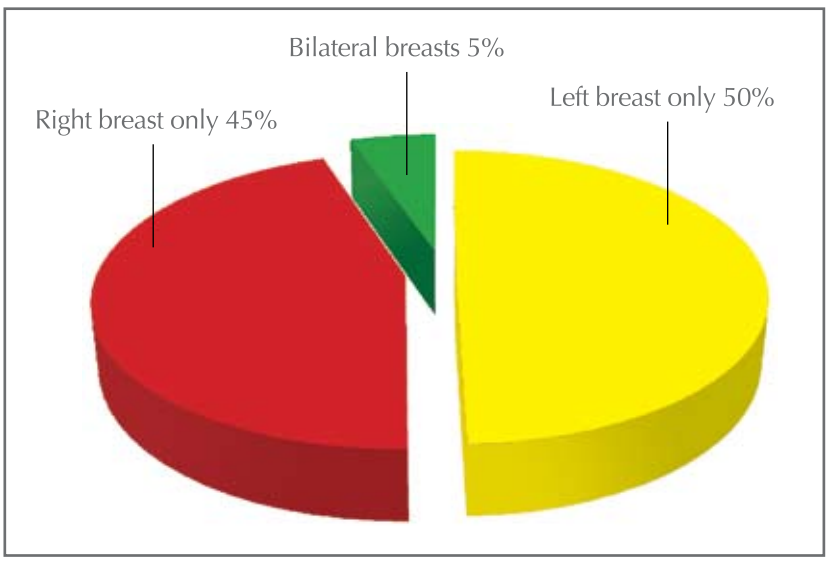
Duration from onset of symptoms to first medical consultation

Of the 2,607 patients who detected their cancers by chance, 45.1% sought their first medical consultation within 1-3 months of the onset of symptoms, 0.3% within 4-12 months and 0.1% after more than 12 months.

2.2 Characteristics of primary breast cancer

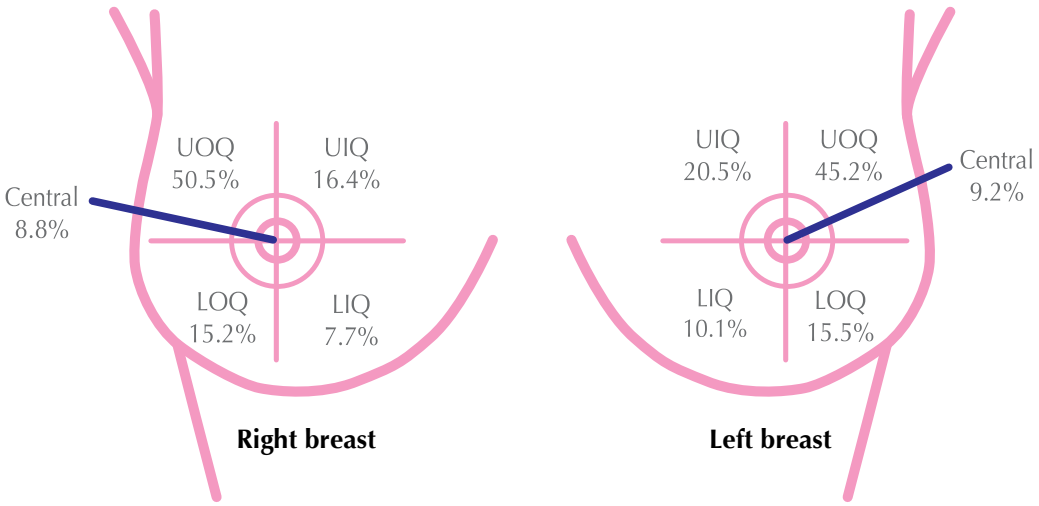
In the patient cohort, 45% of breast cancer occurred in the right breast only, 50% occurred in the left breast only and 5% occurred in both breasts (Figure 2.2.1).

Figure 2.2.1 Laterality of 3,467 breast cancer cases



A tumour can be multifocal or multicentric, or it can occur in both forms. Regarding tumour locations in the breast, the majority were found in the upper outer quadrant of the right breast (50.5%) and of the left breast (45.2%), while fewer occurred in the lower inner quadrant of the right breast (7.7%) and in the central of the left breast (9.2%) (Figure 2.2.2).

Figure 2.2.2 Locations of breast cancer (N=3,467)



UOQ: Upper outer quadrant, UIQ: Upper inner quadrant, LOQ: Lower outer quadrant, LIQ: Lower inner quadrant
* Figures include multicentric cancers

Diagnostic results of breast cancer

A number of diagnostic tests are used for the diagnosis of breast cancer. Mammography (MMG) is currently considered the 'gold standard' of breast imaging test. Breast ultrasound imaging (USG) and magnetic resonance imaging (MRI) are used for further investigation. Fine needle aspiration (FNA) and core needle biopsy (CNB) are used to confirm the malignancy of breast lesions.

About 80% of the patient cohort were diagnosed through MMG, 75.9% had USG and 4.7% had MRI (Table 2.2.1). Among the three breast imaging modalities, the sensitivities ranged from 75.6% in MMG to 95.7% in MRI.

Table 2.2.1 Sensitivity and diagnostic results of mammography, breast ultrasound and magnetic resonance imaging (MRI)

	Mammography (N=2,866)	Breast ultrasound (N=2,633)	MRI (N=162)
Proportion of subjects using the diagnostic test	2,866 / 3,467	2,633 / 3,467	162 / 3,467
Overall sensitivity	75.6%	83.4%	95.7%
BIRADS category			
Incomplete (BIRAD 0)	6 (0.2%)	2 (0.1%)	0 (0.0%)
Normal (BIRADS 1)	183 (6.4%)	73 (2.8%)	2 (1.2%)
Benign (BIRADS 2)	225 (7.9%)	85 (3.2%)	3 (1.9%)
Probably benign (BIRADS 3)	286 (10.0%)	277 (10.5%)	2 (1.2%)
Suspicious abnormality (BIRADS 4)	1,317 (46.0%)	1,309 (49.7%)	56 (34.6%)
Diagnostic / malignant (BIRADS 5)	849 (29.6%)	887 (33.7%)	99 (61.1%)

MRI: Magnetic resonance imaging; BIRADS: Breast Imaging Reporting and Data System;
Sensitivity: Number of true positives divided by total number

FNA, CNB and excisional biopsy were performed in 52.0%, 41.0% and 14.2% of the 3,467 patients respectively (Table 2.2.2). The sensitivities of these diagnostic tests were high, ranging from 90.8% in FNA to 100% in excisional biopsy.

Table 2.2.2 Sensitivity and diagnostic results of fine needle aspiration (FNA), core needle biopsy (CNB) and excisional biopsy

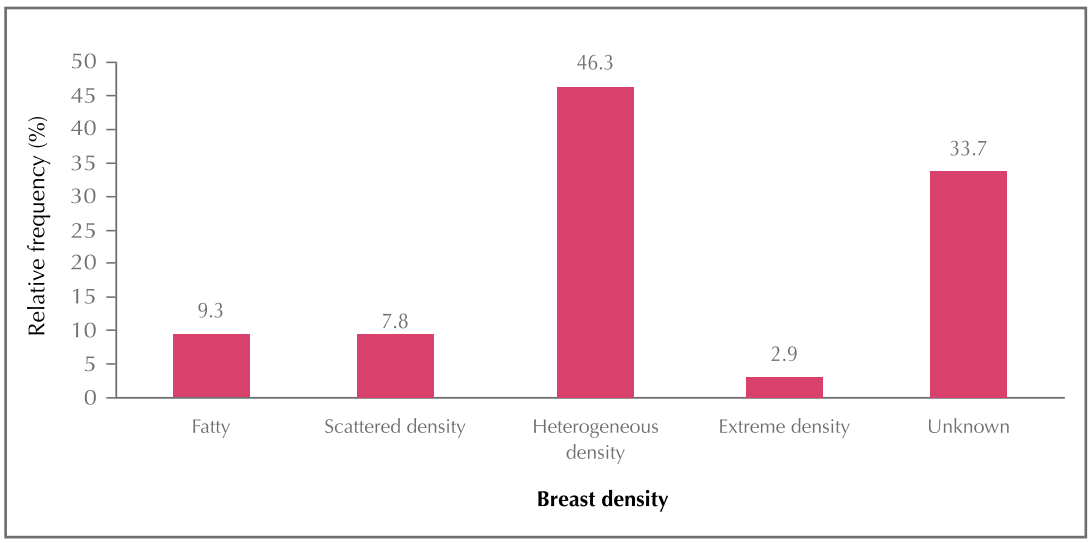
	FNA (N=1,805)	CNB (N=1,422)	Excisional biopsy (N=491)
Proportion of subjects using the diagnostic test	1,805 / 3,467	1,422 / 3,467	491 / 3,467
Overall sensitivity	90.8%	98.6%	100.0%
Class			
Incomplete (Class 0)	24 (1.3%)	2 (0.1%)	–
Scanty benign (Class I)	52 (2.9%)	4 (0.3%)	–
Benign (Class II)	90 (5.0%)	14 (1.0%)	–
Atypical (Class III)	172 (9.5%)	18 (1.3%)	–
Suspicious (Class IV)	379 (21.0%)	39 (2.7%)	–
Diagnostic / malignant (Class V)	1,088 (60.3%)	1,345 (94.6%)	491 (100.0%)

FNA: Fine needle aspiration; CNB: Core needle biopsy; Sensitivity: Number of true positives divided by total number

Mammography is a standard diagnostic method for the early detection of breast cancer. Of those diagnosed through mammography, micro-calcifications were found in 44.4% and opacity was found in 42.2% of the patient cohort.

Dense breast is associated with an increased risk of breast cancer. Of those who had diagnostic mammography, about 50% of patients were categorised as having heterogeneous or extremely dense breast tissue (Figure 2.2.3).

Figure 2.2.3 Breast density on mammography (N=2,866)



Types of cancer staging methods

Chest X-rays, abdominal ultrasound, PET scans, MRIs, bone scans and CT scans are common types of cancer staging methods to determine the extent of cancer spread.

Of the 2,967 patients, 9.6% did not receive any type of cancer staging and 90.4% received at least one type of cancer staging. For those who used cancer staging method, 60.6% had chest X-rays or abdominal ultrasound imaging which were the most common methods used. PET scans were the second most common method at 17.4%; CT thorax, CT abdomen or bone scans were used in 0.9%; and MRIs in 0.1% of 2,682 patients (Table 2.2.3).

Table 2.2.3 Types of cancer staging methods in 2,682 breast cancer patients

Type of cancer staging method	Number	(%)
CXR / USG abd	1,625	(60.6%)
PET scan only	467	(17.4%)
CTT / CTA / bone scan	24	(0.9%)
MRI only	4	(0.1%)
Unknown	410	(15.3%)
Others	152	(5.7%)

CXR/USG abd: Chest X-ray or abdominal ultrasound; PET scan: Positron emission tomography scan;
MRI: Magnetic resonance imaging; CTT / CTA/bone scan: Computed tomography of the thorax, computed tomography of the abdomen or bone scan

Cancer stage

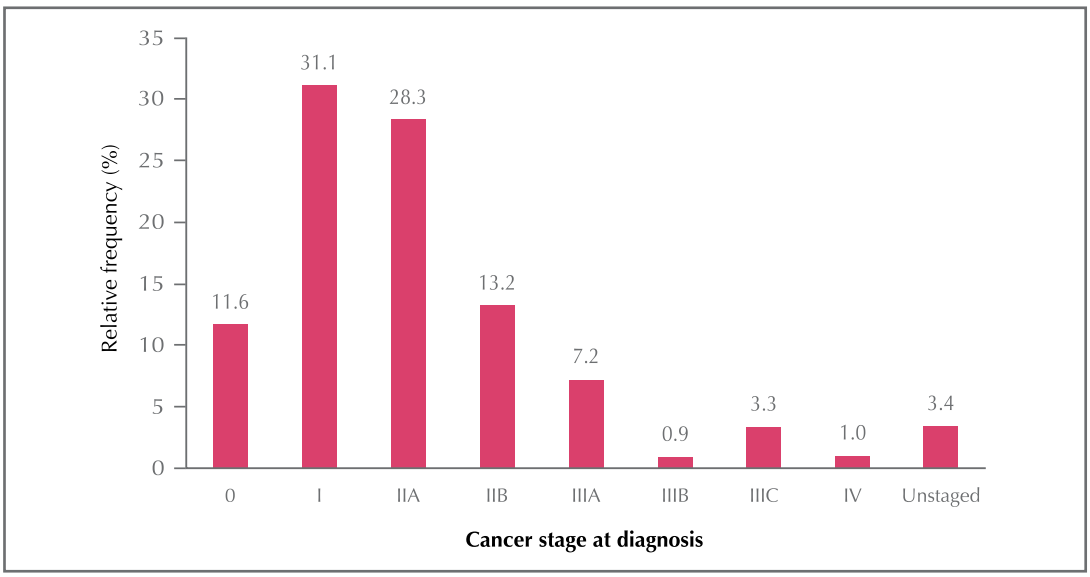
According to the AJCC Cancer Staging Classification[14], the distribution of cancer stages 0, I, IIA, IIB, IIIA, IIIB, IIIC, IV and unstaged at diagnosis among this cohort were 11.6%, 31.1%, 28.3%, 13.2%, 7.2%, 0.9%, 3.3%, 1.0% and 3.4% respectively (Figure 2.2.4). About 84% were early stage (stage 0-II) and 12.4% advanced stage (stages III-IV).

AJCC Cancer Staging Classification (7th edition)

Stage	T	N	M
0	Tis	N0	M0
IA	T1 *	N0	M0
IB	T0	N1mi	M0
	T1 *	N1mi	M0
IIA	T0	N1**	M0
	T1 *	N1**	M0
	T2	N0	M0
IIB	T2	N1**	M0
	T3	N0	M0
IIIA	T0	N2	M0
	T1 *	N2	M0
	T2	N2	M0
	T3	N1	M0
	T3	N2	M0
IIIB	T4	N0	M0
	T4	N1	M0
	T4	N2	M0
IIIC	Any T	N3	M0
IV	Any T	Any N	M1
Stage unknown			

* T1 includes T1mi
** T0 and T1 tumour with nodal micrometastases only are excluded from Stage IIA and are classified Stage IB.

Figure 2.2.4 Cancer stage at diagnosis in breast cancer patients (N=3,467)

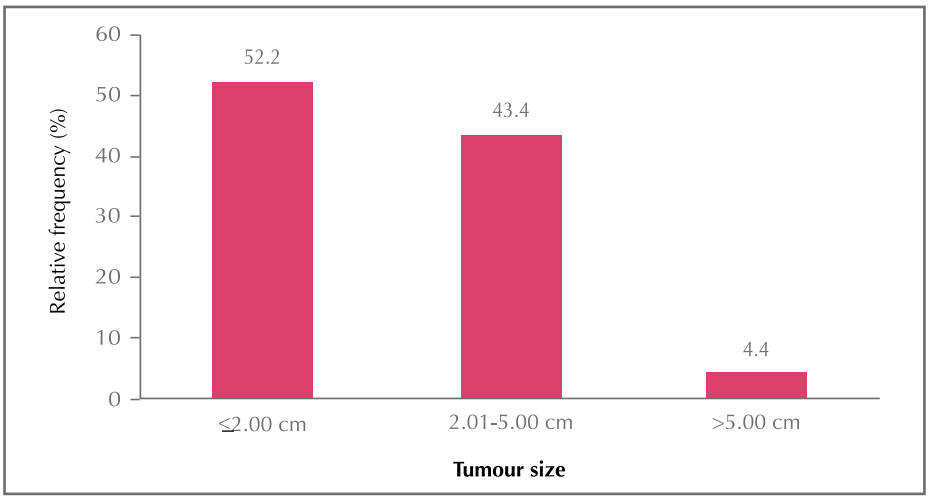


Characteristics of invasive breast cancer

Of the 3,467 breast cancer patients, invasive breast cancer accounted for 85.3% (2,957 cases). Over 83.6% of invasive breast cancer was early stage and 14.5% was advanced stage (Stage 0: 0.1%; Stage I: 35.7%; Stage IIA: 32.5%; Stage IIB: 15.3%; Stage III: 13.5%; Stage IV: 1.0%; Unstaged: 1.9%).

52.2% had invasive breast tumour smaller than 2.00 cm; 43.4% had invasive breast tumour between 2.01 and 5.00 cm; and 4.4% had invasive breast tumour larger than 5.00 cm (Figure 2.2.5).

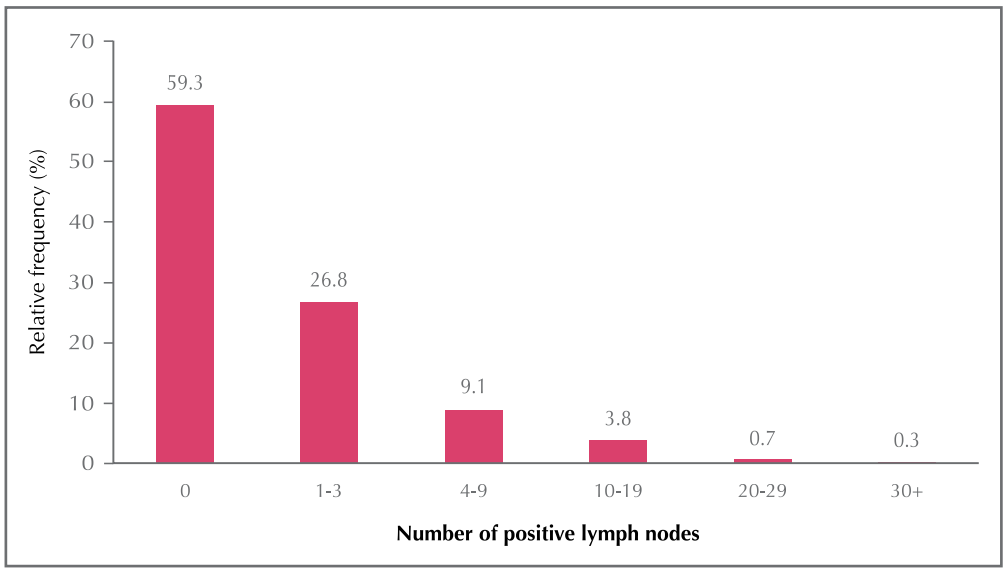
Figure 2.2.5 Distribution of tumour size of invasive breast cancer



The mean and median tumour sizes of invasive breast cancer were 2.3 cm and 2.0 cm respectively (range: 0.01cm-20.1cm). The median tumour size of invasive breast cancer was 50% larger in self-detected breast cancer than screen-detected breast cancer (self-detected vs. screen-detected: 2.1 cm vs. 1.4 cm). Screen-detected cases refer to breast cancer detected through clinical examination, mammography screening or ultrasound screening.

About 60% had no lymph node involvement; 26.8% had 1 to 3 positive lymph nodes; 9.1% had 4 to 9 positive lymph nodes and 4.8% had more than 10 positive lymph nodes (Figure 2.2.6).

Figure 2.2.6 Number of positive lymph nodes in invasive breast cancer

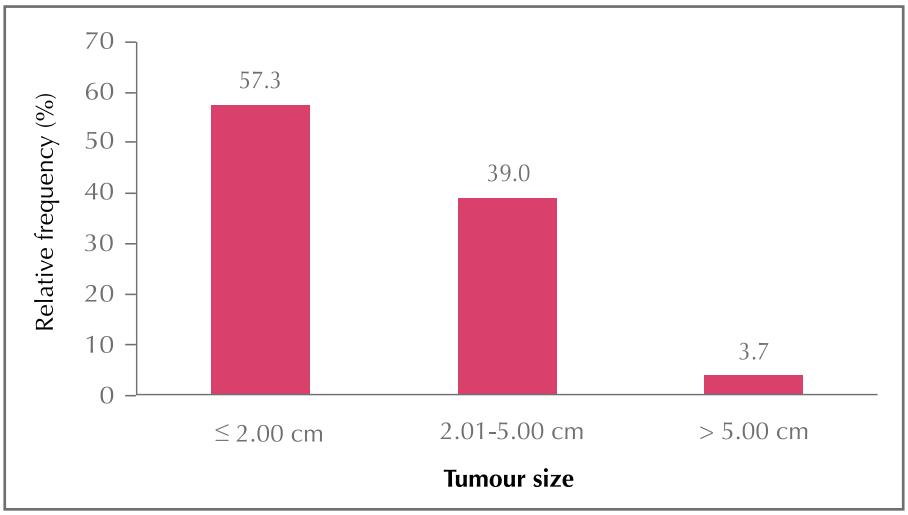


Characteristics of in situ breast cancer

Of all breast cancer cases, 422 (12.2%) were in situ breast cancer which was non-invasive in nature. The mean and median tumour sizes of in situ breast cancer were 2.2 cm and 1.7 cm respectively (range: 0.13 cm-9.0 cm).

Over 50% of tumours were smaller than 2.00 cm, 39.0% were 2.01-5.00 cm and only 3.7% were larger than 5.00 cm (Figure 2.2.7).

Figure 2.2.7 Distribution of tumour size of in situ breast cancer (N=422)



2.3 Histological and molecular characteristics

Invasive breast cancer

Of 2,956 invasive breast cancer cases, the five most common histological types were ductal (84.8%), lobular (4.5%), mucinous (3.6%), microinvasive (1.4%), tubular (1.0%) and papillary (0.9%). Grade 3 invasive breast cancer was found in 34.8% of the cases. Lymphovascular invasion was observed in 29.8% of the cases. About 13% were multifocal, with foci 5 mm apart in the same breast quadrant; only 3.1% were multicentric, defined as breast cancer occurring in more than one quadrant of the same breast (Table 2.3.1).