or rates (e.g. number of women with cancer detected per 1,000 women screened). Due to rounding, the sum of percentages in some tables will not equal 100%.

Definitions and formulae detailing how the statistics used in the report are calculated are given in Appendix B in the separate Appendices document.

1.3 Relevance
Appendix E of the separate appendices document gives details of who uses the statistics in this publication and what they use them for.

1.4 Accuracy and Reliability
These are established collections based on complete data, i.e. not a sample.

Appendix G contains further information on data validation and data quality. All validation queries that were raised through NHS Digital’s data validation processes were resolved satisfactorily.

Note on Selected Diagnostic and Outcome Statistics
Data in Tables 14 and 15 in the data tables present diagnostic and outcome statistics for each local screening programme. More information about the statistics in these tables is given in Appendix B – Definitions, in the separate Appendices document.

The breast screening units vary enormously in size, with the smallest screening just over 7,000 women aged 50-70 in 2016-17 and the largest over 54,000. Prevalent screening, which is shown in Table 5 of the data tables, accounts for only 11.3% of women aged 50-70 screened. Rates for smaller units, particularly for prevalent screening, are therefore often based on a very small number of cases.

The figures in this report represent all women screened in the reporting period, but uncertainty may still arise as a result of natural or random variation, with statistics involving small numbers being most susceptible. Where statistics in Tables 14 and 15 have been highlighted with an asterisk, caution should be exercised when using them for comparative purposes, either from year to year, or across reporting units. The asterisks have been applied when the number of occurrences used to make the calculation is less than 25 (e.g. where the number of small cancers used in the calculation of a small cancer detection rate is less than 25). Occurrences of less than 25 approximate to a Relative Standard Error (RSE) value of more than 20%. The RSE is the standard error expressed as a

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5 Please see Table 14 in the data tables
6 Prevalent screening refers to women being screened for the first time within the breast screening programme. In this statistical bulletin, prevalent screening figures relate to first invitations for routine screening and routine invitations to previous non-attendees.
7 An RSE of 20% or more is often used by the Office for National Statistics (ONS) to advise where figures should be treated with caution.
percentage of the measure itself and is used to identify the level of reliability in
statistics when the potential for random variation is taken into account. The
higher the RSE, the less confidence there is in the reliability of the statistic.

**False positive and false negative screening results**

Users of these statistics should be aware that screening tests are not 100%
accurate. In any screening programme there may be some false positive results
and some false negative results.

Some people with a positive screening test result do not actually have the
condition being screened for. These people are said to have a ‘false-positive’
result. Some people with a negative screening test do actually have the condition
being screened for. These people are said to have a ‘false negative’ result.

**False Positives**

In breast screening, false positives refer to women whose mammograms appear
abnormal but who are found not to have cancer after further investigation. All
women whose mammograms appear abnormal are offered further tests until a
definitive diagnosis is reached. These diagnostic tests are a routine part of the
screening programme.

In 2016-17, 4.1% (89,104)\(^8\) of women aged 45 and over screened had an
abnormal result and were therefore referred for assessment. 79.3% (70,702)\(^9\) of
these women were found not to have breast cancer. Therefore, the percentage
of all women screened who were found not to have had breast cancer following
an abnormal mammogram was 3.2%\(^10\).

**False Negatives**

In breast screening, false negatives are identified when a woman is diagnosed
with cancer and a review of her previous screening results shows that an
abnormality was present which, in retrospect, may have been the cancer.

Cancers can be diagnosed at any time following a screening episode with a
negative outcome. Cancers diagnosed between scheduled screening episodes
are known as interval cancers. These can be divided into those that were false
negative, those that are new (i.e. those that have developed since the last
screening episode) and those that are not visible on mammography film.

There is no generally accepted or expected level of false negatives in the NHS
Breast Screening Programme (NHSBSP), although there are targets to minimise
interval cancer rates which will include false negative cancers. Such

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\(^8\) Please see Table 7a in the data tables
\(^9\) Please see Table 1 in the data tables
\(^10\) Calculated from the KC62 data set as: (Total number of women referred for assessment – Total number
where outcome of assessment is cancer) / Total number of women screened * 100
measurements require long term follow up and are beyond the scope of this bulletin.

An NHSBSP report on interval cancers, which can include newly-developed cancers and those not detectable using mammography (known as occult cancers) as well as those associated with a false negative screening test, is available at:

http://www.cancerscreening.nhs.uk/breastscreen/publications/or1203.html

The Independent Breast Screening Review\textsuperscript{11} published in October 2012 contains more information on false positives and false negatives:


1.5 Timeliness and Punctuality

The breast screening data are made available annually as soon as possible after they have been compiled and validated. The time delay in publishing the statistics is because the data returns are produced six months after the year end (sufficient time to allow most screening episodes to be completed and outcomes to be recorded).

The statistics published in this report reflect data submitted as of 10 November 2017. At the time of publication (31 January 2018), no amendments to these data had been received.

A copy of last year’s report can be found at:
http://digital.nhs.uk/pubs/brstscreen1516

1.6 Accessibility and Clarity

The data fields are published in the Data Tables which are available as Excel files and as CSV files and are accessible through the NHS Digital breast screening web pages\textsuperscript{12}.

We have also made an interactive data dashboard available as part of the data resources for this publication. The dashboard has been developed in software called Microsoft Power BI and is designed to make data more meaningful by allowing local, regional and national comparisons over time. This includes coverage statistics for women aged 53 to 70 years presented by Upper Tier Local Authority (LA), and uptake statistics for women aged 50-70 years presented by Breast Screening Unit (BSU). For further information contact: enquiries@nhsdigital.nhs.uk or telephone 0300 303 5678.


\textsuperscript{12} https://digital.nhs.uk/search?q=breast+screening+programme&s=s
1.7 Coherence and Comparability

NHS Digital maintains awareness of changes that may impact on the data through regular meetings/communication with NHS Cancer Screening Programmes and the Department of Health.

Time series

For key statistics, the report presents a 10-year time series where possible. For other statistics, figures for the current year are compared with the previous year, or occasionally with figures from 5 years ago.

The changes in policy described in Appendix A on Breast Screening Policy need to be taken into account when considering trend data.

Local and Regional Comparisons

The statistics are presented at a national, regional and local level. Local level statistics are presented by Upper Tier Local Authority (LA), region (see ‘Impact of NHS Re-organisation’ below) and breast screening unit (BSU).

At a regional level, LA (KC63) data are aggregated up to eight regions. Data from BSUs (KC62) are aggregated to the NHS Cancer Screening Programme’s eight reporting regions with sub-regional breakdowns for North East, Yorkshire and the Humber (showing North East and Yorkshire and the Humber) and the South (showing the South East and South West). Occasionally, BSU’s and LA’s will move between reporting regions, these are reported under the relevant data table(s).

Impact of NHS Re-organisation

Prior to 1 April 2013 all NHS planning and delivery was done by the Department of Health, Strategic Health Authorities (SHAs) and Primary Care Organisations (PCOs). From April 2013, PCOs and SHAs ceased to exist and NHS England has taken on many of the functions of the former PCOs with regard to the commissioning of primary care health services, including breast screening. From April 2013, Local Authorities took on new responsibilities for public health.

The statistics in this report are therefore presented by Upper Tier LA. LA data was published in this report for the first time in 2012-13 as experimental statistics. Local Authority coverage statistics for previous years are published as part of the Public Health Outcomes Framework (PHOF) and are available at:

http://www.phoutcomes.info/

Although the data source is the same, LA PHOF figures differ slightly to LA figures from the KC63, with slightly more women both eligible and screened identified in the KC63 than in the PHOF. Coverage at a national level is not affected and only a very small number of LAs show a difference between the two datasets.

The two datasets are run at different points, the PHOF figures being automatically extracted and the KC63 being submitted following QA checks by the local NHAIS screening manager and QA Reference Centre.
There are a number of possible reasons for the differences in counts of eligible population. The two different run dates could allow for remedial actions taken by screening manager or more common actions, such as delayed registrations/deductions, amendments to registration/deduction dates, changes to registered postcodes, corrections to date of birth and corrections to registered gender.

Updates to Local Authority mapping files might also assign women to LAs that were previously 'unknown'. It is also possible that a delayed transfer of screening history when women move area, or a delayed transfer of screening results/updates received from screening units will affect the number reported for women screened.

Comparisons with other countries

Some of the statistics in this report can be compared with other UK countries - see sections 2.1.5, 2.4.5 and 2.6.4 of the main report.

1.8 Performance Cost and Respondent Burden

The publication is based on information that has been routinely collected by the NHS Breast Screening Programme for a number of years as part of the performance management of the breast screening organisations.

All data collections used in this publication are subject to the Burden Advice and Assessment Service (BAAS) procedure (previously known as Review of Central Returns (ROCR)) and licensed by BAAS. This is to ensure that data collections do not duplicate other collections, minimise the cost to all parties and have a specific use for the data collected. Information on BAAS can be found at: http://content.digital.nhs.uk/baas

1.9 Confidentiality, Transparency and Security

The standard NHS Digital security and confidentiality policies have been applied in the production of these statistics. An annual risk assessment is undertaken prior to publication which addresses any potential issues around disclosure.

No disclosure issues were identified in relation to this publication and no disclosure controls have been applied.

The eligible populations in two LAs are relatively small and in these instances their data have been combined and reported under other LAs. Data for Isles of Scilly are reported under Cornwall and City of London are reported under Hackney. Statistics in this report are therefore presented by 150 Upper Tier Local Authorities, two of which include another small LA.

1.10 Data Revisions

Where any data are re-submitted post-publication, NHS Digital will assess whether the resubmitted data has a significant impact on England-level data. Where this is the case, the affected Excel tables will be re-issued. Any other related documents, such as interactive reports, will also be updated. Where the
impact to England level data is not significant, footnotes will be made to the affected Excel tables but not to the PDF report.

1.11 Exclusions

Data from the high risk screening programme has been published in this bulletin since 2013-14. Their status has been designated as experimental statistics due to the lack of nationwide implementation of the programme and limitations of the computer system to provide complete statistics. In 2016-17, the programme has been delivered to all geographies and the software is being adapted to allow robust monitoring of this small cohort of women. Comprehensive data will be available in our annual report post publication, following the required changes.
Annex A – Collection and Assurance

Briefing paper

How Public Health England (PHE) collects and assures the quality of breast screening programme data.

This briefing paper is designed for screening professionals, stakeholders and the public to explain the processes of data collection of screening outputs from the NHSBSP. It outlines the electronic methods of collection and the verification of data by staff within the programme and analysts within PHE.

The National Breast Screening Computer System (NBSS)

PHE screening has developed the computer system, NBSS, through which the breast screening programme is administered. The contents of the system meets both the operational need of the screening programme while also collecting the data items identified as being required to monitor the performance of the programme which is undertaken by the Screening Quality Assurance Service (SQAS within PHE). Agreed data items from the system are reported to support the QA function and also as part of the return of the national Korner statistics (KC62) to NHS Digital.

The role of services in collecting these data which are collected on NBSS is clearly set out in the national specification (NHS England) for the provision of breast screening. This is the vehicle through which breast screening is commissioned by NHS England. An extract of the most relevant contract requirements is included in the table below. This also illustrates the purpose through which PHE has access to these data.

PHE and NHS England have developed a Memorandum of Understanding (MOU) to describe the working relationship between the two organisations for the purpose of data sharing.
Audit and Quality Assurance

1.11. The provider and the quality assurance team within Public Health England should work collaboratively to:

• monitor, collect, and report statistical data and other relevant information to relevant bodies, use it to promote continuous improvement in service performance and outcomes, give formal feedback to NHS England and the population served by the programme, and provide key information and models of good practice/innovation/achievement to those working in the area of breast screening.

The provider should:

• ensure that complete and accurate outcomes and results for all women are accurately entered onto the National Breast Screening System (NBSS) to allow national reports to be uploaded at prescribed intervals to the Breast Screening Information System (BSIS) for further analysis and audit by the SQAS.

Information Technology (IT)  1.12.

The provider should:

• use the programme’s IT systems (NBSS) and Breast Screening Select (BSSelect)) to manage women through the screening process, and to capture key screening data/outcomes promptly and accurately, supporting local and national SQAS, cancer registration processes and programme evaluation.

Programme Coordination

The provider will:

• be responsible for ensuring that the programme it delivers is coordinated. Where collaboration is necessary, each part of the programme should interface seamlessly with others, particularly in the areas of timeliness and data sharing. This will ensure that the aims and objectives of the NHSBSP are met.

Testing (performance of tests by individuals)

Screening units enter routine data onto the National Breast Screening Information System (NBSS) in a timely manner and in the required format, as specified in NHSBSP manuals and guidance (see Appendix 4).

Data collection and monitoring

3.30. The Quality Assurance service, in liaison with the providers, will provide validated data for the following purposes:

• provide routine data to NHS England, Public Health England and the Health and Social Care Information Centre in a timely manner to monitor performance
• contribute to national data collection exercises where required for national analysis
• provide annual data measuring performance against both standards and the Key Performance Indicators to monitor performance and measure trends

Data reporting

3.31. The Quality Assurance service, in liaison with the providers, will:

• report data to NHS England and Public Health England on a regular basis as documented in Appendices 1 and 2.
participate in data reporting for consolidated annual reports KC62 (activity) currently published by NHS Digital for the purpose of service comparison.

Service Specification No 24, NHS England & PHE
How information is recorded on NBSS

The NBSS system works on an episode basis. Every woman who is invited for screening has an episode opened. This episode should be populated as the women moves through the pathway. At the end of the pathway the woman’s episode is closed using the appropriate end code. Each year as part of the preparation for the KC62 submission one of the system checks is for open episodes. Where these occur can be due to factors such as the woman has chosen to be screened or assessed elsewhere. The system requires that the missing information is sourced for these cases and added to the system so that a complete episode of that woman’s screening is recorded (NHSBSP, 2011). This applies should a woman choose to go to another NHS provider or to the private sector. The SQAS are informed of all open episodes and works with services to get these appropriately closed. As a result of this approach the dataset contains data on all women who were invited and then more detailed information on those women who have been screened therefore removing potential bias from the data set. Services are also aware of the requirement to source data on those women who choose to be treated elsewhere. This is generally achieved for those women who are treated within England. Gaps may occur if a woman goes abroad for treatment such as women who return to their native countries but the instances of this is very small relative to the total size of the dataset (2.16 million women screened in 2015/16).

Reporting outcomes

Each element of the screening programme is underpinned by professional guidance. These documents include, where required, the specific data recording on NBSS that should be undertaken by the relevant professionals. Additionally, these documents set out the quality standards through which services will be monitored using the data recorded. As part of a recent review of how we QA national screening programmes a standardised list of data items were agreed together with associated frequency, cohort size and levels of analysis.

The routine data collection from NBSS is undertaken either through standardised reports designed for this specific purpose to produce:

- National Korner Returns
- Surgical audit data to include the aspects of the surgical management of benign, invasive and non-invasive breast disease. The neo and adjuvant treatment of cases and time specific survival
- Audit of assessment. Assessment to include recall rates, no of visits, biopsy rates, localisation type, non-operative diagnosis rates, axillary assessment and previously assessed cancers
- Pathology audit data to include performance in the assessment of cytology, biopsy and final histological samples
- Film reader audit data assurance to include Positive Predictive Value of recall, discrepant cancer rates, interval cancers and cancer detection rates
In addition, NBSS runs crystal reports which are bespoke reports designed to measure key performance indicators (KPI) for the programme relating largely to throughput, acceptance and waiting times. The schedule of data extraction is agreed in advance and the reports are run by the individual services and submitted directly to SQAS or submitted via the Breast Screening Information System (BSIS) for validation. BSIS will provide immediate feedback to the data uploader on any anomalies and will direct the user to where amendments are required. Each of these extracts are scrutinised for data anomalies, and the KC62 in particular lists exceptions and highlights to direct users to potential issues for resolution.

**Ensuring data quality**

The quality of the data is of paramount importance and through this ongoing working relationship between QA and service providers over an excess of 20 years there are robust processes in place to ensure the quality of the data. The source data on NBSS is entered by NHS staff employed and trained to work in the breast screening programme. The programme has funded a NBSS training school through which services can access specific training courses. Additionally, the NBSS developers, Hitachi, provide training resources and a helpdesk function which also contributes to the accuracy of the data entry and by extension the quality of the data retained. As part of the QA breast screening QA visits are held at a frequency not exceeding every 5 years. As part of this process training records are discussed and the visiting peer audits a specified number of cases and where necessary makes recommendations to improve the data quality. Recommendations are followed up via the programme boards with commissioners. Visits are also an opportunity to identify good practice and this is shared across the programme.

The SQAS also supports services through the hosting of professional network meetings. At these meetings, which have been held for many years, service representatives are kept informed of developments and can share any issues or challenges. These forums support services in keeping up to date on system developments and requirements. Additionally, at these meeting users are encouraged to identify and submit system change requests that will be considered at the NBSS programme board.

The NBSS programme board meets 6 monthly and at this forum Hitachi (NBSS developer), the programme, QA, training school and representatives from the professional areas of administration, radiology and pathology attend. Developments to the system are discussed and prioritised and feedback on help desk enquiries are reviewed.

Data are either submitted directly to SQAS for review and validation or are submitted via the Breast Screening Information System (BSIS) directly from screening services. Whether manually or electronic all data are submitted to comprehensive data quality checks individually designed for each return. To give an example of the level of scrutiny the following are the steps in place for the KC62 returns:
• Staff are trained in data entry and encourage to maintain data entry throughout the year
• Interim KC62s are run at pre-set time points and submitted to commissioners. Reviews are undertaken by SQAS staff and any particular issues re data integrity are flagged
• NHS Digital writes to the services to confirm the date period during which the KC62 must be run
• The standard report meets the dataset defined in the NHS Data dictionary (NHS, 2017)
• The KC62 functional specification details the rules which governs how the return is populated (NBSS Development, Parys Snowden Systems Ltd, 2002)
• BSIS includes data warnings that the service must respond to while uploading the data (PHE, 2016)
• Upload process is monitored via BSIS upload reports tables
• SQAS staff are available to respond to any queries from services
• Data are submitted to NHS Digital for further data validation
• Services proceed to uploading the annual NHSBSP and ABS audit of screen-detected breast cancers which will further audit the data integrity of the returns and where necessary trigger a resubmission of the KC62 return
• SQAS audit staff will interrogate and analyse the KC62 returns, any significant variation in practice will be followed up with services to get assurance that the data are an accurate reflection of performance

The nature of all audits within the NHSBSP are designed to rigorously quality assure the programme, provide information on service delivery and to inform further developments on all aspects of programme delivery.

References


NHSBSP. (2011). INTERIM Quality assurance guidelines for administration and IT. NHS Cancer Screening Programmes.

Information and technology for better health and care

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Published by NHS Digital, part of the Government Statistical Service

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