

# INCIDENT ROUND CANCERS – IMAGING CHARACTERISTICS AT DIAGNOSIS AND ON THE PREVIOUS SCREENING ROUND.

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## INTRODUCTION:

Incident round cancers are those detected at subsequent routine recall screens in women who have already had their first or prevalent screen. The incident round cancer detection rate is increasing. Over the 6 year period between 2000 and 2005 it increased by 24% (from 5.4/1000 in 2000 to 6.7/1000 in 2005), mainly due to the rise in detection of small cancers ( $\leq 10\text{mm}$ ) which increased by 40%<sup>1</sup>.

At incident rounds, compared to the prevalent round, there is a lower recall rate (which dropped from 3.8% in 2000 to 3.6% in 2005). There is a balance between keeping the recall rate as low as possible while maintaining the cancer detection rate. The lower recall rate at incident rounds may in part be due to the benefit of having mammograms from the previous round to compare and use as a baseline to detect any change. Two-view mammography has been mandatory in screening assessment since 2003 which further aids in the detection of small, low grade invasive cancers.

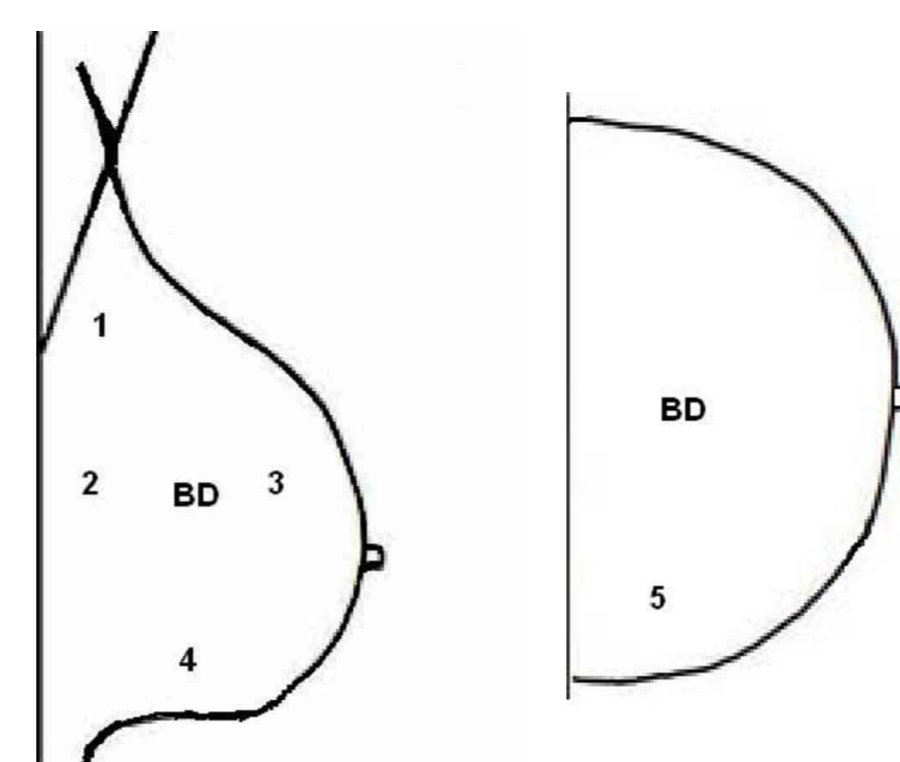
We have reviewed the imaging characteristics of incident round cancers at diagnosis and, if present, on the previous screening round to document their imaging progression and identify possible false negative screens (missed cancers).

## METHOD:

925 incident round cancers presented through the South East London Breast Screening Programme over a 10 year period, April 1998 to March 2008. The screening mammograms from 844 women were reviewed from the incident round and previous screening round. For each case, age, mammographic and histological size, mammographic sign, tumour type, grade and nodal status were documented.

When visible previously, mammographic size and sign, the position in the breast and interpretation previously were noted. There were 9 possible mammographic signs on the local coding sheet to document: mass, mass+microcalcifications, spiculated mass, spiculated mass + microcalcifications, microcalcifications, stellate, stellate + microcalcifications, asymmetric density or none. Only one sign was documented for each patient. The position in the breast was localised to one of 6 areas on the MLO and CC views as shown in figure 1. The interpretation previously was either normal/benign, subtle/uncertain or suspicious.

Figure 1 : Breast areas



## RESULTS:

26% (216/844) of incident cancers were potentially detectable on the previous screening mammograms (group 1). 74% (628/844) were not (group 2). The average patient age in both groups was 61 years and the average mammographic size at diagnosis was 17 mm in both groups ( $p=0.01$ ).

There were significant differences between the mammographic sign at diagnosis ( $p=0.0025$ ) and tumour grade ( $p=0.0001$ ). There were no significant differences in the tumour type ( $p=0.97$ ) or nodal status ( $p=0.12$ ) between the two groups.

### MAMMOGRAPHIC SIGN AT DIAGNOSIS

The most frequent mammographic sign at diagnosis was a spiculated mass in both groups, however there was a significant difference in the percentage of spiculated masses in each group, 56% in group 1 and 48% in group 2 ( $p=0.0025$ ). This table illustrates the mammographic sign at diagnosis ranked in order for both groups.

Mammographic sign	Number group 1	Percentage group 1 (%)	Ranking group 1	Number group 2	Percentage group 2 (%)	Ranking group 2
Mass	17	8	4	109	17	2
Mass + mcc	5	2.5	6	17	3	6
Spiculated mass	122	56	1	303	48	1
Spiculated mass + mcc	39	18	2	59	9	4
Microcalcification (mcc)	19	9	3	80	13	3
Stellate	7	3	5	32	6	5
Stellate + mcc	5	2.5	6	13	2	7
Asymmetric density	2	1	8	15	2	7
<b>TOTAL</b>	<b>216</b>	<b>100</b>		<b>628</b>	<b>100</b>	

### TUMOUR GRADE

Most tumours at diagnosis were grade 2 (group 1, 46%; group 2, 45%). In group 1 there were significantly more grade 1 tumours (43%) and nearly half the amount of grade 3 tumours (11%) ( $p=0.0001$ ).

Tumour Grade	Number group 1	Percentage group 1 (%)	Number group 2	Percentage group 2 (%)
Grade 1	93	43	178	28
Grade 2	99	46	282	45
Grade 3	24	11	132	21
<b>TOTAL</b>	<b>216</b>	<b>100</b>	<b>628</b>	<b>100</b>

There was a significant difference in mammographic size between the cancers at diagnosis (mean 17mm) and if present on the previous round (mean 10mm) ( $p=0.01$ ). If present previously, 69% were interpreted as subtle/uncertain, while 29% were interpreted as suspicious with only 2% as normal/benign.

### MAMMOGRAPHIC SIZE AT DIAGNOSIS AND IF PRESENT PREVIOUSLY

If present previously (group 1) the most likely signs were a mass (57%) ( $p=0.001$ ), microcalcification (13%) or asymmetric density (10%). This table illustrates the cases from group 1 with the mammographic sign at diagnosis and if present the sign previously, both ranked.

Mammographic sign	Number group 1	Percentage group 1 (%)	Ranking group 1	Number group 1 Present previously	Percentage group 2 (%) present previously	Ranking group 2
Mass	17	8	4	124	57	1
Mass + mcc	5	2.5	6	20	9	4
Spiculated mass	122	56	1	19	9	4
Spiculated mass + mcc	39	18	2	3	2	6
Microcalcification (mcc)	19	9	3	28	13	2
Stellate	7	3	5	0	0	
Stellate + mcc	5	2.5	6	0	0	
Asymmetric density	2	1	8	22	10	3
<b>TOTAL</b>	<b>216</b>	<b>100</b>		<b>216</b>	<b>100</b>	

### POSITION IN THE BREAST

This table shows the distribution of cancers as seen on the previous mammograms. The majority are in the suspicious "milky way"

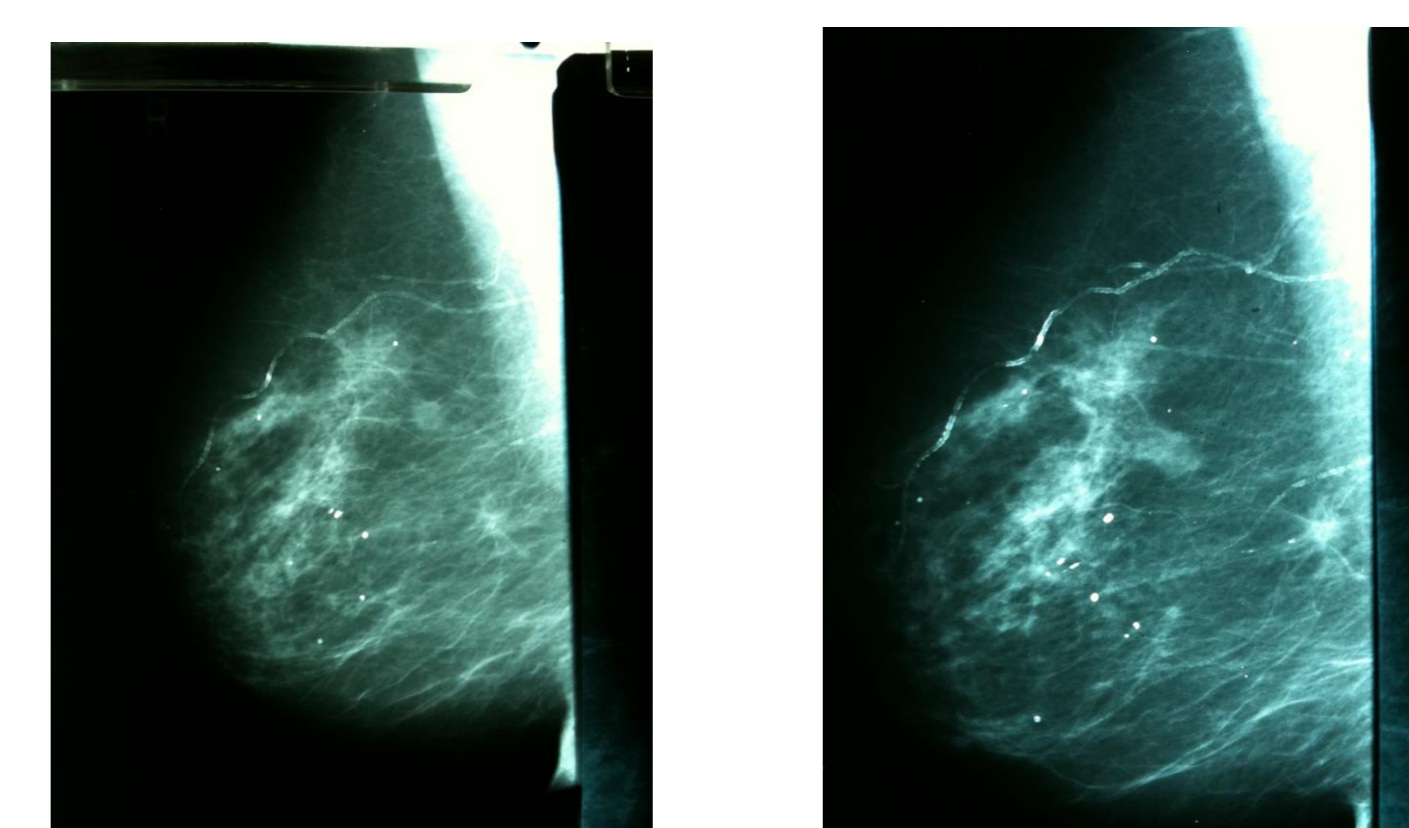
Position in the breast	Number	Percentage (%)
1	67	31
2	52	24
3	23	11
4	28	13
Breast Disc (bd)	46	21
<b>TOTAL</b>	<b>216</b>	<b>100</b>

## DISCUSSION:

26% of the incident cancers in our series were potentially detectable on the previous screening round mammograms. This is comparable with published data<sup>3</sup>. It has been reported that up to 48% of screen-detected cancers potentially show minimal signs on the previous screening mammograms<sup>4</sup>. The majority of incident cancers were grade 2 at diagnosis, however in group 1 the large quantity of grade 1 tumours (43%) and few grade 3 tumours (11%) suggest that incident cancers are slower growing and less aggressive in comparison to interval cancers which are more likely to be high grade.

At diagnosis the majority of incident cancers presented as a spiculated mass. If present previously they are most likely to appear as a mass (57%), asymmetric density (10%) or focus of microcalcification (13%). The mammographic progression of a mass/asymmetric density is to become a spiculated mass, which appears more obvious to the observers eye due to the accompanying distortion of the surrounding tissues and associated increased density as illustrated in figure 2. New or enlarging foci microcalcification are also more suspicious to the naked eye.

Figure 2 : Incident cancer on the right anterior to the pectoralis muscle with previous mammogram of 4 years



In our review, 98% of the cases that were present previously had their previous mammograms categorised as subtle/uncertain or suspicious. Care should be taken in the interpretation of these figures however as bias is introduced here, it being easier to identify a potentially abnormal area on a mammogram with the benefit of subsequent films.

In conclusion, if visible on previous mammograms incident round cancers are likely to be small, of low grade and appear as a mass, asymmetric density or focus of microcalcification. Special attention should be paid to these signs when in the review areas of the breast.

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