



Public Health
England



NHS Breast Screening Programme

Guidance on collecting, monitoring and reporting technical recall and repeat examinations

December 2017

Public Health England leads the NHS Screening Programmes

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About PHE Screening

Screening identifies apparently healthy people who may be at increased risk of a disease or condition, enabling earlier treatment or better informed decisions. National population screening programmes are implemented in the NHS on the advice of the UK National Screening Committee (UK NSC), which makes independent, evidence-based recommendations to ministers in the 4 UK countries. The Screening Quality Assurance Service ensures programmes are safe and effective by checking that national standards are met. PHE leads the NHS Screening Programmes and hosts the UK NSC secretariat.

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Background

The guidelines have been produced by a working group of the NHS Breast Screening Programme (NHSBSP) Clinical and Professional Group for Radiography. They update and replace Collecting, monitoring and reporting repeat examinations (Good Practice Guide No 4, Version 2, November 2006).

Introduction

Mammographers are responsible for producing breast images of the highest diagnostic quality to maximise cancer detection. The aim is for all glandular tissue to be included on the mammogram and for the tissue to be presented, without any obstructions, to its clear visualisation. To achieve this a woman may, in some circumstances, require a repeat examination or recall to a second appointment for technical reasons.

The term mammographer includes:

- registered radiographers, who are regulated by the Health and Care Professions Council
- mammography assistant practitioners (APs)

Purpose of the guidelines

These guidelines clarify and standardise the recording of data on repeat mammographic examinations in order to monitor performance against the national standard.

Definitions

Repeat examinations can be divided into two categories: technical repeats and technical recalls.

Technical repeat (TP) is when the mammographer makes the decision to repeat the same projection(s) during the examination immediately after image acquisition. It should have been possible to produce a diagnostic image in that exposure but an additional exposure(s) is now required to correct and complete the examination. For example, this may be due to image blur or a sub-optimally positioned breast.

Technical recall (TC) is when the film reader makes the decision to recall the woman when screening images are reviewed (usually at the time of reporting). The woman is asked to re-attend for the same projection(s) to be repeated because the current screening examination is technically inadequate for reporting.

The abbreviations recorded on the national breast screening computer system (NBSS), are used in this document (TC and TP). The term repeat examinations (TR) refers to the total number of technical repeats (TPs) and technical recalls (TCs).

Taking repeat images (TPs)

Psychologically and radiologically, this is an avoidable repeat exposure/dose and a negative physical experience for the client. All repeat exposures must be recorded on NBSS with a relevant reason code. Local policy will dictate where these exposures are held on the picture archiving computer (PACS) system.

A crystal report (Over 2 images.rpt) can be run where more than 4 images are taken, to ensure the accurate reporting of TP and extra views. This allows individual monitoring of performance to ensure that mammographers are recording examinations accurately and it allows audit of the reason for the repeat. This report should be run monthly and quarterly to co-incide with production of the TR monitoring data.

If the wrong breast is imaged at a technical recall or assessment appointment, this should not be reported as an extra view. It should be reported as a screening incident under ionising radiation medical exposure regulations (IRMER).

Taking extra images

It should be noted that TPs are distinguished from additional 'extra' images. Extra images are those taken when:

- it is impossible to image the breast optimally with the standard views due to such things as the client's physical characteristics (for example mis-shaped breasts, 'mis-placed' nipples, a prominent sternum or a breast that is too large for the detector)
- the detector is a fixed size which cannot be increased so more images are required to adequately image the client's breast to enable diagnosis of breast lesions
- it is impossible to improve the position of the breast or the woman, smooth out skin folds, change the angle or change the exposure factors to obtain a better image

Technical recalls (TCs)

Standard TCs:

Usually, TCs are images which are not of diagnostic quality and a second visit for mammography is necessary. This can be performed at a mobile or static site.

Standard TCs where assessment may possibly be required

Some images for a woman may be of diagnostic quality although one or more may require technical recall to obtain a full set of diagnostic quality images. In circumstances where assessment may possibly be required, the woman should be invited by the service to a static site during an assessment clinic for further imaging. Repeat images can then be reviewed and the decision made for further assessment if required. The woman should receive a letter from the service inviting her to a technical recall appointment.

Standard TCs where assessment is required

Occasionally, image readers will identify an abnormality from an incomplete set of diagnostic quality images. The outcome of TC and then recall to assessment must be recorded separately on NBSS with an outcome of recall to assessment. The woman will be sent a letter to attend screening assessment. The technical repeat images must be taken first at the assessment appointment prior to further investigations.

If images are repeated as part of the screening assessment process, these should be recorded on NBSS but are not included in the technical recall statistics. The TC standards relate to technical recall appointments in routine screening mammography only. Each breast screening unit should have clear protocols in place for collecting and monitoring the repeat images carried out in assessment clinics.

Women who fail to attend technical recall appointments

If a woman fails to attend a technical recall appointment she should be sent a second timed invitation. If she fails to attend a second time, the unit director must write to the woman and to the woman's GP. The letter should explain the importance of attending for a technically adequate screening examination and advise that a full image report (screening result), cannot be given without this. A woman may decide not to attend for repeat imaging despite having all the relevant information. This needs to be recorded on the client record as Opted Out (OT) as she has not had a full diagnostic screen. Such women will be identified on the annual Department of Health KC62 returns as 'lost to follow up'. Each breast screening unit should have a protocol in place for when women fail to attend for their TR appointment outlining the process detailed above.

Partial mammography

If a full diagnostic mammogram for a client is impossible, this is defined as a 'partial mammogram'. This could be due to withdrawn consent, or because mammography is not physically possible (for example due to a pacemaker, or physical immobility). If the mammographer can screen at least half of one breast, in any view, the examination can be clinically justified. A mammogram must not be categorised as a 'partial mammogram' if additional, repeat or recall views would complete the mammogram.

Partial mammography should be recorded on the NBSS daybook and via the radiographer direct entry (SMDE) section following local work instructions. The alert created in doing so will flag the partial mammography status to the film reader during reporting.

Appropriate information which states the limitations of the examination must be provided to women at the time of screening. The partial mammography leaflet can be printed locally and is available via the NBSS intranet.

Mammographer responsibilities

Mammographers must achieve optimum image quality with as low a radiation dose as practicable. There are specific responsibilities under the [IRMER Regulations 2000](#) (IR(ME)R2000) for justifying and thereby minimising repeat mammographic examinations. These should be clearly set out in local work instructions. The appropriate circumstances for the repeat must be specified in local instructions and always applied.

Mammographers working in the NHS breast screening programme are responsible for accurately recording, collecting and monitoring repeat examination data on NBSS. The data is analysed at service, regional and national level by the Screening Quality Assurance Service (SQAS) and the national radiography Clinical and Professional Group (CPG).

Mammographers are responsible for regularly auditing their own number of repeat examinations and reviewing their performance against peers, unit average and national standards of performance.

Assistant practitioners and mammography trainees

Only a qualified mammographer acting as an IRMER practitioner can make the decision that a repeat image/examination is required. APs and trainee mammographers should seek guidance from their supervising radiographer to confirm whether a repeat examination is necessary.

Recording TPs and TCs on NBSS

Recording repeat examinations

The following data must be recorded on NBSS to monitor repeat examination rates:

- name and screening number of the woman
- code of the mammography practitioner performing the examination
- number of repeated images
- repeat reason code

Inputting technical repeats

Technical repeats are entered on NBSS using the daybook or NBSS live, following local work instructions. Figures 1 to 5 show where repeats and extra views are entered on NBSS.

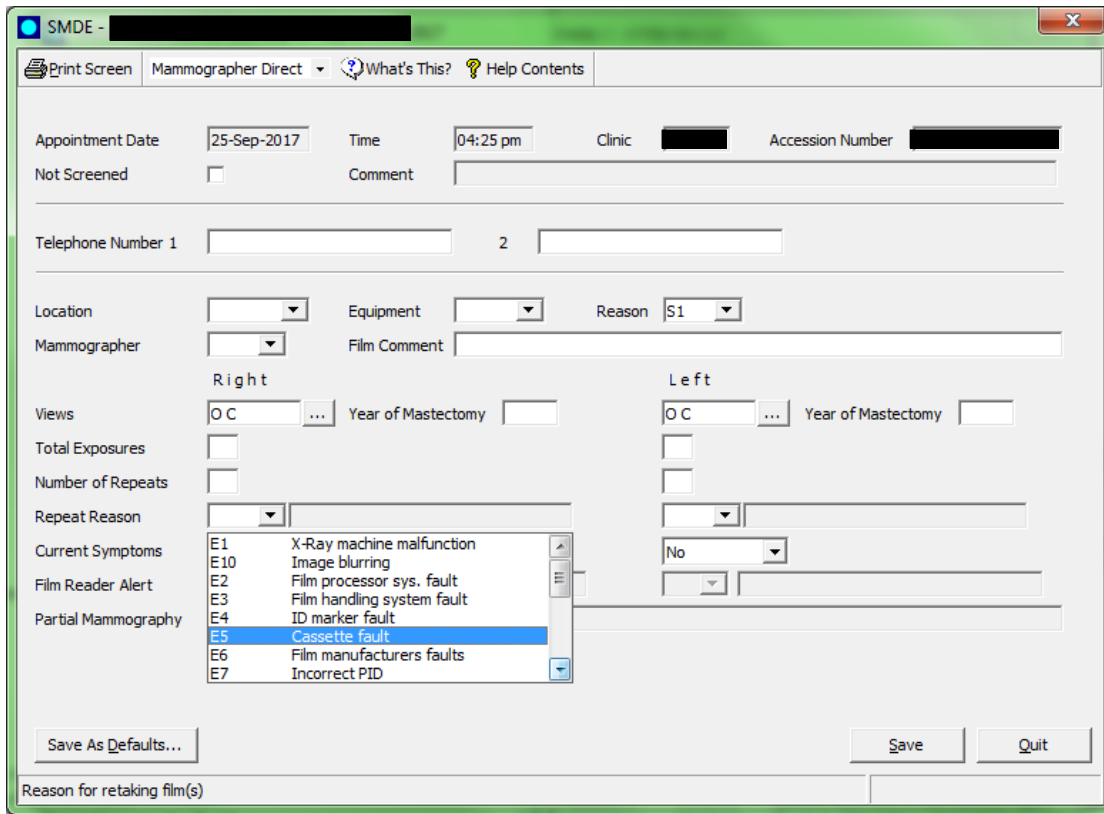


Figure 1: Screenshot showing the entry screen for inputting repeats on NBSS

The categories of repeat examinations and associated reason codes are shown in Table 1.

Category	Reason Code	Reason
Mammographer	R1A	Inadequate pos'ning-radiographer
	R2	Inadequate compression
	R3	Incorrect exposure
	R5	Artefacts obscuring image
Equipment	E1	X-ray machine malfunction
	E10	Image blurring
	E2	Film processor system fault
	E7	Incorrect PID
	E8	Loss of images
	E9	Detector fault
	E4	ID marker fault
Client	R1B	Inadequate pos'ning – client

Table 1: Categories of reasons for technical recalls on NBSS

Inputting technical recall

The decision to recall a client for technical reasons is usually made by the image reader at the time of reporting on NBSS. The following screen shots show where technical recalls are recorded on the computer system.

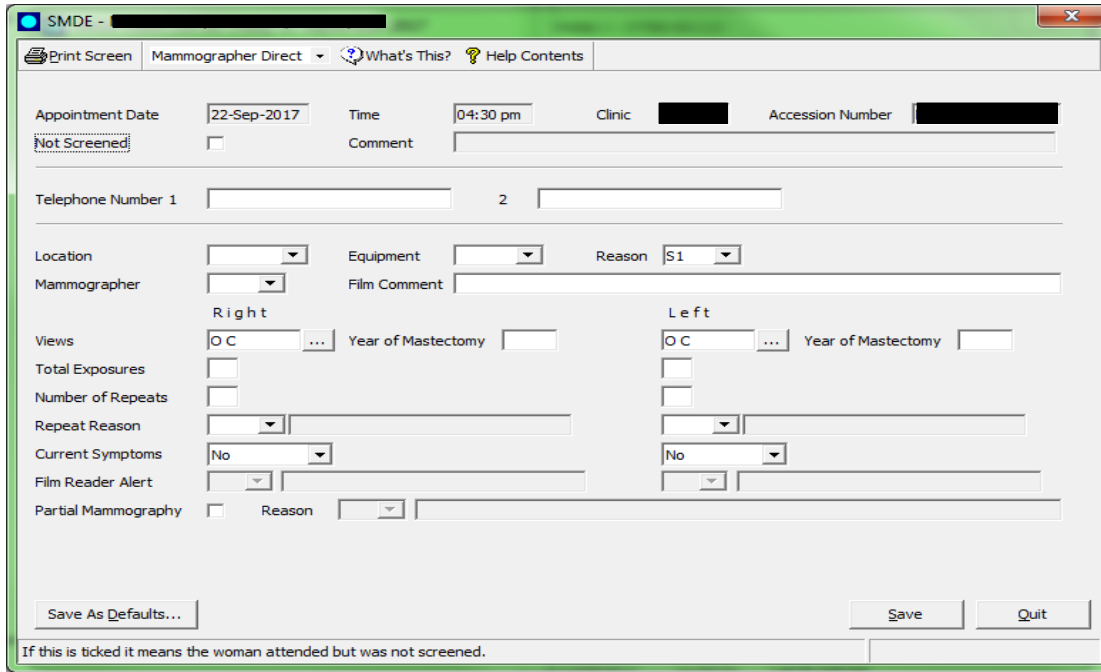


Figure 2: Screenshot showing the entry screen for radiographers

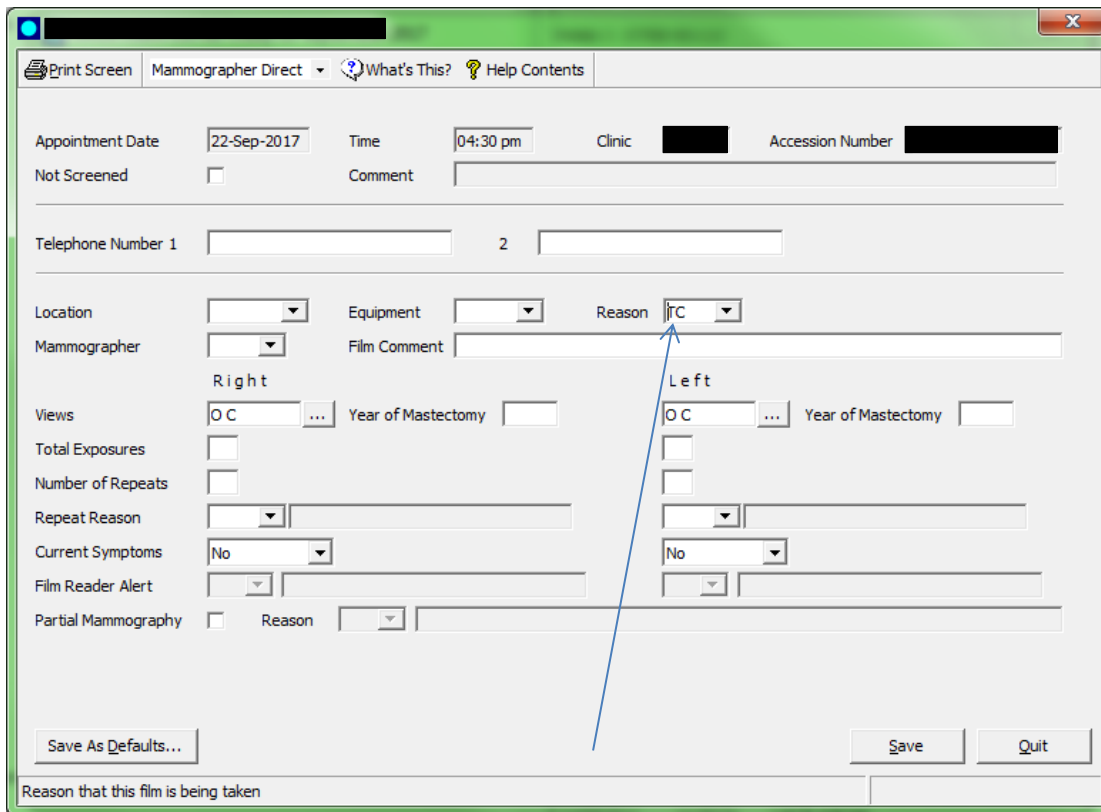


Figure 3: Screenshot showing the TR screen on the 2nd scr-film record

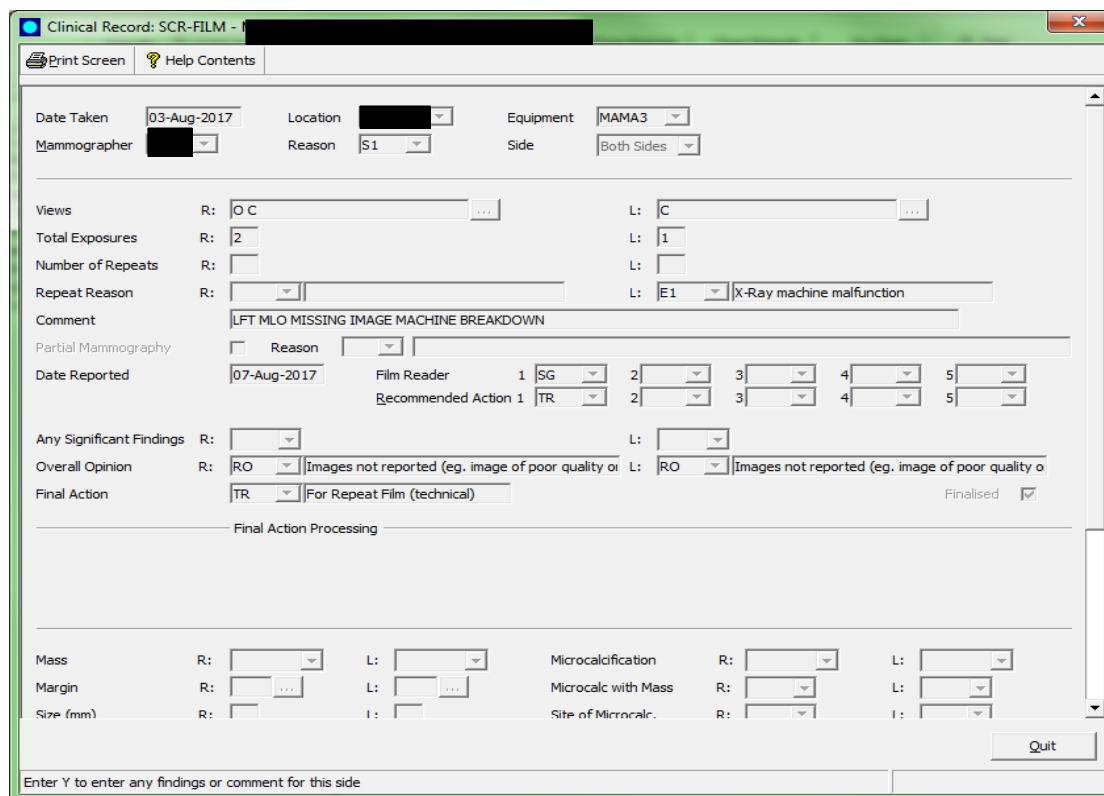


Figure 4: Screenshot showing the technical recall screen following image reading

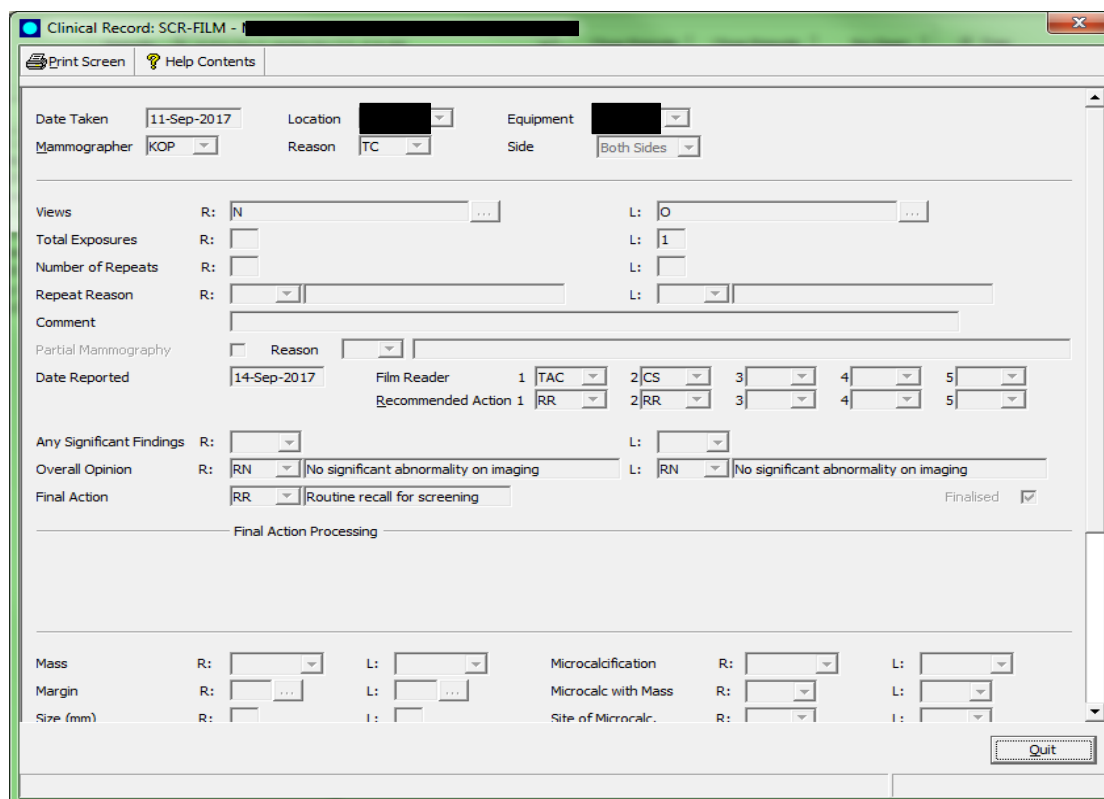


Figure 5: Screenshot showing second attendance with TR view required now taken

To record a technical recall:

- only one reader is required to enter this outcome on NBSS
- a technical recall outcome should be recorded for each side of the breast (whether one or both sides are affected)
- the 'Save & Unload' function should be used in order that the woman can be removed from the batch after only one read and recalled for her TC
- local protocols should be written to manage this within the 'Right Results' process

Reporting and monitoring TRs

NHSBSP standards

The **consolidated standards** contain indicators relating to mammographic performance. They provide acceptable and achievable targets for repeat examination rates.

Using crystal reports to measure the standards

A standard crystal report for monitoring technical recalls and technical repeats against the national standard is available on the **NBSS website** in the crystal reports section. The NBSS website is password protected and for NHS staff only. The reference for the relevant crystal report is SR011. Other crystal reports with bespoke data items are available for local use.

Local reporting and monitoring

Each breast screening unit should have work instructions for the local process for collecting, recording, monitoring and reporting TRs. It is important that mammographers and administration and clerical staff are fully informed about the need for, and the process of collecting this data. It is the responsibility of the internal radiography management team to ensure that all staff have appropriate training and updates. The superintendent radiographer/programme manager should analyse the following information (which should be based on the number of women rather than on the number of images):

- the number and percentage of TRs

- number and percentage of TCs by mammographer and by reason
- number and percentage of TPs by mammographer and by reason
- TR rates which are <1% at service level (as repeat rates may not be recorded adequately on NBSS)

In relation to TCs/TPs, each breast screening service should ensure that:

- there is good communication between image readers and mammographers
- training is provided to identify what constitutes the need for a technical recall (TC) or a technical repeat (TP)
- all TC/TP events must be entered onto NBSS in accordance with the good practice guide
- sufficient time/resource is allocated for TC/TP audit and image quality peer review

The lead radiographer/radiography manager is accountable for the monitoring of TC/TP data, including repeat reasons. The mammographer with responsibilities for quality control (QC) may generate the data. The information should be carefully analysed and discussed regularly with the regional radiographic Professional Clinical Advisor (PCA) at regional network meetings.

The radiography manager should monitor these data in conjunction with the unit QA radiographer and all the mammographers.

The unit should carry out audit out on a regular basis (monthly as a minimum), and the outcome of the audit should be available for discussion and feedback to the mammographers.

To calculate the rates, the number of women screened must be known. Training centres and breast screening services which have mammographers in training should identify them separately on NBSS with an individual code. Repeat examination rate for a department should be calculated both including and excluding trainees, as repeat rates will obviously be higher with staff in training.

Regional reporting and monitoring

Breast screening services should report the following information monthly and quarterly to the regional SQAS:

- the number and percentage of TRs, TCs and TPs
- the number and percentage of TRs, TCs and TPs by reason code

- an explanation of the reasons and plans to address the issues, where the national standard has not been met

SQAS should summarise this information and report the TC/TP rates of individual breast screening services, along with regional performance and exceptions on a monthly and quarterly basis for national collation to NHS England.

The data should be discussed at part of the local professional network meetings between radiography managers and the regional PCA. This should inform regular discussion between the radiography manager and mammographers within a screening service. Data should also be available for discussion at the formal QA visits.

The PCA for radiography will monitor TC/TP rates and reasons throughout their region and assist in identifying remedial actions as required.

National reporting and monitoring

PHE will collate the quarterly information data and will provide an annual summary of the regional data. This will be available from the programme and cascaded through the PHE network.

The radiography CPG will have access to the quarterly data on a national basis and will discuss at each of their regional meetings.

Equipment faults

Some technical recalls could be due to equipment faults. Every breast screening service must ensure that any equipment failure is reported via the national equipment fault reporting system and the relevant people/organisations informed both locally and nationally as appropriate. The National Co-ordinating Centre for the Physics of Mammography (NCCPM) collate and analyse this information on an on-going basis.

The recording of equipment type on NBSS is a mandatory requirement and will enable specific equipment within a unit to be monitored. The equipment fields are user definable.

Monitoring the standards

There is a great variation in the number of mammograms taken at the individual mammographer level. This means that monitoring performance is compromised due to the instability of statistics caused by small numbers. It is important that performance data is aggregated over time to ensure that the number of examinations is sufficient to guarantee statistical stability. This may mean that individual recalls are calculated over

quarterly or six monthly rolling periods. Monthly data monitoring is inappropriate where only a small number of examinations are undertaken. There will be a natural variation in the TC/TP rate within any mammographer’s practice. The use of confidence intervals can be helpful when discriminating between natural and special cause variation which may require more investigation to establish why performance is different (see appendix 1).

A better way of monitoring technical recall performance monthly is to calculate rates over successive 6 month periods as shown in table 2:

	Month1	Month2	Month3	Month4	Month5	Month6	Month7	Month8	Month9
Sample1									
Sample2									
Sample4									
Sample5									

Table 2: Monitoring technical recall trends in performance by month(s)

The limitation with this is that an improvement in performance in any single month would appear smaller because the percentage TR/TP rate would always be the average across the last six months. However, the trend in a single month would still be evident, either better or worse.

Improving performance

A sensible approach to monitoring performance over time is necessary to assess trends. An individual TC/TP rate persistently higher than the acceptable standard indicates the need to look at the images repeated and the reasons recorded in the first instance. This should be undertaken with the individual and the radiographer responsible for performance in the service (usually the superintendent or radiographic programme manager. Any training needs identified should be acted upon and continual monitoring is recommended.

Unusually low rates should also be investigated because they can arise from under-reporting or “under-calling” images which are of non-diagnostic quality (a tendency to accept sub-standard images).

Factors contributing to sub-optimal performance in the department should also be considered, such as having new trainees, low staffing levels, equipment problems or

data entry errors. Performance of TRs against the standards should always be discussed in regular management meetings within the service between the screening director and programme manager. Where the standards are not met at individual or service level, a plan should be put in place to improve performance.

Appendix 1: Adequate sample size to calculate if a mammographer is operating within the acceptable standard of a 3% maximum repeat examination (TR) rate or is an outlier

Each mammographer's TR rate is measured every month and quarter by all screening services. The TR rate is defined as the total number of women requiring technical repeats and technical recalls divided by the total number of women attending screening expressed as a percentage. It is important that the analysis is statistically valid and also timely. Individual performance can be examined in a table format or be plotted graphically using the funnel plot method.

The funnel plot below shows the 95% control limits for a TR rate to be significantly above 3% by number of women screened. Any TR rate above the control limit requires further investigation.

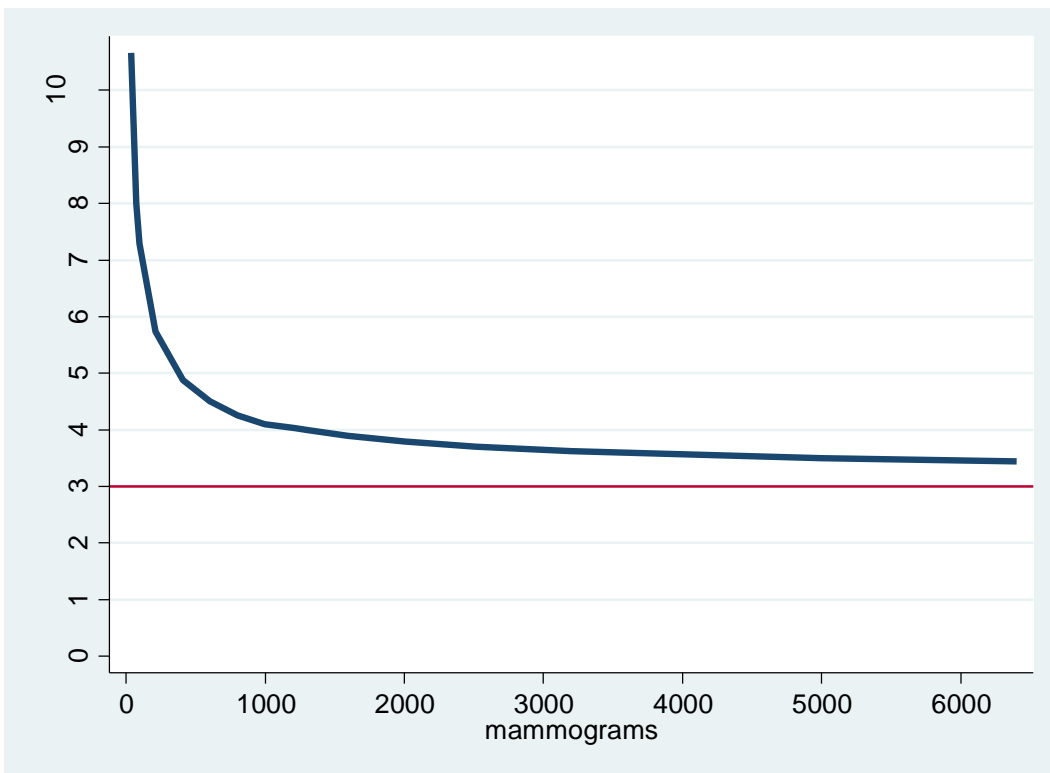


Table 3 below shows the number of repeat examinations required for a given number of mammograms for the TR rate at a given number of mammograms to be statistically significantly raised above 3% standard at the 95% level. We can interpret this as being 95% 'sure' that the problem is related to performance and not just chance due to small numbers. This represents outlier performance. For only 100 women's mammograms the results are heavily influenced by chance and a TR rate of at least 8% is needed to be statistically significant. In contrast if data is examined from 1000 women's mammograms a TR rate of 4.2% (42 repeat examinations) only is needed to be 95% sure that the TR rate is above 3%.

The more data the better, but statistical stability has to be balanced against timeliness. If the mammographer screens a further 1000 women before the data is examined again, the opportunity to spot a problem at an earlier stage will have been missed.

Table 3 can be used by mammographers to compare their technical recall and repeats rates to the values and percentages shown. Any performance equivalent to that shown (or higher), represents outlier performance at the 95% level and further investigation should be carried out.

Screens	Minimum number of repeat examinations to be significantly above 3%	TR rate and 95% confidence interval
100	8	8.0 (3.5-15.2)
200	12	6.0 (3.1-10.2)
300	16	5.3 (3.1-8.5)
400	20	5.0 (3.1-7.6)
500	24	4.8 (3.1-7.1)
600	28	4.7 (3.1-6.7)
700	31	4.4 (3.0-6.2)
800	35	4.4 (3.1-6.0)
900	38	4.2 (3.0-5.7)
1000	42	4.2 (3.0-5.6)
1500	59	3.9 (3.0-5.0)
2000	76	3.8 (3.0-4.7)
2500	93	3.7 (3.0-4.5)
3000	110	3.7 (3.0-4.4)

Table 3: Example of performance where mammographer is an outlier at the 95% level

As there is wide variation in the number of women screened by a mammographer, the information can be looked at quarterly or as a running average. We can consider two part-time mammographers (A and B) who screen very low numbers of women per year to illustrate the methods. If we consider mammographer A who screens 630 women in one year, we see that the overall TR rate is 2.4% and although it goes above 3% in the first quarter it is not significant. In contrast mammographer B has an annual TR rate of 7.3% which is significantly above 3% in the third quarter. On the 31st September in that year we are therefore alerted to a problem.

Example: Individual mammographer (A) examined over four quarters

Quarter	Screens	TR (%)	Comment
1 January - 31 March	150	6 (4.0)	Above 3%, but not statistically significant
1 April - 30 June	124	3 (2.4)	
1 July - 31 September	167	2 (1.2)	
1 October - 31 December	189	4 (2.1)	
Total	630	15 (2.4)	Annual data within 3%

Example: Individual mammographer (B) examined over four quarters

Quarter	Screens	TR (%)	Comment
1 January - 31 March	204	6 (2.9)	
1 April - 30 June	154	7 (4.5)	Above 3% but not statistically so
1 July - 31 September	123	15 (12.2)	Significantly above 3%
1 October - 31 December	134	17 (12.7)	Significantly above 3%
Total	615	45 (7.3)	Significantly above 3%

Rates can also be monitored over a rolling 6 month period using a running average over the last 6 months as outlined in section 3.1. In the above example if we assume mammographer B started in January (so that there is no data before then) we can produce a table by month. In this table using the same data as used earlier, for the period January to June the total number of mammograms is 358 and the TR is 3.6%, but this is not significant. For the next running average for February to July the TR is 4.8%, but still not significantly above 3%. Finally for March to August the rate is 6.3% which is significantly above 3%. The mammographer is therefore statistically significantly above 3% by the end of August. This allows outlier performance to be detected sooner compared to quarterly examination of data.

Month	Mammograms	TR	Mammograms over 6 months	TR (%)
January	27	0	-	-
February	89	2	-	-
March	88	4	-	-
April	52	1	-	-
May	48	3	-	-
June	54	3	358	13(3.6)
July	46	5	377	18 (4.8)
August	43	5	331	21 (6.3)
September	34	5		
October	45	6		
November	36	8		
December	53	3		

This can be shown graphically and we can see that if there were other concerns there may be some evidence to look further at the mammographers performance as early as July as the TR is almost significant.

Collecting, monitoring and reporting repeat examinations

