

Breast Cancer Treatment Variable Selection

Karen Murphy

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For example, if breast cancer is diagnosed during pregnancy, a variable asking if the patient is pregnant is required along with the trimester variable as this is important to the safety of both the patient and the unborn child when administering treatment.

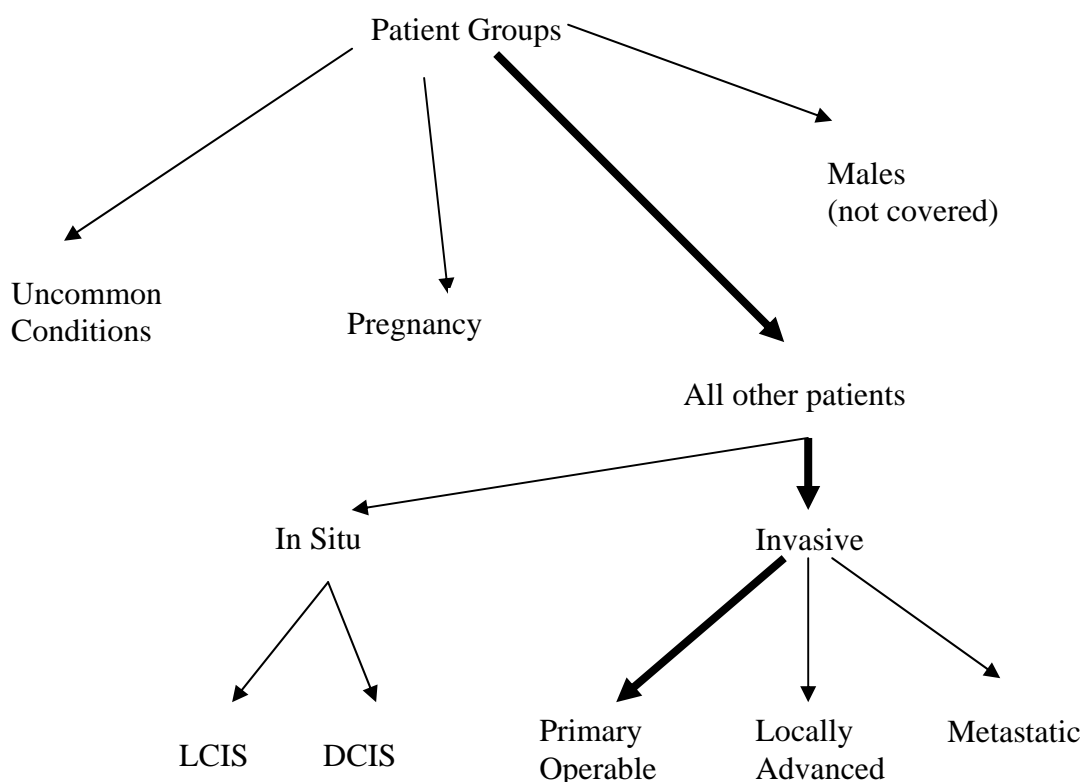


Figure 1

Appendix 4 of the COIN guidelines give the Breast Cancer Clinical Core Dataset to be collected for audit purposes, see below. This provides a good model for the breast cancer patient database, however some variables required for this system are missing in this dataset. For instance, there is no data item for pregnancy, the current state of health of the patient is not considered (so it is not known if the patient is fit enough to receive chemotherapy). This dataset has been altered to add any extra variables not recorded in this dataset that this system needs. These are shown in small bold capital letters. Also added are the anatomical subsites of the breast which were not included in the dataset although they were asked for.

Clinical Oncology

Clinical Oncology (1999)11:S132-133
The Royal College of Radiologists

Appendix 4: The COIN Breast Cancer Clinical Core Dataset to be Collected for Audit Purposes

Data item	Detail and Choice lists and <i>Subsidiary choice lists</i>	<i>m</i> = mandatory data collection <i>o</i> = optional data collection
Patient		
Identification	GP details and health authority number	<i>m</i>
	Practice and name of doctor	<i>o</i>
Date and source of referral	Screening centre / GP / Other	<i>m</i>
Presentation	Asymptomatic	<i>Screening / Self presenting / Well woman examination</i> <i>m</i>
	Symptomatic	<i>Lump only / Pain and lump</i> <i>m</i>
	Associated symptoms	<i>Nipple discharge / Nipple soreness / Nipple indrawn / Abscess / Deformity</i> <i>m</i>
	Side and quadrant	<i>SIDE: LEFT OR RIGHT</i> <i>QUADRANT: NIPPLE</i> <i>CENTRAL PORTION</i> <i>UPPER-INNER QUADRANT</i> <i>LOWER-INNER QUADRANT</i> <i>UPPER-OUTER QUADRANT</i> <i>LOWER OUTER QUADRANT</i> <i>AXILLARY TAIL</i> <i>m</i>
Duration (Weeks)		<i>m</i>
Age at presentation		<i>m</i>
Sex	Female / male	<i>m</i>
Menopausal status	Premenopausal / Perimenopausal / Postmenopausal / Not stated	<i>m</i>
PREGNANT	YES/NO	TRIMESTER: FIRST SECOND THIRD
LACTATING	YES/NO	
Assessment		
Name of consultant		<i>m</i>
Name of non-consultant trained breast surgeon / consultant trained breast surgeon / other surgeon		<i>o</i>
Place and date of surgical assessment	One stop breast clinic / General breast clinic / General surgical clinic / Other	<i>m</i>

Investigations		
Result and date of fine needle aspiration cytology	C1 inadequate / C2 benign / C3 indeterminate / C4 suspicious / C5 malignant	<i>m</i>
Result and date of mammogram	R1 normal-benign / R2 discrete-benign / R3 indeterminate / R4 suspicious / R5 malignant	<i>m</i>
Result and date of ultrasound	U1 normal-benign / U2 discrete-benign / U3 indeterminate / U4 suspicious / U5 malignant	<i>m</i>
Result and date of tru-cut biopsy	1 normal-benign / 2 discrete-benign / 3 indeterminate / 4 suspicious / 5 malignant	<i>m</i>
<i>Operation</i>		
Date		
Excision biopsy	Of palpable lump / Localised by ultrasound / Localised by x-ray	<i>m</i>
Wide local excision	Localised by ultrasound / Localised by x-ray	<i>m</i>
Segmentectomy/ quadrantectomy		<i>m</i>
Simple mastectomy	With / Without immediate reconstruction	<i>m</i>
Subcutaneous mastectomy	With / Without immediate reconstruction	<i>m</i>
Frozen section performed	Yes / No	<i>m</i>
Lymph node procedure	None / Axillary sampling / Axillary clearance (<i>Level I/II/III</i>) /SCF node biopsy / IMC node biopsy	<i>m</i>

Pathology																																												
Dates of original diagnosis and histology report		<i>m</i>																																										
Type of specimen	Tru-cut biopsy / Excision biopsy (<i>wide/local/segmental</i>) / Mastectomy	<i>m</i>																																										
Weight of specimen		<i>o</i>																																										
Maximum size of tumour (in cm)		<i>m</i>																																										
*Grade	<p>I / II / III</p> <p>G Histopathological Grading</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>GX</td> <td>Grade of differentiation cannot be assessed</td> </tr> <tr> <td>G1</td> <td>Well differentiated</td> </tr> <tr> <td>G2</td> <td>Moderately differentiated</td> </tr> <tr> <td>G3</td> <td>Poorly differentiated</td> </tr> <tr> <td>G4</td> <td>Undifferentiated</td> </tr> </table> <p>Scarff, Bloom and Richardson Grade</p> <p>Gives the degree of differentiation.</p> <p>Method Pathologists closely observe three features when determining a cancer's grade: the frequency of cell mitosis (rate of cell division), tubule formation (percentage of cancer composed of tubular structures), and nuclear pleomorphism (change in cell size and uniformity). Each of these features is assigned a score ranging from 1 to 3 (1 indicating slower cell growth and 3 indicating faster cell growth). The scores of each of the cells' features are then added together for a final sum that will range between 3 to 9.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Tubule Formation (% of Carcinoma Composed of Tubular Structures)</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>> 75%</td> <td>1</td> </tr> <tr> <td>10-75%</td> <td>2</td> </tr> <tr> <td>less than 10%</td> <td>3</td> </tr> <tr> <th>Nuclear Pleomorphism (Change in Cells)</th> <th>Score</th> </tr> <tr> <td>Small, uniform cells</td> <td>1</td> </tr> <tr> <td>Moderate increase in size and variation</td> <td>2</td> </tr> <tr> <td>Marked variation</td> <td>3</td> </tr> <tr> <th>Mitosis Count (Cell Division)</th> <th>Score</th> </tr> <tr> <td>Up to 7</td> <td>1</td> </tr> <tr> <td>8 to 14</td> <td>2</td> </tr> <tr> <td>15 or more</td> <td>3</td> </tr> </tbody> </table> <p>If sum = 3,4,5 then grade I (well differentiated) If sum = 6,7 then grade II (moderately differentiated) If sum = 8,9 then grade III (poorly differentiated)</p> <p>Elston's Modification for the Criteria of Bloom and Richardson in the Histological Grading of Infiltrating Ductal Carcinoma.</p> <p>This is a modification of the method shown above (don't know which one is used).</p> <p>Extent of tubule formulation</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Growth Pattern</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>Extensive tubule formation (>75%)</td> <td>1</td> </tr> <tr> <td>Intermediate tubule formation (10-75%)</td> <td>2</td> </tr> <tr> <td>Little tubule formation (<10%)</td> <td>3</td> </tr> </tbody> </table>	GX	Grade of differentiation cannot be assessed	G1	Well differentiated	G2	Moderately differentiated	G3	Poorly differentiated	G4	Undifferentiated	Tubule Formation (% of Carcinoma Composed of Tubular Structures)	Score	> 75%	1	10-75%	2	less than 10%	3	Nuclear Pleomorphism (Change in Cells)	Score	Small, uniform cells	1	Moderate increase in size and variation	2	Marked variation	3	Mitosis Count (Cell Division)	Score	Up to 7	1	8 to 14	2	15 or more	3	Growth Pattern	Score	Extensive tubule formation (>75%)	1	Intermediate tubule formation (10-75%)	2	Little tubule formation (<10%)	3	
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Nuclear Pleomorphism

Nuclear Features	Score
Nuclei small regular and uniform	1
Nuclei show moderate variation in size and shape	2
Nuclei show extensive variation in size and shape with large abnormal forms	3

Mitotic count

The number of mitoses within 10 high-powered fields are counted and a score assigned. The count of the mitotic rate is greatly affected by the field of vision given by the objective. This must be taken into account when applying a score to the number of mitoses counted.

Diameter in mm	Examples	Mitotic Count Score = 1	Mitotic Count Score = 2	Mitotic Count Score = 3
0.44 mm	Nikon Labophot	0-5 mitoses	6-10 mitoses	> 11 mitoses
0.59 mm	Leitz Ortholux	0-9 mitoses	10-19 mitoses	> 20 mitoses
0.63 mm	Leitz Diaplan	0-11 mitoses	12-22 mitoses	> 23 mitoses

If the data in the table is plotted out the following equations can approximate the break points for separating mitotic count score 1 from 2 and 2 from 3:

N.B *diam* = diameter of carcinoma in mm.

mitotic count score 1 if

$$\text{mitotic count} \leq (122.82 \times (\text{diam})^2) - (99.8 \times (\text{diam})) + 25.15$$

mitotic count score 2 if

$$(78.95 \times (\text{diam})^2) - (21.32 \times (\text{diam})) + 4.09 \geq \text{mitotic count} > \text{break point for score 1}$$

mitotic count score 3 (no information given – must find)

Scoring

Histological score =

(points for extent of tubule formation) + (points for nuclear pleomorphism) + (points for mitotic rate)

Interpretation

- Minimum score is 3
- Maximum score is 9

Histological Score	Grade	Differentiation
3 4 or 5	I	well-differentiated
6 or 7	II	moderately differentiated
8 or 9	III	poorly differentiated

Type	In situ LCIS. In situ DCIS: (Apocrine / Comedo / Cribriform / Cystic hypersecretory / Intracystic papillary / Micropapillary / Neuro-endocrine / Signet ring/ With micro-invasion (No / Possible / Yes / Not stated / Absent)). Invasive: (No / Yes / Tubular / Mucoïd / Colloid (mucinous) / Medullary / Invasive comedo carcinoma / Invasive papillary carcinoma / Adenoid cystic carcinoma / Apocrine carcinoma / Lipid rich carcinoma / Glycogen rich carcinoma / Paget's disease of the nipple / Inflammatory carcinoma / Mixed (Tubular-ductal / Tubular-lobular) / Sarcoma / Lymphoma (include leukaemic infiltration)).	<i>m</i>
Focality	Localised / Diffuse single quadrant / Multiquadrant / Not stated	<i>m</i>
Margins	Incomplete (reaches margin) / Complete / Not stated	<i>m</i>
Distance of nearest margin		<i>m</i>
Lymphovascular invasion	Present / Not seen / Not stated	<i>m</i>
<i>Diagnostic imaging</i>		
Date and result of bone scan	Normal / Abnormal / Unclear / Not performed	<i>o</i>
Date and result of liver ultrasound	Normal / Abnormal / Unclear / Not performed	<i>o</i>
Date and result of chest x-ray	Normal / Abnormal / Unclear / Not performed	<i>o</i>

The next section deals with the staging of the disease, this version of the dataset includes explanations of the terms. Also included other prognostic indices.

Staging

***Clinical Staging**
T, N, M

T - Primary Tumour		<i>m</i>																							
T_x	primary tumour can not be assessed																								
T₀	no evidence of primary tumour																								
T_{is}	carcinoma in-situ – intraductal carcinoma, lobular carcinoma in situ or Pagets disease of the nipple with no associated tumour.																								
T₁	Tumour ≤ 2 cm in greatest dimension																								
	T_{1mic} : Tumour ≤ 0.1 cm in greatest dimension (Microinvasion)																								
	T_{1a} : 0.1 cm < Tumour ≤ 0.5 cm in greatest dimension																								
	T_{1b} : 0.5 cm < Tumour ≤ 1 cm in greatest dimension																								
	T_{1c} : 1 cm < Tumour ≤ 2 cm in greatest dimension																								
T₂	2cm < Tumour ≤ 5 cm in greatest dimension																								
T₃	Tumour > 5 cm in greatest dimension																								
T₄	Tumour of any size with direct extension to a) chest wall or b)skin as described below.																								
	T_{4a} : Extension to chest wall																								
	T_{4b} : Edema (including peau d'orange) or ulceration of the skin of the breast or satellite skin nodules confines to the same breast																								
	T_{4c} : Both of the above i.e. T_{4a} and T_{4b}																								
	T_{4d} : Inflammatory carcinoma Note: Inflammatory carcinoma of the breast is characterised by diffuse, brawny induration of the skin with an erysipeloid edge, usually with no underlying palpable mass. If the skin biopsy is negative and there is no localised measurable primary cancer, the T category is pTX when pathologically staging a clinical inflammatory carcinoma (T _{4d}). Dimpling of the skin, nipple retraction or other skin changes, except those in T _{4b} and T _{4d} , may occur in T ₁ , T ₂ or T ₃ without affecting the classification.																								
N - Regional Lymph Nodes																									
N_x	regional lymph nodes can not be assessed (previously removed)																								
N₀	no regional lymph node metastases																								
N₁₋₃	increasing involvement of regional lymph nodes																								
	N₁ : Metastasis to movable ipsilateral axillary lymph node(s)																								
	N₂ : Metastasis to ipsilateral axillary lymph node(s) fixed to each other or to other structures																								
	N₃ : Metastasis to ipsilateral internal mammary lymph node(s)																								
M - Distant Metastases																									
M_x	Presence of distant metastases can not be assessed																								
M₀	no distant metastases																								
M₁	Distant metastases present (includes metastasis to ipsilateral supraclavicular lymph nodes) The category M1 may be further specified according to the following notation:																								
	<table border="0"> <tr> <td>Pulmonary</td> <td>PUL</td> <td>Bone Marrow</td> <td>MAR</td> <td>Lymph Nodes</td> <td>LYM</td> </tr> <tr> <td>Osseous</td> <td>OSS</td> <td>Pleura</td> <td>PLE</td> <td>Skin</td> <td>SKI</td> </tr> <tr> <td>Hepatic</td> <td>HEP</td> <td>Peritoneum</td> <td>PER</td> <td>Other</td> <td>OTH</td> </tr> <tr> <td>Brain</td> <td>BRA</td> <td>Adrenals</td> <td>ADR</td> <td></td> <td></td> </tr> </table>	Pulmonary	PUL	Bone Marrow	MAR	Lymph Nodes	LYM	Osseous	OSS	Pleura	PLE	Skin	SKI	Hepatic	HEP	Peritoneum	PER	Other	OTH	Brain	BRA	Adrenals	ADR		
Pulmonary	PUL	Bone Marrow	MAR	Lymph Nodes	LYM																				
Osseous	OSS	Pleura	PLE	Skin	SKI																				
Hepatic	HEP	Peritoneum	PER	Other	OTH																				
Brain	BRA	Adrenals	ADR																						

UICC TNM Staging

Correlation of UICC (1987) and TMN Classifications of Tumours

T_{is}	LCIS	Stage IV	T _{1a} N ₀ M ₁
	DCIS	Any T any N M ₁	T _{1a} N ₁ M ₁
Stage I	T _{1a} N ₀ M ₀		T _{1a} N ₂ M ₁
T ₁ N ₀ M ₀	T _{1b} N ₀ M ₀		T _{1a} N ₃ M ₁
	T _{1c} N ₀ M ₀		T _{1b} N ₀ M ₁
			T _{1b} N ₁ M ₁
			T _{1b} N ₂ M ₁
Stage II	T _{1a} N ₁ M ₀		T _{1b} N ₃ M ₁
T ₁ N ₁ M ₀	T _{1b} N ₁ M ₀		T _{1c} N ₀ M ₁
T ₂ N ₀₋₁ M ₀	T _{1c} N ₁ M ₀		T _{1c} N ₁ M ₁
Any T N ₂₋₃	T ₂ N ₀ M ₀		T _{1c} N ₂ M ₁
M ₀	T ₂ N ₁ M ₀		T _{1c} N ₃ M ₁
			T ₂ N ₀ M ₁
Stage III	T _{1a} N ₂ M ₀		T ₂ N ₁ M ₁
T ₃ any N M ₀	T _{1a} N ₃ M ₀		T ₂ N ₂ M ₁
T ₄ any N M ₀	T _{1b} N ₂ M ₀		T ₂ N ₃ M ₁
	T _{1b} N ₃ M ₀		T ₃ N ₀ M ₁
	T _{1c} N ₂ M ₀		T ₃ N ₁ M ₁
	T _{1c} N ₃ M ₀		T ₃ N ₂ M ₁
	T ₂ N ₂ M ₀		T ₃ N ₃ M ₁
	T ₂ N ₃ M ₀		T _{4a} N ₀ M ₁
	T ₃ N ₀ M ₀		T _{4a} N ₁ M ₁
	T ₃ N ₁ M ₀		T _{4a} N ₂ M ₁
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	T _{4a} N ₂ M ₀		T _{4b} N ₃ M ₁
	T _{4a} N ₃ M ₀		T _{4c} N ₀ M ₁
	T _{4b} N ₀ M ₀		T _{4c} N ₁ M ₁
	T _{4b} N ₁ M ₀		T _{4c} N ₂ M ₁
	T _{4b} N ₂ M ₀		T _{4c} N ₃ M ₁
	T _{4b} N ₃ M ₀		T _{4d} N ₀ M ₁
	T _{4c} N ₀ M ₀		T _{4d} N ₁ M ₁
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<p>* Pathological Staging pT, pN</p>	<p>pTNM Pathological Classification</p> <p>pT – Primary Tumour The pathological classification requires the examination of the primary carcinoma with no gross tumour at the margins of resection. A case can be classified pT if there is only microscopic tumour in a margin. The pT categories correspond to the t categories in TNM stage. Note: When classifying pT the tumour size is a measurement of the invasive component. If there is a large in situ component (e.g. 4 cm) and a small invasive component (e.g. 0.5 cm), the tumour is coded pT1a.</p> <p>pN – Regional Lymph Nodes The pathological classification requires the resection and examination of at least the low axillary lymph nodes (level 1). Such a resection will ordinarily include 6 or more lymph nodes.</p> <p>Pathological Classification of Axillary Lymph Nodes</p> <table border="1" data-bbox="424 645 1254 1093"> <tr> <td>pNX</td> <td colspan="2">Regional lymph nodes can not be assessed (not removed for study or previously removed)</td> </tr> <tr> <td>pN0</td> <td colspan="2">No regional lymph node metastasis</td> </tr> <tr> <td rowspan="6">pN1</td> <td colspan="2">Metastasis to movable ipsilateral axillary node(s)</td> </tr> <tr> <td>PN1a</td> <td>Only micrometastasis. Tumour \leq 0.2 cm</td> </tr> <tr> <td rowspan="2">PN1b</td> <td>Metastasis to lymph node(s), any larger than 0.2 cm</td> </tr> <tr> <td>pN1bi</td> <td>Metastasis to 1 – 3 lymph nodes. Any more than 0.2 cm and all less than 2 cm in greatest dimension.</td> </tr> <tr> <td>pN1bii</td> <td>Metastasis to 4 or more lymph nodes, ant more than 0.2 cm and all less than 2cm in greatest dimension.</td> </tr> <tr> <td>pN1biii</td> <td>Extension of tumour beyond the capsule of a lymph node metastasis less than 2 cm in greatest dimension.</td> </tr> <tr> <td>pN2</td> <td colspan="2">Metastasis to ipsilateral axillary lymph nodes that are fixed to one another or to other structures.</td> </tr> <tr> <td>pN3</td> <td colspan="2">Metastasis to ipsilateral internal mammary lymph node(s).</td> </tr> </table> <p>Note: The prognosis of patient with pN1a is similar to that of patients with pN0.</p> <p>pM – Distant metastasis The pM categories correspond to the M categories (as in TNM staging).</p>	pNX	Regional lymph nodes can not be assessed (not removed for study or previously removed)		pN0	No regional lymph node metastasis		pN1	Metastasis to movable ipsilateral axillary node(s)		PN1a	Only micrometastasis. Tumour \leq 0.2 cm	PN1b	Metastasis to lymph node(s), any larger than 0.2 cm	pN1bi	Metastasis to 1 – 3 lymph nodes. Any more than 0.2 cm and all less than 2 cm in greatest dimension.	pN1bii	Metastasis to 4 or more lymph nodes, ant more than 0.2 cm and all less than 2cm in greatest dimension.	pN1biii	Extension of tumour beyond the capsule of a lymph node metastasis less than 2 cm in greatest dimension.	pN2	Metastasis to ipsilateral axillary lymph nodes that are fixed to one another or to other structures.		pN3	Metastasis to ipsilateral internal mammary lymph node(s).		<p><i>m</i></p>
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<p>*Prognostic Indices</p>	<p>Nottingham Prognostic Index (invasive ductal carcinoma)</p> <p>Overview: Haybittle et al developed a prognostic index for infiltrating ductal carcinoma based on certain quantitative measures. This was developed at the Nottingham City Hospital and Tenovus Institute for Cancer Research in England.</p> <p>Parameters</p> <ol style="list-style-type: none"> (1) histologic grade (2) tumour size in cm (3) lymph node stage <p>Lymph Node Stage:</p> <ul style="list-style-type: none"> • Based on histological examination of three lymph nodes (low axillary apical axillary and internal mammary) • This manner of lymph node examination is not routine in the US. 																										

Parameter	Finding	Points
histologic grade	well differentiated	1
	moderately differentiated	2
	poorly differentiated	3
lymph node stage	A (no metastases)	1
	B (metastases in low axillary lymph node)	2
	C (metastases in apical axillary and/or internal mammary lymph node)	3

prognostic index =

= (0.2(tumour size in cm)) + (points for lymph node stage) + (points for histologic grade)

Interpretation

- minimum score: just over 2
- maximum score: over 7

Prognostic Index	Prognosis
< 3.4	good
3.4 to 5.399	moderate
>= 5.4	poor

Van Nuys Prognostic Index for Ductal Carcinoma In Situ (unsure if this is used in UK)

Overview: Management of ductal carcinoma in situ can be problematic due to the heterogenous nature of the disease process. Objective evaluation of the lesion can help decide if and what additional therapy is needed. Features found to aid in the decision making process include: size of lesion distance to surgical margins and pathologic grade with or without luminal necrosis. The Van Nuys Prognostic Index (VNPI) uses these features to predict the patient risk and to guide therapeutic decisions.

Parameter	Finding	Points
size of tumour in mm	<= 15 mm	1
	16-40 mm	2
	>= 41 mm	3
margins	>= 10 mm	1
	1-9 mm	2
	< 1 mm	3
pathologic classification	low or intermediate grade without necrosis	1
	low or intermediate grade with necrosis	2
	high grade with or without necrosis	

	<p>Van Nuys prognostic index =</p> <p>= (points for size) + (points for margins) + (points for pathologic classification)</p> <p><i>Interpretation</i></p> <ul style="list-style-type: none"> • minimum score 3 • maximum score 9 <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Prognostic Index</th> <th>Risk Group</th> </tr> </thead> <tbody> <tr> <td>3 or 4</td> <td>low risk</td> </tr> <tr> <td>5 6 or 7</td> <td>intermediate risk</td> </tr> <tr> <td>8 or 9</td> <td>high risk</td> </tr> </tbody> </table> <p><i>Treatment Recommendations</i> (Not usually given)</p> <ul style="list-style-type: none"> • score 3 or 4: do not benefit from radiation therapy and can be treated by excision alone • score 5 6 or 7 with margin score 1: benefit from radiation therapy • score 5 6 or 7 with margin score of 2 or 3: re-excision of biopsy site may be sufficient to preclude need for radiation therapy • score 8 or 9: post-excisional radiation therapy with serious consideration for mastectomy <p><i>Limitations</i></p> <ul style="list-style-type: none"> • Difficulty in defining size in some lesions. • Results may be affected by how the specimen is oriented and processed. 	Prognostic Index	Risk Group	3 or 4	low risk	5 6 or 7	intermediate risk	8 or 9	high risk	
Prognostic Index	Risk Group									
3 or 4	low risk									
5 6 or 7	intermediate risk									
8 or 9	high risk									

This is end prognostic (or audit) input recommended by COIN. This is the point where the decisions have to be made. However there is still some input required for the decision process to follow the guidelines. These are:

- Is there evidence of extracapsular extension to the axillary fat?
- The number of lymph nodes involved
 1. No nodal involvement
 2. 1 – 3 nodes involved
 3. 4 or more nodes involved
- The number of nodes examined (not crucial to decision making, but it is a constraint as there should be at least 4 examined).
- Is the patient fit enough to receive chemotherapy? (This may be decided by a doctor, given the patients current state of health or it may be taken from the patients general record).

Prognostic Factors in Breast Carcinoma

Below is a table of important prognostic factors, some of which are asked for by the guidelines and some which are not. The latter are in normal weight text and these measures are currently undergoing research for their importance and will certainly be needed in the future to predict survival and to decide on adjuvant treatment. It would be worthwhile including these factors as they would make the database more useful, particularly for research purposes.

Parameter	Favourable	Unfavourable
patient's age	> 35 and < 50 years of age	> 50 especially if elderly; <= 35 years of age
pregnancy or lactation		overall poorer prognosis
invasiveness	in situ	invasive
size of tumour	invasive carcinoma <= 1 cm	> 1 cm; 1-2 cm better than >= 2 cm
microscopic grade	well-differentiated (Grade I)	poorly differentiated (Grade III)
type of margin	"pushing"	"infiltrating"
metastasis to axillary lymph nodes	absent	present (having 1-3 nodes positive better than if >= 4)
metastasis to internal mammary lymph nodes	absent	present
oestrogen receptor	>= 10 fmol/mg protein	< 10 fmol/mg protein
progesterone receptor	>= 10 fmol/mg protein (poor if ER negative)	< 10 fmol/mg protein
pS2 protein	high (> 11 ng/mg)	low (< 11 ng/mg)
S phase fraction	low	high
ploidy	diploid	aneuploid
mitotic index	low	high
thymidine labelling index	low	high
c-erbB-2 (neu/HER-2) oncogene	absent	present
proliferating cell markers (Ki-67 PCNA/cyclin others)	low	high
cytoarchitectural patterns	tubular carcinoma (pure) medullary carcinoma (true) mucinous carcinoma (pure) papillary carcinoma (pure) adenoid cystic carcinoma (pure) secretory carcinoma (pure)	signet ring carcinoma inflammatory carcinoma

The next section records treatment given after the decisions have been made.

Radiotherapy		
Location	Intact breast / Intact breast and boost / Chest wall / Supraclavicular fossa / Internal mammary chain / Other loco-regional	<i>m</i>
Method of immobilisation		<i>o</i>
Patient moved between fields?		<i>o</i>
Simulation?		<i>o</i>
Gap policy?	Nil / Defined	<i>o</i>
Dose measured during radiotherapy?		<i>o</i>
Treatment frequency	Daily / Alternate days (M W F) / Alternate days (M W F T Th) / Other	<i>o</i>
Chemotherapy		
Pre-op		<i>m</i>
Post-op		<i>m</i>
Sequence with RT	Not applicable / Pre-RT / Post-RT / Concurrently / Alternating / During RT	<i>m</i>
TYPE (E.G. CMF)	NEED TO FIND ALL USED AND COMBINATIONS	
Hormone Therapy		
Pre-op		<i>m</i>
Post-op		<i>m</i>
Given	With RT / Post RT / In sequence with chemotherapy / Sequentially(<i>Concurrently / Sequence unknown</i>)	<i>o</i>
Type	Tamoxifen / Zoladex / Arimidex / Megace / Lentaron / Surgical ovarian ablation / Radiotherapy ovarian ablation / Other	<i>m</i>

The next section deals with follow up after treatment.

Follow Up									
Date seen		<i>m</i>							
Alive	With no evidence of progression	<i>m</i>							
Clinical Recurrence	Date of recurrence	<i>m</i>							
	Site: Local / Regional distant metastases / Unknown								
Complications of treatment	Arm oedema / Brachial plexopathy / Soft tissue necrosis / Soft tissue Fibrosis / Rib fracture / Osteonecrosis / Pneumonitis / Pericarditis / Cardiomyopathy / Pulmonary fibrosis / Haematological haemorrhage / Axillary fistula / Radiation induced malignancy / Stiff shoulder	<i>o</i>							
Cosmesis	Doctor's judgement: Excellent / Good / Moderate / Poor	<i>o</i>							
	Patient's judgement: Delighted / Satisfactory / Unsatisfactory	<i>o</i>							
	R Classification The absence or presence or residual tumour after treatment may be described by the symbol R.								
	<table border="1"> <tr> <td>RX</td> <td>Presence of residual tumour cannot be assessed</td> </tr> <tr> <td>R0</td> <td>No residual tumour</td> </tr> <tr> <td>R1</td> <td>Microscopic residual tumour</td> </tr> <tr> <td>R2</td> <td>Macroscopic residual tumour</td> </tr> </table>	RX	Presence of residual tumour cannot be assessed	R0	No residual tumour	R1	Microscopic residual tumour	R2	Macroscopic residual tumour
RX	Presence of residual tumour cannot be assessed								
R0	No residual tumour								
R1	Microscopic residual tumour								
R2	Macroscopic residual tumour								
Date of death		<i>m</i>							
Cause of death	Breast cancer / Intercurrent disease / Complications of treatment / Unknown	<i>m</i>							