# 6a.6 NCB and VANCB reporting guidelines

This section of this document is designed to assist in classification of needle NCB and VANCB samples.

## 6a.6.1 Specimen information & handling

Proper interpretation of core biopsies requires knowledge of details of both clinical and imaging findings (mammography/US) and this information should be provided on the request form. The completed request form should include clinical details, specifying the imaging findings, the site of biopsies and the number of cores.

The tissue fixation protocol should be based on a standard procedure agreed between the departments involved.

Biopsies performed from microcalcifications should be x-rayed to determine the presence of calcification. A comment regarding the presence of **representative** microcalcification of the mammographic lesion in the sample should be provided along with the specimen x-ray.

Biopsies should be placed in fixative solution immediately and sent promptly to the laboratory.

The specimen x-ray procedure should not interfere with prompt fixation. Before fixation, the specimen should be arranged straight, if multiple in parallel. It is recommended that no more than four NCB specimens should placed into a single cassette.

In cases of mammographic microcalcification, examination of further levels should be performed if calcification is not immediately apparent on histological examination. In problem cases further levels and/or radiography of paraffin blocks may be helpful.

**Figure 1a: Specimen NCB/VANCB reporting form**

## Breast screening NCB/VANCB Form

Surname _____ Forenames _____

Date of Birth _____

Screening No _____ Hospital No _____

Centre _____ Report No _____

**Side** Right Left Quadrant : _____

Clinical details: _____

_____

_____

**Radiological category** R1 R2 R3 R4 R5

**Radiological Appearance**

Spiculate mass Stellate lesion Microcalcification, coarse branching
Well defined mass Architectural distortion fine clustered

**Localisation technique** Palpation Stereotactic Ultrasound guided

**Specimen type** NCB VANCB Number of cores _____

**Calcification present on specimen X-ray** Yes No Radiograph not seen

**Histological calcification** Absent In benign changes In malignancy In both

**Opinion of Pathologist**

B1. Uninterpretable/Normal tissue only
B2. Benign
B3. Lesion of uncertain malignant potential
B4. Suspicious of malignancy
B5. Malignant
- a. In situ carcinoma
- b. Invasive carcinoma
- c. Invasive status not assessable
- d. Other malignancy

Pathologist _____ Operator taking biopsy _____

Date _____

Comment _____

_____

_____

_____

**Figure 1b: NCB/VANCB reporting form**

## Optional further information:

**Benign lesion**

| | | |
|---|---|---|
| Fibroadenoma | Solitary papilloma | Multiple papilloma |
| Fibrocystic change | Sclerosing adenosis | Complex sclerosing lesion/radial scar |
| Periductal mastitis/duct ectasia | | Columnar cell change |

Other (please specify)_____

**Epithelial proliferation**

Not present Present without atypia Present with atypia (ductal)

Present with lobular intraepithelial neoplasia

Columnar cell change with atypia

**Malignant lesion**

| | | | |
|---|---|---|---|
| In situ carcinoma | Not present | Ductal | Lobular with necrosis |
| DCIS grade | High | Intermediate | Low Not assessable |
| Invasive Carcinoma | Not present | Present | |
| Oestrogen receptor status: | Positive | Negative | _____Quick Score (Allred) |
| | Not performed | | |

Comment _____

_____

_____

## 6a.6.2 Recording basic information

Information on the nature of the mammographic abnormality and clinical characteristics should be provided by the breast screening radiologist requesting the pathology examination.

**Centre/Location**
Give the name of the assessment centre, clinic, department etc., where the specimen was obtained.

**Side**
Indicate right or left.
For specimens from both sides use a separate form for each side.

**Quadrant**
The quadrant of the index lesion can be entered here.

**Radiological category**
The radiological assessment of the lesion should be entered here.

**Radiological appearance**
This section of the form is to be filled in by the clinician to indicate the radiological abnormality.
- Spiculate mass
- Stellate lesion
- Well defined mass
- Microcalcification. This should be classified by the requesting radiologist into coarse or fine and branching or clustered
- Architectural distortion

**Localisation technique**
Please choose one of the following terms:

| | |
|---|---|
| • Palpation | NCB guided by palpation |
| • Stereotactic | NCB/VANCB guided by stereotaxis |
| • Ultrasound guided | CB/VANCB guided by ultrasound. |

**Number of cores**
If known indicate the number of NCB samples taken.
It is recommended that any cores containing calcification are so identified and are sent separately to the pathologist.

**Calcification present on specimen X-ray**
Indicate whether there is calcification visible on the specimen radiograph if available.

**Histological calcification**
Indicate whether calcification has been identified in the sample and if present whether it is associated within a benign or malignant lesion.

**Pathologist**
The name of the pathologist giving the histological opinion. The pathologist should be registered at the screening office.

**Operator**
Enter the name of the operator performing the biopsy.

**Date**
Enter the date of reporting the slides.

**Comment field**
This free text field is included for extra information to be recorded.

**Optional further information**
In some cases it may be helpful to record further information. This will be particularly so where

neo-adjuvant or primary chemotherapy is contemplated or for VANCB specimens where the whole lesion may be resected. The fields chosen are the relevant fields from the main histology form (See section B).

## 6a.6.3 Reporting categories

It is important to remember that histological examination of both NCB and VANCB samples is performed to fulfil the assessment process role by giving a pathology category classification (B1-5) and not designed to give a definitive diagnosis, although this is possible in the majority of cases. Thus whilst most samples can be readily categorised as normal, benign or malignant, it must be recognised that a small proportion (probably less than 10%) of samples cannot. The following reporting guidelines have been devised in recognition of this and should be used for all screen-detected lesions (microcalcification, architectural deformities and mass lesions). It is also important to remember that, although there are five reporting categories similar to those used in fine needle aspiration cytology (FNAC), these are not equivalent.

**B1. Normal tissue/uninterpretable**

This indicates a core of normal tissue whether or not breast parenchymal structures are present; thus this category is equally appropriate for a core including normal breast ducts and lobules or mature adipose/fibrous tissue only. A B1 report should include a description of the components present and comment should be made regarding the presence of breast epithelial structures.

Cores with B1 diagnoses may contain microcalcification, for example within involutional lobules. It is important in these cases that discussion between pathology and radiology colleagues is undertaken to confirm the appropriateness of the microcalcification in the histological specimen. Small foci of calcification within involuted lobules are common and frequently too small to be visible mammographically, thus a report that merely records the presence of this calcification without additional comment on its nature, size and site may be misleading and lead to false reassurance. Mammograms do not demonstrate microcalcification, either singly or in clusters, less than 100 microns in diameter.

Exceptionally some specimens may be classified as uninterpretable, for example due to excessive crush artefact or composed of blood clot only. Such samples should also be classified as B1 although some experts would prefer these to be classified as B0.

**B2. Benign lesion**

A core is classified as B2 Benign when it contains a benign abnormality. This category is appropriate for a range of benign lesions including fibroadenomas, fibrocystic changes, sclerosing adenosis and duct ectasia and extends to include other non-parenchymal lesions such as abscesses and fat necrosis.

In some cases it may be difficult to determine whether a specific lesion is present, for example if minor fibrocystic changes are seen. The multi-disciplinary approach is once again vital in these cases to determine whether the histopathological features are in keeping with the radiological and clinical findings. It may be appropriate and prudent to classify the lesion as B1, rather than B2 if only very minor changes are present; such histopathological features would clearly be insufficient to explain a well-defined mass lesion and classification as B2 would be inappropriate.

**B3. Lesion of uncertain malignant potential**

This category mainly consists of lesions which may provide benign histology on NCB, but either are known to show heterogeneity or to have an increased risk (albeit low) of associated malignancy.

The B3 category has a lower rate of malignancy on further surgical biopsy (25%) when compared with B4 (66%). The majority of B3 lesions require surgical excision, but all these cases should be discussed at a preoperative multidisciplinary meeting.

**I. Papillary lesions**

Papillary lesions may show intralesional heterogeneity and the limited sampling achieved with NCB may miss areas of in situ cancer. The majority of these lesions should, therefore, also be designated B3 of uncertain malignant potential. On rare occasions when a small lesion has been very widely sampled and submitted for pathological examination, a benign B2 classification may be considered. Conversely, when a sample of a papillary lesion in a NCB shows atypia, for example strongly suspicious of papillary carcinoma in situ, a B4 designation may occasionally be more appropriate.

**II. Radial scar/complex sclerosing lesion**

Biopsies which show features of a radial scar/complex sclerosing lesion such as areas of hyalinisation, elastosis, or tubular entrapment with epithelial proliferation should be categorised as B3 if they represent the cause of the radiological abnormality[30a.] Actually, these lesions are heterogeneous and a proportion of them are associated with atypia or malignancy (in general LIN or low grade DCIS).

**III. Lobular intraepithelial neoplasia (LIN)**

A small cell regular epithelial proliferation within moderately distended lobules which is considered by the pathologist to represent lobular intraepithelial neoplasia or LIN (regrouping ALH and LCIS) should be classified as B3: this process does not necessarily have the same management implications as a diagnosis of DCIS but surgical diagnostic excision might be considered. Lobular intraepithelial neoplasia is frequently a co-incidental finding in a core biopsy from a screen-detected lesion however and multidisciplinary discussion is essential as the abnormality identified radiologically may not be represented. Furthermore, it may be that LIN encountered serendipitously in a breast surgical excision does not carry the same risk and prognosis as LIN diagnosed via a targeted NCB/VANCB of a mammographic abnormality[31]. These cases must be managed cautiously.

On occasions it may be impossible to classify a small cell epithelial proliferation in lobules and/or ducts as either lobular neoplasia or low grade DCIS and in these circumstances a numerically higher category (B4 or B5) is prudent and should be considered. In these cases, E-cadherin may help in the differential diagnosis[32]. Pleomorphic LIN may also be classified as B5. There is at present, however, no definite follow-up information on these lesions and management should be discussed in a multidisciplinary forum.

**IV. Atypical epithelial proliferation of ductal type**

The definition of atypical ductal hyperplasia (ADH) is derived from surgical resection specimens and relies on a combination of histological, morphological and size extent criteria. There is a range of severity from those which are insufficient for a definite diagnosis of DCIS but highly suspicious to those which only show a minor degree of atypia, normally architectural which requires further assessment. In some cases, the appropriate categorisation may be B4 in lesions highly suspicious of DCIS. These proliferations must be clearly separated from usual epithelial hyperplasia (see pitfalls).

A definitive diagnosis of ADH is not possible on NCB. It has been shown that core biopsy samples which include atypical epithelial proliferative foci of ductal type, of insufficient extent for classification as DCIS, on subsequent surgical resection may form part of an established in situ neoplastic lesion with or without associated invasion. This view is based on several studies which describe the subsequent surgical diagnosis in cases described as ADH in NCB. In over 50% of cores surgical excision biopsy has shown either in situ or invasive carcinoma[33]. The limited tissue sampling which can be undertaken by NCB guns (often by stereotactic methods for foci of microcalcification) may thus provide insufficient material for definitive diagnosis of low grade DCIS if only a few involved duct spaces are obtained. In all cases open biopsy is indicated to evaluate the lesion, define its extent, and to exclude invasive growth. It should be clear that ADH cannot be diagnosed on NCB, and that it is incorrect to use the term ADH for cases where core biopsies include atypical intraductal epithelial proliferative foci, or an area of well differentiated DCIS insufficient in extent for classification as DCIS. These should be diagnosed as atypical epithelial proliferation of ductal type.

**V. Phyllodes tumour**
Fibroepithelial lesions suggesting phyllodes tumour (cellular stroma, stromal overgrowth and possibly some mitotic activity) should also be designated B3. Thus the presence of a cellular stroma within a fibroepithelial lesion should prompt a search for other features that may aid in discrimination from a fibroadenoma. In practice, however, this distinction is often impossible and careful appraisal of the entire clinical picture will usually allow appropriate management to be undertaken. Obviously malignant cases should be classified as B5.

**B4. Suspicious of malignancy**
Technical problems such as crushed or poorly fixed cores which contain probable carcinoma but cannot provide the definitive diagnosis are best included as B4. Similarly, apparently neoplastic cells contained within blood clot or adherent to the outer aspect of the sample should be classified as B4 suspicious.
A complete single duct space bearing an unequivocal high-grade epithelial proliferative process can be classified as B5 malignant. However care must be taken if one or only part of a duct space is seen containing a highly atypical epithelial process particularly if no necrosis is present; this may be regarded as suspicious rather than definitively malignant. In particular great care should be taken if the epithelial cells show any features of an apocrine phenotype, which may represent an atypical apocrine proliferation rather than DCIS.
The management of cases classified as B4 will usually be either diagnostic excision biopsy of the area or repeat NCB sampling to obtain a definitive diagnosis. **Definitive therapeutic surgery should not be undertaken as a result of a B3 or B4 NCB diagnosis.**

**B5. Malignant**
This category is appropriate for cases of unequivocal malignancy on NCB. Further categorisation into in situ and invasive malignancy should be undertaken whenever possible. Other forms of malignancy such as malignant lymphoma may also be classified as B5.

**I. Lobular intraepithelial neoplasia (see above B3)**
Lobular intraepithelial neoplasia is included in the B3 category, as it does not have the same management implications as a diagnosis of DCIS or invasive malignancy. Nevertheless the pleomorphic variant or LIN with comedo-necrosis may be classified as B5.

**II. Ductal carcinoma in situ**
One of the benefits of NCB is that it can allow distinction between in situ and invasive carcinoma. It should however be borne in mind that, due to sampling error, exclusive presence of DCIS in the core does not exclude the possibility of an invasive focus being present. In approximately 20% of cases sampled by standard methods co-existing invasive carcinoma will be identified in the subsequent surgical excision specimen[21]. The nuclear grade, architecture and the presence of necrosis within the DCIS can be indicated on the NCB report. In particular, the presence of associated calcification should be recorded. Biopsies of skin for Paget's disease may also be recorded as non-operative diagnostic procedures and can be classified accordingly.

**III. Invasive carcinoma**
An advantage of NCB over FNAC is the ability to diagnose invasion positively. Invasive mammary carcinoma can be unequivocally identified in NCB with a positive predictive value of 98% [34]. As noted above, however, the negative predictive value for invasion is only 80% when only DCIS is identified. Assessment of grade and type of carcinoma may be achieved (although concordance with final grade and type are not absolute and, if performed, should be interpreted with caution)[35,36].