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Hong Kong Breast Cancer Registry Report No. 17

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Hong Kong Breast Cancer Registry
Report No. 17

ISSUE 2025

CONTENTS

FOREWORD

This year marks the 20th Anniversary of the Hong Kong Breast Cancer Foundation. We are pleased to announce that the data of over 30,000 breast cancer patients in Hong Kong have been collected and maintained under the Hong Kong Breast Cancer Registry (HKBCR). Through the collection of extensive data with long-term follow-up, the HKBCR has now grown to become the most comprehensive and representative breast cancer-specific database in Hong Kong and serve as a platform for breast cancer research. These invaluable data facilitate the conduct of various local studies and collaboration on research projects, providing insights into the better management of breast cancer in Hong Kong and benefiting the community.

As shown in the HKBCR data, the majority of breast cancer patients were worried about recurrence, while longer follow-up on survival revealed late recurrences. Continuing our research on metastatic breast cancer, this year we focused on those occurring after definitive treatment for an initial diagnosis of stages I-III disease, i.e. recurrent metastatic breast cancer (rMBC) or distant recurrence, and aimed to expand our knowledge on the risk factors for rMBC and its prognosis. Details of the study findings are set out in the accompanying Bulletin Issue 16.

Our achievement would not be possible without the dedication and foresight of the HKBCR Steering Committee, the efforts of our research team, the generosity of our sponsors and supporters and, most importantly, the trust of Hong Kong breast cancer patients and survivors. Future patients will benefit from the participation of Hong Kong breast cancer patients and survivors who entrusted us with their medical information for aggregate analysis. We extend our heartfelt thanks to each of them.

The publication of the HKBCR report and bulletin provides insights and evidence for stakeholders, including doctors, patients, policymakers and the wider public, to advocate and design plans for more effective cancer control. We will continue to study information from the HKBCR and conduct research for better breast health and cancer care to benefit the community of Hong Kong.

Thank you for your commitment and contribution.

Dr. Polly Cheung
Co-chairman, Hong Kong Breast Cancer Registry Steering Committee
Founder, Hong Kong Breast Cancer Foundation

Dr. Chun-chung Yau
Co-chairman, Hong Kong Breast Cancer Registry Steering Committee
Vice Chairman, Management Committee, Hong Kong Breast Cancer Foundation

ABOUT THE HONG KONG BREAST CANCER FOUNDATION

The Hong Kong Breast Cancer Foundation (HKBCF), founded on 8 March 2005, is the first non-profit charitable organisation in Hong Kong dedicated to mitigating the threat of breast cancer to the local community through education, patient support, research and advocacy. The HKBCF is operated by Hong Kong Breast Cancer Foundation Limited.

Mission

- Promote public awareness of breast cancer and the importance of breast health
- Support breast cancer patients on their road to recovery
- Advocate better breast health and breast cancer care in Hong Kong

Work

- Provides breast health education, risk assessment, breast screening and diagnostic services, including mammography and ultrasound screening, needle biopsy and consultation with surgeons, through its two **Breast Health Centres**
- Provides holistic breast cancer care for patients and their families including peer emotional support, professional counselling, paramedical care such as lymphoedema prevention and treatment, drug assistance and other support services through its two **Breast Cancer Support Centres**
- Collects data on local breast cancer cases, monitors related changes and publishes findings and analyses through the **Hong Kong Breast Cancer Registry** of its **Breast Cancer Research Centre (BCRC)**; the BCRC also undertakes other breast cancer researches to facilitate the development and advocacy of better treatment and care for breast cancer and more appropriate healthcare control policies in Hong Kong

ABOUT THE HONG KONG BREAST CANCER REGISTRY

The Hong Kong Breast Cancer Registry (HKBCR) was established in 2007 by the Hong Kong Breast Cancer Foundation (HKBCF) and has since grown to become the most comprehensive and representative data collection and monitoring system for breast cancer in Hong Kong.

The HKBCR aims to collect and conduct analyses on data from local breast cancer cases to provide comprehensive reports on patient demographics, risk exposures, clinical examinations, treatments, clinical outcomes and psychosocial impact on patients. These reports allow patients, medical professionals and public health policymakers to better understand breast cancer in Hong Kong and be informed of up-to-date facts regarding the disease. These reports also provide insights and evidence to support the HKBCF's advocacy for better prevention, detection and treatment of breast cancer.

The HKBCR's work is guided by a committee, the Hong Kong Breast Cancer Registry Steering Committee, consisting of doctors, professionals from the legal, business management and public health fields, and breast cancer patients.

Data analyses and study findings by the HKBCR are published annually in the ***Hong Kong Breast Cancer Registry Report*** and ***HKBCR Bulletin***.

Information about the HKBCR as well as research reports and bulletins are available online:
https://www.hkbcf.org/en/our_research/main/424/

The HKBCR is a member of the International Association of Cancer Registries (IACR).

Missions

- Provide vital data, analyses and insights for medical professionals, policymakers, the HKBCF, and wider public to advocate and design plans for more effective cancer control
- Bring about changes in public policies and medical practice for improving breast health care in Hong Kong
- Serve as a model for other cancer-specific registries to guide cancer control plans in Hong Kong

AN OVERVIEW OF THE HONG KONG BREAST CANCER REGISTRY'S WORK

Breast cancer in Hong Kong

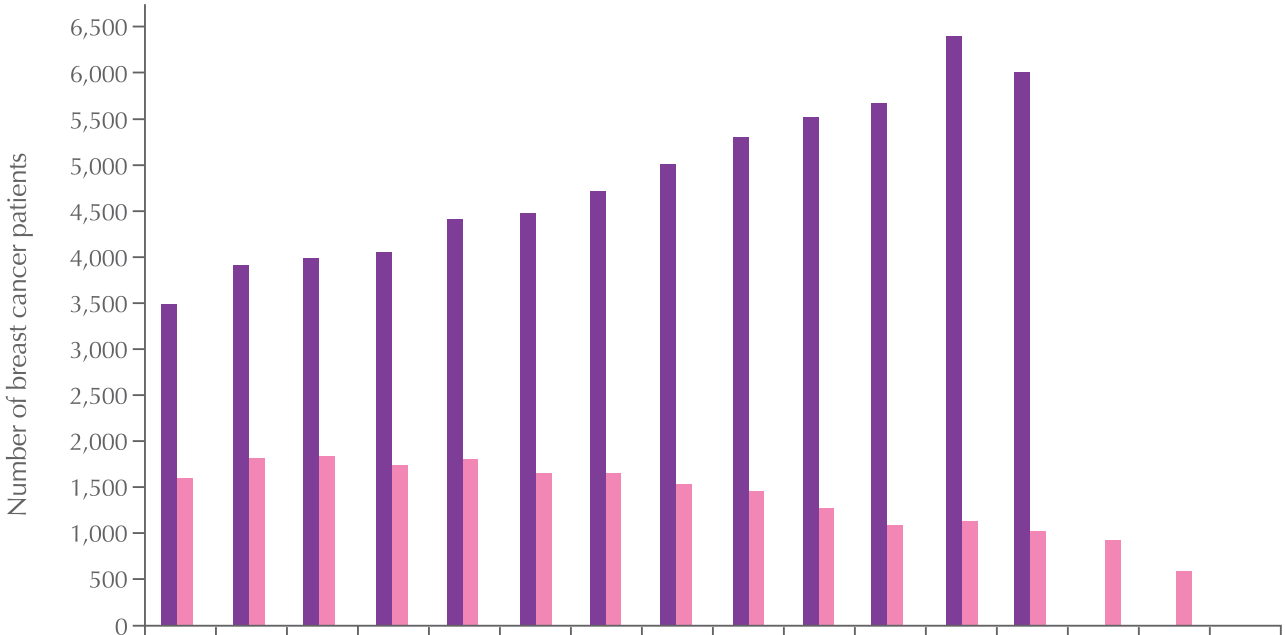
Breast cancer is the most common cancer among women in Hong Kong. In 1994, 1,266 women in Hong Kong were diagnosed with invasive breast cancer. The figure increased to 5,182 women in 2022, accounting for 28.6% of all new female cancer cases in that year. The cumulative lifetime risk of developing invasive breast cancer is also on the increase: from one in 21 women in 2008 to one in 14 women in 2022.[1]

Breast cancer has the third highest mortality rate among all female cancer deaths. In 2022, 792 women died of breast cancer.[1]

About 30,000 patients are registered with the Hong Kong Breast Cancer Registry

Between 2008 and February 2025, about 30,000 breast cancer patients had registered with the Hong Kong Breast Cancer Registry (HKBCR) and participated in the data collection and analyses of the HKBCR. The distribution of year of diagnosis in the past 15 years is shown in Figure I.

Figure I: Distribution of year of diagnosis of HKBCR participants in the past 15 years



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
HKCaR	3486	3903	3985	4041	4398	4475	4707	5009	5287	5498	5662	6400	6017	0	0	0
HKBCR	1613	1827	1867	1747	1810	1660	1662	1560	1448	1280	1088	1141	1029	932	586	11
HKBCR / HKCaR, %	46.3	46.8	46.9	43.2	41.2	37.1	35.3	31.1	27.4	23.3	19.2	17.8	17.1	N/A	N/A	N/A

HKCaR presents the number of breast cancer cases recorded by the Hong Kong Cancer Registry, Hospital Authority; Data for years marked with "0" are not published

HKBCR presents the number of patients registered with the Hong Kong Breast Cancer Registry, Hong Kong Breast Cancer Foundation

Participating hospitals and clinics

The HKBCR aims to collect data on as many breast cancer cases as possible so as to present comprehensive reports on breast cancer in Hong Kong. The success of the HKBCR relies heavily on the participation of breast cancer patients and survivors as well as the support of medical and healthcare professionals. At present, the HKBCR has 66 participating sites comprising multiple public and private hospitals and clinics in Hong Kong. They include:

- CUHK Medical Centre*
- Hong Kong Adventist Hospital*
- Hong Kong Baptist Hospital*
- Hong Kong Sanatorium and Hospital*
- Kwong Wah Hospital
- North District Hospital
- Our Lady of Maryknoll Hospital
- Pamela Youde Nethersole Eastern Hospital*
- Pok Oi Hospital
- Prince of Wales Hospital
- Princess Margaret Hospital*
- Queen Elizabeth Hospital
- Queen Mary Hospital*
- Ruttonjee Hospital
- St. Paul's Hospital
- Tseung Kwan O Hospital
- Tsuen Wan Adventist Hospital
- Tuen Mun Hospital
- Union Hospital
- United Christian Hospital
- Yan Chai Hospital

and

- 38 Private clinics

* With multiple participating sites

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ABOUT THE PATIENT COHORT OF REPORT NO. 17

During the COVID-19 pandemic, on-site recruitment was suspended especially in public hospitals, leading to a skewed public-private distribution of participants. Although the number of registrations from public hospitals has gradually increased in the post-pandemic era, recovery takes time. To partial out the impact of COVID-19, detailed local facts of breast cancer (Chapters 1-3) were drawn from patients diagnosed between 2006 and 2018, while the characteristics, disease pattern and treatment trend of patients diagnosed from 2019 onwards are reported in Chapter 4. The number of patients whose data were used for analyses in each chapter/section of this report is shown in Table I.

As of February 2025, a total of 30,038 breast cancer patients were registered with the HKBCR. **This report covered 26,364 patients diagnosed from 2006 onwards.** Of the 20,521 patients diagnosed between 2006 and 2018, 5,214 (25.4%) were registered at private clinics or hospitals and the remaining 15,307 (74.6%) through public hospitals.

Upon receiving written consent from patients, the HKBCR research staff gathered information including demographics, lifestyle, health background, breast screening habits, physical discomfort after treatment, psychosocial impacts and lifestyle adjustments after diagnosis and therapy (Chapters 1 and 3 data) through standardised questionnaires. HKBCR research staff also collected data on cancer characteristics and treatment modality (Chapter 2 data) from patients' medical records. Patient follow-up was conducted on an annual basis, and data regarding patient recurrence or metastasis were also collected, including date and site of disease recurrence.

Patient participants of the HKBCR diagnosed between 2006 and 2018 represented about 40% of all the breast cancer cases reported by the Hong Kong Cancer Registry of the Hospital Authority in those years. To illustrate that our data are representative, 1,222 HKBCR participants diagnosed in 2018 were extracted from the database. As shown in Table II, the distribution of prognostic stages in both groups of cases was similar, of which about half of the cases were stage I breast cancer.

Conclusions and observations in this report are drawn solely from the data analyses of the patient participants of the HKBCR, who are part of the breast cancer patient population. Increased participation from hospitals and clinics in Hong Kong has helped render the data more representative over the years. Since the publication of the first HKBCR report, an increasing percentage of patients from public hospitals has been covered: from 41.7% in Report No. 2 to 74.6% in this report which is comparable to the estimated percentage (75%) of breast cancer patients who use public health sector services.

Table I: Number of patients whose data were used for analyses in different chapters of Report No. 17

	Number of patients
Chapter 1	20,104
Chapter 2	19,811
Patient Status	18,872
Chapter 3	18,289
Chapter 4	5,967

Table II: Distribution of prognostic stages in patients diagnosed in 2018

	HKCaR (N=5,287)		HKBCR (N=1,222)	
	N	%	N	%
Stage 0	669	12.7	143	11.7
Stage I	2,600	49.2	639	52.3
Stage II	656	12.4	130	10.6
Stage III	554	10.5	76	6.2
Stage IV	379	7.2	30	2.5
Unstaged	429	8.1	204	16.7

HKCaR: Hong Kong Cancer Registry, Hospital Authority;
HKBCR: Hong Kong Breast Cancer Registry, Hong Kong Breast Cancer Foundation

EXECUTIVE SUMMARY

During the COVID-19 pandemic, on-site recruitment was suspended especially in public hospitals, leading to a skewed public-private distribution of participants. Although the number of registrations from public hospitals has gradually increased in the post-pandemic era, recovery takes time. To partial out the impact of COVID-19, detailed local facts of breast cancer (Chapters 1-3) were drawn from patients who were diagnosed between 2006 and 2018, while the patient characteristics and disease pattern of patients who were diagnosed from 2019 onwards are reported in Chapter 4.

Local facts of breast cancer in Hong Kong

Patient characteristics

- Of the 20,104 patients who were diagnosed with breast cancer between 2006 and 2018 and recruited in the HKBCR, two-thirds of the patients were aged between 40 and 59, with the median age at 52.3.
- About 60% of the patients had three or more common risk factors, while only 2.6% had none. The top four common risk factors were lack of exercise, no breastfeeding, being overweight/obese and high level of stress. They are all modifiable and women are encouraged to take primary preventive actions, i.e. maintaining a healthy lifestyle, in order to reduce their risk of breast cancer.
- Of the patients aged 40 or above, 66.5% had never undergone mammography (MMG), while less than a quarter had regular MMG. Patients with lower education levels and lower monthly household income had lower proportion of undergoing regular MMG. The findings reflected that the breast screening habits were poor, and more should be done to enhance women's awareness of regular check-ups.

Disease pattern

- The primary method of first cancer detection was self-detection by chance.
- The proportion of stages 0-I cancer was higher among MMG-detected cases compared to self-detected cases. Also, MMG-detected tumours were smaller than those self-detected by chance, reflecting that screening could detect cancer earlier.
- The most common cancer stage at diagnosis was stage II (35.8%) followed by stage I (31.0%) and stages III-IV (16.3%). In addition, 12.8% of the patients were diagnosed with stage 0 cancer.

Treatment

- Of the patients, 15.2% received care at private medical services, 50.9% received care at public medical services, and 33.9% received care at both private and public medical services.
- The number of treatment modalities increased with increasing cancer stage, showing that combinations of treatments were usually used to treat breast cancer effectively.
- Nearly all patients underwent surgery as part of their treatment. The proportion of patients who underwent mastectomy was positively correlated with increasing age.
- Sentinel node biopsy alone was more commonly performed on patients with negative clinical nodal status than those with positive clinical nodal status, while axillary dissection alone was more commonly performed on the patients with positive clinical nodal status than those with negative clinical nodal status.
- The proportions of the patients who underwent breast-conserving surgery and received radiotherapy afterwards were similar across cancer stages, while the proportion of patients who underwent mastectomy

and also received radiotherapy increased significantly with progressing cancer stage.

- The use of neoadjuvant chemotherapy was positively correlated with progressing cancer stage from stage I to III, while the overall use of curative intent chemotherapy also increased.
- For patients with invasive breast cancer, about 75% or more received endocrine therapy, while for patients with in situ breast cancer, only 15.8% received endocrine therapy.
- The use of anti-HER2 targeted therapy was much lower for stage I patients, and the proportions increased with increasing cancer stage among stage II or above patients.

Patient status

- A total of 18,872 patients had been followed up at least once since registration, with the median follow-up period of 6.3 years, and 1,708 patients died from breast cancer.
- In the cohort, 2.5% experienced only locoregional recurrence, 3.2% experienced only distant recurrence, and 2.3% experienced both locoregional and distant recurrence.
- The most common sites for locoregional recurrence were breast (39.5%) and axilla (32.7%), while the top four organs involved in distant recurrence were bone (59.8%), lung (47.2%), liver (39.1%) and brain (16.0%).

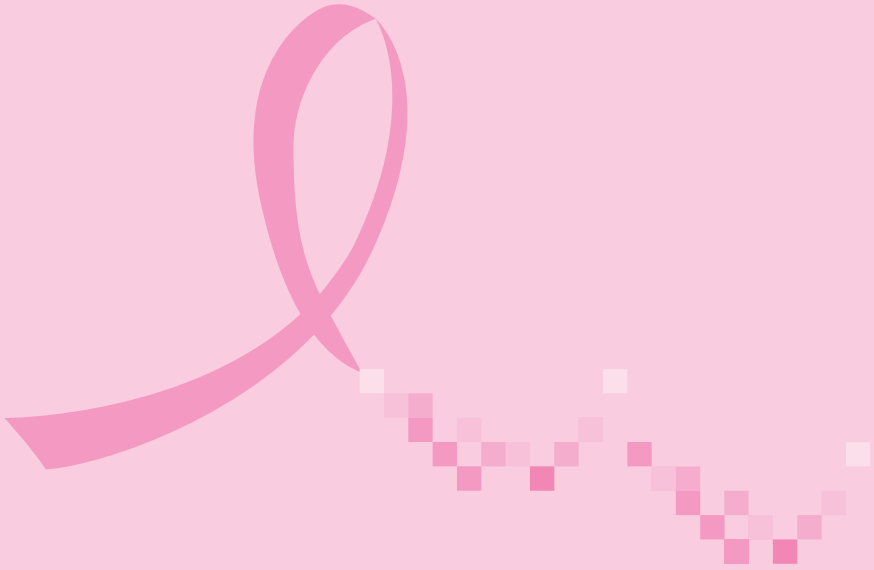
Physical and psychological impact of breast cancer

- The majority of patients experienced no or minimal physical discomfort after undergoing surgery, radiotherapy, endocrine therapy and targeted therapy, while about half of the patients who had chemotherapy experienced severe physical discomfort due to side effects.
- Positive changes in outlook on life and self-image were negatively associated with increasing age.
- The proportion of patients who never worried about recurrence increased with increasing age, while the proportion of patients who always worried about recurrence decreased with increasing age.

Breast cancer under COVID-19 pandemic

- Of the 5,967 patients who were diagnosed between 2019 and 2025, about 55% were aged between 40 and 59, with the median age at 56.4.
- Of the patients, 64.7% had three or more common risk factors, while only 2.5% had none.
- The primary method of first breast cancer detection in the cohort was still self-detection by chance (64.2%), while detection through mammography screening constituted 22.6%.
- The most common cancer stage at diagnosis was stage I (34.9%) followed by stage II (30.3%) and stages III-IV (11.9%). In addition, 16.5% of the patients were diagnosed with stage 0 cancer.
- Of the patients, 39.0% received care at private medical services, 26.3% received care at public medical services, and 34.7% received care at both private and public medical services. It might imply that the public-private distribution of participants has become skewed towards the private sector due to suspension of on-site recruitment in public hospitals during the pandemic. Further actions are being taken to increase the registrations at public hospitals in order to capture the true picture of breast cancer patients in Hong Kong.

The theme paper on recurrent metastatic breast cancer (Bulletin Issue 16) is also published, please read online: https://www.hkbcf.org/en/our_research/main/424/



CHAPTER 1

PREVENTION AND EARLY DETECTION OF BREAST CANCER

CHAPTER 1
PREVENTION AND EARLY DETECTION OF BREAST CANCER

I. Introduction

1.1 It is well established that breast cancer is related to certain health factors and lifestyle behaviours. In this chapter, using the data collected on the demographics and socio-economic factors, lifestyle and health background from 20,104 Hong Kong breast cancer patients diagnosed between 2006 and 2018 and recruited in the Hong Kong Breast Cancer Registry (HKBCR), the distribution of these factors among patients in the local context was studied. Their breast screening habits, in particular, were also examined. These analyses aim to shed light on the causes of breast cancer in Hong Kong.

HIGHLIGHTS

This chapter reports the patient characteristics of 20,104 breast cancer patients diagnosed between 2006 and 2018 and recruited in the HKBCR.

- Two-thirds of the patients were aged between 40 and 59, with the median age at 52.3.
- About 70% attained secondary school level or above.

Risk factors

- The 10 most common risk factors of breast cancer, with the respective proportions of risk exposure, are listed below:

	%
Lack of exercise (<3 hours / week)	77.6
No breastfeeding	66.0
Being overweight / obese	38.9
High level of stress (>50% of time)	37.0
No childbirth / first live birth after age 35	27.4
Family history of breast cancer	15.1
Diet rich in meat / dairy products	14.1
Early menarche (<12 years old)	14.1
Habit of drinking alcohol	5.3
Use of hormone replacement therapy	3.5

- In the cohort, 61.3% of the patients had three or more common risk factors, while 36.1% had one to two risk factors. Only 2.6% of the patients had none of the common risk factors.

Screening habits

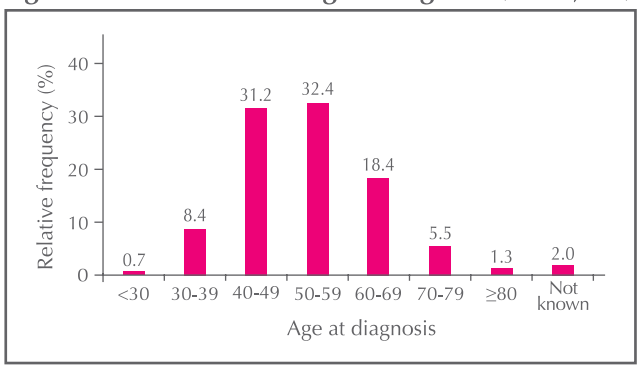
- Of the patients aged 40 or above, 66.5% had never undergone mammography (MMG), while about 20% had regular MMG.
- Patients with lower education levels had lower proportion of undergoing regular MMG.
- Patients with lower monthly household income had lower proportion of undergoing regular MMG.

II. Demographics

A. Age at diagnosis

1.2 The age at diagnosis ranged from 18 to 103 with two-thirds of the patients aged between 40 and 59 (Figure 1.1), and the median was 52.3 years. It was found that patients in different age groups had different habits of breast screening (Section IV below).

Figure 1.1: Distribution of age at diagnosis (N=20,104)

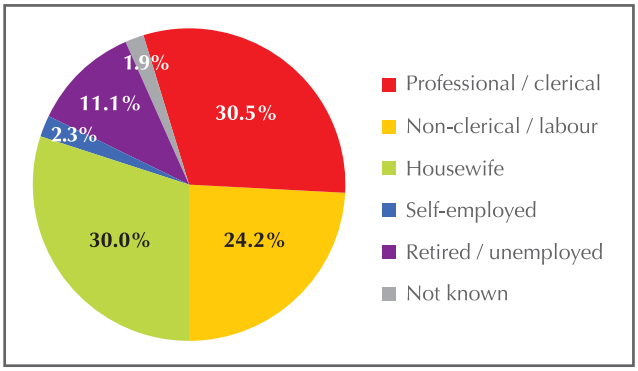


B. Occupation

1.3 Although international studies provided no evidence that occupation was related to breast cancer,[2] some studies suggested a certain degree of association between night shift and breast cancer.[3] There were arguments that night shift work interacted with chronotype and resulted in a disrupted circadian rhythm due to exposure to artificial light at night.[3,4]

1.4 A local study found that the median working hours among women in the general population was 42.0 per week.[5] The findings of the Hong Kong Breast Cancer Foundation (HKBCF) were consistent with the finding of the local study. In this report, slightly more than half of the patients were working at cancer diagnosis (Figure 1.2), and the median working hours was 45.0 per week. Of the employed patients, 9.0% had night shift duties, and the median number of nights they worked in a year was 60.0.

Figure 1.2: Occupation of patient cohort (N=20,104)



C. Education level and monthly household income

1.5 Studies conducted in Western countries found that lower education level and household income were associated with lower level of breast cancer awareness and less regular breast screening habits of women, even though they lived in the same city.[6-8] A study of the HKBCF produced similar findings.[9]

1.6 In this report, 70.9% of the patients attained secondary school level or above, while the remainder had primary school level or below (Figure 1.3). Patients who attained lower education levels were less likely to undergo regular breast screening than those with higher education levels (Section IV below).

1.7 About 40% of patients had a monthly household income of $30,000 or more, while about 20% had less than $10,000 (Figure 1.4). Patients who had lower monthly household income were less likely to undergo regular breast screening than those with higher income (Section IV below).

Figure 1.3: Education level of patient cohort (N=20,104)

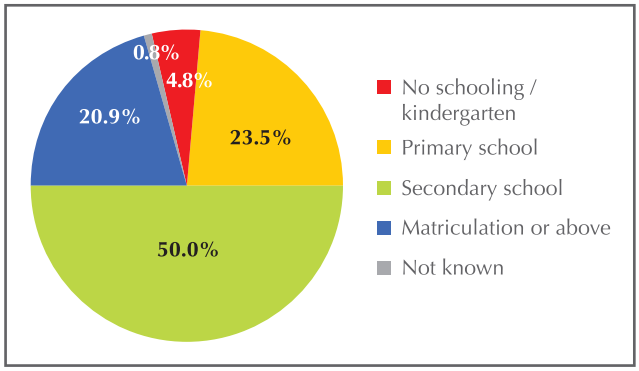
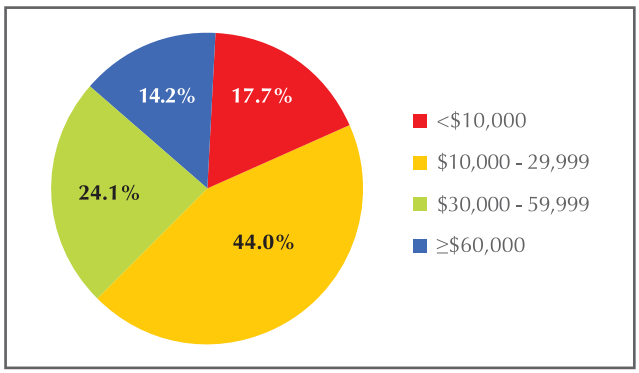


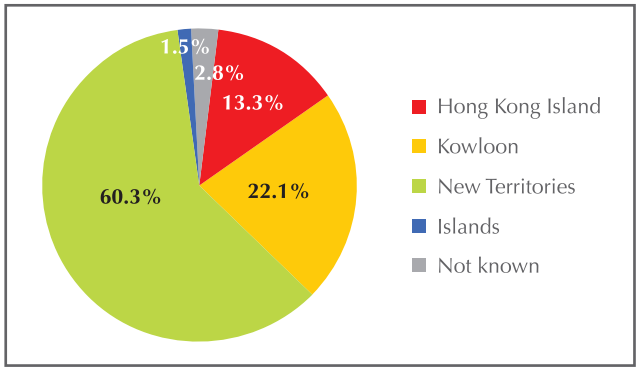
Figure 1.4: Monthly household income (HK$) of patient cohort (N=11,048)



D. District of residence

1.8 In the cohort, 60.3% of the patients resided in the New Territories, 22.1% resided in Kowloon, and 13.3% resided on Hong Kong Island (Figure 1.5). Patients living in the New Territories or Kowloon had less regular breast screening than those living on Hong Kong Island (Section IV below).

Figure 1.5: District of residence of patient cohort (N=20,104)



E. Bra band size and bra cup size

1.9 It is commonly perceived that women with larger breast size may have higher risk of breast cancer. However, such a direct relationship lacks supporting evidence.[10,11] A study indicated that breast cup size could account for breast density[12] which has a role in breast cancer risk.[13,14] Another study found that larger breast size could be genetically predisposed to high body mass index (BMI), which correlated with breast cancer risk.[15] Therefore, only an indirect relationship between breast size and breast cancer risk was suggested.

1.10 In the cohort, the median bra band size was 34 inches and 49.3% of the patients were above the median (Figure 1.6). For breast cup size, about three-quarters had cup B or smaller breasts, while only a small proportion had cup D or above (Figure 1.7).

Figure 1.6: Bra band size of patient cohort (N=15,579)

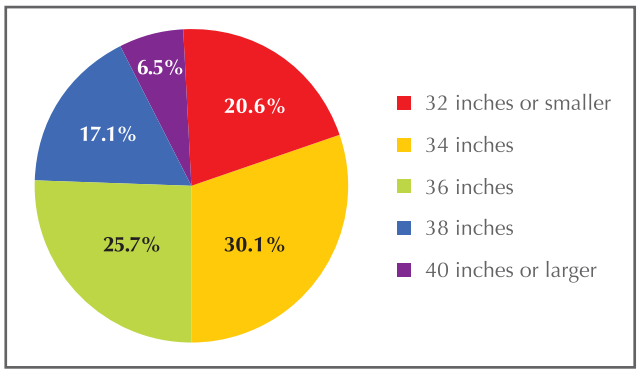
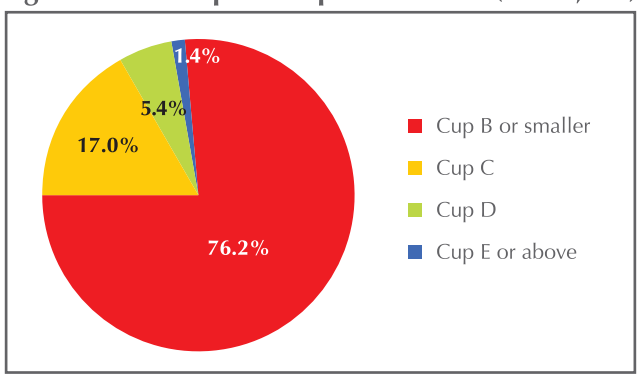


Figure 1.7: Bra cup size of patient cohort (N=13,125)



III. Risk factors and health background

A. Tobacco smoking

1.11 The International Agency for Research on Cancer (IARC) has classified tobacco smoking as a probable cause of breast cancer.[3] A study found that in Hong Kong, 3.4% of women currently had smoking habit.[16] Although the relationship between active or passive smoking and breast cancer has yet to be established,[17] the HKBCF found that current or ex-smokers had a higher breast cancer risk.[18]

1.12 In the cohort, 4.8% of the patients reported that they had smoked prior to cancer diagnosis, and 48.2% of these smokers were still smoking at diagnosis. The mean packs of cigarettes consumed by current or ex-smokers, who had quit smoking for less than a year, were 3.8 per week in the preceding 12 months prior to cancer diagnosis.

B. Alcohol drinking

1.13 The World Health Organization (WHO) has classified alcohol consumption as Group 1 carcinogen for breast cancer for people of all ages.[3,19] The risk of breast cancer increases with the amount of alcohol consumed. For every 10 g ethanol (i.e. one standard drink, approximately equals to a 330 ml can of beer or a 100 ml glass of table wine or a 30 ml glass of high strength spirit) consumed per day, the risk of breast cancer is increased by 5% for premenopausal women and 9% for postmenopausal women.[19] A study found that in 2023, 18.4% of Hong Kong women in the general population had consumed alcoholic beverages in a 12-month period.[16]

1.14 In the cohort, 5.3% of the patients reported that they had been alcohol consumers (i.e. consuming five alcoholic drinks or more in a 12-month period) at some point in their life, and 40.4% of them still consumed alcohol at diagnosis.

C. *Dietary and exercise habits and stress level*

1.15 Most findings on the effect of dietary factors on breast cancer risk were inconclusive and inconsistent. However, a link between physical activity and prevention of postmenopausal breast cancer was found.[19] The HKBCF also found a negative association between physical exercise and breast cancer risk, in that working out for three hours or more per week would help reduce breast cancer risk not only among postmenopausal women but also among premenopausal women.[18]

1.16 In the cohort, 69.0% of the patients had a balanced diet, while 14.1% ate a diet rich in meat or dairy products (Figure 1.8). About one-fifth of the patients exercised three hours or more per week, while about two-fifths never exercised in the year prior to diagnosis (Figure 1.9).

1.17 Current studies on stress as a risk factor for breast cancer are non-conclusive and the subject requires further investigation. The HKBCF, nevertheless, found increased risk in women with a perceived high level of psychological stress, when it is measured at a global level with all the possible stressors included.[18] In this report, 37.0% of the patients said that they had experienced high level of stress in the year prior to cancer diagnosis (Figure 1.10).

Figure 1.8: Dietary habits at diagnosis (N=20,104)

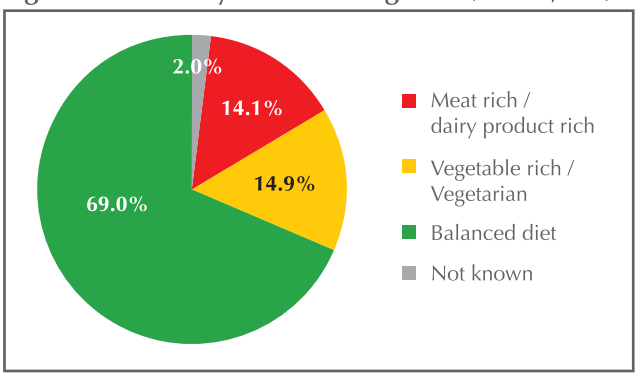


Figure 1.9: Exercise habits at diagnosis (N=20,104)

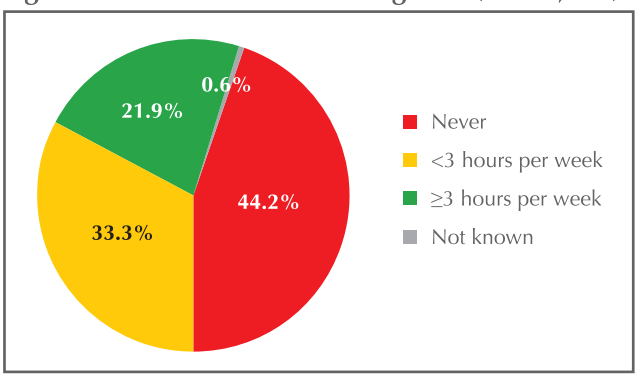
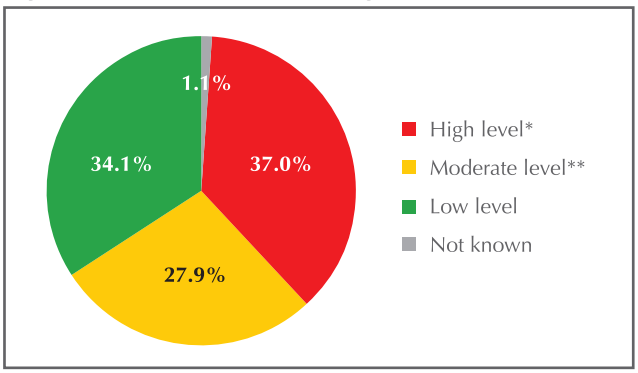


Figure 1.10: Stress level at diagnosis (N=20,104)



* High level is defined as more than 50% of the time

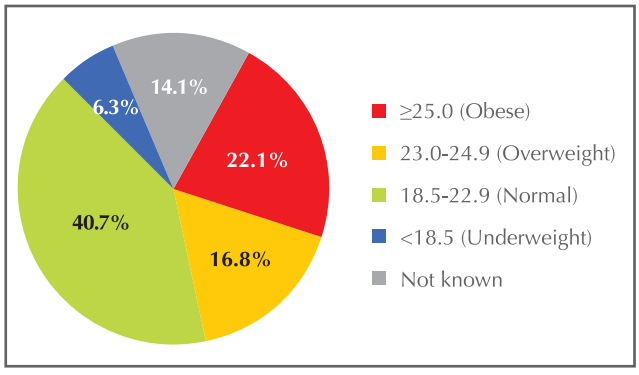
** Moderate level is defined as 25%-50% of the time

D. Height, weight and body mass index

1.18 Body mass index (BMI) is a heuristic method of estimating human body fat based on an individual's height and weight. It is calculated by dividing weight in kilograms by height in metres squared (kg/m^2). Overweight and obesity for Asian women were defined as having BMI of 23.0 to 24.9 and 25.0 or over respectively. Obesity is considered a risk factor for breast cancer.[18,20] A local study found that 19.7% and 26.4% of women aged 15 to 84 in Hong Kong were classified as overweight and obese respectively.[21]

1.19 In this report, the patient cohort had an average height of 157.9 cm and an average weight of 57.5 kg. About two-fifths of the patients were overweight or obese (Figure 1.11).

Figure 1.11: Body mass index at diagnosis (N=20,104)



E. Family history of breast cancer

1.20 Breast cancer risk is found to be higher among women who have one first-degree relative with breast cancer, when compared to women with no first-degree relatives with the disease. The risk is even higher among women having more first-degree relatives with breast cancer, or having relatives diagnosed before the age of 50.[22,23] In the cohort, 15.1% of the patients had family histories of breast cancer (Table 1.1).

Table 1.1: Family history of breast cancer at diagnosis (N=20,104)

	Number	%
No	16,863	83.9
Yes with first-degree relative(s)	2,176	10.8
Yes with non first-degree relative(s) only	816	4.1
Yes but details not known	36	0.2
Family history not known	213	1.1

F. Personal history of other tumours

1.21 International studies and studies on Hong Kong Chinese cohort estimated that 5% to 10% of breast cancer patients are genetically predisposed.[24,25] Breast cancer risk was higher in women with previous histories of germline-mutation-related types of cancer, including Hodgkin lymphoma, melanoma, lung adenocarcinoma, bowel cancer, uterine cancer and chronic lymphocytic leukaemia, or any type of cancer in childhood.[26-31] On the other hand, breast cancer risk was found to be lower in cervical squamous cell carcinoma survivors.[30,31] In this report, 1.8% of the patients suffered from other types of malignant tumours prior to breast cancer diagnosis (Table 1.2), and the most common tumour was thyroid cancer (Table 1.3).

Table 1.2: Personal history of other tumours at diagnosis (N=20,104)

	Number	%
No	16,459	81.9
Benign tumour	2,956	14.7
Malignant tumour	361	1.8
Nature of previous tumours not known	56	0.3
History of tumours not known	272	1.4

Table 1.3: Origins of malignant tumours reported by patients (N=361)

	Number	%
Thyroid	58	16.1
Colon / rectum	54	15.0
Uterus	53	14.7
Cervix	24	6.6
Lung	23	6.4
Ovary	23	6.4
Nasopharynx	16	4.4
Small intestine	13	3.6
Lymphatic system	12	3.3
Others*	51	14.1
Not known	54	15.0

*Others included liver, skin, bladder, etc.

Note: The total percentages may exceed 100 as multiple body parts may be involved.

G. History of benign breast disease

1.22 Several studies found that women with some types of benign breast disease would have an increased risk of breast cancer.[32] Benign breast disease can be classified into three categories: non-proliferative disease, proliferative disease without atypia, and proliferative disease with atypia. Non-proliferative diseases, such as fibroadenoma or other fibrocystic diseases, are generally not associated with an increased risk of breast cancer.[32] On the other hand, proliferative diseases without atypia (e.g. papilloma and papillomatosis) and proliferative diseases with atypia [e.g. atypical ductal hyperplasia (ADH) and lobular neoplasia, including atypical lobular hyperplasia (ALH) and lobular carcinoma in situ (LCIS)] are linked to variably increased risk of breast cancer.[32]

1.23 The proportion of patients who had history of benign breast disease was 13.8% (Table 1.4). Fibroadenoma, which does not increase the risk of breast cancer, was the most common (47.8%). In addition, nine patients suffered from ADH and three suffered from LCIS prior to breast cancer diagnosis (Table 1.4).

Table 1.4: History of benign breast disease at diagnosis (N=20,104)

	Number	%
Have history of benign breast disease	**2,778**	**13.8**
Type of benign breast disease		
Fibroadenoma	1,328	47.8
Fibrocystic disease	455	16.4
Microcalcification	51	1.8
Inflammation	84	3.0
Papilloma	43	1.5
Papillomatosis	5	0.2
Hyperplasia	292	10.5
Lipoma	28	1.0
Atypical ductal hyperplasia	9	0.3
Lobular carcinoma in situ	3	0.1
Others (e.g. other benign tumours)	381	13.7
Not known	166	6.0

Note: The total percentages may exceed 100 as multiple types of benign breast disease may be reported.

H. *Early menarche, late menopause and reproductive history*

1.24 Life events such as early menarche (<12 years old), late natural menopause (>55 years old), not bearing children, and late first pregnancy (>35 years old) all increase the lifetime exposure to the hormone estrogen, thus increasing the risk of breast cancer. On the other hand, late menarche, early menopause, bearing children and early pregnancy all reduce the risk of breast cancer.[19]

1.25 The mean age at menarche of the patients was 13.2, and 14.1% experienced early menarche (Table 1.5). Of the patients, 53.2% were postmenopausal. Among them, a small proportion experienced late menopause and the mean age at menopause was 49.8. In addition, the proportion of patients being nulliparous was 23.1%, and only 4.3% had their first childbirth after the age of 35 (Table 1.5). Among those who experienced childbirth(s), about 70% had two or more children (Table 1.6), and the mean age at which they had their first childbirth was 27.

1.26 Breastfeeding is considered a protective factor against breast cancer at all ages.[18,19] In the cohort, about one-third of the patients had breastfed their children (Table 1.5), and the mean total duration of breastfeeding was 15.6 months.

Table 1.5: Menarche, menopause and reproductive history at diagnosis

	Number	%
Menarche (N=20,104)		
Early menarche (<12 years old)	2,830	14.1
Normal menarche (≥12 years old)	15,633	77.8
Age at menarche not known	1,641	8.2
Menopause (N=10,692)		
Late menopause (>55 years old)	591	5.5
Normal menopause (≤55 years old)	8,703	81.4
Age at menopause not known	1,398	13.1
Reproductive history (N=20,104)		
No childbirth	4,639	23.1
First childbirth at early age (≤35 years old)	13,861	68.9
First childbirth at late age (>35 years old)	861	4.3
Age at first live birth not known	458	2.3
Reproductive history not known	285	1.4
Breastfeeding (N=20,104)		
Yes	6,494	32.3
No (had childbirth)	8,591	42.7
No (no childbirth)	4,638	23.1
No (reproductive history not known)	43	0.2
Not known	338	1.7

Table 1.6: Number of live births reported by patients (N=15,180)

	Number	%
1	4,338	28.6
2	6,843	45.1
3	2,549	16.8
4	859	5.7
5 or more	525	3.5
Not known	66	0.4

I. Use of hormonal contraceptives

1.27 Hormonal contraceptives contain synthetic sex hormones. They are administered in the form of oral tablets, injections, implants and transdermal contraceptive patches. Although the IARC has classified current or recent use of combined estrogen-progestogen oral contraceptives as a risk factor for breast cancer, some studies suggested discontinuing use for five to 10 years or 10 years or more resulted in no excess risk compared to non-users.[3,33,34] Conflicting results were obtained, however, when studying the correlation between breast cancer risk and injectable contraceptives or implants.[35-39] Further investigation is therefore needed to ascertain the correlation between hormonal contraceptives and breast cancer risk.

1.28 The proportion of patients who had never used hormonal contraceptives was 68.7% (Table 1.7). Of the hormonal contraceptive users, 79.7% had stopped using it at diagnosis and the mean years that they had stopped using it was 18.6.

Table 1.7: Use of hormonal contraceptives at diagnosis (N=20,104)

	Number	%
Non-user	13,813	68.7
OC use <5 years	2,875	14.3
OC use 5-10 years	1,495	7.4
OC use >10 years	618	3.1
Length of OC use not known	983	4.9
Not known if OC was used	320	1.6

OC: hormonal contraceptives

J. Use of hormone replacement therapy

1.29 Hormone replacement therapy (HRT) contains synthetic sex hormones and is used to relieve postmenopausal symptoms. The IARC has classified current use of combined estrogen-progestogen HRT for menopausal symptoms as a risk factor for breast cancer.[3] Of the postmenopausal patients, only 2.6% had used HRT for five or more years (Table 1.8).

Table 1.8: Use of hormone replacement therapy at diagnosis (N=10,692)

	Number	%
Non-user	9,799	91.6
HRT use <5 years	374	3.5
HRT use 5-10 years	221	2.1
HRT use >10 years	51	0.5
Length of HRT use not known	67	0.6
Not known if HRT was used	180	1.7

HRT: hormone replacement therapy

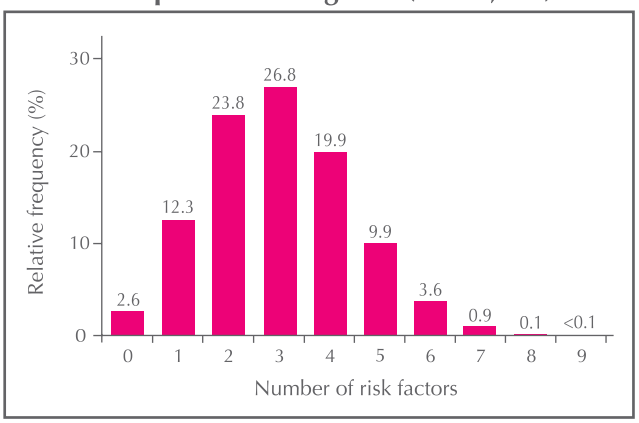
K. Ten most common risk factors associated with breast cancer in Hong Kong

1.30 Among all the risk factors studied, the majority of patients were exposed to the factor of lack of exercise, followed by no breastfeeding experience and being overweight or obese (Table 1.9). The combination of multiple risk factors increases the risk of getting breast cancer, with the single factor of stress contributing to more than three-fold breast cancer risk.[18] In the cohort, 61.3% of the patients had three or more common risk factors, while 36.1% had one to two risk factors. Only 2.6% of the patients had none of the common risk factors studied (Figure 1.12).

Table 1.9: Ten most common risk factors for breast cancer in patient cohort (N=20,104)

	Number	%
Lack of exercise (<3 hours / week)	15,591	77.6
No breastfeeding	13,272	66.0
Being overweight/obese	7,813	38.9
High level of stress (>50% of time)	7,435	37.0
No childbirth/first live birth after age 35	5,500	27.4
Family history of breast cancer	3,028	15.1
Diet rich in meat/dairy products	2,842	14.1
Early menarche (<12 years old)	2,830	14.1
Habit of drinking alcohol	1,062	5.3
Use of hormone replacement therapy	712	3.5

Figure 1.12: Distribution of risk factors among patients at diagnosis (N=20,104)



IV. Breast screening habits

A. Breast screening methods

1.31 Breast screening is a method of checking woman's breasts when there are neither signs nor symptoms of breast cancer in an attempt to enable earlier detection. Early detection reduces mortality from breast cancer. The three screening methods used for breast cancer screening include breast self-examination (BSE), clinical breast examination (CBE), and mammography screening (MMG). BSE is done by the woman herself, checking for lumps, changes in size or shape of the breast, or any other changes in the breasts or underarm. CBE is conducted by a medical professional, such as a doctor or nurse, who uses his or her hands to feel for lumps or other changes. MMG is the current standard test for breast cancer screening which uses a low-energy X-ray to examine a woman's breasts, while breast ultrasound screening (USG) could detect breast opacity using high-frequency sound waves.

1.32 The HKBCF recommends women aged 40 or above to perform monthly BSE as a measure of raising breast self-awareness, and also regularly undergo CBE and MMG. In addition, MMG plus USG is suggested for women with dense breasts. Although there is no population-based breast screening programme in Hong Kong, the Government has recommended risk-based population screening in average risk women since July 2020.[40] The Breast Cancer Screening Pilot Programme Phase I and Phase II were launched in September 2021 and June 2025, respectively, to provide screening services for women with increased risk.[41,42] The breast screening habits prior to cancer diagnosis studied in the current report were self-initiated.

B. Breast screening habits and age

1.33 The breast screening habits of the patient cohort were studied by age group (Table 1.10). For each age group in the cohort, the respective proportions who underwent regular BSE, MMG or USG were less than a quarter (Table 1.10). Regular CBE were performed by about 40% of the patients aged below 60, but the proportions dropped for patients aged between 60 and 69 and aged 70 or above (Table 1.10). With the exception of patients aged below 40, the proportion of patients who had never performed BSE or had never undergone CBE and USG was positively correlated with age. In addition, 66.5% of the patients aged 40 or above had never undergone MMG.

Table 1.10: Breast screening habits by age group

	Age group, %				
	<40	40-49	50-59	60-69	≥70
BSE (N=19,697)	**(N=1,831)**	**(N=6,268)**	**(N=6,516)**	**(N=3,703)**	**(N=1,379)**
Never	38.1	35.4	37.8	43.5	58.7
Occasional	41.8	41.4	38.8	35.9	27.0
Monthly	19.0	22.1	21.8	19.5	13.3
Not known	1.1	1.1	1.6	1.1	1.0
CBE (N=19,697)	**(N=1,831)**	**(N=6,268)**	**(N=6,516)**	**(N=3,703)**	**(N=1,379)**
Never	51.0	42.2	44.8	56.5	77.8
Occasional	13.7	14.9	15.7	15.6	10.0
Regular*	34.4	41.7	38.2	26.4	10.6
Not known	1.0	1.1	1.4	1.5	1.6
MMG# (N=17,866)		**(N=6,268)**	**(N=6,516)**	**(N=3,703)**	**(N=1,379)**
Never	—	67.9	62.0	65.6	84.0
Occasional	—	11.6	13.3	14.0	8.2
Regular*	—	19.3	23.2	18.8	6.2
Not known	—	1.2	1.5	1.6	1.6
USG# (N=17,866)		**(N=6,268)**	**(N=6,516)**	**(N=3,703)**	**(N=1,379)**
Never	—	66.3	66.9	73.2	85.9
Occasional	—	11.5	11.8	11.2	7.0
Regular*	—	20.0	19.1	13.2	5.2
Not known	—	2.2	2.2	2.4	1.9

BSE: breast self-examination; CBE: clinical breast examination; MMG: mammography screening; USG: breast ultrasound screening

* "Regular" is defined as having the breast screening test every 1-3 years

Included patients aged 40 or above only

C. Breast screening habits and education level

1.34 Breast screening habits were further studied by patients' education level (Table 1.11). The findings suggested that patients with lower education levels had undergone less breast screening prior to cancer diagnosis. In the cohort, 65.1% of the patients who had kindergarten level or no schooling had never performed BSE, compared to 27.9% of the patients who attained matriculation level or above. The corresponding figures are 75.5% compared to 32.3% for CBE, 86.4% compared to 50.0% for MMG, and 88.3% compared to 51.3% for USG.

Table 1.11: Breast screening habits by education level

	Education level, %			
	No schooling / Kindergarten	Primary school	Secondary school	Matriculation or above
BSE (N=19,939)	**(N=959)**	**(N=4,730)**	**(N=10,054)**	**(N=4,196)**
Never	65.1	48.1	38.2	27.9
Occasional	22.5	32.1	37.9	51.0
Monthly	11.7	18.9	22.7	19.4
Not known	0.7	0.9	1.2	1.6
CBE (N=19,939)	**(N=959)**	**(N=4,730)**	**(N=10,054)**	**(N=4,196)**
Never	75.5	61.9	47.5	32.3
Occasional	10.1	13.1	14.6	18.9
Regular*	13.6	24.2	36.5	47.3
Not known	0.8	0.8	1.4	1.5
MMG# (N=17,718)	**(N=916)**	**(N=4,588)**	**(N=8,980)**	**(N=3,234)**
Never	86.4	74.9	66.3	50.0
Occasional	6.3	10.9	12.0	17.5
Regular*	6.6	13.2	20.1	31.0
Not known	0.8	1.0	1.6	1.4
USG# (N=17,718)	**(N=916)**	**(N=4,588)**	**(N=8,980)**	**(N=3,234)**
Never	88.3	79.2	69.3	51.3
Occasional	4.7	8.9	10.9	17.0
Regular*	6.0	10.3	17.6	28.6
Not known	1.0	1.7	2.1	3.1

BSE: breast self-examination; CBE: clinical breast examination; MMG: mammography screening; USG: breast ultrasound screening

* "Regular" is defined as having the breast screening test every 1-3 years

Included patients aged 40 or above only

D. Breast screening habits and monthly household income

1.35 Breast screening habits were also studied by patients' monthly household income level (Table 1.12). Figures show that patients with lower income had undergone less breast screening prior to cancer diagnosis. In the cohort, 43.8% of the patients with monthly household income of less than $10,000 had never performed BSE, compared to 22.1% of the patients who had income of $60,000 or more. The corresponding figures are 59.1% compared to 20.7% for CBE, 73.6% compared to 40.3% for MMG, and 78.4% compared to 43.5% for USG.

Table 1.12: Breast screening habits by monthly household income (HK$)

	Monthly household income (HK$), %			
	<10,000	**10,000 – 29,999**	**30,000 – 59,999**	**≥60,000**
BSE (N=11,048)	**(N=1,954)**	**(N=4,862)**	**(N=2,660)**	**(N=1,572)**
Never	43.8	37.1	30.2	22.1
Occasional	36.7	40.4	47.9	56.6
Monthly	18.1	21.4	20.8	19.6
Not known	1.4	1.1	1.2	1.7
CBE (N=11,048)	**(N=1,954)**	**(N=4,862)**	**(N=2,660)**	**(N=1,572)**
Never	59.1	44.4	32.7	20.7
Occasional	13.8	15.0	17.7	19.7
Regular*	25.8	39.6	48.3	57.6
Not known	1.2	1.0	1.2	2.1
MMG# (N=9,485)	**(N=1,794)**	**(N=4,230)**	**(N=2,126)**	**(N=1,335)**
Never	73.6	66.5	53.3	40.3
Occasional	10.0	12.7	16.5	19.5
Regular*	14.9	19.6	28.9	38.9
Not known	1.6	1.3	1.4	1.3
USG# (N=9,485)	**(N=1,794)**	**(N=4,230)**	**(N=2,126)**	**(N=1,335)**
Never	78.4	69.5	55.4	43.5
Occasional	8.6	11.3	15.5	19.5
Regular*	10.9	17.1	27.1	33.3
Not known	2.2	2.1	2.0	3.7

BSE: breast self-examination; CBE: clinical breast examination; MMG: mammography screening; USG: breast ultrasound screening

* "Regular" is defined as having the breast screening test every 1-3 years

Included patients aged 40 or above only

E. Breast screening habits and district of residence

1.36 Breast screening habits were further stratified by patients' district of residence (Table 1.13). For each breast screening method, higher proportions of patients living in Kowloon or the New Territories had never undergone breast screening than those living on Hong Kong Island. In addition, a higher proportion (29.6%) of patients living on Hong Kong Island had regular MMG than those living in Kowloon (18.4%) and the New Territories (17.5%).

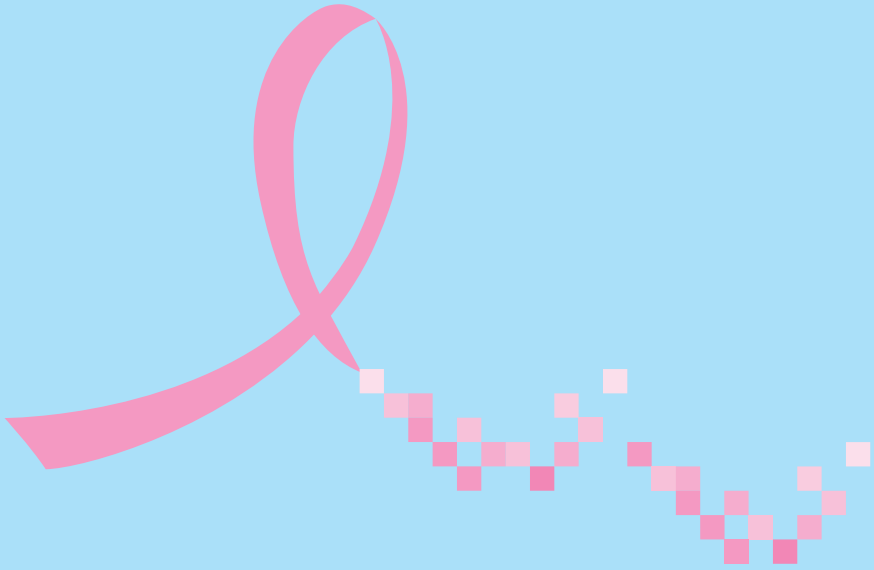
Table 1.13: Breast screening habits by district of residence

	District of residence, %		
	Hong Kong Island	**Kowloon**	**New Territories**
BSE (N=19,245)	**(N=2,678)**	**(N=4,444)**	**(N=12,123)**
Never	31.8	41.6	40.7
Occasional	46.5	38.0	37.0
Monthly	19.3	18.8	21.5
Not known	2.4	1.6	0.8
CBE (N=19,245)	**(N=2,678)**	**(N=4,444)**	**(N=12,123)**
Never	34.2	53.9	50.8
Occasional	17.0	14.0	14.7
Regular*	46.0	30.6	33.6
Not known	2.8	1.5	0.8
MMG# (N=17,165)	**(N=2,348)**	**(N=3,970)**	**(N=10,847)**
Never	51.1	68.9	69.5
Occasional	16.5	11.2	12.0
Regular*	29.6	18.4	17.5
Not known	2.8	1.5	1.0
USG# (N=17,165)	**(N=2,348)**	**(N=3,970)**	**(N=10,847)**
Never	54.9	72.2	72.2
Occasional	15.0	10.4	10.6
Regular*	24.8	15.2	15.8
Not known	5.2	2.2	1.4

BSE: breast self-examination; CBE: clinical breast examination; MMG: mammography screening; USG: breast ultrasound screening

* "Regular" is defined as having the breast screening test every 1-3 years

Included patients aged 40 or above only



CHAPTER 2

DISEASE PATTERN, TREATMENT TREND AND CLINICAL OUTCOME OF BREAST CANCER IN HONG KONG

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I. Introduction

2.1 This chapter reviews the data collected from 20,656 breast cancer cases regarding their cancer's clinical presentation, cancer characteristics and treatment methods. The aim is to analyse the clinical management of breast cancer and identify the trends in disease and treatment in the local context in order to develop and improve the standard of care for breast cancer patients in Hong Kong.

HIGHLIGHTS

This chapter presents the disease pattern and treatment trend of 20,656 breast cancer cases which were diagnosed between 2006 and 2018. The clinical outcome of 18,872 patients who completed at least one follow-up were also examined.

Clinical presentation

- The primary method of first cancer detection was self-detection by chance.
- While only 8.3% of self-detected cases were in situ breast cancer, 41.3% of mammography-detected cases were in situ breast cancer.
- The proportion of stages 0-I cancer was also higher among mammography-detected cases compared to self-detected cases.
- After onset of symptoms (mainly, painless lumps), the majority of patients who self-detected their cancer by chance sought their first medical consultation in three months.
- A much higher proportion (13.5%) of the patients who sought first medical consultation after 12 months of symptom onset was diagnosed with stage IV disease than those who sought first medical consultation in less than one month (2.0%).
- The most common cancer stage at diagnosis was stage II (35.8%) followed by stage I (31.0%) and stages III-IV (16.3%). In addition, 12.8% of the patients were diagnosed with stage 0 cancer.

Cancer characteristics

- The mean size of invasive tumours was 2.2 cm, and 57.9% did not have nodal involvement. Invasive carcinoma of no specific type was the most common type. Almost all invasive cases were tested for estrogen receptor (ER) or progesterone receptor (PR) status, and about 80% of them were either ER or PR positive. Also, 22.3% of the invasive breast cancer cases were c-erbB2/HER2 positive.
- The mean size of in situ tumours was 2.0 cm. Ductal cancer was the most common type. About 70% of in situ cases were tested for ER or PR status, and the majority were either ER or PR positive. In addition, a quarter of in situ cases were HER2 positive.

Treatment

- Of the patients, 15.2% received care at private medical services, 50.9% received care at public medical services, and 33.9% received care at both private and public medical services.
- The number of treatment modalities increased with increasing cancer stage.

- Surgery
  - For patients with invasive breast cancer, nearly all (98.2%) underwent surgery as part of their treatment. About two-thirds had mastectomy, while one-third had breast-conserving surgery. Nearly all (97.1%) of the patients with invasive breast cancer received nodal surgery and among them, 37.3% required axillary dissection (AD) alone, and 16.2% required AD after sentinel node biopsy (SNB).
  - For patients with in situ breast cancer, almost all (99.2%) underwent surgery. About half had breast-conserving surgery, while 47.3% had mastectomy. In addition, 66.8% received nodal surgery and among them, 86.3% had SNB only.
  - The percentage of patients who underwent mastectomy was positively correlated with increasing age, while the percentage of patients who underwent mastectomy with reconstruction was negatively correlated with increasing age.
  - SNB alone was more commonly performed on patients with negative clinical nodal status (59.2%) than those with positive clinical nodal status (16.6%), while AD alone was more commonly performed on the patients with positive clinical nodal status (68.3%) than those with negative clinical nodal status (25.7%).

- Radiotherapy
  - The majority of patients who underwent breast-conserving surgery received radiotherapy afterwards, regardless of their cancer stage.
  - The proportion of patients who underwent mastectomy and also received radiotherapy increased significantly with progressing cancer stage, from 4.0% of stage 0 patients to 95.2% of stage III patients.

- Chemotherapy
  - Two-thirds of the patients with invasive cancer underwent chemotherapy.
  - The use of neoadjuvant chemotherapy was positively correlated to progressing cancer stage from stage I to III, while the overall use of curative intent chemotherapy also increased.

- Endocrine therapy
  - In the cohort, 67.6% of the patients were treated with endocrine therapy.
  - For patients with invasive breast cancer, about 75% or more received endocrine therapy, while for patients with in situ breast cancer, only 15.8% received endocrine therapy.

- Targeted therapy
  - Of the patients with invasive HER2-positive breast cancer, 67.5% underwent anti-HER2 targeted therapy.
  - The use of anti-HER2 targeted therapy was much lower for stage I patients, and the proportions increased with increasing cancer stage among stage II or above patients.

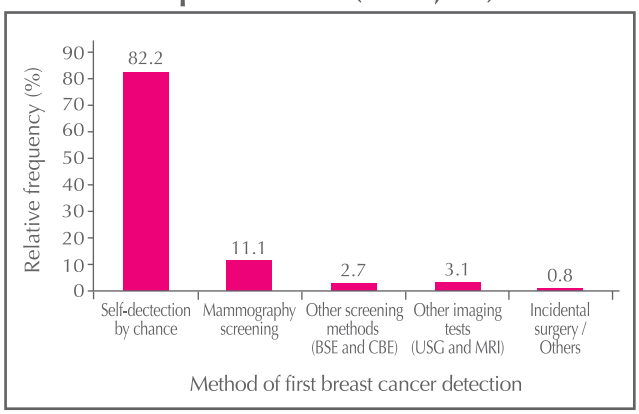
Patient status

- A total of 18,872 patients completed at least one follow-up, providing data to examine their survival aspects. The mean and median follow-up period were 6.8 and 6.3 years respectively.
- In the cohort, 2.5% experienced only locoregional recurrence, 3.2% experienced only distant recurrence, and 2.3% experienced both locoregional and distant recurrence.
- The most common sites for locoregional recurrence were breast (39.5%) and axilla (32.7%), while the top four organs involved in distant recurrence were bone (59.8%), lung (47.2%), liver (39.1%) and brain (16.0%).
- In the cohort, 1,708 patients died from breast cancer.

II. Clinical presentation

2.2 The primary method of first breast cancer detection in the patient cohort was self-detection by chance (82.2%) (Figure 2.1). Detection through healthcare service-assisted screening methods, including clinical breast examination (CBE), mammography screening (MMG), and breast ultrasound screening (USG) constituted a small proportion. Compared to Western countries, the uptake of MMG, in particular, was low. A study in the United States, for instance, found that 43% of the breast cancer cases were detected through MMG.[43]

Figure 2.1: Methods of first breast cancer detection in the patient cohort (N=19,558)



BSE: breast self-examination; CBE: clinical breast examination; USG: breast ultrasound screening; MRI: magnetic resonance imaging

2.3 In terms of the types of medical service received, the proportion of patients who self-detected their breast cancer by chance was higher among public medical service users (84.0%) or mixed public/private medical service users (83.7%) than among private medical service users (70.9%). In contrast, the proportion of the patients who first detected their breast cancer through MMG was higher among private medical service users (16.5%) than among public medical service users (11.1%) or mixed public/private medical service users (9.2%) (Table 2.1).

2.4 Studies have shown that MMG is effective in detecting early cancer when there are neither signs nor symptoms that can be observed by patients or medical professionals.[44] In the patient cohort, only 8.3% of self-detected cases were in situ breast cancer, whereas 41.3% of MMG-detected cases were in situ breast cancer (Table 2.2). As shown in Table 2.3, MMG detected a much higher proportion (84.0%) of early stage cancer cases (stages 0-1) than advanced stage cancer cases.

Table 2.1: Methods of first breast cancer detection by type of medical service users (N=19,558)

	Type of medical service users, %		
	Public (N=9,956)	Private (N=2,430)	Mixed public / private (N=7,172)
Self-detection by chance	84.0	70.9	83.7
Mammography screening	11.1	16.5	9.2
Other screening methods (BSE and CBE)	2.5	3.0	3.0
Other imaging tests (USG and MRI)	1.5	8.3	3.5
Incidental surgery / Others	0.8	1.3	0.7

BSE: breast self-examination; CBE: clinical breast examination; USG: breast ultrasound screening; MRI: magnetic resonance imaging

Table 2.2: Methods of first breast cancer detection by type of cancer (N=19,377)

	Type of cancer, %	
	Invasive	In situ
Self-detection by chance (N=15,949)	91.7	8.3
Mammography screening (N=2,143)	58.7	41.3
Other screening methods (BSE and CBE) (N=529)	84.9	15.1
Other imaging tests (USG and MRI) (N=593)	71.3	28.7
Incidental surgery / Others (N=163)	77.3	22.7

BSE: breast self-examination; CBE: clinical breast examination; USG: breast ultrasound screening; MRI: magnetic resonance imaging

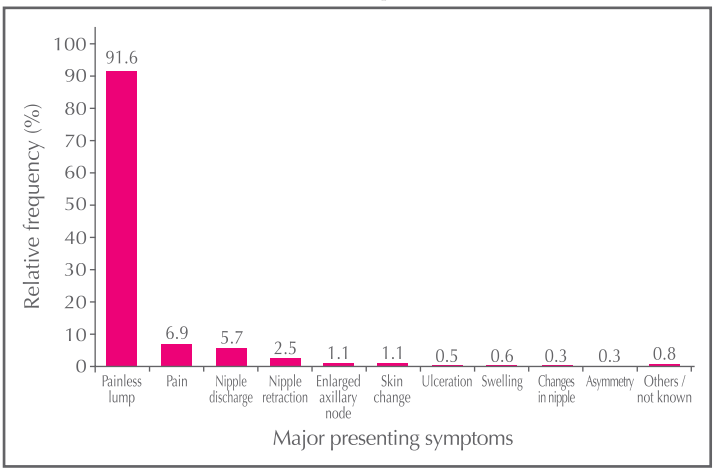
Table 2.3: Methods of first breast cancer detection by cancer stage (N=18,791)

	Cancer stage, %					
	0	I	IIA	IIB	III	IV
Self-detection by chance (N=15,408)	8.6	30.0	27.1	14.6	16.7	3.1
Mammography screening (N=2,123)	41.7	42.3	10.6	2.4	2.5	0.6
Other screening methods (BSE and CBE) (N=518)	15.4	39.0	23.2	10.2	9.8	2.3
Other imaging tests (USG and MRI) (N=584)	29.1	48.1	14.7	3.3	3.6	1.2
Incidental surgery / Others (N=158)	23.4	36.1	19.6	6.3	10.1	4.4

BSE: breast self-examination; CBE: clinical breast examination; USG: breast ultrasound screening; MRI: magnetic resonance imaging

2.5 Most (91.6%) patients who self-detected their cancer by chance found a painless lump on their breast(s). Pain is not usually a symptom of breast cancer; only 6.9% of the patients felt pain in their breast(s) at initial presentation. Some patients (8.5%) experienced changes in nipple (such as nipple discharge, nipple retraction, redness, scaliness or thickening of nipple) (Figure 2.2).

Figure 2.2: Major presenting symptoms of self-detected breast cancer in the patient cohort (N=16,086)



A. *Time interval between the onset of symptoms and first medical consultation*

2.6 Longer delay in seeking medical consultation is associated with higher probability of local cancer spread or distant metastasis and poorer prognosis.[45] After the onset of symptoms, one-third of the patients who self-detected their cancers by chance sought first medical consultation in less than one month, while a quarter waited more than three months before seeking first medical consultation (Figure 2.3).

2.7 Within self-detected patients, the proportion of the patients who sought their first medical consultation in less than one month was higher among private medical service users (42.1%) than among public medical service users (25.6%) (Table 2.4).

Figure 2.3: Time interval between onset of symptoms and first medical consultation for patients who self-detected their cancer (N=4,586)

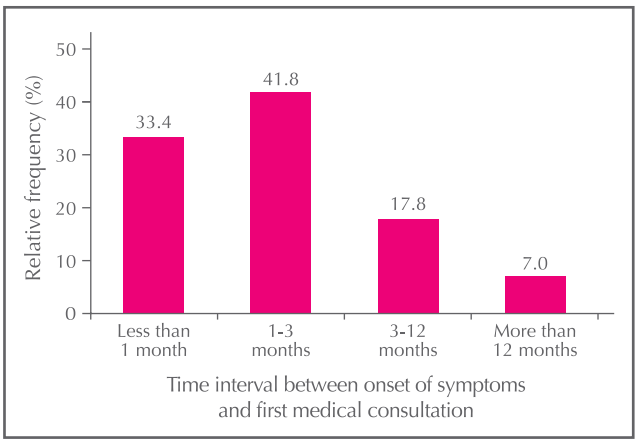


Table 2.4: Time interval between onset of symptoms and first medical consultation for patients who self-detected their cancer by type of medical service users (N=4,586)

	Type of medical service users, %		
	Public (N=2,235)	Private (N=725)	Mixed public / private (N=1,626)
Less than 1 month	25.6	42.1	40.3
1-3 months	43.3	37.8	41.5
3-12 months	22.3	14.9	12.8
More than 12 months	8.8	5.2	5.4

2.8 A much higher proportion (13.5%) of the patients who sought first medical consultation after 12 months of symptom onset was diagnosed with stage IV disease than those who sought first medical consultation in less than one month (2.0%) (Table 2.5).

Table 2.5: Cancer stage at diagnosis among self-detected patients by time interval between onset of symptoms and first medical consultation (N=4,040)

	Time interval between onset of symptoms and first medical consultation, %			
	Less than 1 month (N=1,363)	1-3 months (N=1,700)	3-12 months (N=710)	More than 12 months (N=267)
Stage I	36.2	30.8	26.1	23.2
Stage IIA	31.7	32.4	30.0	24.3
Stage IIB	15.8	16.3	15.8	17.6
Stage III	14.4	17.4	21.8	21.3
Stage IV	2.0	3.1	6.3	13.5

III. Cancer characteristics

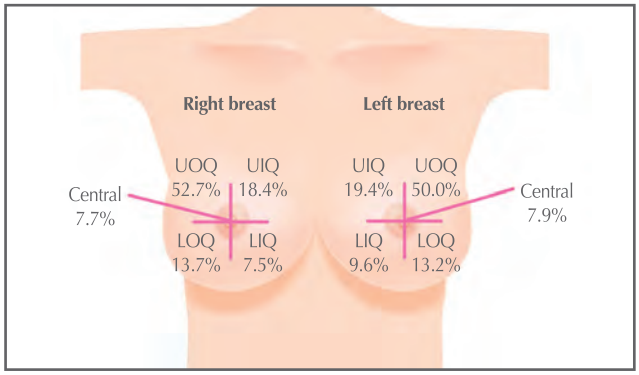
2.9 Breast cancer can occur in one (unilateral) or both (bilateral) breasts. The majority (90.6%) of the cases were unilateral breast cancer, while a small proportion (5.1%) were synchronous bilateral breast cancer at first diagnosis (Table 2.6).

Table 2.6: Laterality of breast cancer cases in the patient cohort (N=20,656)

	Number of patients	Number of cases	Median time interval for metachronous cases
Unilateral	**18,720**	**18,720**	—
Bilateral (synchronous)	**528**	**1,056**	—
All bilateral (metachronous) cases	**563**	**880**	**6.8 years**
Bilateral (metachronous) - Initial diagnosis during 2006-2018	*317*	*634*	*4.6 years*
Bilateral (metachronous) - Initial diagnosis before 2006	*246*	*246*	*11.0 years*

2.10 As regards the locations of malignant breast tumour, about half of the breast cancer cases in either the left or the right breast (50.0% and 52.7% respectively) were detected in the upper outer quadrant (Figure 2.4).

Figure 2.4: Locations of malignant tumour on breasts within the patient cohort (N=20,656)



UOQ: upper outer quadrant UIQ: upper inner quadrant
LOQ: lower outer quadrant LIQ: lower inner quadrant
Note: Figures included multicentric cancers

A. Diagnostic tests for breast cancer

2.11 There are two types of breast cancer diagnostic tests: imaging tests and biopsies. Imaging tests include diagnostic MMG, USG and magnetic resonance imaging (MRI). Diagnostic MMG is the main procedure for breast cancer diagnosis, and USG is used to distinguish a solid mass (which may be cancer) from a fluid-filled cyst (which is usually not cancer). Breast MRI is usually performed on women who have been diagnosed with breast cancer to check the extent of their disease.

2.12 For cancer diagnosis, MMG was used on 85.2% of the patients and USG on 80.4%, while MRI was used on only 9.8% of the patients (Table 2.7). Results of imaging tests are classified into categories using the Breast Imaging Reporting and Data System (BIRADS). BIRADS 4 or 5 are suspected breast cancer and should be checked by further surgical tests such as biopsies.

Table 2.7: Sensitivity and diagnostic results of breast imaging tests (N=20,656)

	Mammography	Breast ultrasound	MRI
Proportion of patients using the test	**85.2%**	**80.4%**	**9.8%**
Overall sensitivity*	**84.7%**	**92.0%**	**97.1%**
BIRADS category, Number (%)			
Diagnostic / malignant (BIRADS 5)	5,694 (32.4)	6,122 (36.9)	1,621 (80.1)
Suspicious abnormality (BIRADS 4)	9,211 (52.3)	9,157 (55.1)	345 (17.0)
Probably benign (BIRADS 3)	873 (5.0)	814 (4.9)	28 (1.4)
Benign (BIRADS 2)	679 (3.9)	245 (1.5)	13 (0.6)
Normal (BIRADS 1)	1,024 (5.8)	256 (1.5)	16 (0.8)
Incomplete (BIRADS 0)	115 (0.7)	10 (0.1)	1 (<0.1)

MRI: magnetic resonance imaging; BIRADS: Breast Imaging Reporting and Data System
*Sensitivity: Number of true positives (BIRADS 4-5) divided by total number of patients who had the test

2.13 Opacity was observed in 66.0% of the patients with BIRADS 4 or 5 mammograms, while microcalcification was observed in 48.6% (Table 2.8). The mammographic density of a woman's breasts affects the sensitivity of mammography. Heterogeneously dense breast may obscure small masses, while extremely dense breast lowers the sensitivity of mammography. In the patient cohort, 69.4% had heterogeneously dense breasts, 7.0% had extremely dense breasts (Figure 2.5). Mammographic density of a woman's breasts declines with increasing age. The proportion of patients with extremely dense breast decreases significantly from 17.6% among patients aged below 30 to 1.9% among patients aged 70 and above (Table 2.9).

Table 2.8: Mammographic findings of patients diagnosed through mammography (N=14,905)

	Number	%
Opacity	9,834	66.0
Microcalcification	7,239	48.6
Architectural distortion	2,113	14.2
Asymmetric density	1,123	7.5
Unclassified	851	5.7

Note: The total percentages may exceed 100 as multiple mammographic abnormalities may be found.

Figure 2.5: Mammographic density of breasts of patients diagnosed through mammography (N=10,262)

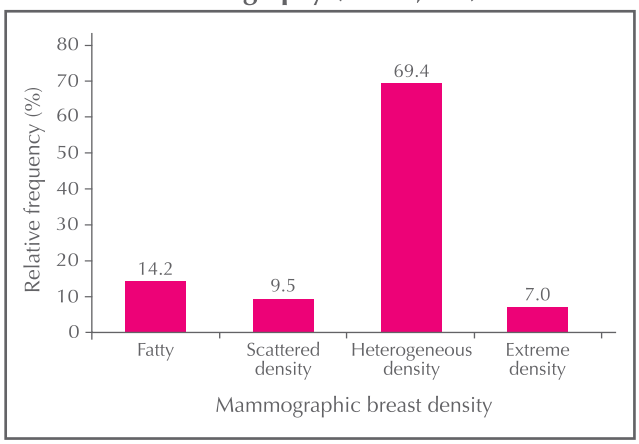


Table 2.9: Mammographic density of breasts of patients diagnosed through mammography by age group (N=10,041)

	Age group, %					
	<30 (N=51)	30-39 (N=760)	40-49 (N=3,021)	50-59 (N=3,459)	60-69 (N=1,999)	≥70 (N=751)
Fatty	5.9	5.1	8.1	13.8	20.5	34.1
Scattered density	3.9	4.5	6.5	9.7	13.0	16.5
Heterogeneous density	72.5	77.4	75.5	70.7	62.8	47.5
Extreme density	17.6	13.0	10.0	5.8	3.7	1.9

2.14 Biopsies (samplings of breast cells or tissues for examination) for breast cancer diagnosis include fine needle aspiration (FNA), core needle biopsy (CNB) and excisional biopsy. As a standard of care, biopsies are for confirming before surgery if a breast lesion is malignant. FNA and CNB are less invasive sampling methods and used more often, but sometimes an excisional biopsy, which removes a relatively larger portion of breast tissue, is necessary. FNA and/or CNB were performed in 85.9% of the patients in the cohort and among them, 22.5% received only FNA, 55.0% received only CNB, while 22.5% received both FNA and CNB. In addition, 9.7% of the patients had excisional biopsy. Excisional biopsy had the highest overall sensitivity of 100%, followed by CNB (99.0%) and FNA (90.6%) (Table 2.10).

Table 2.10: Sensitivity and diagnostic results of breast tissue biopsies (N=20,656)

	FNA		CNB		Excisional biopsy	
Proportion of patients using the test	**38.7%**		**66.6%**		**9.7%**	
Overall sensitivity*	**90.6%**		**99.0%**		**100.0%**	
Class, Number (%)						
Diagnostic / malignant (Class V)	5,119	(64.1)	13,183	(95.9)	1,996	(100.0)
Suspicious (Class IV)	1,219	(15.3)	224	(1.6)	—	
Atypical (Class III)	898	(11.2)	215	(1.6)	—	
Benign (Class II)	295	(3.7)	87	(0.6)	—	
Scanty benign (Class I)	334	(4.2)	39	(0.3)	—	
Incomplete (Class 0)	122	(1.5)	5	(<0.1)	—	

FNA: fine needle aspiration; CNB: core needle biopsy

*Sensitivity: Number of true positives (Class III-V) divided by total number of patients who had the test

B. Methods of cancer staging

2.15 Cancer staging is the process of finding out the extent of the disease in the body pre-operatively after diagnosis of breast cancer. Cancer staging is essential for patients with clinically node positive or locally advanced disease. Patients who only had chest x-ray are considered not having adequate workup for cancer stage to be determined.

2.16 The proportion of patients with invasive breast cancer who did not have any cancer staging as part of their diagnosis and treatment was 51.4%. Among those patients who had cancer staging as part of their treatment, positron emission tomography scan (PET scan) was the most common method used (Table 2.11).

2.17 According to the National Comprehensive Cancer Network (NCCN) guidelines, PET scan is not recommended for patients with early breast cancer, including stage I, stage II, or operable stage III breast cancer, to determine the extent of disease.[46] This might be due to its low sensitivity and fairly low specificity in staging of the axillary lymph nodes and low detection rate of metastases in patients with apparent early-stage disease. However, among those patients who had cancer staging, 23.7% of stage I and 44.2% of stage IIA patients had PET scan to determine the extent of their disease (Figure 2.6).

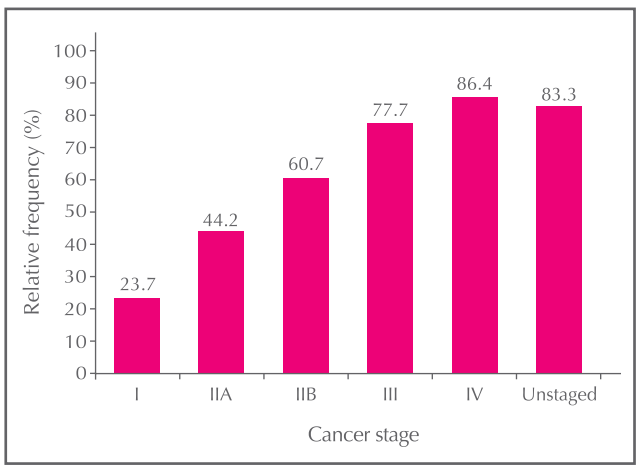
Table 2.11: Method of cancer staging among invasive breast cancer patients (N=8,119)

	Number	%
Positron emission tomography scan (PET scan)	4,294	52.9
Chest x-ray and abdominal ultrasound	3,023	37.2
Computed tomography (CT) of body parts*	582	7.2
Bone scan	242	3.0
Magnetic resonance imaging (MRI) of whole body	65	0.8
Others (e.g. bone x-ray)	466	5.7
Not known	405	5.0

* Body parts included thorax, abdomen, pelvis, brain, or whole body

Note: The total percentages may exceed 100 as multiple methods of cancer staging may be used.

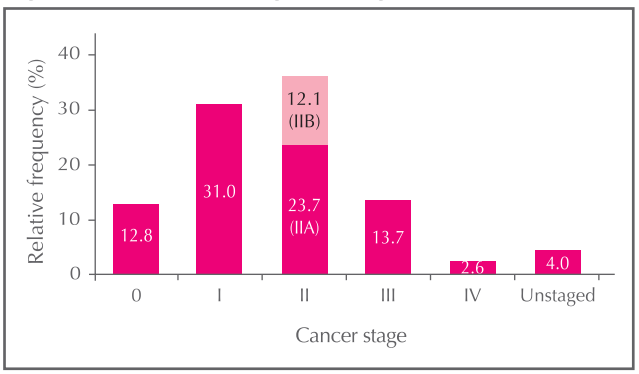
Figure 2.6: Use of PET scan among patients who had cancer staging by cancer stage (N=8,119)



2.18 The American Joint Committee on Cancer (AJCC) Anatomic Breast Cancer Staging (8th edition)[47] is used for determining cancer staging in the patient cohort. There are two stage groups according to this system: anatomic and prognostic stage groups. The anatomic stage group assigns a cancer stage based on the anatomic information on the tumour (T), regional nodes (N), and distant metastases (M) categories. The prognostic stage group, in conjunction with the aforementioned anatomic information (i.e. TNM categories), also takes into account other factors, including the tumour grade, biomarkers [human epidermal growth factor receptor 2 (HER2), estrogen receptor (ER) and progesterone receptor (PR)] expression and genomic assays in assigning a stage.

2.19 Although prognostic stage group was recommended for patient care and was used for reporting of all cancer patients in the United States starting from 2018, it was not adopted in this report. The reason was that patients in the cohort were mostly diagnosed between 2006 and 2017 and the treatment offered to patients in the cohort was based on the prevailing anatomic stage group. It is noted that there is only minimal difference in the TNM anatomic staging between the 7th and 8th edition. The most common cancer stage at diagnosis was stage II (35.8%) followed by stage I (31.0%) and stages III-IV (16.3%). In addition, 12.8% of the patients were diagnosed with in situ cancer (stage 0) (Figure 2.7).

Figure 2.7: Cancer stage at diagnosis (N=20,656)

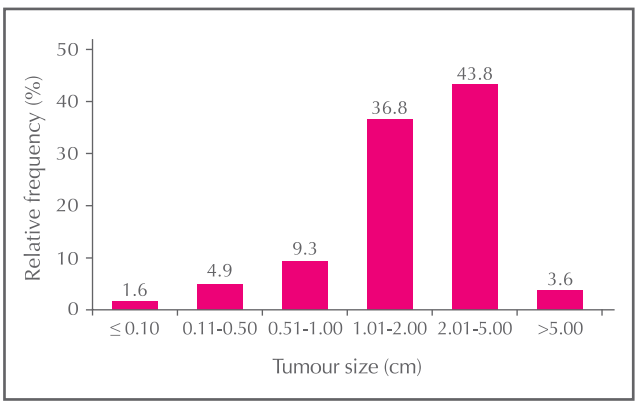


2.20 Of the 20,656 breast cancer cases analysed, data from 20,149 cases with available pathology data were used for subsequent analyses on cancer characteristics. A total of 17,514 patients were diagnosed with invasive cancer, while 2,617 patients were diagnosed with in situ cancer. In addition, 18 cases were diagnosed with occult primary breast cancer.

C. Characteristics of invasive breast cancer

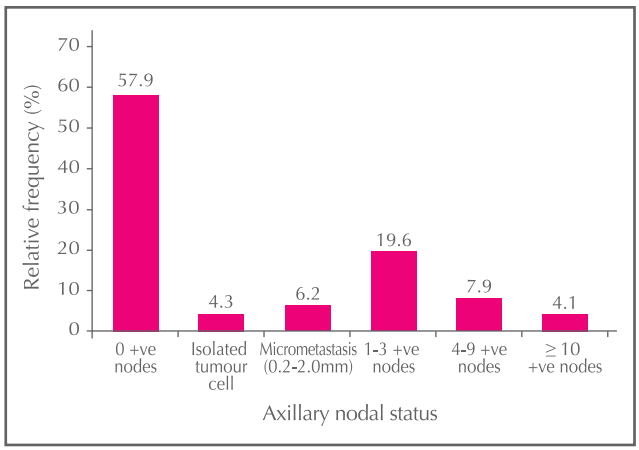
2.21 The mean size of tumours of invasive breast cancer was 2.2 cm (standard deviation: ±1.4 cm). Tumours of one cm or less in size were found in 15.8% of the patients, while tumours of sizes 1.01 to 2.00 cm and 2.01 to 5.00 cm were respectively found in about 36.8% and 43.8% of the patients (Figure 2.8). Only a small proportion (3.6%) of patients had tumours of sizes exceeding five cm. In addition, screen-detected tumours were significantly smaller than those self-detected by chance (mean: 1.2±0.9 cm vs. 2.3±1.4 cm; p<0.001).

Figure 2.8: Distribution of tumour size (cm) of invasive breast cancer (N=14,855)



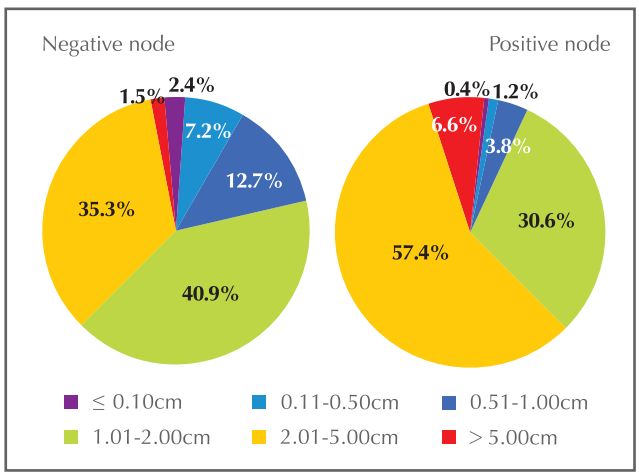
2.22 Lymph node status is one of the factors used for determining breast cancer stage. Multiple affected lymph nodes signify a higher disease stage. Of the patients with invasive breast cancer, 57.9% had no positive axillary lymph nodes, 4.3% had isolated tumour cells (metastasis size ≤ 0.2 mm or a cluster of fewer than 200 tumour cells), 6.2% had micrometastasis (metastasis size > 0.2 mm and ≤ 2 mm), while 31.6% had at least one positive axillary lymph node with metastasis size larger than two mm (Figure 2.9).

Figure 2.9: Number of positive axillary lymph nodes among patients with invasive breast cancer (N=15,483)



2.23 Of the patients with node positive invasive cancer, 57.4% had tumours of 2.01 to 5.00 cm in size, while a small proportion (6.6%) had tumours larger than five cm. In contrast, more patients with node negative invasive cancer (63.2%) had tumours of two cm or less, compared to patients with node positive invasive cancer (36.0%) (Figure 2.10).

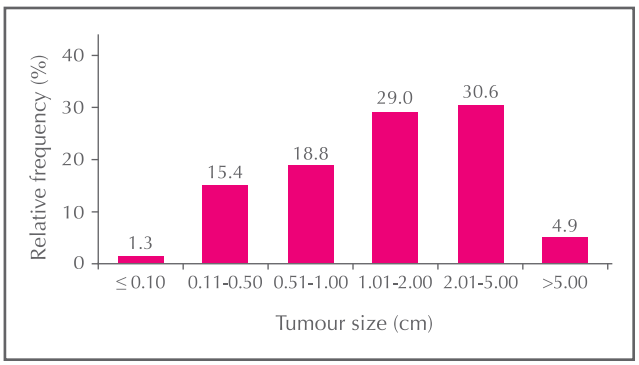
Figure 2.10: Distribution of tumour size (cm) in invasive cancer with negative or positive nodal status (N=14,696)



D. Characteristics of in situ breast cancer

2.24 The mean size of tumours of in situ breast cancer was 2.0 cm (standard deviation: ±1.6 cm). Tumours of one cm or less in size were found in 35.5% of the patients while tumours of 2.01 to 5.00 cm in size were found in 30.6% of the patients (Figure 2.11). A small proportion (4.9%) of the patients had in situ tumours larger than five cm. Of the in situ breast cancer cases where MMG was performed, 62.2% showed microcalcification.

Figure 2.11: Distribution of tumour size (cm) of in situ breast cancer (N=2,143)



IV. Histological and biological characteristics

2.25 Breast cancer is a heterogeneous group of tumours, consisting of different histologic subtypes with diverse microscopic appearances. The histological data of breast carcinomas provide valuable prognostic information. They complement other independent parameters including size, grade, nodal status, hormonal receptor status and HER2 oncogene status to help predict the likelihood of recurrence and response to treatment.

A. *Invasive breast cancer*

2.26 As far as histological characteristics, grading, multifocality and multicentricity of invasive breast cancer in the patient cohort are concerned, the majority (88.3%) was invasive carcinoma of no specific type (Table 2.12), and about one-third of the invasive tumours were of grade 3 (Table 2.13).

Table 2.12: Histological type of invasive breast cancer (N=17,514)

	Number	%
Invasive carcinoma of no specific type	15,465	88.3
Lobular	636	3.6
Mucinous (colloid)	571	3.3
Papillary	172	1.0
Tubular	110	0.6
Mixed ductal and lobular	80	0.5
Borderline / malignant phyllodes	78	0.4
Micropapillary	73	0.4
Metaplastic	66	0.4
Carcinoma with apocrine features	29	0.2
Adenoid cystic	19	0.1
Cribriform	9	0.1
Tubulo-lobular	6	<0.1
Inflammatory	4	<0.1
Squamous cell	3	<0.1
Secretory	3	<0.1
Paget's disease of nipple	3	<0.1
Sarcoma	1	<0.1
Acinic cell	1	<0.1
Others	101	0.6
Not known	84	0.5

Table 2.13: Grading, multifocality and multicentricity of invasive breast cancer (N=17,514)

	Number	%
Grade		
Grade 1	2,856	16.3
Grade 2	6,902	39.4
Grade 3	5,578	31.8
Not known	2,178	12.4
Lymphovascular invasion	**4,438**	**25.3**
Multifocality	**1,611**	**9.2**
Number of foci		
2	883	54.8
3-4	278	17.3
5 or more	146	9.1
Not known	304	18.9
Multicentricity	**434**	**2.5**
Number of quadrants		
2	373	85.9
3	23	5.3
4	12	2.8
Not known	26	6.0

2.27 Of the patients with invasive breast cancer, almost all (96.8%) were tested for ER or PR status. Among them, 79.7% were either ER or PR positive. Using immunohistochemistry (IHC), score 3 is considered as c-erbB2/HER2 positive and score 0 or 1 is considered as negative. As for score 2 (equivocal), it is also considered as HER2 positive if the results are positive in the in situ hybridization (ISH) test. Based on the 2018 guideline,[48] most of the cases classified as equivocal previously (i.e. cases with low HER2 copy number, or low HER2:CEP17 ratio) are now classified as negative. Of the invasive breast cancer cases, 22.3% were c-erbB2/HER2 positive. In addition, for HER2 IHC score 1, or score 2 with equivocal or negative ISH test, this subgroup is now considered as low HER2. The biological characteristics of invasive breast cancer are shown in Table 2.14.

Table 2.14: Biological characteristics of invasive breast cancer (N=17,514)

	Number	%
Estrogen receptor (ER) [96.8% had the test]		
Positive	13,258	78.2
Negative	3,695	21.8
Progesterone receptor (PR) [96.6% had the test]		
Positive	11,079	65.5
Negative	5,831	34.5
c-erbB2 / HER2 [96.6% had the test]		
Positive (IHC score 3)	3,357	19.8
Equivocal (IHC score 2) ISH positive	415	2.5
Equivocal (IHC score 2) ISH equivocal *	172	1.0
Equivocal (IHC score 2) ISH negative *	2,900	17.1
Equivocal (IHC score 2) ISH not done	1,940	11.5
Negative (IHC score 1) *	3,683	21.8
Negative (IHC score 0)	3,588	21.2
Negative (IHC score not known)	867	5.1
Ki-67 index [56.5% had the test]		
<14%	3,574	36.1
≥14%	6,325	63.9

HER2: human epidermal growth factor receptor 2; IHC: immunohistochemistry; ISH: in situ hybridization
Note: The asterisks (*) in the table indicate low HER2.

2.28 Breast cancer is well known to be a heterogeneous disease and can be further classified into several biological subtypes[49] by immunohistochemical staining of several biological markers (Table 2.14). While amplification or over-expression of HER2 oncogene is associated with the development of certain types of breast cancer, further prognostic and predictive information can be obtained by assessing these biological markers together, rather than separately. The surrogate definitions of these intrinsic biological subtypes and their relative frequencies by cancer stage are shown in Table 2.15. Overall, 66.4% of the invasive tumours were HR+ HER2-, 13.3% were HR+ HER2+, 9.0% were HR- HER2+ and 11.3% were TNBC.

Table 2.15: Biological subtypes of invasive tumours by cancer stage (N=16,408)

	Cancer stage, %				
	I (N=6,147)	IIA (N=4,734)	IIB (N=2,416)	III (N=2,683)	IV (N=428)
Luminal A	27.9	17.0	14.4	11.1	8.6
Luminal B (HER2 negative)	19.0	22.3	24.2	22.9	23.4
Luminal A/B (HER2 negative)	25.9	24.6	27.2	25.6	25.0
Luminal B (HER2 positive)	10.6	13.0	13.2	17.7	21.3
HER2 positive (HER2 negative)	7.5	9.0	8.5	11.9	13.1
TNBC	9.0	14.1	12.7	10.8	8.6

HR: hormone receptors (ER and PR)
Luminal A: ER and/or PR+, HER2-, and low Ki-67 index (<14%)
Luminal B (HER2 negative): ER and/or PR+, HER2-, and high Ki-67 index (≥14%)
Luminal A/B (HER2 negative): ER and/or PR+, HER2-, and Ki-67 index not known
Luminal B (HER2 positive): ER and/or PR+, HER2+, and any Ki-67 index
HER2 positive (HR negative): ER and PR-, HER2+, and any Ki-67 index
TNBC (triple negative breast cancer): ER and PR-, HER2-, and any Ki-67 index

2.29 In the past, breast cancer patients with positive hormone receptor often underwent chemotherapy. However, it has been shown that the vast majority of these patients with early-stage breast cancer do not benefit from adjuvant chemotherapy and could be burdened by the short- and long-term side effects caused. There is therefore a change of paradigm in early breast cancer management in recent practice, i.e. considering proven chemotherapy benefit instead of assumed chemotherapy benefit. Oncotype DX Breast Recurrence Score test can classify patients into groups based on the genomic assay that is predictive of chemotherapy benefit.[50] Among the tested patients, 81.0% were found with a Recurrence Score of 25 or below, indicating a low or moderate risk of recurrence.

B. In situ breast cancer

2.30 Ductal cancer was found to be the most common type of in situ breast cancer (94.0%). Table 2.16 shows the histological characteristics, grading, multifocality and multicentricity of in situ breast cancer in the patient cohort.

Table 2.16: Histological type, grading, multifocality and multicentricity of in situ breast cancer (N=2,617)

	Number	%
Histological type		
Ductal	2,460	94.0
Mixed	60	2.3
Papillary	42	1.6
Intracystic papillary	15	0.6
Encapsulated papillary	11	0.4
Apocrine	8	0.3
Neuroendocrine	4	0.2
Cribriform	1	<0.1
Micropapillary	1	<0.1
Others	9	0.3
Not known	6	0.2
Necrosis	**840**	**32.1**
Nuclear grade		
Low	668	25.5
Intermediate	861	32.9
High	932	35.6
Not known	156	6.0
Multifocality	**295**	**11.3**
Number of foci		
2	142	48.1
3	23	7.8
4 or more	10	3.4
Not known	120	40.7
Multicentricity	**55**	**2.1**
Number of quadrants		
2	46	83.6
3	3	5.5
Not known	6	10.9

2.31 Of the patients with in situ breast cancer, more than two-thirds (68.2%) were tested for ER or PR status. Among them, the majority (81.8%) were either ER or PR positive. In addition, 25.0% of in situ breast cancer patients were HER2 positive. Table 2.17 shows the biological characteristics of in situ breast cancer in the patient cohort.

Table 2.17: Biological characteristics of in situ breast cancer (N=2,617)

	Number	%
Estrogen receptor (ER) [68.2% had the test]		
Positive	1,442	80.8
Negative	342	19.2
Progesterone receptor (PR) [66.7% had the test]		
Positive	1,259	72.1
Negative	486	27.9
c-erbB2/HER2 [61.8% had the test]		
Positive (IHC score 3)	402	24.9
Equivocal (IHC score 2) ISH positive	2	0.1
Equivocal (IHC score 2) ISH equivocal	0	0.0
Equivocal (IHC score 2) ISH negative	23	1.4
Equivocal (IHC score 2) ISH not done	545	33.7
Negative (IHC score 1)	334	20.7
Negative (IHC score 0)	270	16.7
Negative (IHC score not known)	40	2.5
Ki-67 index [41.7% had the test]		
<14%	698	64.0
≥14%	392	36.0

HER2: human epidermal growth factor receptor 2;
IHC: immunohistochemistry; ISH: in situ hybridization

V. Treatment methods

2.32 Of the patients, 15.2% received care at private medical services, 50.9% received care at public medical services, and 33.9% received care at both private and public medical services. Combinations of treatments are usually used to treat breast cancer effectively. Patients with invasive cancer are usually given multimodality treatments, which may include surgery, radiotherapy, chemotherapy, endocrine therapy, targeted therapy and immunotherapy. In contrast, patients with in situ cancer require less aggressive treatments including surgery, radiotherapy and endocrine therapy. Chemotherapy, targeted therapy and immunotherapy are generally not required for patients with in situ cancer. The non-surgical treatments may be applied in adjuvant (after surgery), neoadjuvant (before surgery) or palliative (for metastatic disease) settings according to the stage of disease at diagnosis.

2.33 Table 2.18 shows the multimodality treatment pattern of the patients. In general, the number of modalities increased with increasing cancer stage. In the cohort, the majority (90.2%) of patients with stage 0 disease received two or less treatments. On the other hand, 79.3% of the patients with stage IIA, 91.8% of those with stage IIB and 96.4% of those with stage III disease received three or more modalities.

Table 2.18: Number of treatment modalities by cancer stage (N=19,821)

	Cancer stage, %					
	0 (N=2,652)	I (N=6,410)	IIA (N=4,893)	IIB (N=2,495)	III (N=2,830)	IV (N=541)
0	0.3	0.0	0.0	0.1	<0.1	0.9
1	39.6	6.4	2.6	1.4	0.9	6.8
2	50.3	31.9	18.1	6.7	2.7	14.6
3	8.3	42.3	36.5	26.4	17.2	30.3
4	1.2	16.2	37.0	55.3	64.1	34.8
5	0.2	3.2	5.8	10.1	15.1	12.6

A. Surgical treatment

2.34 Surgery is an important consideration in the effective treatment of both in situ and invasive breast cancer. With the continuing developments in breast cancer treatment, surgery is less disfiguring nowadays. Options for local treatment include breast-conserving surgery or total mastectomy. Breast-conserving surgery followed by radiotherapy gives equivalent survival rates compared with mastectomy. Women who have a mastectomy may decide to have breast reconstruction, either at the same time or at a later stage.

2.35 Nodal surgery is usually performed together with breast surgery to ascertain the extent of disease. Lymph node surgery includes sentinel lymph node biopsy (SNB) or axillary dissection (AD). For patients with negative clinical nodal status, SNB can be conducted before AD to determine whether any lymph node is affected. This is to prevent lymphoedema which may occur when a large number of lymph nodes are removed by surgery.

2.36 In the cohort, 50.5% of the patients had surgery at private medical facilities, while 49.5% had surgery at public medical facilities.

2.37 For patients with invasive breast cancer, nearly all (98.2%) underwent surgery as part of their treatment. Of the patients with invasive cancer, 63.9% had mastectomy, while 34.0% had breast-conserving surgery. Among the patients who had mastectomy, 11.9% had either immediate or delayed reconstruction. The most common type of reconstruction was TRAM flap (70.6%) (Table 2.19). Nearly all (97.1%) the patients with invasive breast cancer received nodal surgery and among them, 37.3% required AD alone, and 16.2% required AD after SNB.

2.38 For patients with in situ breast cancer, almost all (99.2%) underwent surgery (Table 2.19). About half (51.7%) had breast-conserving surgery, while 47.3% had mastectomy. In addition, one-third (33.2%) did not receive nodal surgery, and among those who received nodal surgery, 86.3% had SNB only.

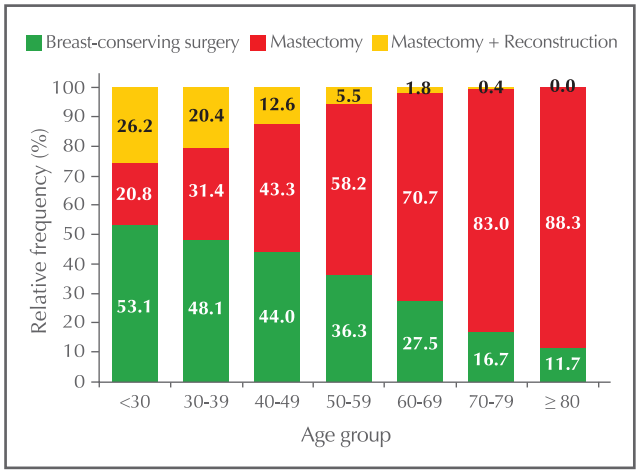
Table 2.19: Use of surgery for patients with invasive or in situ cancer

	Type of cancer, %	
	Invasive	**In situ**
Type of surgery (N=20,456)	**(N=17,804)**	**(N=2,652)**
No surgery	1.7	0.8
Breast-conserving surgery	34.0	51.7
Mastectomy	63.9	47.3
Nodal surgery only	0.1	<0.1
Type of surgery not known	0.1	0.2
Not known if surgery done	0.1	0.0
Type of mastectomy (N=12,637)	**(N=11,382)**	**(N=1,255)**
Total mastectomy	94.1	86.5
Skin sparing	3.8	9.3
Areolar sparing	0.1	0.3
Nipple sparing	1.7	3.7
Type not known	0.2	0.1
Type of reconstruction (N=1,624)*	**(N=1,357)**	**(N=267)**
TRAM flap	70.6	61.8
Implant	15.4	29.2
LD flap	7.5	4.9
LD flap & implant	4.7	3.4
Type not known	1.8	0.7
Type of nodal surgery (N=19,066)	**(N=17,294)**	**(N=1,772)**
Sentinel node biopsy alone	45.2	86.3
Sentinel node biopsy followed by axillary dissection	16.2	2.1
Axillary dissection alone	37.3	9.8
Type not known	1.3	1.7

* Only included patients who had reconstruction after mastectomy

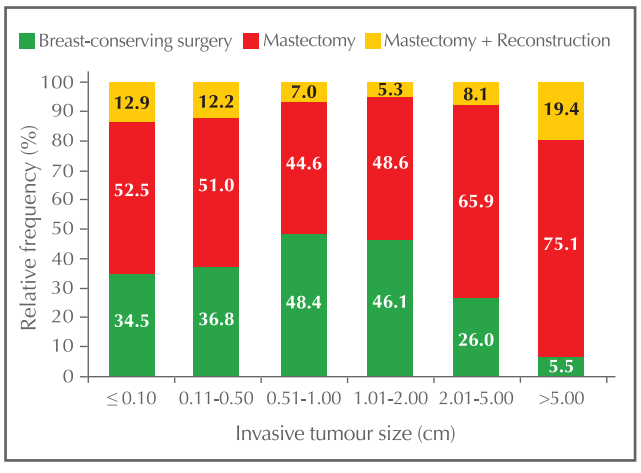
2.39 The percentage of patients who underwent mastectomy was positively correlated with increasing age, while the percentage of patients who underwent mastectomy with reconstruction was negatively correlated with increasing age (Figure 2.12).

Figure 2.12: Type of breast surgery by age group (N=19,691)



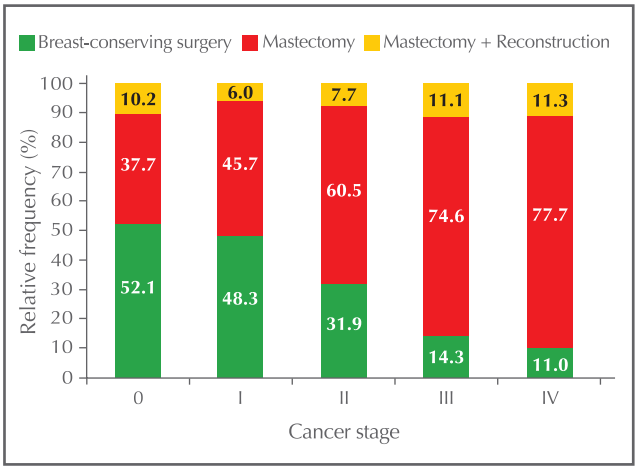
2.40 For the patients with tumours larger than 0.5 cm in size, the proportion of patients who had breast-conserving surgery was negatively correlated with increasing tumour size (Figure 2.13).

Figure 2.13: Type of breast surgery by invasive tumour size (cm) (N=15,991)



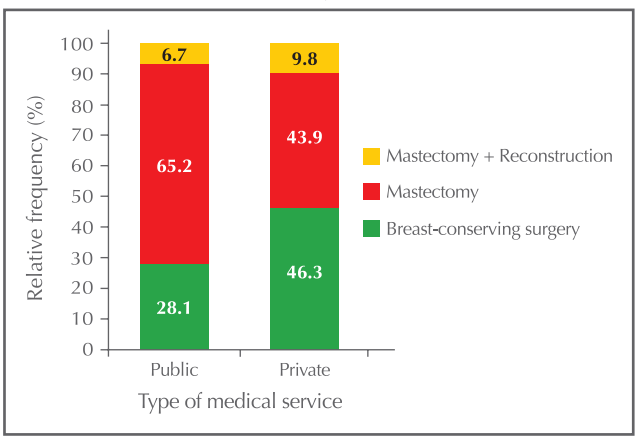
2.41 The proportion of patients who received breast-conserving surgery was negatively correlated with increasing cancer stage. The proportion of those who received mastectomy with reconstruction did not show any correlation with increasing cancer stage (Figure 2.14).

Figure 2.14: Type of breast surgery by cancer stage (N=19,525)



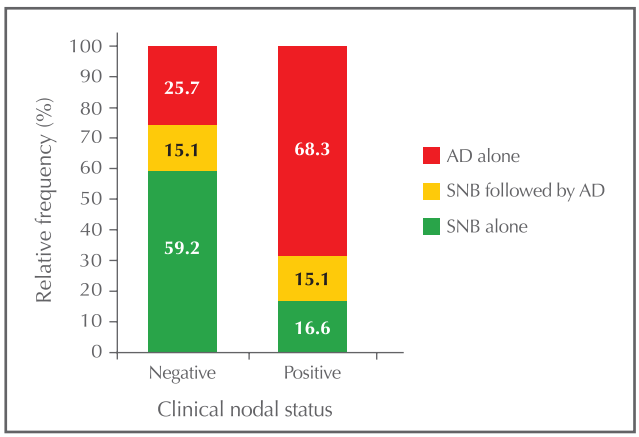
2.42 A higher proportion (46.3%) of patients who had surgery at private medical facilities underwent breast-conserving surgery than those who had surgery at public medical facilities (28.1%) (Figure 2.15).

Figure 2.15: Type of breast surgery by type of medical service (N=19,454)



2.43 SNB alone was more commonly performed on patients with negative clinical nodal status (59.2%) than those with positive clinical nodal status (16.6%). On the other hand, AD alone was more commonly performed on patients with positive clinical nodal status (68.3%) than those with negative clinical nodal status (25.7%). Figure 2.16 shows the type of nodal surgery received by patients with positive or negative clinical nodal status in the patient cohort.

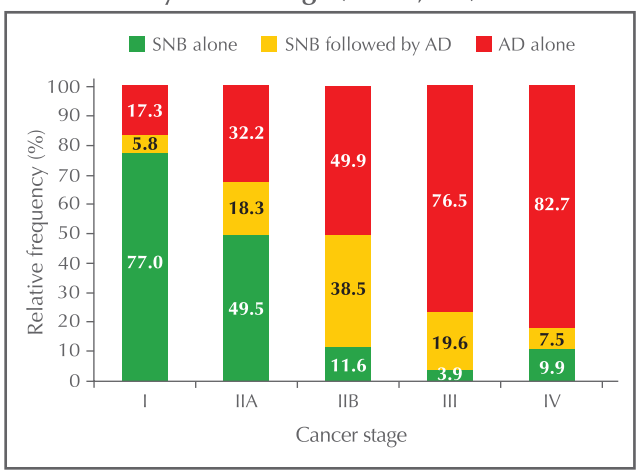
Figure 2.16: Type of nodal surgery by clinical nodal status (N=18,907)



SNB: sentinel node biopsy; AD: axillary dissection

2.44 The use of AD alone was positively correlated with progressing cancer stage. In the cohort, the use of AD after SNB increased from stage I to II patients, but decreased for stage III or IV patients. This is because most of the patients with stage III or IV disease received AD as their first nodal surgery (Figure 2.17).

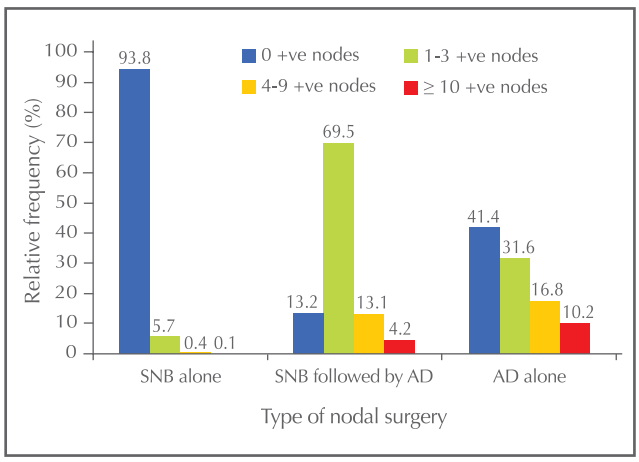
Figure 2.17: Type of nodal surgery for invasive cancer by cancer stage (N=16,637)



SNB: sentinel node biopsy; AD: axillary dissection

2.45 Of the patients with invasive cancer, 93.8% who underwent only SNB had no positive lymph node, while 41.4% who underwent only AD and 13.2% who underwent AD after SNB had no positive lymph node (Figure 2.18).

Figure 2.18: Number of positive nodes by type of nodal surgery (N=17,000)



SNB: sentinel node biopsy; AD: axillary dissection

B. Radiotherapy

2.46 Radiotherapy is a treatment to kill cancer cells using ionizing radiation. It is capable of inflicting damage on the DNA structure and thus induces cell death and causes cell division failure. Radiotherapy can be administered in two settings: firstly, locoregional radiotherapy where the breast or chest wall, with or without regional lymph nodes, are irradiated with curative intent; and secondly palliative radiotherapy (e.g. to bone) is used to reduce symptoms that can be pain, pressure symptoms, airway obstruction, bleeding and secretion from metastases.

i. Locoregional radiotherapy

2.47 Radiotherapy to the breast following breast-conserving surgery is an integral part of breast-conserving therapy in order to achieve an outcome equivalent to mastectomy. This applies to all patients with invasive breast cancer and most patients with in situ cancer. Some patients whose tumour is locally advanced, or with cancer cells found in the lymph nodes also need radiotherapy after mastectomy.

2.48 In the patient cohort, 63.5% of the patients had radiotherapy as part of their treatment, with almost all (99.8%) being adjuvant. The majority (87.3%) of patients were treated with radiotherapy at public medical facilities, while the remainder had radiotherapy at private medical facilities.

2.49 The proportions of the invasive breast cancer patients who had undergone either breast-conserving surgery or mastectomy and received radiotherapy as part of their treatment by different cancer stages are shown in Figures 2.19 and 2.20 respectively. The majority (over 95%) of the invasive breast cancer patients who underwent breast-conserving surgery also received radiotherapy (Figure 2.19). On the other hand, the proportion of invasive breast cancer patients who underwent mastectomy and also received radiotherapy increased significantly with progressing cancer stage (Figure 2.20).

2.50 Of the patients with in situ cancer who had breast-conserving surgery, 93.6% received radiotherapy afterwards (Figure 2.19), while only 4.0% of the patients with in situ cancer who had mastectomy underwent radiotherapy (Figure 2.20).

Figure 2.19: Use of radiotherapy among patients who underwent breast-conserving surgery by cancer stage (N=7,201)

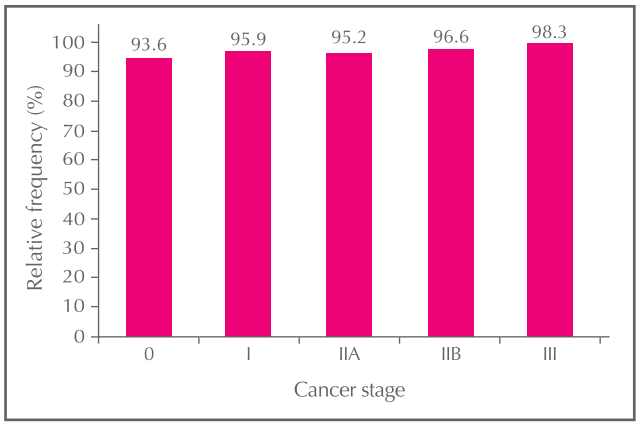
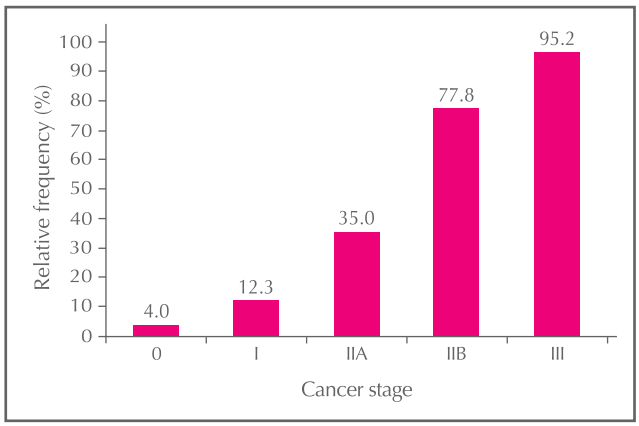


Figure 2.20: Use of radiotherapy among patients who underwent mastectomy by cancer stage (N=11,970)



2.51 Radiotherapy for breast cancer involves localised irradiation of regions such as breast and chest wall, with or without regional nodes. Table 2.20 shows the irradiated regions of adjuvant locoregional radiotherapy among the patients who received radiotherapy by the type of surgery they underwent.

Table 2.20: Coverage of regional lymph nodes by adjuvant locoregional radiotherapy (N=7,702)

	Number	%
Breast-conserving surgery (N=4,143)		
Breast alone	3,520	85.0
Breast and regional lymph nodes	623	15.0
Mastectomy (N=3,559)		
Chest wall alone	894	25.1
Chest wall and regional lymph nodes	2,665	74.9

ii. Palliative radiotherapy

2.52 Palliative radiotherapy for breast cancer is used for reducing symptoms which can be pain, pressure symptoms, airway obstruction, bleeding and secretion from metastases. Among the patients with metastatic breast cancer, 61.9% underwent palliative radiotherapy to various sites.

C. Chemotherapy

2.53 Chemotherapy is a form of systemic treatment using one or more cytotoxic drugs to kill or control cancer cell growth. The drugs destroy breast cancer cells by interfering with their ability to grow and divide. Chemotherapy is generally not required for patients with in situ tumour. Chemotherapy regimens are classified into three generations[51] and the number of cycles actually delivered within any regimen may vary, depending on patient factors such as bone marrow reserve and severity of side effects.

2.54 Of the patients with invasive cancer, 66.5% underwent chemotherapy. Of these patients, 83.3% had adjuvant chemotherapy, 12.8% had neoadjuvant chemotherapy, and 3.9% had palliative chemotherapy. The majority (85.9%) of the patients received chemotherapy in public medical facilities, and the remainder in private medical facilities.

2.55 In the patient cohort, the use of curative intent chemotherapy was positively correlated with progressing cancer stage from stage I to III. In addition, the majority (85.4%) of the patients with stage IV cancer underwent palliative chemotherapy (Figure 2.21).

2.56 In general, for all cancer stages, the use of chemotherapy among the patients aged 70 or above was much lower than that among patients aged below 70. Table 2.21 shows the percentage of the patients who received chemotherapy in the same age group and cancer stage.

Figure 2.21: Use of chemotherapy by cancer stage (N=17,169)

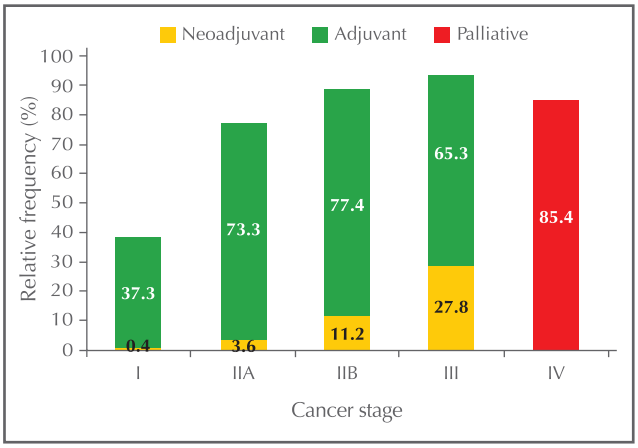


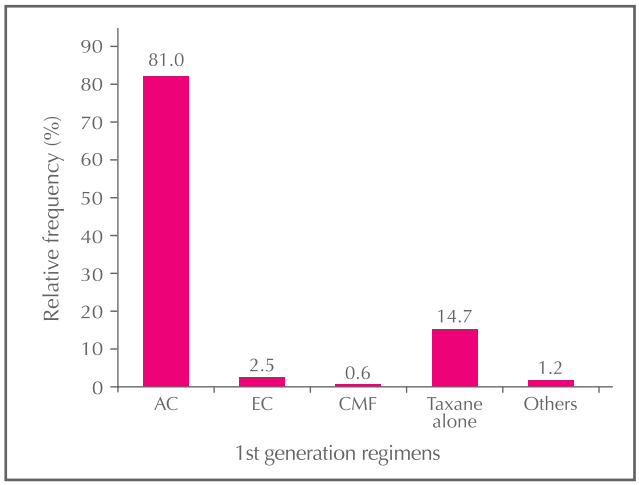
Table 2.21: Use of chemotherapy by age group and cancer stage at diagnosis (N=16,731)

	Cancer stage, Number (% of patients in the same age group and cancer stage)									
	I		IIA		IIB		III		IV	
<30	25	(58.1)	24	(85.7)	17	(100.0)	14	(100.0)	3	(100.0)
30-39	286	(56.3)	374	(90.1)	204	(97.6)	226	(99.1)	31	(77.5)
40-49	901	(44.4)	1,221	(87.0)	714	(95.7)	854	(98.4)	159	(95.2)
50-59	795	(39.5)	1,343	(85.3)	782	(94.2)	922	(97.3)	170	(88.1)
60-69	318	(27.0)	665	(68.2)	424	(88.9)	498	(92.7)	73	(88.0)
≥70	20	(4.3)	40	(10.8)	32	(19.2)	63	(36.6)	13	(35.1)

i. Neoadjuvant chemotherapy

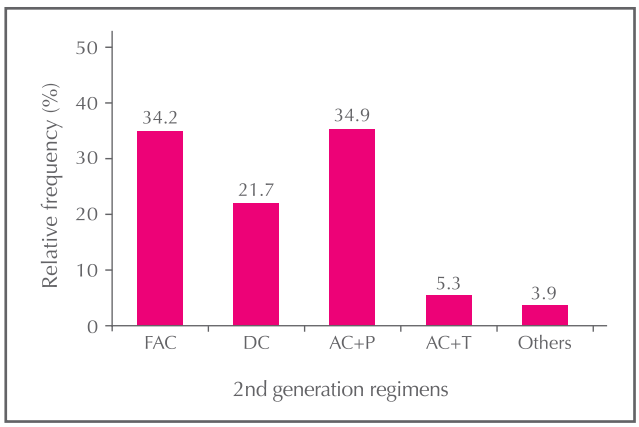
2.57 Of the 11,848 patients who underwent chemotherapy, 12.8% received it as neoadjuvant treatment. The use of neoadjuvant chemotherapy increased substantially with progressing cancer stage (Figure 2.21). Figures 2.22, 2.23 and 2.24 show the use of chemotherapy regimens of the three generations in neoadjuvant setting among patients in the cohort. The use of HER2 regimens is shown in Figure 2.25. The types of chemotherapy regimens used by patients with different biological subtype in the cohort are shown in Figure 2.26.

Figure 2.22: Type of first generation chemotherapy regimens (non-HER2) used in neoadjuvant setting (N=163)



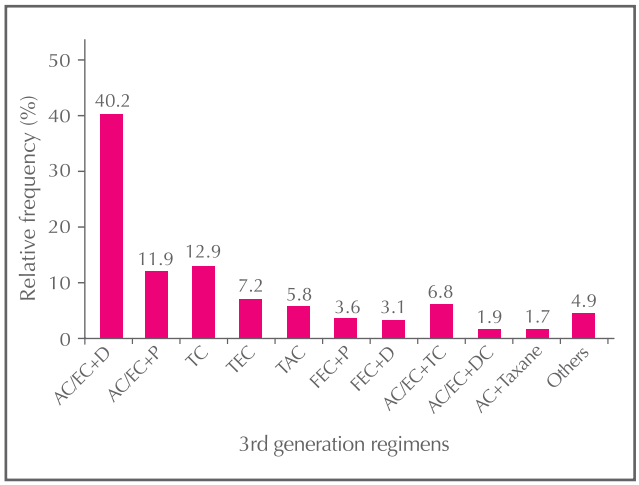
A: Adriamycin/Doxorubicin; E: Epirubicin; C: Cyclophosphamide; M: Methotrexate; F: 5FU; Taxane: Docetaxel or Paclitaxel

Figure 2.23: Type of second generation chemotherapy regimens (non-HER2) used in neoadjuvant setting (N=152)



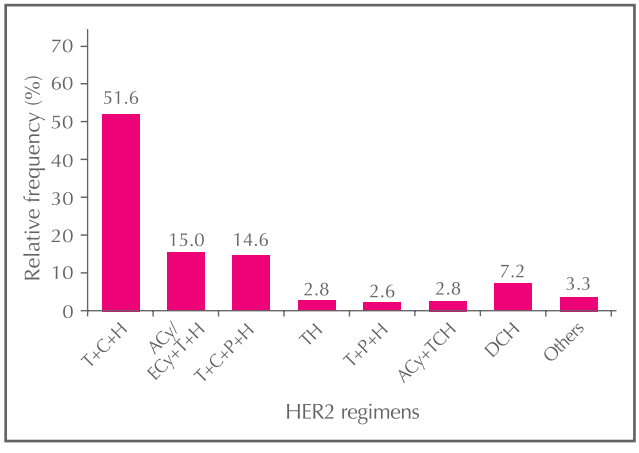
DC: Docetaxel+Cyclophosphamide; P: Paclitaxel; T: Taxane

Figure 2.24: Type of third generation chemotherapy regimens (non-HER2) used in neoadjuvant setting (N=587)



D: Docetaxel; P: Paclitaxel; TC: Paclitaxel+Carboplatin; DC: Docetaxel+Cyclophosphamide

Figure 2.25: Type of HER2 regimens used in neoadjuvant setting (N=459)



A: Anthracycline; C: Carboplatin; T: Taxane; H: Trastuzumab; P: Pertuzumab; Cy: Cyclophosphamide; DC: Docetaxel+Cyclophosphamide

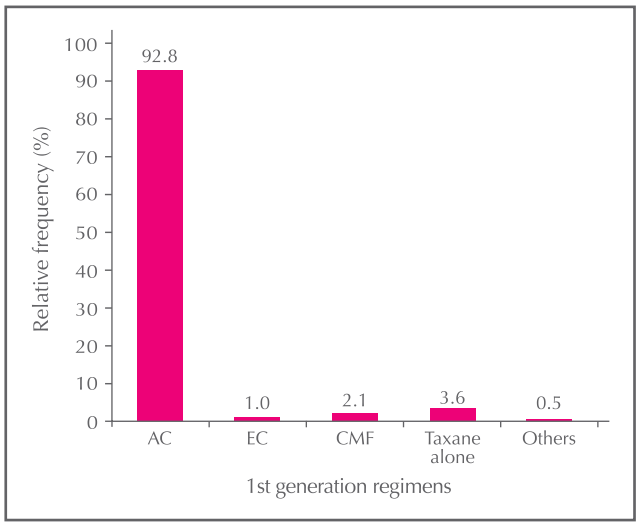
Figure 2.26: Type of chemotherapy regimens used by biological subtype in neoadjuvant setting (N=1,315)

AC+T: uncertain 2nd/3rd generation due to uncertain week intervals
* Others included any non-HER2 regimens containing Capecitabine, Gemcitabine, or Vinorelbine

ii. Adjuvant chemotherapy

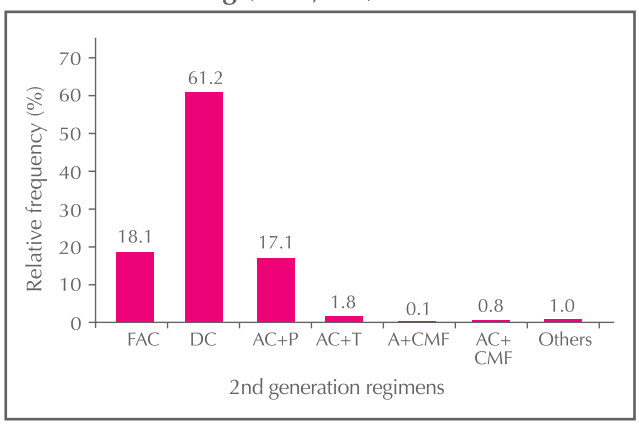
2.58 Of the 11,848 patients who underwent chemotherapy, 83.3% received it as adjuvant (stages I-III) treatment. Figures 2.27, 2.28 and 2.29 show the use of chemotherapy regimens of three generations in adjuvant setting among patients in the cohort. The use of HER2 regimens in adjuvant chemotherapy is shown in Figure 2.30. Figures 2.31 and 2.32 show the relative frequency for different types of regimens used by biological subtype and cancer stage, respectively.

Figure 2.27: Type of first generation chemotherapy regimens (non-HER2) used in adjuvant setting (N=1,690)



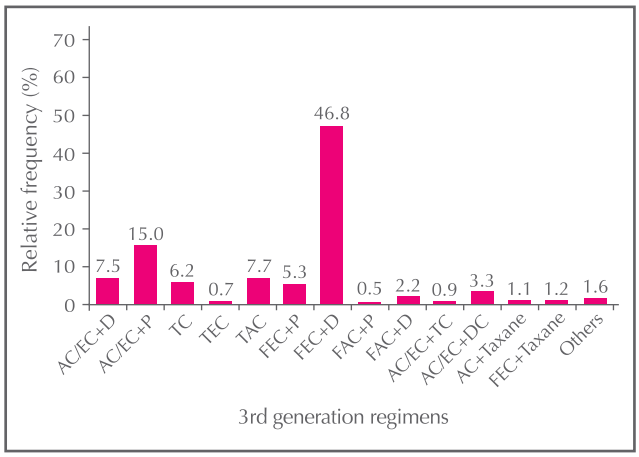
A: Adriamycin/Doxorubicin; E: Epirubicin; C: Cyclophosphamide; M: Methotrexate; F: 5FU; Taxane: Docetaxel or Paclitaxel

Figure 2.28: Type of second generation chemotherapy regimens (non-HER2) used in adjuvant setting (N=2,718)



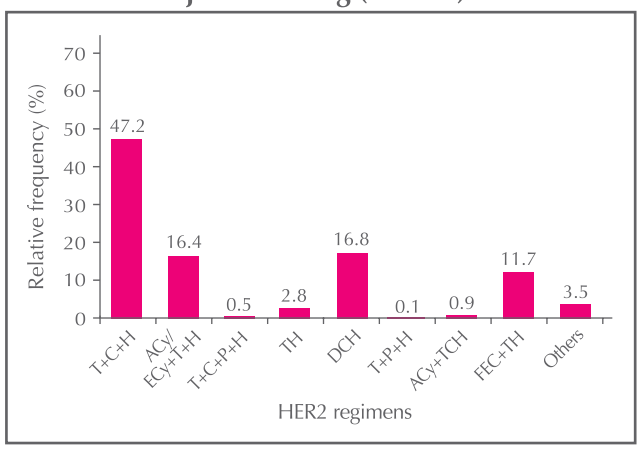
DC: Docetaxel+Cyclophosphamide; P: Paclitaxel; T: Taxane

Figure 2.29: Type of third generation chemotherapy regimens (non-HER2) used in adjuvant setting (N=2,891)



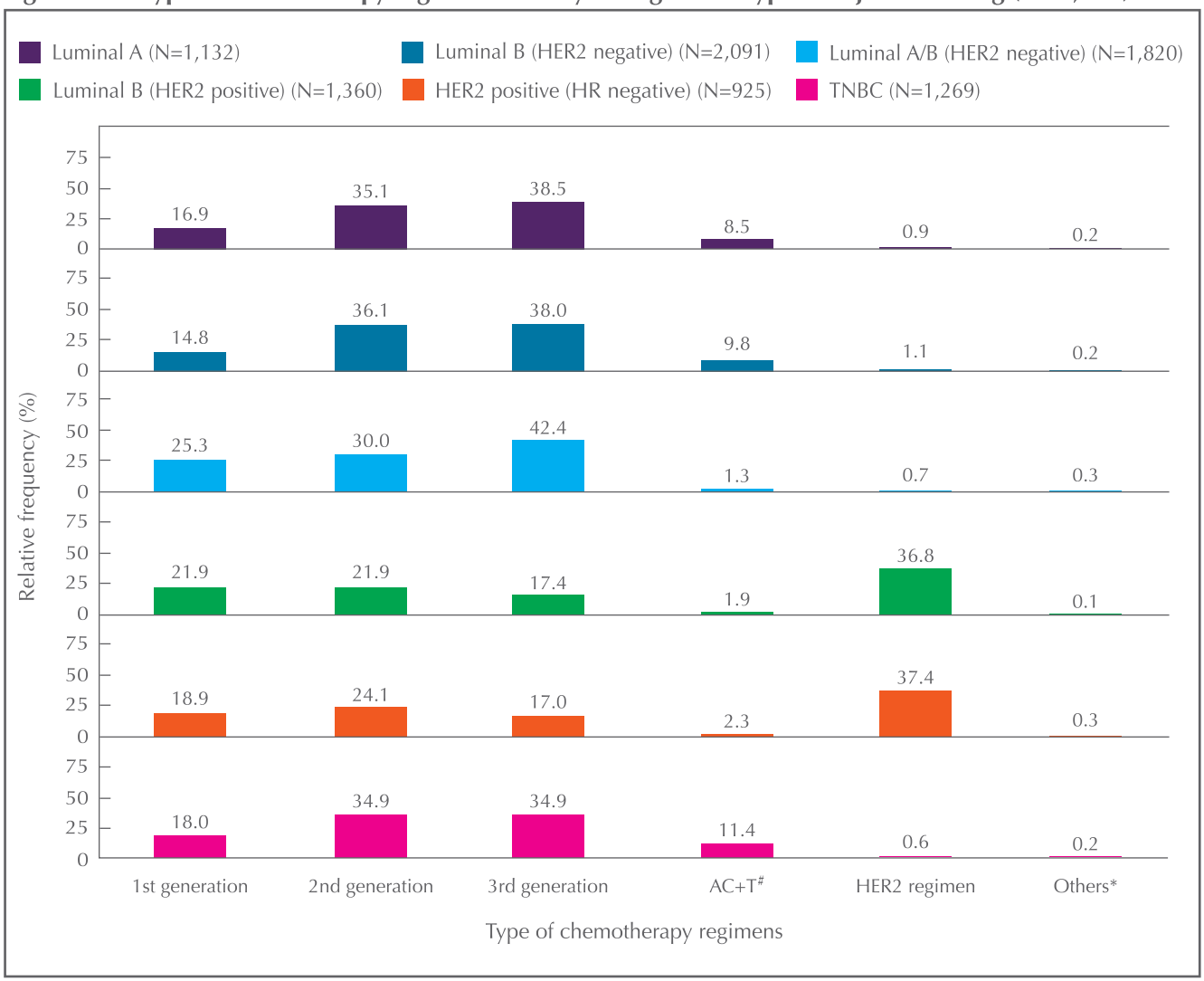
D: Docetaxel; P: Paclitaxel; TC: Paclitaxel+Carboplatin; DC: Docetaxel+Cyclophosphamide

Figure 2.30: Type of HER2 regimens used in adjuvant setting (N=914)



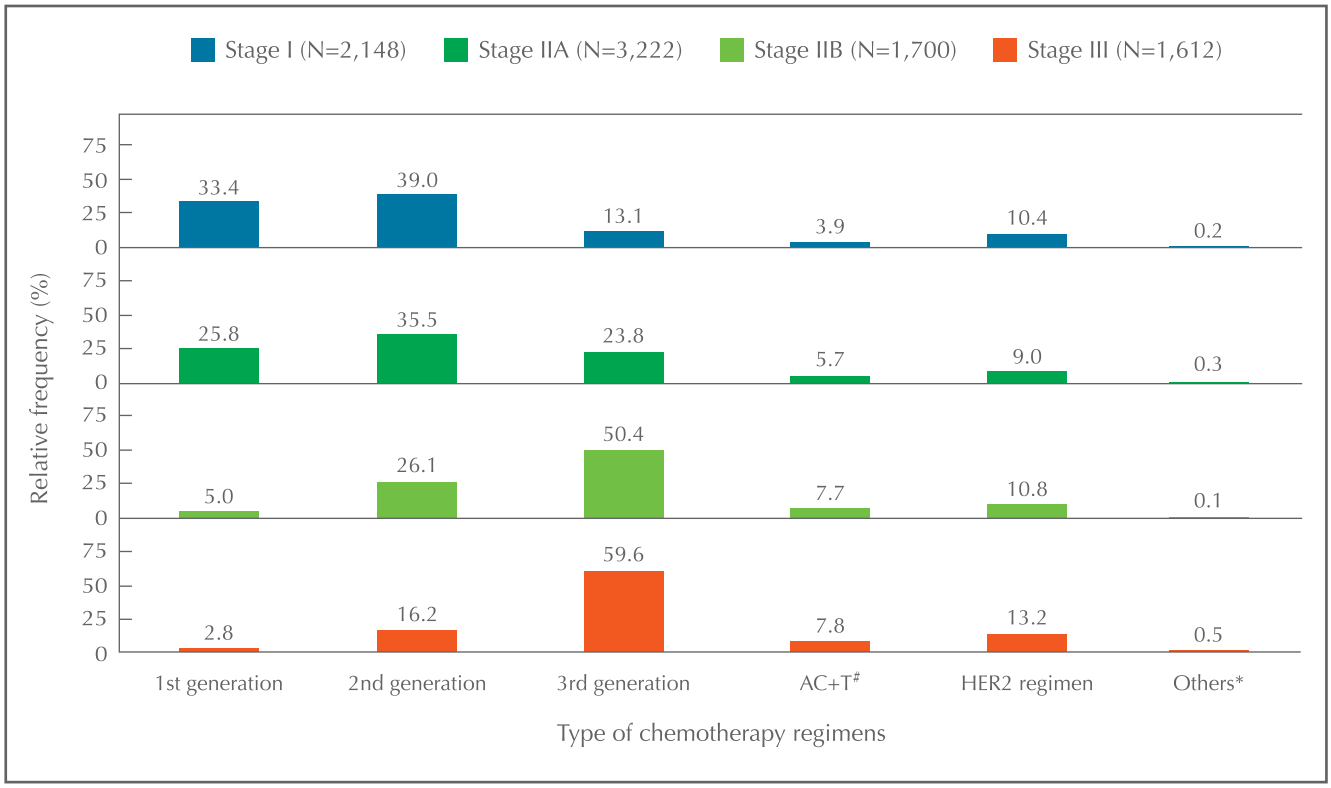
A: Anthracycline; C: Carboplatin; T: Taxane; H: Trastuzumab; P: Pertuzumab; Cy: Cyclophosphamide; DC: Docetaxel+Cyclophosphamide

Figure 2.31: Type of chemotherapy regimens used by biological subtype in adjuvant setting (N=8,597)



AC+T: uncertain 2nd/3rd generation due to uncertain week intervals
* Others included any non-HER2 regimens containing Capecitabine, Gemcitabine, or Vinorelbine

Figure 2.32: Type of chemotherapy regimens used by cancer stage in adjuvant setting (N=8,682)

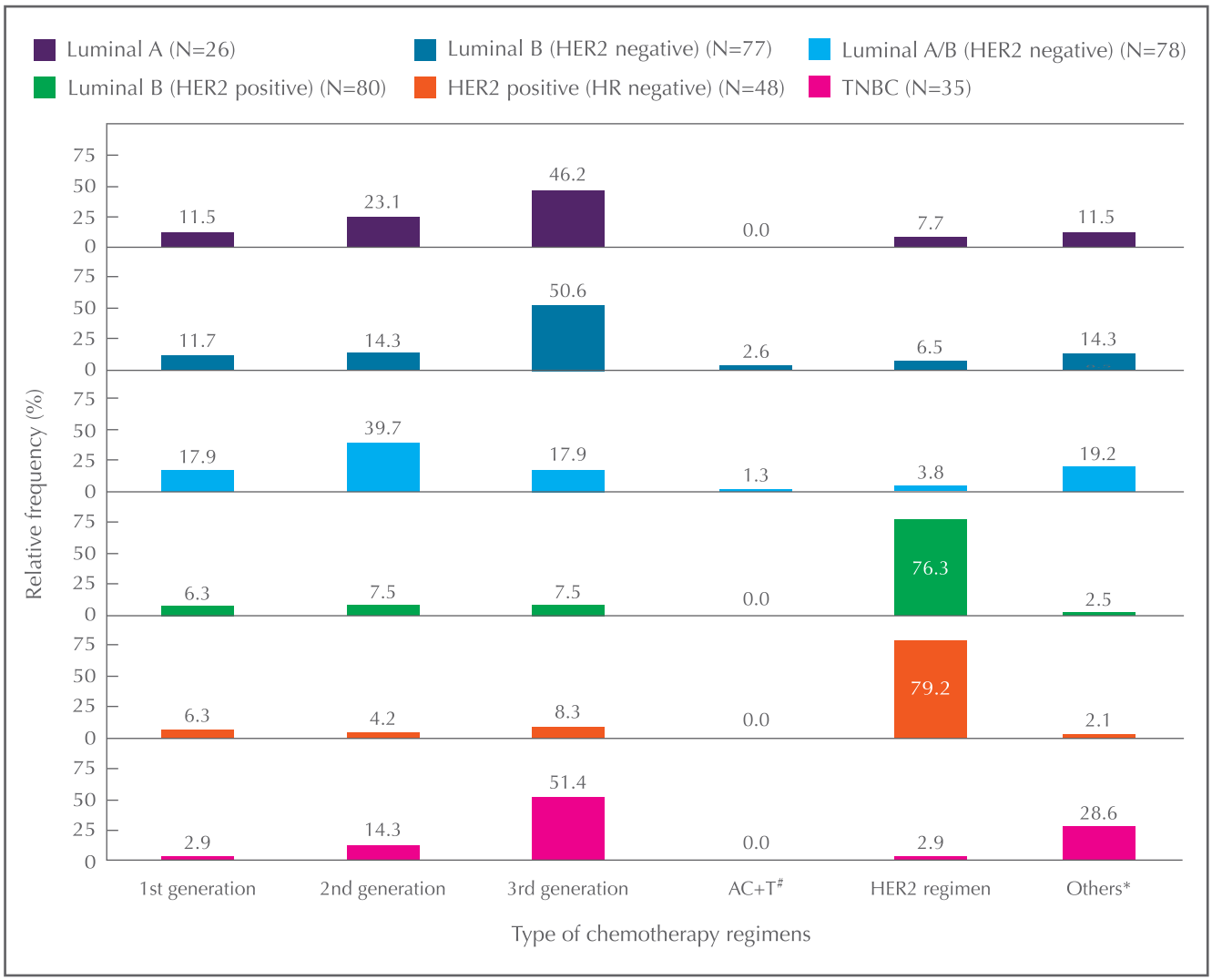


AC+T: uncertain 2nd/3rd generation due to uncertain week intervals
* Others included any non-HER2 regimens containing Capecitabine, Gemcitabine, or Vinorelbine

iii. Palliative chemotherapy

2.59 Of the 11,848 patients who underwent chemotherapy, 3.9% received it as palliative (stage IV) treatment. Figure 2.33 shows the relative frequency for different types of regimens used by biological subtype.

Figure 2.33: Type of chemotherapy regimens used by biological subtype in palliative setting (N=344)



AC+T: uncertain 2nd/3rd generation due to uncertain week intervals
* Others included any non-HER2 regimens containing Capecitabine, Gemcitabine, or Vinorelbine

D. Endocrine therapy

2.60 Endocrine therapy plays an important role in all stages of the treatment and prevention strategy for hormone receptor-positive breast cancer. Breast cancer develops from abnormal breast cells that are often sensitive to sex hormones, such as estrogen and progesterone. Endocrine therapy acts on the hormone receptors of cancer cells.

2.61 In the cohort, 67.6% of the patients were treated with endocrine therapy. Among them, the majority (97.0%) were adjuvant, while neoadjuvant (0.9%) and palliative (2.1%) accounted for small proportions. In addition, the majority (89.9%) of patients received endocrine therapy at public medical facilities, while the remainder received at private medical facilities.

2.62 For patients with invasive breast cancer, about three-quarters received endocrine therapy, while for patients with in situ breast cancer, only 15.8% received endocrine therapy (Figure 2.34).

2.63 Two types of drugs are commonly used: anti-estrogens and aromatase inhibitors. Anti-estrogen drugs slow down breast cancer growth by binding to ER on breast cancer cells. The most common anti-estrogen is tamoxifen which is used in both premenopausal and postmenopausal women. Aromatase inhibitors decreases the level of estrogen in the body. Aromatase inhibitors, including anastrozole, letrozole and exemestane, are only effective for women who are postmenopausal. Figure 2.35 shows the use of tamoxifen and aromatase inhibitors by age group in the patient cohort.

Figure 2.34: Use of endocrine therapy by cancer stage (N=19,754)

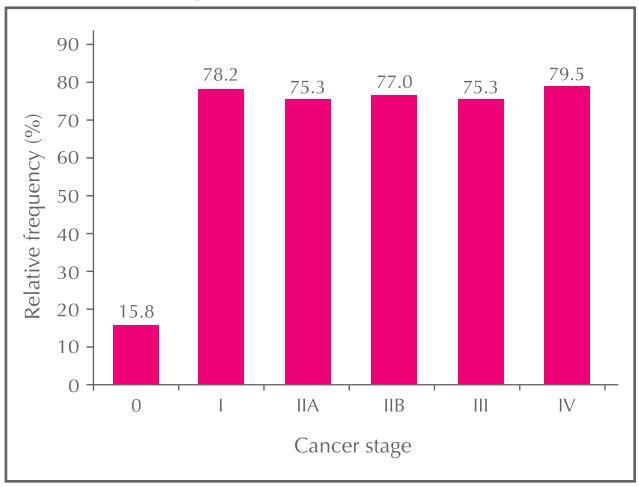
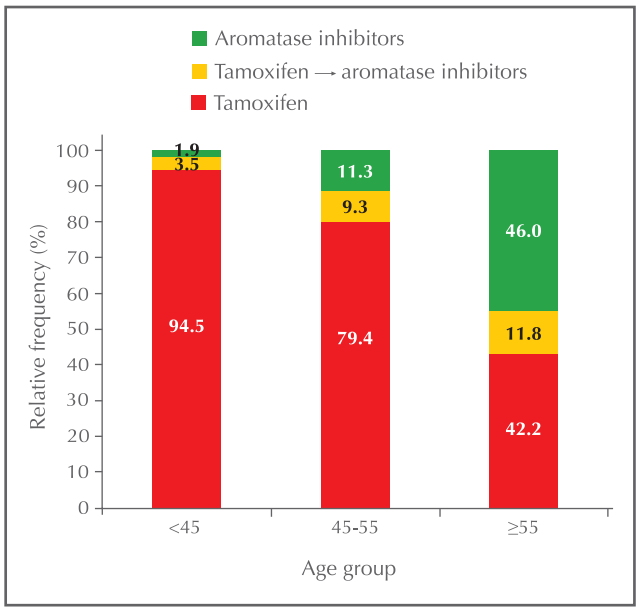


Figure 2.35: Forms of endocrine therapy by age group (N=12,690)

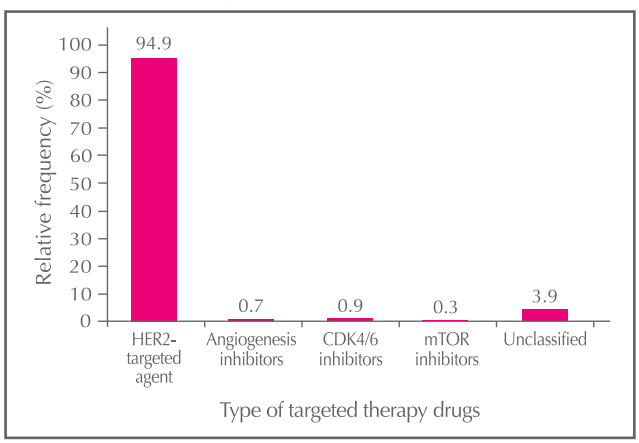


E. Targeted therapy

2.64 Targeted therapy uses a drug that specifically inhibits the abnormal growth pathway of cancer cells by blocking specific molecules required for tumour growth or anti-apoptosis. Anti-HER2 targeted therapy is used for treating patients with invasive breast cancer cells that over-express HER2 oncogene (HER2-positive breast cancer).

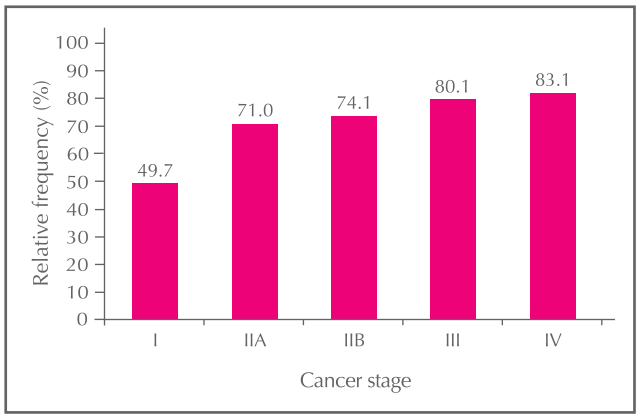
2.65 Among all patients, 14.6% received targeted therapy, particularly HER2-targeted agents (94.9%) (Figure 2.36). Of the patients with invasive HER2-positive breast cancer in the cohort, 67.5% underwent anti-HER2 targeted therapy. Among them, 79.3% were adjuvant, 17.4% were neoadjuvant and 3.3% were palliative. In addition, the majority (87.6%) of the patients received anti-HER2 targeted therapy at public medical facilities, and the remainder at private medical facilities. In the cohort, the use of anti-HER2 targeted therapy was much lower for stage I patients, and the proportions increased with increasing cancer stage among stage II or above patients (Figure 2.37).

Figure 2.36: Type of targeted therapy drugs used (N=3,018)



HER2: human epidermal growth factor receptor 2;
CDK: cyclin-dependent kinase;
mTOR: mammalian target of rapamycin
Note: The total percentages may exceed 100 as multiple types of targeted therapy drugs may be used.

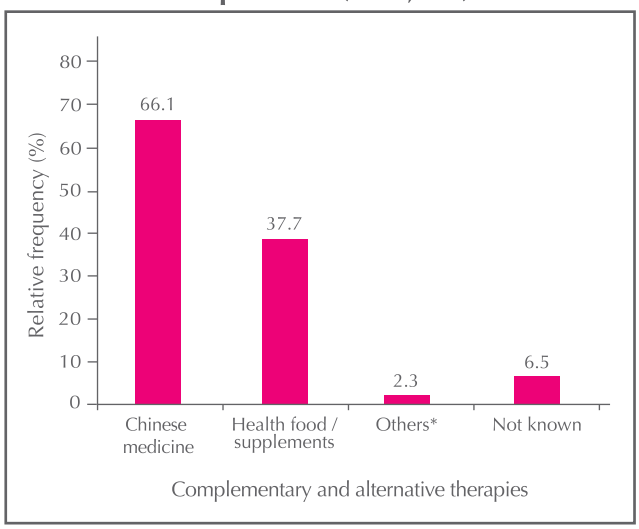
Figure 2.37: Use of anti-HER2 targeted therapy in HER2 positive patients by cancer stage (N=3,637)



F. Complementary and alternative therapies

2.66 Apart from the standard medical treatments and care of breast cancer described in the previous sections of this chapter, patients may seek different kinds of complementary and alternative therapies, such as taking traditional Chinese medicines, health food and supplements. A total of 7,357 (35.6%) of the patients in the cohort sought complementary and alternative therapies as part of their treatment. Two-thirds of them used traditional Chinese medicines (Figure 2.38).

Figure 2.38: Type of complementary and alternative therapies used (N=7,357)



* Others included Tai Chi, Qigong, Naturopathy, acupuncture and moxibustion, massage and yoga

Note: The total percentages may exceed 100 as multiple types of complementary and alternative therapies may be used.

VI. Patient status

2.67 Once treatment is completed, the HKBCR will follow up with the registered patients annually to ascertain the efficacy of the treatment. To date, a total of 18,872 patients completed at least one follow-up and 13.4% of them had the last follow-up within the past two years. About 60% have been followed up for five or more years (Table 2.22). The mean and median follow-up period were 6.8 and 6.3 years respectively.

2.68 Of the patients who have been followed up, 2.5% experienced only locoregional recurrence (LRR), 3.2% experienced only distant recurrence (DR), and 2.3% experienced both locoregional and distant recurrence concurrently or sequentially. The mean and median time to recurrence are shown in Table 2.23.

Table 2.22: Follow-up of patients (N=18,872)

	Number	%
Follow-up period		
<1 year	1,280	6.8
1-2 years	1,911	10.1
2-5 years	4,575	24.2
5-10 years	5,868	31.1
≥10 years	5,198	27.5
Not known	40	0.2
Mean (95% CI)	6.8 years (6.74-6.87)	
Median (95% CI)	6.3 years (6.17-6.42)	
Mortality		
No. of deaths from breast cancer	1,708	9.1
No. of deaths from unrelated causes	812	4.3
No. of deaths with causes not known	77	0.4

CI: confidence interval

Table 2.23: Recurrence pattern of patients (N=18,092)

	Number	%
Locoregional recurrence only		
No. of patients	461	2.5
Mean time (95% CI)	5.4 years (5.01-5.75)	
Median time (95% CI)	4.5 years (3.80-5.00)	
Distant recurrence only		
No. of patients	585	3.2
Mean time (95% CI)	4.6 years (4.32-4.83)	
Median time (95% CI)	3.8 years (3.40-4.30)	
Locoregional and distant recurrence		
No. of patients	408	2.3
Mean time (95% CI)	4.0 years (3.65-4.26)	
Median time (95% CI)	3.3 years (2.90-3.50)	

CI: confidence interval

Note: Patients with stage IV disease or those who did not receive surgery were excluded.

2.69 In the cohort, the proportion of patients with only LRR did not show any association with cancer stage at diagnosis. However, the proportion of the patients with only DR increased from 1.4% of stage I patients to 9.1% of stage III patients, while the proportion of the patients with both LRR and DR increased from 0.9% of stage I patients to 5.7% of stage III patients (Table 2.24).

Table 2.24: Locoregional and distant recurrence among invasive breast cancer patients by cancer stage (N=15,467)

	Cancer stage, %			
	I (N=5,800)	IIA (N=4,602)	IIB (N=2,376)	III (N=2,689)
Locoregional recurrence only	2.4	2.5	1.2	2.1
Distant recurrence only	1.4	2.7	4.7	9.1
Locoregional and distant recurrence	0.9	2.0	3.2	5.7
No recurrence	95.3	92.8	90.9	83.1

2.70 Table 2.25 shows the number of invasive breast cancer patients with LRR in different subgroups specified by surgery type and cancer stage at diagnosis in the patient cohort. Patients who received breast-conserving surgery without radiotherapy had higher LRR rates than those who received breast-conserving surgery with radiotherapy. Similar pattern was observed among patients who received mastectomy. In addition, among patients who received mastectomy without radiotherapy, LRR rate increased with increasing cancer stage (Table 2.25). The two most common sites for LRR were breast (39.5%) and axilla (32.7%) (Table 2.26).

Table 2.25: Locoregional recurrence by type of surgery received and cancer stage at diagnosis

	Cancer stage, Number (% of patients with the same surgery type and cancer stage)				
	I	IIA	IIB	III	Total
BCS with RT	84/2,759 (3.0)	75/1,575 (4.8)	21/543 (3.9)	27/376 (7.2)	207/5,253 (3.9)
BCS without RT	8/104 (7.7)	11/77 (14.3)	2/17 (11.8)	1/7 (14.3)	22/205 (10.7)
MTX with RT	13/368 (3.5)	20/1,032 (1.9)	57/1,420 (4.0)	159/2,190 (7.3)	249/5,010 (5.0)
MTX without RT	88/2,563 (3.4)	100/1,914 (5.2)	25/391 (6.4)	19/104 (18.3)	232/4,972 (4.7)

BCS: breast-conserving surgery; MTX: mastectomy; RT: radiotherapy

Table 2.26: Sites involved in locoregional recurrence (N=869)

	Number	%
Breast	343	39.5
Axilla	284	32.7
Chest wall	240	27.6
Supraclavicular fossa	156	18.0
Internal mammary node	62	7.1
Infraclavicular fossa	8	0.9
Others	10	1.2
Unspecified	24	2.8

Note: The total percentages may exceed 100 as multiple sites may be involved in locoregional recurrence.

2.71 In the cohort, 993 patients experienced distant recurrence. Among them, the top four organs involved were bone (59.8%), lung (47.2%), liver (39.1%) and brain (16.0%) (Table 2.27). The median time for distant recurrence to these organs and the distribution of biological subtypes of the patients involved are shown in Table 2.28.

Table 2.27: Sites involved in distant recurrence (N= 993)

	Number	%
Bone	594	59.8
Lung	469	47.2
Liver	388	39.1
Brain	159	16.0
Intrathoracic node	222	22.4
Pleura	83	8.4
Neck node	80	8.1
Distant lymph node	53	5.3
Contralateral axillary node	39	3.9
Adrenal gland	35	3.5
Peritoneum	27	2.7
Pancreas	6	0.6
Ovary	5	0.5
Spleen	5	0.5
Thyroid gland	4	0.4
Uterus	3	0.3
Others	38	3.8
Unspecified	29	2.9

Note: The total percentages may exceed 100 as multiple sites may be involved in distant recurrence.

Table 2.28: Time for organ-specific metastasis and distribution of the biological subtypes of patients

	Bone (N=594)	Lung (N=469)	Liver (N=388)	Brain (N=159)
Median time for metastasis	**4.0 years**	**4.1 years**	**3.6 years**	**3.2 years**
Biological subtype, %				
Luminal A	12.0	8.1	9.0	5.7
Luminal B (HER2 negative)	24.7	20.9	24.5	17.6
Luminal A/B (HER2 negative)	29.6	29.2	32.7	21.4
Luminal B (HER2 positive)	14.8	14.7	14.7	18.2
HER2 positive (HR negative)	5.9	7.5	7.7	14.5
TNBC	8.8	14.5	8.5	18.2
Not known	4.2	5.1	2.8	4.4

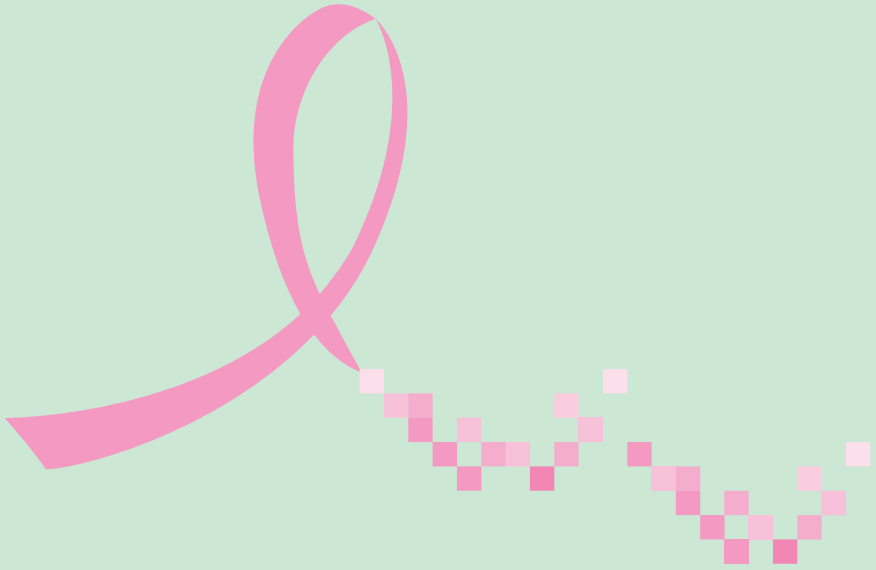
HR: hormone receptors (ER and PR)
Luminal A: ER and/or PR+, HER2-, and low Ki-67 index (<14%)
Luminal B (HER2 negative): ER and/or PR+, HER2-, and high Ki-67 index (≥14%)
Luminal A/B (HER2 negative): ER and/or PR+, HER2-, and Ki-67 index not known
Luminal B (HER2 positive): ER and/or PR+, HER2+, and any Ki-67 index
HER2 positive (HR negative): ER and PR-, HER2+, and any Ki-67 index
TNBC (triple negative breast cancer): ER and PR-, HER2-, and any Ki-67 index

2.72 In the cohort, 1,708 patients died from breast cancer. Slightly more than half (51.2%) of them were stage III or IV at initial diagnosis. Survival time ranged from 0.3 to 17.5 years. Information on biological subtypes of these patients is shown in Table 2.29.

Table 2.29: Characteristics of breast cancer-specific deaths (N=1,708)

	Cancer stage at initial diagnosis						
	0	**I**	**IIA**	**IIB**	**III**	**IV**	**Unstaged**
No. of cases (% of breast cancer death cases)	**19 (1.1)**	**175 (10.2)**	**267 (15.6)**	**240 (14.1)**	**566 (33.1)**	**310 (18.1)**	**131 (7.7)**
Survival time (range in years)	**3.7-16.0**	**1.3-16.2**	**0.3-15.4**	**1.1-17.5**	**0.8-15.3**	**0.4-14.6**	**0.3-13.1**
Time from first diagnosis of distant recurrence to death (years), mean (range)	**3.0 (0.8-8.6)**	**2.9 (0.1-10.4)**	**2.3 (0.0-9.2)**	**2.1 (0.0-9.4)**	**2.2 (0.0-11.8)**	**4.6 (0.4-14.6)**	**2.4 (0.0-7.4)**
Biological subtype, Number							
Luminal A	2	11	21	23	49	15	7
Luminal B (HER2 negative)	0	50	69	58	114	56	26
Luminal A/B (HER2 negative)	3	46	67	71	143	69	23
Luminal B (HER2 positive)	2	24	28	25	90	52	15
HER2 positive (HR negative)	3	17	21	10	50	24	5
TNBC	0	23	56	43	87	22	11
Not known	9	4	5	10	33	72	44

HR: hormone receptors (ER and PR)
Luminal A: ER and/or PR+, HER2-, and low Ki-67 index (<14%)
Luminal B (HER2 negative): ER and/or PR+, HER2-, and high Ki-67 index (≥14%)
Luminal A/B (HER2 negative): ER and/or PR+, HER2-, and Ki-67 index not known
Luminal B (HER2 positive): ER and/or PR+, HER2+, and any Ki-67 index
HER2 positive (HR negative): ER and PR-, HER2+, and any Ki-67 index
TNBC (triple negative breast cancer): ER and PR-, HER2-, and any Ki-67 index



CHAPTER 3

PHYSICAL AND PSYCHOSOCIAL IMPACT OF BREAST CANCER AND ITS TREATMENT

CHAPTER 3
PHYSICAL AND PSYCHOSOCIAL IMPACT OF BREAST CANCER AND ITS TREATMENT

I. Introduction

3.1 Being diagnosed with breast cancer can be overwhelming for a woman. During treatment or recovery, women often experience emotional turmoil as a result of physical, psychological and social changes. This chapter analyses the physical and psychosocial impact of breast cancer and its treatment on 18,289 patients in the cohort.

HIGHLIGHTS

This chapter describes the physical discomfort after treatment and psychological impact of breast cancer on 18,289 patients who were diagnosed between 2006 and 2018.

Physical discomfort after treatment

- The majority of patients experienced no or minimal physical discomfort after undergoing surgery, radiotherapy, endocrine therapy and targeted therapy.
- About half of the patients who had chemotherapy experienced severe physical discomfort due to side effects.

Psychological impact of breast cancer

- At diagnosis, 47.7% of the patients accepted their diagnosis with a calm or positive attitude, while 23.1% could not accept their diagnosis.
- Positive changes in outlook on life and self-image were negatively associated with increasing age.
- In the cohort, 79.8% reported having changes in their lifestyle after diagnosis with breast cancer, mainly change in diet.
- The proportion of patients who never worried about recurrence increased with increasing age, while the proportion of patients who always worried about recurrence decreased with increasing age.

II. Physical discomfort after treatment

A. Physical discomfort after surgery

3.2 Overall, 70.7% of the patients who had surgery experienced no or minimal physical discomfort, while 9.4% experienced severe discomfort (Figure 3.1). In terms of level of discomfort by type of surgery, the proportion of the patients who reported severe physical discomfort was highest (13.0%) among those patients who had undergone both mastectomy and reconstruction (Figure 3.2).

Figure 3.1: Level of physical discomfort after surgery (N=18,229)

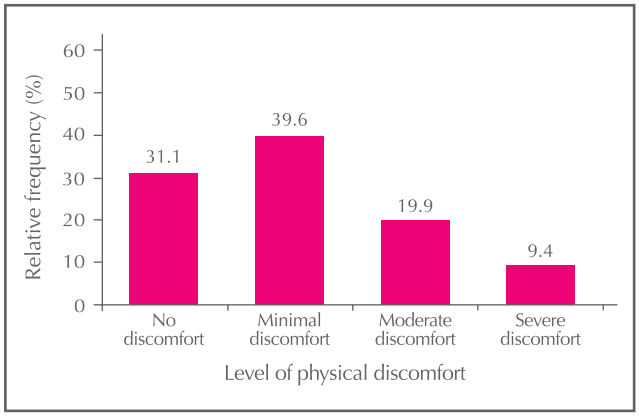
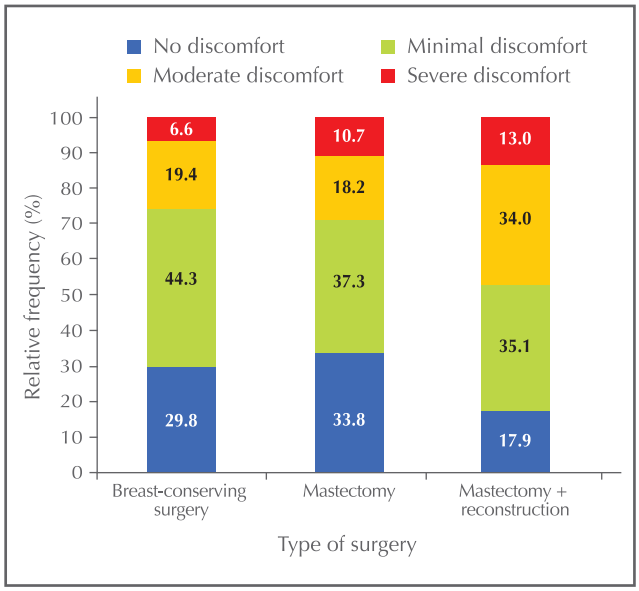


Figure 3.2: Level of physical discomfort by type of surgery (N=18,179)



B. Physical discomfort after radiotherapy

3.3 Among the patients who had radiotherapy, 69.1% experienced no or minimal discomfort (Figure 3.3). Higher proportions of patients who had undergone chest wall irradiation reported having severe discomfort than those who had undergone breast irradiation, regardless of whether or not they had regional lymph nodes irradiation (Figure 3.4).

Figure 3.3: Level of physical discomfort after radiotherapy (N=10,883)

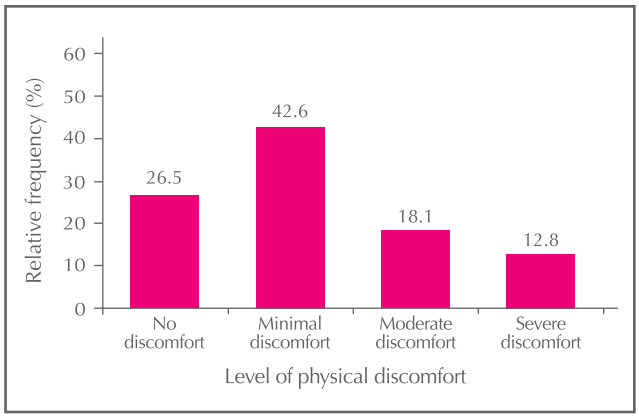
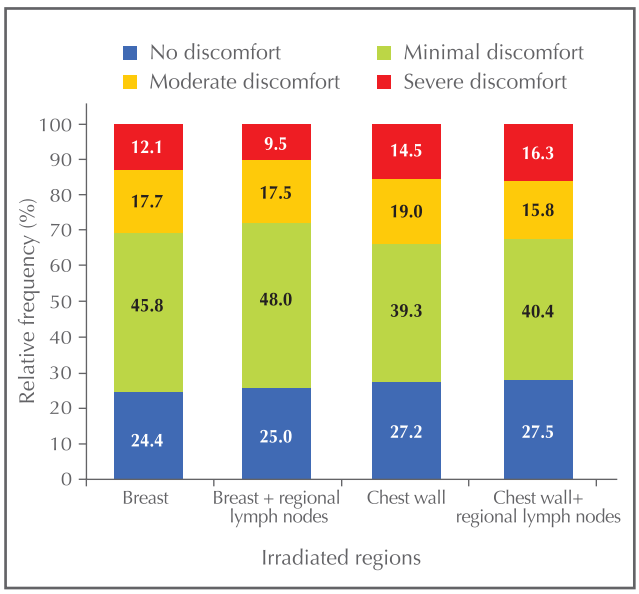


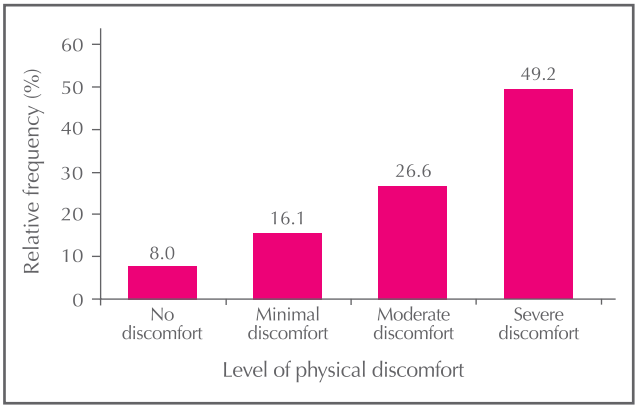
Figure 3.4: Level of physical discomfort after radiotherapy by irradiated regions (N=7,230)



C. *Physical discomfort after chemotherapy*

3.4 Of the patients who had chemotherapy, 49.2% experienced severe physical discomfort due to side effects (Figure 3.5).

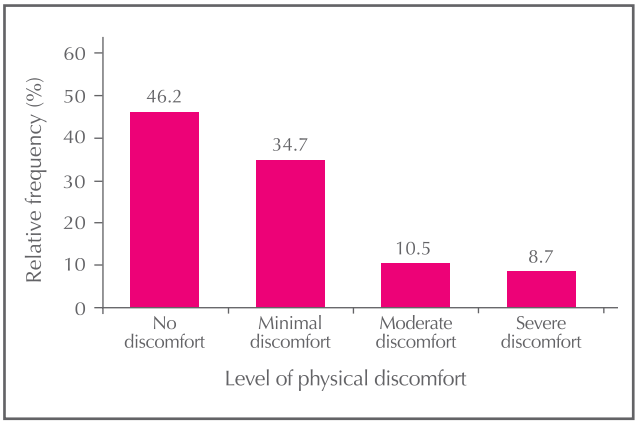
Figure 3.5: Level of physical discomfort after chemotherapy (N=10,714)



D. *Physical discomfort after endocrine therapy*

3.5 Of the patients who had undergone endocrine therapy, 80.9% experienced no or minimal discomfort (Figure 3.6).

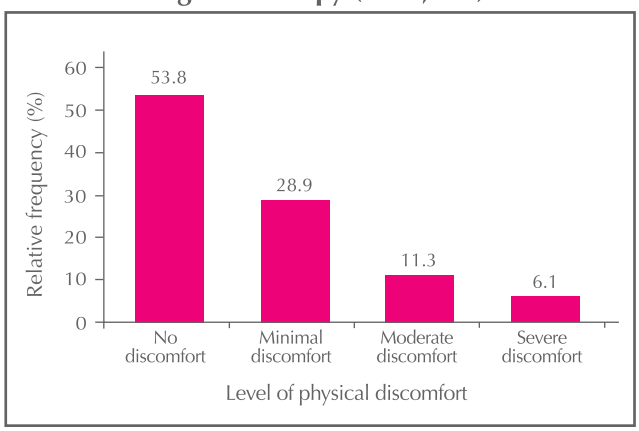
Figure 3.6: Level of physical discomfort after endocrine therapy (N=11,660)



E. Physical discomfort after targeted therapy

3.6 Of the patients who had undergone targeted therapy, 82.7% experienced no or minimal discomfort (Figure 3.7).

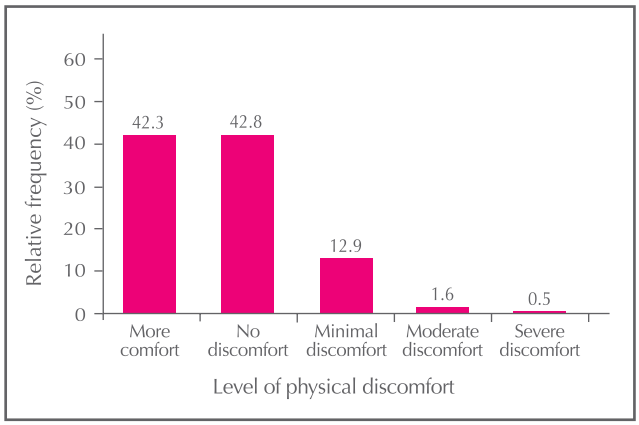
Figure 3.7: Level of physical discomfort after targeted therapy (N=2,413)



F. Physical discomfort after complementary and alternative therapies

3.7 Of the patients who received complementary and alternative therapies, 55.7% felt no or minimal discomfort, and 42.3% felt more comfortable (Figure 3.8).

Figure 3.8: Level of physical discomfort after complementary and alternative therapies (N=7,108)



III. Psychosocial impact and adjustments after diagnosis and treatment

A. Psychosocial impact after diagnosis and treatment

3.8 At diagnosis, 47.7% of the patients accepted their diagnosis with a calm or positive attitude. In contrast, 23.1% could not accept their diagnosis (Table 3.1). After treatment, 31.2% of the patients felt that cancer was a wake-up call that caught them by surprise. As for other changes, 49.9% reported having a positive change in their outlook on life and 40.1% reported having a positive change in their self-image after cancer diagnosis and its treatment (Table 3.1).

Table 3.1: Psychosocial impact of breast cancer

	Number	%
Feelings at time of breast cancer diagnosis (N=17,764)		
Acceptance and positive attitude to fight	3,909	22.0
Calm acceptance	4,559	25.7
Acceptance with depression	4,868	27.4
Lack of acceptance ("It cannot be true.")	4,103	23.1
Acceptance with anger ("Something must be wrong.")	325	1.8
Feelings after breast cancer treatments (N=12,647)		
Cancer was a wake-up call that caught patient by surprise	3,943	31.2
Life was not fair	7,143	56.5
Cancer changed patient's value system	752	5.9
Cancer took away something from patient	809	6.4
Change in outlook on life (N=17,899)		
Positive	8,930	49.9
Negative	1,306	7.3
No change	7,663	42.8
Change in self-image (N=17,890)		
Positive	7,182	40.1
Negative	1,700	9.5
No change	9,008	50.4

3.9 In the patient cohort, positive change in outlook on life was negatively associated with increasing age. The proportion of patients who reported having no change in their outlook on life increased with age (Figure 3.9). Similar pattern was also found in the change in self-image (Figure 3.10).

Figure 3.9: Change in outlook on life by age group (N=17,539)

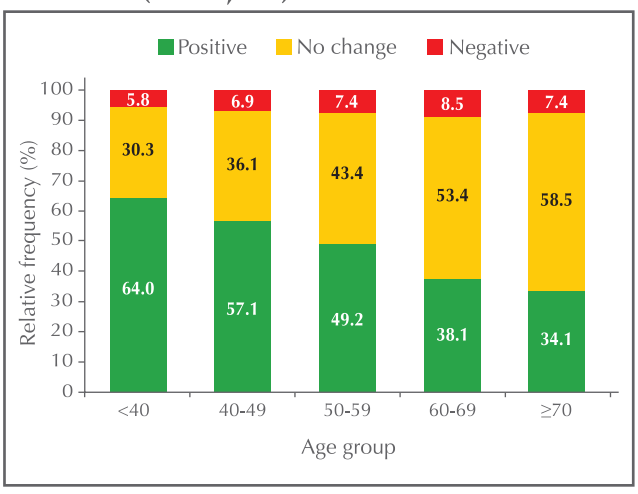
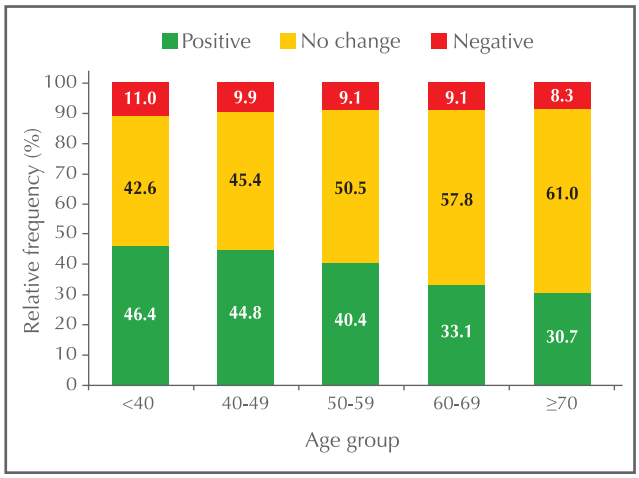


Figure 3.10: Change in self-image by age group (N=17,535)



B. Psychosocial adjustments and coping strategies

3.10 Of the 18,289 patients in the cohort, 79.8% reported having changes in their lifestyle after diagnosis with breast cancer. A change in diet (72.6%) was the most common lifestyle change, followed by increased exercise (61.1%). In addition, 11.6% of the patients resigned from their jobs (Table 3.2).

3.11 In the patient cohort, the two most common ways of managing negative emotions were direct verbal expression (55.9%) and diverting attention from negative emotions (32.3%) (Table 3.2).

C. Level of worry about recurrence

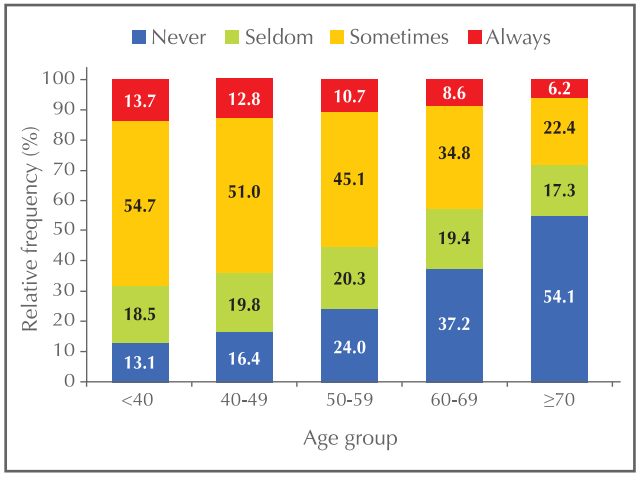
3.12 A quarter of the patients did not worry about recurrence, while 55.6% always or sometimes worried about recurrence (Table 3.2). The level of worry about recurrence showed correlation with the patients' age: the proportion of patients who never worried about recurrence increased with increasing age, while the proportion of patients who always worried about recurrence decreased with increasing age (Figure 3.11).

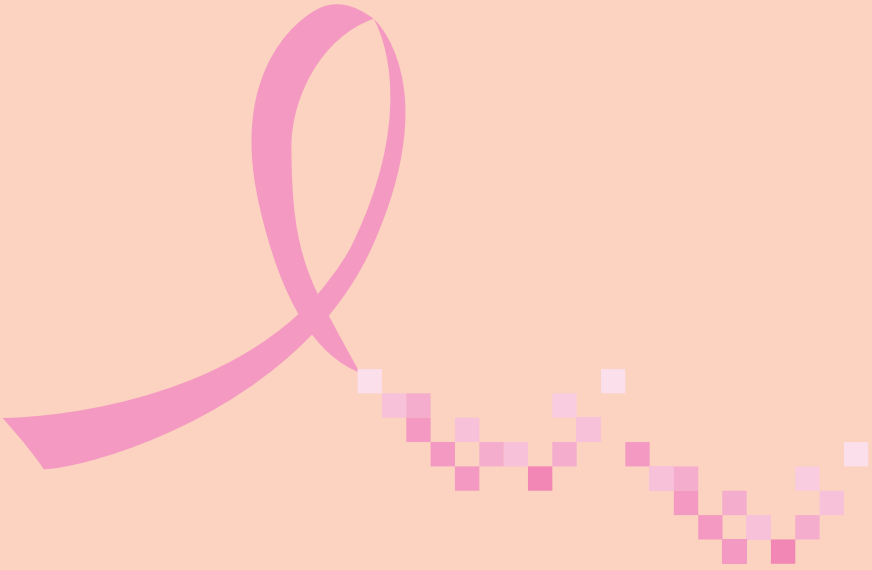
Table 3.2: Psychosocial adjustments and coping strategies for survivorship

	Number	%
Types of lifestyle changes (N=14,598)*		
Changing diet	10,598	72.6
Doing more exercise	8,923	61.1
Taking health supplements	3,081	21.1
Reducing workload	2,765	18.9
Quitting job	1,695	11.6
Ways of managing negative emotions (N=17,171)*		
Direct verbal expression	9,592	55.9
Diverting attention from them	5,548	32.3
Ignoring them	1,965	11.4
Feeling depressed	1,174	6.8
Others	1,429	8.3
Levels of worry about recurrence (N=17,902)		
Never	4,443	24.8
Seldom	3,506	19.6
Sometimes	7,982	44.6
Always	1,971	11.0

* The total percentages may exceed 100 as multiple changes or strategies may be applied.

Figure 3.11: Level of worry about recurrence by age group (N=17,537)





CHAPTER 4

BREAST CANCER UNDER COVID-19 PANDEMIC

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BREAST CANCER UNDER COVID-19 PANDEMIC

I. Introduction

4.1 During the COVID-19 pandemic, on-site recruitment was suspended especially in public hospitals, leading to a skewed public-private distribution of participants. Although the number of registrations from public hospitals has gradually increased in the post-pandemic era, recovery takes time. To partial out the impact of COVID-19, this chapter sets out the patient characteristics, disease pattern and treatment trend of 5,967 patients who were diagnosed with breast cancer since 2019 and recruited in the HKBCR.

HIGHLIGHTS

This chapter sets out the patient characteristics, disease pattern and treatment trend of 5,967 patients who were diagnosed between 2019 and 2025.

Patient characteristics

- About 55% of the patients were aged between 40 and 59, with the median age at 56.4.
- More than 80% attained secondary school level or above.
- The 10 most common risk factors of breast cancer are listed below, with the respective proportions of risk exposure:

	%
Lack of exercise (<3 hours / week)	70.8
No breastfeeding	65.4
Being overweight / obese	44.8
High level of stress (>50% of time)	37.4
No childbirth / first live birth after age 35	37.2
Family history of breast cancer	19.3
Diet rich in meat / dairy products	12.3
Early menarche (<12 years old)	15.5
Habit of drinking alcohol	8.9
Use of hormone replacement therapy	2.9

- In the cohort, 64.7% of the patients had three or more common risk factors, while 32.7% had one to two risk factors. Only 2.5% of the patients had none of the common risk factors studied.

Disease pattern

- The primary method of first breast cancer detection in the patient cohort was self-detection by chance (64.2%), while detection through mammography screening constituted 22.6%.
- The most common cancer stage at diagnosis was stage I (34.9%) followed by stage II (30.3%) and stages III-IV (11.9%). In addition, 16.5% of the patients were diagnosed with stage 0 cancer.
- The mean size of invasive tumours was 2.0 cm, and 66.1% of the patients with invasive breast cancer had no positive axillary lymph nodes.
- The mean size of in situ tumours was 2.0 cm.

Treatment

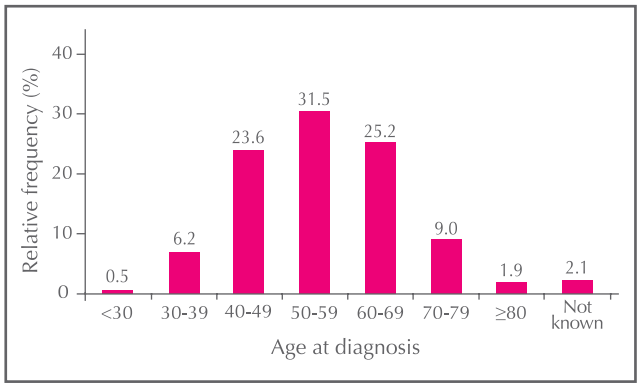
- Of the patients, 39.0% received care at private medical services, 26.3% received care at public medical services, and 34.7% received care at both private and public medical services.
- The number of treatment modalities increased with increasing cancer stage.

II. Patient characteristics

A. Demographics

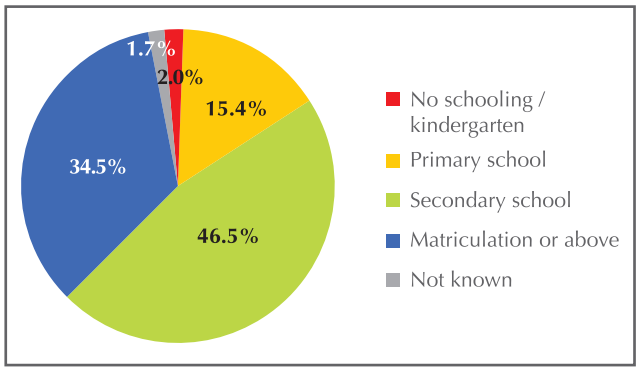
4.2 The age at diagnosis ranged from 20 to 99 with about 55% of the patients aged between 40 and 59 (Figure 4.1), and the median was 56.4 years.

Figure 4.1: Distribution of age at diagnosis (N=5,749)



4.3 In this report, 81.0% of the patients attained secondary school level or above, while 17.4% had primary school level or below (Figure 4.2).

Figure 4.2: Education level of patient cohort (N=5,749)



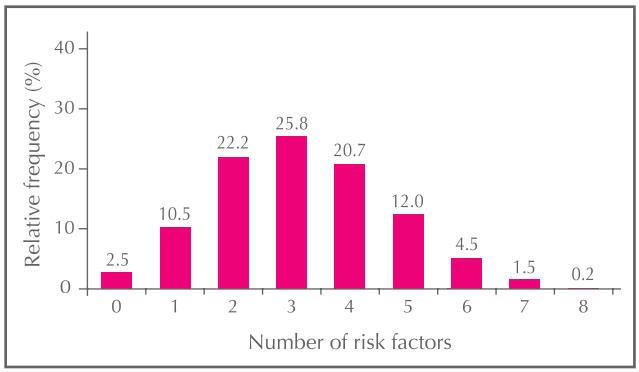
B. Ten most common risk factors associated with breast cancer in Hong Kong

4.4 Among all the risk factors studied, the majority were exposed to the factor of lack of exercise, followed by no breastfeeding experience (Table 4.1). In the cohort, 64.7% of the patients had three or more common risk factors, while 32.7% had one to two risk factors. Only 2.5% of the patients had none of the common risk factors studied (Figure 4.3).

Table 4.1: Ten most common risk factors for breast cancer in patient cohort (N=5,749)

	Number	%
Lack of exercise (<3 hours / week)	4,069	70.8
No breastfeeding	3,759	65.4
Being overweight / obese	2,578	44.8
High level of stress (>50% of time)	2,152	37.4
No childbirth / first live birth after age 35	2,136	37.2
Family history of breast cancer	1,112	19.3
Diet rich in meat / dairy products	707	12.3
Early menarche (<12 years old)	890	15.5
Habit of drinking alcohol	514	8.9
Use of hormone replacement therapy	167	2.9

Figure 4.3: Distribution of risk factors among patients at diagnosis (N=5,749)



C. Breast screening habits

4.5 Of the 5,244 patients aged 40 or above, 25.3% have never undergone any breast screenings, while about half had never undergone MMG or USG. Table 4.2 shows the breast screening habits in the patient cohort.

Table 4.2: Breast screening habits

	Type of breast screening methods, %			
	BSE (N=5,749)	CBE (N=5,749)	MMG# (N=5,244)	USG# (N=5,244)
Never	34.9	45.2	54.7	54.9
Occasional	44.0	20.2	18.9	18.5
Regular*	19.2	32.5	24.3	24.4
Not known	1.9	2.0	2.1	2.2

BSE: breast self-examination; CBE: clinical breast examination; MMG: mammography screening; USG: breast ultrasound screening

* "Regular" is defined as having BSE monthly or having the breast screening test every 1-3 years for CBE, MMG and USG

Included patients aged 40 or above only

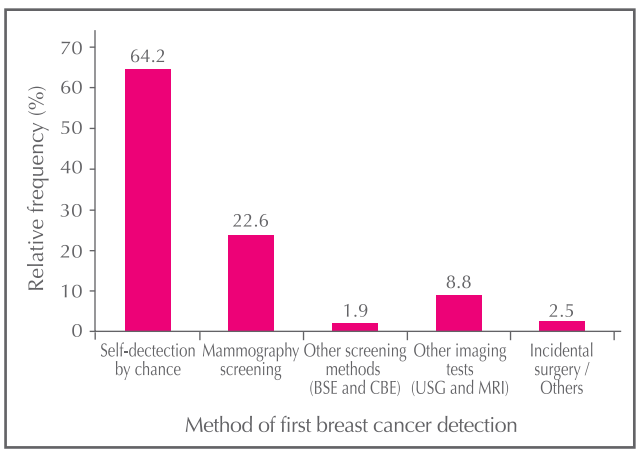
III. Disease pattern and treatment trend

A. Clinical presentation

4.6 The primary method of first breast cancer detection in the patient cohort was self-detection by chance (64.2%), while detection through mammography screening constituted 22.6% (Figure 4.4).

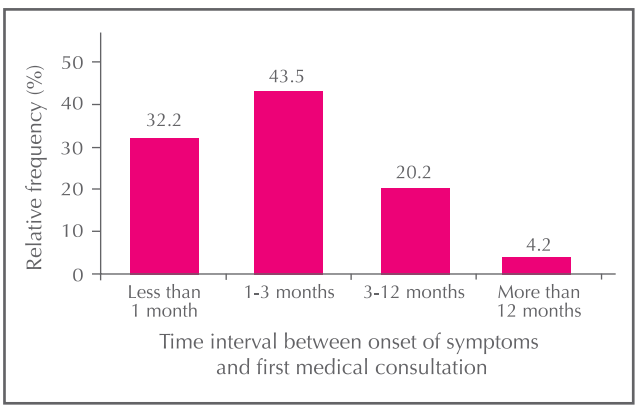
4.7 After the onset of symptoms, 32.2% of the patients who self-detected their cancers by chance sought first medical consultation in less than one month, while 24.4% waited more than three months before seeking first medical consultation (Figure 4.5).

Figure 4.4: Methods of first breast cancer detection in the patient cohort (N=3,460)



BSE: breast self-examination; CBE: clinical breast examination; USG: breast ultrasound screening; MRI: magnetic resonance imaging

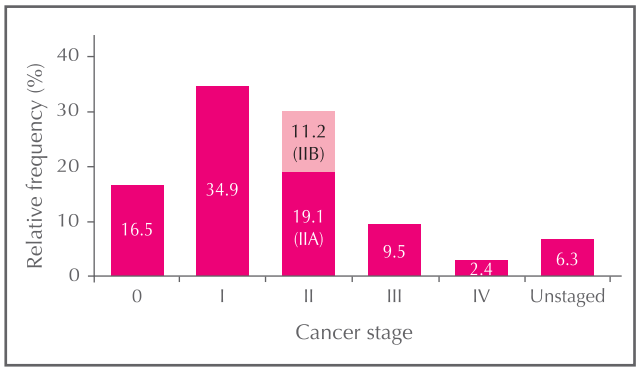
Figure 4.5: Time interval between onset of symptoms and first medical consultation for patients who self-detected their cancer (N=1,645)



B. Cancer characteristics

4.8 The most common cancer stage at diagnosis was stage I (34.9%) followed by stage II (30.3%) and stages III-IV (11.9%). In addition, 16.5% of the patients were diagnosed with in situ cancer (stage 0) (Figure 4.6).

Figure 4.6: Cancer stage at diagnosis (N=3,514)

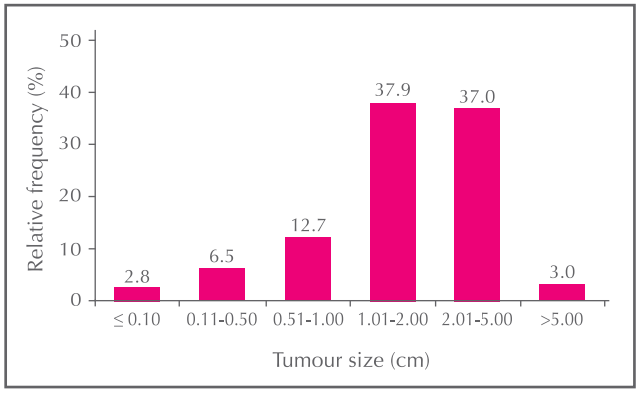


4.9 Of the 3,514 breast cancer cases analysed, data from 3,465 cases with available pathology data were used for subsequent analyses on cancer characteristics. A total of 2,889 patients were diagnosed with invasive cancer, while 576 patients were diagnosed with in situ cancer.

i. Characteristics of invasive breast cancer

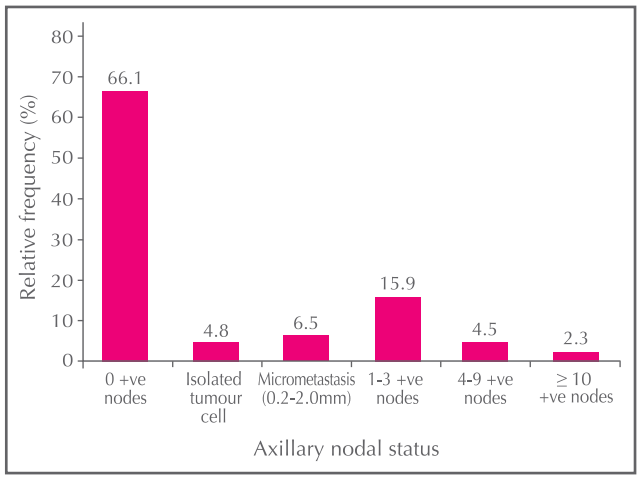
4.10 The mean size of tumours of invasive breast cancer was 2.0 cm (standard deviation: ±1.4 cm). Tumours of one cm or less in size were found in 22.0% of the patients, while tumours of sizes 1.01 to 2.00 cm and 2.01 to 5.00 cm were respectively found in about 37.9% and 37.0% of the patients (Figure 4.7). Only a small proportion of patients had tumours of sizes exceeding five cm. In the patient cohort, screen-detected tumours were significantly smaller than those self-detected by chance (mean: 1.3±1.0 cm vs. 2.3±1.4 cm; p<0.001).

Figure 4.7: Distribution of tumour size (cm) of invasive breast cancer (N=2,185)



4.11 Of the patients with invasive breast cancer, 66.1% had no positive axillary lymph nodes, 4.8% had isolated tumour cells (metastasis size ≤ 0.2 mm or a cluster of fewer than 200 tumour cells), 6.5% had micrometastasis (metastasis size > 0.2 mm and ≤ 2 mm), while 22.7% had at least one positive axillary lymph node with metastasis size larger than two mm (Figure 4.8).

Figure 4.8: Number of positive axillary lymph nodes among patients with invasive breast cancer (N=2,291)



4.12 The surrogate definitions of the intrinsic biological subtypes and their relative frequencies by cancer stage in the patient cohort are shown in Table 4.3. Overall, 71.0% of the invasive tumours were HR+ HER2-, 10.9% were HR+ HER2+, 7.7% were HR- HER2+ and 10.5% were TNBC.

Table 4.3: Biological subtypes of invasive tumours by cancer stage (N=2,664)

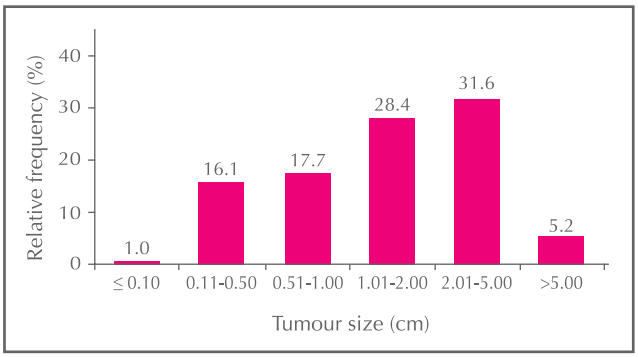
	Cancer stage, %				
	I (N=1,200)	IIA (N=662)	IIB (N=387)	III (N=334)	IV (N=81)
Luminal A	41.2	26.3	19.1	12.9	9.9
Luminal B (HER2 negative)	25.5	35.0	40.8	38.0	35.8
Luminal A/B (HER2 negative)	9.8	12.4	15.0	12.6	8.6
Luminal B (HER2 positive)	7.4	10.9	11.1	12.0	21.0
HER2 positive (HR negative)	7.0	5.1	5.2	11.1	13.6
TNBC	9.2	10.3	8.8	13.5	11.1

HR: hormone receptors (ER and PR)
Luminal A: ER and/or PR+, HER2-, and low Ki-67 index (<14%)
Luminal B (HER2 negative): ER and/or PR+, HER2-, and high Ki-67 index (≥14%)
Luminal A/B (HER2 negative): ER and/or PR+, HER2-, and Ki-67 index not known
Luminal B (HER2 positive): ER and/or PR+, HER2+, and any Ki-67 index
HER2 positive (HR negative): ER and PR-, HER2+, and any Ki-67 index
TNBC (Triple Negative Breast Cancer): ER and PR-, HER2-, and any Ki-67 index

ii. Characteristics of in situ breast cancer

4.13 The mean size of tumours of in situ breast cancer was 2.0 cm (standard deviation: ±1.6 cm). Tumours of one cm or less in size were found in 34.8% of the patients, while tumours of 2.01 to 5.00 cm in size were found in 31.6% of the patients (Figure 4.9). A small proportion (5.2%) of the patients had in situ tumours larger than five cm. Of the in situ breast cancer cases where MMG was performed, 70.2% showed microcalcification.

Figure 4.9: Distribution of tumour size (cm) of in situ breast cancer (N=497)



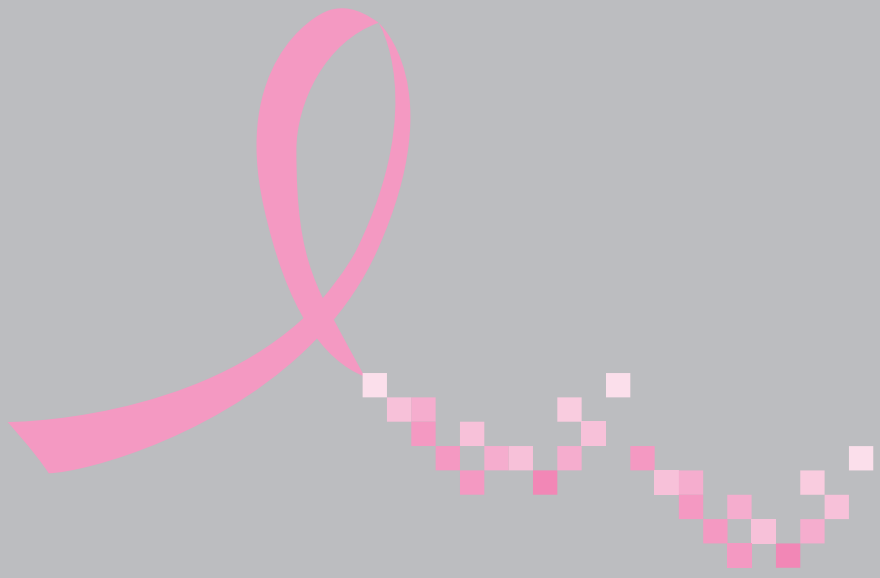
C. Treatment methods

4.14 Of the patients, 39.0% received care at private medical services, 26.3% received care at public medical services, and 34.7% received care at both private and public medical services. Combinations of treatments, including surgery, radiotherapy, chemotherapy, endocrine therapy, targeted therapy and immunotherapy, are usually used to treat breast cancer effectively. In general, the number of modalities increased with increasing cancer stage (Table 4.4). In the cohort, the majority (91.1%) of patients with stage 0 disease received two or less treatments. On the other hand, 76.9% of the patients with stage IIA, 92.9% of those with stage IIB and 97.0% of those with stage III disease received three or more modalities.

Table 4.4: Number of treatment modalities by cancer stage (N=3,292)

	Cancer stage, %					
	0 (N=580)	I (N=1,228)	IIA (N=670)	IIB (N=395)	III (N=335)	IV (N=84)
0	0.0	0.0	0.0	0.0	0.0	0.0
1	37.1	6.4	3.3	1.3	0.3	6.0
2	54.0	30.0	19.9	5.8	2.7	8.3
3	7.6	48.5	41.6	25.3	15.8	19.0
4	1.4	10.8	27.5	52.7	59.4	47.6
5	0.0	4.3	7.8	14.9	21.8	19.0

4.15 Nearly all (98.8%) patients received surgery as part of their treatment. Of the patients with breast-conserving surgery, 94.4% received radiotherapy, while 42.7% of the patients with mastectomy received radiotherapy. Among the invasive breast cancer patients, 53.7% received chemotherapy. In addition, 67.6% of the patients received endocrine therapy, while 17.0% received targeted therapy.



APPENDICES

GLOSSARY

Adjuvant chemotherapy

A postoperative treatment for eradicating residual microscopic cancer cells that could lead to recurrence when these are not yet detectable clinically.

Axillary dissection

A surgical procedure to remove the lymph nodes in the armpit (axillary nodes) hidden under the pectoral major and minor muscles. It is normally performed when there is evidence of cancerous cells in lymph nodes by palpation or imaging, or upon sentinel lymph node biopsy.

Bilateral breast cancer

Cancer occurring in both breasts at the same time or within six months of each other (synchronous), or at different times at least six months apart (metachronous).

Biological subtype

Breast cancer is well known to be a heterogeneous disease and can be further classified into several biological subtypes by immunohistochemical staining of several biological markers [estrogen receptor (ER), progesterone receptor (PR), human epidermal growth factor receptor 2 (HER2), and Ki-67 index]. By assessing these biological markers in the primary tumour together rather than separately, further prognostic and predictive information can be obtained. The biological subtypes of breast cancer include luminal A (ER+ and/or PR+, HER2-, and low Ki-67 index), luminal B (HER2 negative) (ER+ and/or PR+, HER2-, and high Ki-67 index), luminal B (HER2 positive) (ER+ and/or PR+, HER2+, and any Ki-67 index), HER2 positive (HR negative) (ER-, PR-, HER2+, and any Ki-67 index) and triple negative (ER-, PR-, HER2-, and any Ki-67 index).[49]

Breast-conserving surgery

The surgical removal of a cancerous breast lump with a rim of non-cancerous tissue around the lump, without removing the entire breast. The surgery can be lumpectomy, wide local excision, partial mastectomy or segmentectomy.

Breast reconstruction surgery

A surgical treatment that rebuilds the breast contour after mastectomy. A breast implant of the woman's own tissue provides the contour. If desired, the nipple and areola may also be preserved or recreated. Reconstruction is usually done at the time of mastectomy, but it can be done any time later.

Breast surgery

A local operation to remove the breast tumour.

Cancer staging

Appendix II refers.

Cancer specific death

A death with the underlying cause indicated as cancer. Cancer patients who die of other causes are not counted.

Chemotherapy

A treatment that uses one or more cytotoxic drugs to destroy cancer cells. Chemotherapy is often used in addition to surgery or radiotherapy to treat cancer when metastasis (spread) is proven or suspected, when the cancer has come back (recurred), or when there is a strong likelihood that the cancer could recur.

Distant recurrence

Cancer that reoccurs in organs or tissues distant from the original site or regional lymph nodes, such as lungs, liver, bone marrow, or brain.

Endocrine therapy

A treatment with hormonal drugs that interfere with hormone production or hormone action, or surgical removal of hormone-producing glands, to slow or stop the growth of cancer.

Estrogen receptor positive

It is one of the breast cancer biological characteristics. It refers to the status of cancer cells with receptor that binds with estrogen. Cancer cells that are estrogen receptor positive need estrogen to grow, and may stop growing when treated with substances that block their binding with estrogen.

Human epidermal growth factor receptor 2 (HER2) positive

It is one of the breast cancer biological characteristics. In HER2 positive breast cancer, the cancer cells have an abnormally large copy number of HER2 genes per cell. When this happens, excessive HER2 protein appears on the surface of these cancer cells. This is called HER2 protein over-expression. When excessive HER2 receptor-ligand binding complex exists, it would cause cancer cells to grow and divide more quickly. This is why HER2 positive breast cancer is considered aggressive.

In situ breast cancer

This term refers to early stage breast cancer, when it is confined to the layer of cells where it began. In breast cancer, in situ means that the cancer cells remain confined to ducts (ductal carcinoma in situ). They have not grown into deeper tissues in the breast or spread to other organs in the body, and are sometimes referred to as pre-invasive breast cancer.

Invasive breast cancer

Cancer that has already grown beyond the outer lining of myoepithelial cells or basement membrane where it started, for example breast ducts or lobules. Most breast cancer cases are invasive carcinoma.

Ki-67 index

Ki-67 protein is a biological marker for cell proliferation. It presents at low levels in quiescent cells but increases in proliferating cells. Ki-67 index refers to the percentage of tumour cells staining positive as measured by immunohistochemical (IHC) staining. High level of Ki-67 indicates an aggressive tumour. At present, an index of 14% or above is regarded as high Ki-67 index.

Latissimus dorsi flap (LD flap)

A method of breast reconstruction that rotates the fan-shaped flat muscle of the back to the chest area.

Locoregional recurrence

Locoregional recurrence occurs when cancer returns after treatment, and occurs at the same site as the original cancer or in the lymph nodes near the site of origin.

Mastectomy

The surgical removal of all breast tissue. It is usually used for treating serious breast disease, such as breast cancer.

Metastasis

The spread of cancer cells from the place where they first formed to another part of the body.

Mortality

The incidence of death in a population.

Multicentricity

A breast is divided into four quadrants. Breast cancer occurring in multiple quadrants of a breast is considered as multicentric.

Multifocality

Multifocality in breast cancer is defined as the presence of two or more tumour foci (five mm or farther apart) within a single quadrant of the breast.

Necrosis

A term used for describing the death of cellular tissue. Necrosis within a cancerous tumour may indicate that the tumour is growing so rapidly that blood vessels are not able to multiply fast enough to nourish some of the cancer cells. Necrosis usually indicates that the tumour is very aggressive and can spread quickly.

Neoadjuvant chemotherapy

Neoadjuvant chemotherapy (preoperative treatment) is administered to shrink the primary tumour, thereby rendering local therapy (surgery or radiotherapy) less destructive or more effective.

Progesterone receptor positive

It is one of the breast cancer biological characteristics. The hormone progesterone will bind to receptor on the cell surface. Cancer cells that are progesterone receptor positive need progesterone to grow and will usually inhibit growing when endocrine therapy drugs block progesterone from binding.

Proliferative diseases with atypia

A type of benign breast disease in which there is an overgrowth of cells in the ducts or lobules of the breast tissue, with some of the cells no longer appearing normal. Proliferative disease with atypia include atypical ductal hyperplasia (ADH) and lobular neoplasia [e.g. atypical lobular hyperplasia (ALH) and lobular carcinoma in situ (LCIS)], which are linked to variably increased risk of breast cancer.

Radiotherapy

The use of radiation to destroy cancer cells. This type of treatment may be used to reduce the size of tumour before surgery, or to destroy any remaining cancer cells after surgery.

Risk factors

Risk factors are associated with an increased probability of a specified outcome, for example, the occurrence of breast cancer. Risk factors are not necessarily the cause.

Sentinel node biopsy

A surgical procedure to remove the first few lymph nodes to which cancer cells are likely to spread from the breast tumour, more commonly conducted in clinically node-negative cancer. This is to determine if breast cancer has spread to the armpit (axillary) lymph node basin.

Survival time

The duration of time from initial diagnosis until death.

Targeted therapy

A type of medication that inhibits the growth of cancer cells by interfering with specific targeted molecules needed for carcinogenesis and tumour growth.

Time to recurrence

The duration of time from initial diagnosis until the occurrence of recurrence.

Transverse rectus abdominus muscle flap (TRAM flap)

A method of breast reconstruction in which tissues from the lower abdominal wall receiving its blood supply from the rectus abdominus muscle are used. The tissues from this area are moved up to the chest to create a breast mound and an implant is usually not required. Moving muscles and tissues from the lower abdomen to the chest results in flattening of the lower abdomen.

Triple negative breast cancer

It is one of the breast cancer biological subtypes. It describes breast cancer (usually invasive ductal carcinoma) in which the cells lack estrogen receptors and progesterone receptors, and do not have an excess of HER2 protein on their surfaces.

AJCC CANCER STAGING SYSTEM (8TH EDITION)

The American Joint Committee on Cancer (AJCC) Breast Cancer Staging System (8th edition)[47] is used for determining cancer staging in the patient cohort. There are two stage groups according to this system: anatomic and prognostic stage groups. The anatomic stage group assigns a cancer stage based on the anatomic information on the tumour (T), regional nodes (N), and distant metastases (M) categories. The prognostic stage group, in conjunction with the aforementioned anatomic information (i.e. TNM categories), also takes into account other factors, including the tumour grade, biomarkers [human epidermal growth factor receptor 2 (HER2), estrogen receptor (ER) and progesterone receptor (PR)] expression and genomic assays, in assigning a stage.

Although prognostic stage group was recommended for patient care and was used for reporting of all cancer patients in the United States starting from 2018, it was not used in this report. The reason for this was that patients in the cohort were mostly diagnosed between 2006 and 2017 and the treatment offered to patients in the cohort was based on the prevailing anatomic stage group. It is noted that there is only minimal difference in the TNM anatomic staging between the 7th and 8th edition.

Anatomic stage groups

Stage	Tumour	Node	Metastasis
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

T0: no tumour; Tis: carcinoma in situ; T1: tumour size ≤ 20 mm;
T2: 20 mm < tumour size ≤ 50 mm; T3: tumour size > 50 mm;
T4: any size with direct extension to the chest wall and/or to the skin (ulceration or skin nodules)

N0: no positive nodes;
N1mi: 0.2 mm < metastasis size ≤ 2.0 mm or a cluster of more than 200 tumour cells;
N1: 1-3 positive axillary nodes;
N2: 4-9 positive axillary nodes or positive internal mammary nodes;
N3: ≥ 10 positive axillary nodes, or positive axillary and internal mammary nodes, or positive supraclavicular or infraclavicular nodes

M0: no metastasis; M1: evidence of metastasis

* T1 includes T1mi.

** T0 and T1 tumour with nodal micrometastases only are excluded from stage IIA and are classified as stage IB.

Clinical prognostic stage groups

When TNM is	And Grade is	And HER2 Status is	And ER Status is	And PR Status is	Then the Clinical Prognostic Stage Group is
Tis N0 M0	Any	Any	Any	Any	0
T1*N0 M0 T0 N1mi M0 T1* N1mi M0	G1	Positive	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IA
		Negative	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IB
	G2	Positive	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IA
		Negative	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IB
	G3	Positive	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IA
		Negative	Positive	Positive	IA
				Negative	IB
			Negative	Positive	IB
				Negative	IB
T0 N1** M0 T1* N1** M0 T2 N0 M0	G1	Positive	Positive	Positive	IB
				Negative	IIA
			Negative	Positive	IIA
				Negative	IIA
		Negative	Positive	Positive	IB
				Negative	IIA
			Negative	Positive	IIA
				Negative	IIA
	G2	Positive	Positive	Positive	IB
				Negative	IIA
			Negative	Positive	IIA
				Negative	IIA
		Negative	Positive	Positive	IB
				Negative	IIA
			Negative	Positive	IIA
				Negative	IIB

When TNM is	And Grade is	And HER2 Status is	And ER Status is	And PR Status is	Then the Clinical Prognostic Stage Group is
T0 N1** M0 T1* N1** M0 T2 N0 M0	G3	Positive	Positive	Positive	IB
				Negative	IIA
			Negative	Positive	IIA
				Negative	IIA
		Negative	Positive	Positive	IIA
				Negative	IIB
			Negative	Positive	IIB
				Negative	IIB
T2 N1*** M0 T3 N0 M0	G1	Positive	Positive	Positive	IB
				Negative	IIA
			Negative	Positive	IIA
				Negative	IIB
		Negative	Positive	Positive	IIA
				Negative	IIB
			Negative	Positive	IIB
				Negative	IIB
	G2	Positive	Positive	Positive	IB
				Negative	IIA
			Negative	Positive	IIA
				Negative	IIB
		Negative	Positive	Positive	IIA
				Negative	IIB
			Negative	Positive	IIB
				Negative	IIIB
	G3	Positive	Positive	Positive	IB
				Negative	IIB
			Negative	Positive	IIB
				Negative	IIB
		Negative	Positive	Positive	IIB
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIB
T0 N2 M0 T1* N2 M0 T2 N2 M0 T3 N1*** M0 T3 N2 M0	G1	Positive	Positive	Positive	IIA
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIA
		Negative	Positive	Positive	IIA
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIB

Clinical prognostic stage groups

When TNM is	And Grade is	And HER2 Status is	And ER Status is	And PR Status is	Then the Clinical Prognostic Stage Group is
T0 N2 M0 T1* N2 M0 T2 N2 M0 T3 N1*** M0 T3 N2 M0	G2	Positive	Positive	Positive	IIA
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIA
		Negative	Positive	Positive	IIA
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIB
	G3	Positive	Positive	Positive	IIB
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIA
		Negative	Positive	Positive	IIIA
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIC
T4 N0 M0 T4 N1*** M0 T4 N2 M0 Any T N3 M0	G1	Positive	Positive	Positive	IIIA
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIB
		Negative	Positive	Positive	IIIB
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIC
	G2	Positive	Positive	Positive	IIIA
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIB
		Negative	Positive	Positive	IIIB
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIC
T4 N0 M0 T4 N1*** M0 T4 N2 M0 Any T N3 M0	G3	Positive	Positive	Positive	IIIB
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIB
		Negative	Positive	Positive	IIIB
				Negative	IIIC
			Negative	Positive	IIIC
				Negative	IIIC
Any T Any N M1	Any	Any	Any	Any	IV

* T1 includes T1mi.

** N1 does not include N1mi. T1 N1mi M0 and T0 N1mi M0 cancers are included for prognostic staging with T1 N0 M0 cancers of the same prognostic factor status.

*** N1 includes N1mi. T2, T3, and T4 cancers and N1mi are included for prognostic staging with T2 N1, T3 N1 and T4 N1, respectively.

Pathological prognostic stage groups

When TNM is	And Grade is	And HER2 Status is	And ER Status is	And PR Status is	Then the Pathological Prognostic Stage Group is
Tis N0 M0	Any	Any	Any	Any	0
T1*N0 M0 T0 N1mi M0 T1* N1mi M0	G1	Positive	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IA
		Negative	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IA
	G2	Positive	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IA
		Negative	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IB
	G3	Positive	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IA
		Negative	Positive	Positive	IA
				Negative	IA
			Negative	Positive	IA
				Negative	IB
T0 N1** M0 T1* N1** M0 T2 N0 M0	G1	Positive	Positive	Positive	IA
				Negative	IB
			Negative	Positive	IB
				Negative	IIA
		Negative	Positive	Positive	IA
				Negative	IB
			Negative	Positive	IB
				Negative	IIA
	G2	Positive	Positive	Positive	IA
				Negative	IB
			Negative	Positive	IB
				Negative	IIA
		Negative	Positive	Positive	IA
				Negative	IIA
			Negative	Positive	IIA
				Negative	IIA

When TNM is	And Grade is	And HER2 Status is	And ER Status is	And PR Status is	Then the Pathological Prognostic Stage Group is
T0 N1** M0 T1* N1** M0 T2 N0 M0	G3	Positive	Positive	Positive	IA
				Negative	IIA
			Negative	Positive	IIA
				Negative	IIA
		Negative	Positive	Positive	IB
				Negative	IIA
			Negative	Positive	IIA
				Negative	IIA
T2 N1*** M0 T3 N0 M0	G1	Positive	Positive	Positive	IA
				Negative	IIB
			Negative	Positive	IIB
				Negative	IIB
		Negative	Positive	Positive	IA
				Negative	IIB
			Negative	Positive	IIB
				Negative	IIB
	G2	Positive	Positive	Positive	IB
				Negative	IIB
			Negative	Positive	IIB
				Negative	IIB
		Negative	Positive	Positive	IB
				Negative	IIB
			Negative	Positive	IIB
				Negative	IIB
	G3	Positive	Positive	Positive	IB
				Negative	IIB
			Negative	Positive	IIB
				Negative	IIB
		Negative	Positive	Positive	IIA
				Negative	IIB
			Negative	Positive	IIB
				Negative	IIIA
T0 N2 M0 T1* N2 M0 T2 N2 M0 T3 N1*** M0 T3 N2 M0	G1	Positive	Positive	Positive	IB
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIA
		Negative	Positive	Positive	IB
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIA

Pathological prognostic stage groups

When TNM is	And Grade is	And HER2 Status is	And ER Status is	And PR Status is	Then the Pathological Prognostic Stage Group is
T0 N2 M0 T1* N2 M0 T2 N2 M0 T3 N1*** M0 T3 N2 M0	G2	Positive	Positive	Positive	IB
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIA
		Negative	Positive	Positive	IB
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIB
	G3	Positive	Positive	Positive	IIA
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIA
		Negative	Positive	Positive	IIB
				Negative	IIIA
			Negative	Positive	IIIA
				Negative	IIIC
T4 N0 M0 T4 N1*** M0 T4 N2 M0 Any T N3 M0	G1	Positive	Positive	Positive	IIIA
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIB
		Negative	Positive	Positive	IIIA
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIB
	G2	Positive	Positive	Positive	IIIA
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIB
		Negative	Positive	Positive	IIIA
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIC
T4 N0 M0 T4 N1*** M0 T4 N2 M0 Any T N3 M0	G3	Positive	Positive	Positive	IIIB
				Negative	IIIB
			Negative	Positive	IIIB
				Negative	IIIB
		Negative	Positive	Positive	IIIB
				Negative	IIIC
			Negative	Positive	IIIC
				Negative	IIIC
Any T Any N M1	Any	Any	Any	Any	IV

* T1 includes T1mi.

** N1 does not include N1mi. T1 N1mi M0 and T0 N1mi M0 cancers are included for prognostic staging with T1 N0 M0 cancers of the same prognostic factor status.

*** N1 includes N1mi. T2, T3, and T4 cancers and N1mi are included for prognostic staging with T2 N1, T3 N1 and T4 N1, respectively.

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HONG KONG BREAST CANCER REGISTRY'S PUBLICATIONS AND PRESENTATIONS

Publications

Annual Report

1. Breast Cancer Facts in Hong Kong 2008 Report (September 2009)
2. Breast Cancer Facts in Hong Kong Report No. 2 (September 2010)
3. Breast Cancer Facts in Hong Kong Report No. 3 (September 2011)
4. Hong Kong Breast Cancer Registry Report No. 4 (September 2012)
5. Hong Kong Breast Cancer Registry Report No. 5 (September 2013)
6. Hong Kong Breast Cancer Registry Report No. 6 (September 2014)
7. Hong Kong Breast Cancer Registry Report No. 7 (September 2015)
8. Hong Kong Breast Cancer Registry Report No. 8 (September 2016)
9. Hong Kong Breast Cancer Registry Report No. 9 (September 2017)
10. Hong Kong Breast Cancer Registry Report No. 10 (September 2018)
11. Hong Kong Breast Cancer Registry Report No. 11 (September 2019)
12. Hong Kong Breast Cancer Registry Report No. 12 (September 2020)
13. Hong Kong Breast Cancer Registry Report No. 13 (September 2021)
14. Hong Kong Breast Cancer Registry Report No. 14 (September 2022)
15. Hong Kong Breast Cancer Registry Report No. 15 (September 2023)
16. Hong Kong Breast Cancer Registry Report No. 16 (September 2024)

Bulletin

Issue No.	Topic(s)	Publication year
1.	Study 1: Screening-detected breast cancer shows earlier stage than incidental self-detected cancer; Study 2: Unwrapping physical and psychosocial impacts of breast cancer on Hong Kong women	2010
2.	Socio-economic disparities in breast cancer screening practice and cancer staging in Hong Kong	2012
3.	Impact of breast cancer by age in Hong Kong	2013
4.	A study on the differences in the cancer characteristics between self-detected and screen-detected patients and the treatments they received	2013
5.	Delay in medical consultation is more common in widows or non-clerical/labour workers	2014
6.	Sentinel node biopsy in Hong Kong breast cancer patients	2015
7.	Breast cancer in Hong Kong elderly patients	2016
8.	Neoadjuvant chemotherapy induces tumour size reduction and enables breast-conserving surgery in Hong Kong breast cancer patients	2017

Issue No.	Topic(s)	Publication year
9.	Risk factors for breast cancer in Hong Kong women: A case-control study	2018
10.	Chronological changes in risk exposures, detection and treatment pattern for breast cancer patients in Hong Kong over a 12-year period	2019
11.	Diagnostic efficiency of mammogram in breast cancer patients: Complementary breast ultrasound improves cancer detection in young women with dense breasts	2020
12.	Use of positron emission tomography (PET): Local practice and utilisation in preoperative staging of breast cancer	2021
13.	10-year survival analysis of breast cancer patients: Data from Hong Kong Breast Cancer Registry	2022
14.	Mammogram screening saves lives, saves treatment cost	2023
15.	Heterogeneity of de novo metastatic breast cancer	2024

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Presentations

1. Screen-detected breast cancer showed earlier staging than incidental self-detected cancer, Dr. Polly Cheung (Breast Cancer Conference 2009, The Chinese University of Hong Kong)
2. Breast cancer facts in Hong Kong Report No. 2, Dr. Hung Wai Ka (International Surgical Week 2011, Japan) (Nominated for Breast Surgery International Best Paper Award)
3. Risk factors for breast cancer in Hong Kong, Ms. Amy Chan (33rd Annual Meeting of the International Association of Cancer Registries 2011, Mauritius)
4. Local data from the Hong Kong Breast Cancer Registry, Dr. Polly Cheung (Breast Cancer Conference 2011, The Chinese University of Hong Kong)
5. Breast cancer facts in Hong Kong, Dr. Carol Kwok (4th Global Chinese Breast Cancer Organizations Alliance Conference 2012, USA)
6. Hong Kong Breast Cancer Registry: Evidence for improving cancer control and treatment, Dr. Polly Cheung (Breast Cancer Conference 2015, The Chinese University of Hong Kong)
7. Pathological response rate: Analyzing the outcome of neoadjuvant chemotherapy for patients enrolled in Hong Kong Breast Cancer Registry, Dr. Carol Kwok (24th Annual Scientific Meeting of Hong Kong College of Radiologists 2016, Hong Kong)
8. Elders with breast cancer tend to delay seeking medical care and present with a later cancer stage, Dr. Janice Tsang (4th Symposium on Primary Breast Cancer in Older Women 2017, England)
9. Hong Kong Breast Cancer Registry, Dr. Polly Cheung (Breast Cancer Conference 2017, The Chinese University of Hong Kong)
10. Breast cancer in elderly patients: Tumour characteristics, treatment choices and clinical outcomes, Dr. Stephanie Lau (48th World Congress of Surgery 2019, Poland)
11. Neoadjuvant chemotherapy in Hong Kong breast cancer patients and its clinical implications, Dr. Yolanda Chan (48th World Congress of Surgery 2019, Poland)
12. Risk factors for breast cancer in Hong Kong women: A case control study, Dr. Polly Cheung (Breast Cancer Conference 2019, The Chinese University of Hong Kong)
13. A 15-year trend of breast cancer diagnosis and treatment: Data from the Hong Kong Breast Cancer Registry, Dr. Polly Cheung (Breast Cancer Conference 2021, The Chinese University of Hong Kong)
14. 10-year survival analysis, data from Hong Kong Breast Cancer Foundation, Prof. Winnie Yeo (Annual Breast Cancer Updates 2022, Hong Kong Breast Cancer Foundation)
15. Hong Kong Breast Cancer Registry – Health economic study, self vs mammogram detected breast cancer, Dr. Lawrence Li and Prof. Kelvin Tsoi (Annual Breast Cancer Updates 2023, Hong Kong Breast Cancer Foundation)
16. Hong Kong Breast Cancer Registry – Building up big data for the local population, Dr. Polly Cheung (Best of SABCS Review 2023 cum 10th Anniversary Scientific Symposium, Hong Kong Breast Oncology Group)
17. Real-world data on high and intermediate-risk hormone receptor (HR)-positive HER2-negative early breast cancer patients prior to adjuvant CDK4/6i era, Prof. Winnie Yeo (San Antonio Breast Cancer Symposium 2024, USA)
18. Building up big data for the population of breast cancer patients in Hong Kong, Ms. Laura Yuen (2024 International Association of Cancer Registries Scientific Conference, China)
19. Recap HKBCR Bulletin 15: De novo metastatic breast cancer data from HKBCR, Dr. Carol Kwok (Annual Breast Cancer Updates 2024, Hong Kong Breast Cancer Foundation)

ABSTRACTS OF REPORTS NOS. 1 - 16

Breast Cancer Facts in Hong Kong 2008 Report (Report No. 1 published in 2009)

- the common risk factors for breast cancer in Hong Kong

Report No. 1 revealed that age, physical activity, health profile, lifestyle, dietary habit and socio-economic profile were important risk factors for breast cancer.

The most prevalent risk factors for breast cancer among patients in Hong Kong were as follows:

(1) Lack of exercise (< 3 hours per week) (74%)
(2) No breastfeeding (64%)
(3) High level of stress (40%)
(4) Use of oral contraceptives (38%)
(5) Being overweight / obese (34%)
(6) No childbirth / first childbirth after age 35 (28%)
(7) Early menarche (<12 years old) (17%)
(8) Diet rich in meat / dairy products (15%)
(9) Use of hormone replacement therapy after menopause (14%)
(10) Habit of alcohol drinking (9%)
(11) Late menopause (>55 years old) (8%)
(12) Habit of smoking (4%)

According to Report No. 1, most breast cancer cases were not inherited but were closely related to modifiable factors such as dietary habits, lifestyle and stress level in the body. In addition, 52% of the patients had two to three risk factors mentioned above and less than 3% of patients had no known risk factor at all.

In order to reduce breast cancer risk, the Hong Kong Breast Cancer Foundation recommends women to act on the guidelines laid down by the American Cancer Society on Nutrition and Physical Activity for Cancer Prevention 2002:

- Maintain a healthy weight throughout life
- Adopt a physically active lifestyle
- Adopt a healthy diet, with emphasis on plant sources
- Drink no more than one alcoholic drink per day

One of the most noteworthy findings was the lower median age of diagnosis in Hong Kong in comparison with those generally reported in other countries. According to the report, the median age at which breast cancer was diagnosed in Hong Kong was 47.6, which was significantly lower than the respective ages reported in the United States (61 years) and Australia (62 years). The report also found that 81% of the patients in the cohort had bra cup size B or smaller and 64% had a bra band size of 34 inches or below. This countered the common misconception that women with bigger breasts have a higher chance of getting breast cancer.

Breast Cancer Facts in Hong Kong Report No. 2 (Report No. 2 published in 2010)

- private hospitals found higher proportion of in situ breast cancer

Report No. 2 analysed the differences in cancer characteristics and treatment methods of breast cancer patients who received cancer treatments at different types of medical facilities.

The 2,130 patients, based on the type of medical care received, were classified into three categories: total private medical care (23.1%); total public medical care (24.0%); and mix of private and public medical care (52.9%).

The distribution of cancer stage at diagnosis was studied and a significant discrepancy between the patients diagnosed early at stage 0 (in situ breast cancer) in private medical care (13.6%) and public medical care (5.7%) was identified. The tumour size of invasive breast cancer was generally found to be larger in patients receiving full care at public medical facilities.

The mastectomy rate of patients who were treated in public medical facilities was twice as that in private medical facilities. The ratio of the patients who received breast reconstruction was also lowest in the public medical care group. The reason could be related to the patients' age and tumour size.

There was no difference in the patterns of using the chemotherapy drugs anthracycline, taxane and other drugs between the private and public sectors. There was also no obvious difference in the pattern of use of the endocrine therapy drug tamoxifen (the most common form of endocrine therapy) between different medical sectors across different cancer stages.

Findings of this report highlighted the higher proportion of advanced breast cancer cases observed in the public sector which would need to be addressed and further investigated.

Breast Cancer Facts in Hong Kong Report No. 3 (Report No. 3 published in 2011)

- lower income districts recorded higher rate of advanced stage breast cancer and lower breast screening rate

Report No. 3 highlighted that regular breast screening using mammogram was proved to be an effective tool for detecting breast cancer at an early stage and hence reducing mortality. According to this report, the median size of screen-detected tumours was 1.4 cm, one-third smaller than the self-detected tumours (2.1 cm). This demonstrated that patients benefited from regular breast screening.

Report No. 3 also revealed disparities in breast screening rates and breast cancer characteristics across different districts in the territory of Hong Kong.

Half of the breast cancer patients in Wan Chai, the district with the highest household income, had regular mammography screening before diagnosis. In the low-income districts of Kwun Tong and Sham Shui Po, 80% of the patients never had mammograms, the highest among all districts. The percentages of patients who never had mammography screening were also high in Kwai Tsing, North District, Tuen Mun and Tai Po (about 70%). According to the Census and Statistics Department statistics in 2008, these districts had lower household income, compared to the overall median household income of HK$18,000.

The overall percentage of advanced-stage cases (stages III and IV) in the patient cohort was 12.4%. The districts with higher percentages of advanced-stage cases included Wong Tai Sin (17.8%), North District (16.0%), Sham Shui Po (15.0%), Kwun Tong (14.4%) and Kwai Tsing (14.4%).

Report No. 3 concluded that regular breast screening was associated with breast cancer of less advanced stage. More work, therefore, would be needed to promote breast cancer awareness and breast screening, especially in the low-income districts.

Postscript:
The findings of Report No. 3 prompted the Hong Kong Breast Cancer Foundation to open the Hong Kong Breast Cancer Foundation Jockey Club Breast Health Clinic (Kowloon) in March 2018 in order to reach out to women living in Kowloon and the New Territories to educate them about regular screening as well as provide affordable yet professional and quality breast screening and diagnostic services.

Hong Kong Breast Cancer Registry Report No. 4 (Report No. 4 published in 2012)

- unhealthy lifestyle prevails among young breast cancer patients

According to the HKBCR Report No. 4, most breast cancer cases were diagnosed in patients aged between 40 and 70 in Hong Kong (79.7%). The patient cohort also included patients who were under 40 years old (14.0%) and patients who were over 70 years old (5.1%) at diagnosis.

Data analyses revealed that lifestyle-related risk factors such as lack of exercise (85.4%), high level of stress (46.0%), and dairy/meat-rich diets (20.3%) were prevalent among young patients (under 40). Hormone-related factors also prevailed among young patients including the absence of childbirth (43.4%), lack of breastfeeding experience (74.6%), and early menarche (19.5%).

While more young patients were diagnosed at early breast cancer stage (76.6%), young patients were also more likely to have breast cancer with more aggressive biological features and recognised prognostic factors, including higher nuclear grade (Grade 3) of tumours (45.2%), presence of lymphovascular invasion (40.8%), presence of multifocality (15.3%), higher expression of human epidermal growth factor receptor 2 (HER2) (28.7%), and triple negative disease (absence of endocrine receptors) (13.0%). At the same time, a higher proportion of young patients received breast-conserving surgery (45.3%), chemotherapy (68.3%), mastectomy and reconstruction (20.3%), radiotherapy (67.8%) and anti-HER2 targeted therapy (7.2%).

Analyses of the psychological impact of breast cancer on patients revealed that young patients were less likely to accept the diagnosis calmly or positively (16.2%), and were more likely to worry about recurrence all the time (12.3%). The number of patients who changed their lifestyle after diagnosis was also higher among young patients, such as changing dietary habits (71.0%) and doing more exercise (59.0%).

Report No. 4 concluded that patients under 40 encountered more prevalent risk factors for breast cancer and experienced more aggressive cancer with greater fear of disease recurrence, which could profoundly affect the quality of life of these young patients.

Hong Kong Breast Cancer Registry Report No. 5 (Report No. 5 published in 2013)

- regular mammography screening reduces the need for total mastectomy and chemotherapy

The HKBCR Report No. 5 compared the breast cancer characteristics and treatments of two breast cancer patient groups aged 40 or above: one consisting of patients diagnosed by regular mammograms without presenting symptom(s) (screen-detected group) and the other one consisting of those with presenting symptoms who did not undergo regular screening (self-detected group).

Results showed that 45.0% of the screen-detected group had in situ cancer, compared to 9% in the self-detected group, meaning "stage 0" cancer cases in the screen-detected group was nearly five times as that in the self-detected group. The mean invasive tumour size found in the screen-detected group (1.3 cm) was also smaller than that in the self-detected group (2.3 cm).

Slightly less than half (46.3%) of the patients in the screen-detected group received total mastectomy, while two-thirds (67.4%) of those in the self-detected group received the same surgery. There were also significantly more patients in the self-detected group (66.1%) who required chemotherapy, compared to the screen-detected group (25.0%).

In summary, the tumour sizes of the patients with breast cancer detected through regular screening were generally smaller and could be diagnosed at earlier stages. The need of these patients for total mastectomy and/or chemotherapy treatment was also lower. Women, therefore, should conduct regular breast cancer screening to maximise the chance of early detection of the disease and hence reducing the need for aggressive treatment methods.

Hong Kong Breast Cancer Registry Report No. 6 (Report No. 6 published in 2014)
- delay in medical consultation leads to more serious breast disease

The HKBCR Report No. 6 assessed the magnitude of delay in seeking medical care from the onset of symptom(s) and factors associated with such delay. "Self-delay" refers to patients' delay in seeking first medical consultation after the onset of symptoms and "care delay" is defined as medical systems' delay in diagnosis and/or treatment.

According to the findings, the median time of "self-delay" was 40.0 days and 32.5% of the patients waited three or more months before seeking medical consultation. For "care delay", the median time was 20.0 days and 80.9% of the patients started their first treatments in less than a month from the diagnosis of cancer which is within international standards. In addition, 45.7% of the patients had their first treatments at least three or more months after the first sign of symptom.

"Self-delay" had significant negative impact on the disease. Those who delayed their consultation for three or more months were 50% more likely to have larger tumours at diagnosis and 30% more likely to be node-positive, thus the tumours were 70% more likely to be diagnosed as stage III or IV cancer.

Three factors, namely occupation, marital status and having a history of benign breast conditions, were found to be strongly associated with "self-delay". Non-clerical (low-skilled) or labour workers were found to be about 60% more likely to "self-delay" than those who were unemployed; patients who were widowed were also more likely to "self-delay" than those who were unmarried; and patients with previous benign breast conditions had an almost 50% higher tendency to "self-delay".

Overall, the clinical and financial implications point to a bigger, unresolved public health problem in Hong Kong.

Widows or women who are non-clerical or labour workers should be viewed as target groups for increasing breast health awareness. More specifically, they should be made aware of breast cancer symptoms. Women should take notice of any changes in their breasts and seek medical advice as soon as possible. Breast cancer is completely curable if detected in the early stage.

Hong Kong Breast Cancer Registry Report No. 7 (Report No. 7 published in 2015)

- use of sentinel node biopsy increases among Hong Kong breast cancer patients

The HKBCR Report No. 7 investigated the changes in the pattern of sentinel node biopsy (SNB) usage over time in Hong Kong. The benefits of using SNB to replace routine axillary dissection (AD) are that SNB removes the risk of unnecessary extensive lymph node removal, thereby significantly decreases the risks of post-surgical complications of AD such as lymphoedema, thus significantly improving the patients' quality of life.

According to the findings, the use of SNB increased. In particular, more patients with negative clinical nodal status received SNB alone than those patients with positive clinical nodal status (44.0% vs. 11.4%). The proportion of clinically node negative patients receiving SNB (including both SNB alone and SNB followed by AD) showed a positive linear trend over the study period and the proportion increased from 45.7% in 2006 to 76.6% in 2012.

SNB (including both SNB alone and SNB followed by AD) was more commonly used in patients with smaller tumours and the proportion showed a positive linear trend over the study period. For tumours of two cm or less, the use of SNB (including both SNB alone and SNB followed by AD) increased from 50.2% in 2006 to 80.6% in 2012, and that proportion increased from 34.2% in 2006 to 54.2% in 2012 for those patients with tumours that were larger than two cm, but smaller than five cm.

SNB (including SNB alone and SNB followed by AD) was more commonly used by over 40.0% of patients with early-stage breast cancer and the use of SNB increased over the study period. In addition, the proportion of patients who received unnecessary AD (with or without SNB) decreased over the study period: from 44.8% in 2006 to 28.9% in 2012.

In summary, SNB had become a method of choice for more surgeons and patients over the study period. Both surgeons' clinical and patients' personal decisions affect the use of SNB to replace AD as the first nodal surgery for determining the extent of diseases. Surgeons have the responsibility to explain to their patients about SNB and its well-established reliability for determining the nodal status in early stage breast cancer. More efforts should be put into educating breast cancer patients about the benefits of SNB over AD.

Hong Kong Breast Cancer Registry Report No. 8 (Report No. 8 published in 2016)

- elderly with breast cancer tend to delay seeking medical care and present with a later cancer stage

The HKBCR Report No. 8 studied breast cancer in local elderly patients. Breast cancer risk increases with age and it is anticipated that the number of elderly affected by breast cancer will increase with time.

According to the findings, upon the onset of symptoms, more elderly patients delayed for more than a year before seeking medical consultation (17.7% vs. 10.8% for patients of all ages; $p=0.005$). These elderly patients tended to be diagnosed with stage III or IV disease, compared to the elderly patients who sought medical consultation within three months (29.7% vs. 14.5%; $p=0.068$). Compared to patients of all ages, invasive tumours in elderly patients exhibited more favourable biological features, including more grade 1 tumours (26.5% vs. 19.2%; $p<0.001$) and absence of lymphovascular invasion (75.6% vs. 68.1%; $p<0.001$).

In addition, more invasive tumours in elderly patients were estrogen receptor positive (83.0% vs. 78.1%; $p=0.001$), progesterone receptor positive (70.8% vs. 66.0%; $p=0.006$) and human epidermal growth factor receptor 2 negative (83.6% vs. 78.7%; $p=0.001$) as compared to patients of all ages. Elderly patients received more mastectomies (81.7% vs. 57.3% for patients of all ages; $p<0.001$) but less chemotherapy and radiotherapy. Furthermore, elderly patients with more comorbidities received more conservative treatment.

In conclusion, the study results revealed that while elderly patients tended to delay seeking medical consultation, they received less aggressive cancer modalities as compared to patients of all ages. Comorbidity may have association with the treatment choices among elderly patients. Although age is an important factor to consider in decision-making for cancer treatment, it must not be the sole factor.

Hong Kong Breast Cancer Registry Report No. 9 (Report No. 9 published in 2017)

- neoadjuvant chemotherapy can reduce HER2 positive tumour size and the need for mastectomy

The HKBCR Report No. 9 investigated the use of neoadjuvant chemotherapy (NAC) over two study periods, 2006 to 2010 and 2011 to 2015, and assessed the effectiveness of NAC among local breast cancer patients. NAC refers to the administration of chemotherapy before surgery in treating cancer.

There was significant increase in the use of NAC over the two study periods in Hong Kong breast cancer patients: from 4.8% in the period of 2006 to 2010 to 9.4% in the period of 2011 to 2015 ($p < 0.001$). The increase was found especially for the patients with triple negative, HER2 positive (ER and PR negative) and luminal B (HER2 positive) subtypes, as well as those with clinically stage IIB and stage III cancer at diagnosis. In addition, the administration of NAC was positively correlated with cancer stage at diagnosis, in that the proportions of the patients treated with NAC increased from 2.9% for stage IIA disease to 25.8% for stage III disease.

NAC was found to be effective in downsizing tumour, in which one-fifth of the patients achieved pathological complete response (pCR) in the breast and axillary nodal status after NAC. In particular, higher pCR rates were observed in the patients with HER2 positive (ER and PR negative) subtype, in which almost half (48.6%) of them achieved pCR ($p < 0.001$). The proportions of the patients who achieved pCR in patients with luminal B (HER2 positive) and triple negative subtypes were 28.0% and 29.6% respectively, which were also significantly higher when compared to the other subtypes. Furthermore, higher proportions of clinically stage IIA or IIB patients treated with NAC underwent breast-conserving surgery when compared to those who were not treated with NAC.

Findings of this report showed that NAC can reduce HER2 positive tumour size and the need for mastectomy among breast cancer patients. Alterations in breast biomarkers were found in some patients treated with NAC, meaning that retesting these biomarkers on the residual tumour would be useful in tailoring further adjuvant therapies. Further studies would be conducted to evaluate the effectiveness of treatment in terms of survival outcomes among this group of patients treated with NAC.

Hong Kong Breast Cancer Registry Report No. 10 (Report No. 10 published in 2018)
- both non-modifiable and modifiable factors are associated with risk of breast cancer

The HKBCR Report No. 10 compared breast cancer patients with age-matched women without history of any cancers on four categories of potential factors for breast cancer, namely i) non-modifiable; ii) modifiable and lifestyle-related; iii) modifiable and behavioural-related; and iv) modifiable and medical-related, to understand the reasons for a rising trend of incidence in Hong Kong.

As expected, women having first-degree relative(s) suffering from breast cancer (aOR = 2.88; 95%CI, 2.43-3.41) or having menarche before 12 years old (aOR = 1.35; 95%CI, 1.19-1.52) were associated with an increased risk of breast cancer. Compared to women who had their first live birth at or before the age of 35, women who had first live birth after the age of 35 had a significantly higher risk of breast cancer (aOR = 2.06; 95%CI, 1.66-2.55).

In addition, when compared to women who exercised for three hours or more per week, those who exercised for less than three hours per week were more likely to be diagnosed with breast cancer (aOR = 1.53; 95%CI, 1.39-1.69). Women who self-reported as having higher level of stress (feeling stressed for more than half of the time) were at higher risk (aOR = 3.40; 95%CI, 3.09-3.73). Women who consumed diets which were rich in meat or dairy products had higher risk of getting breast cancer than those who consumed balanced diets (aOR=1.80; 95%CI, 1.57-2.07). Obesity was also associated with a 46% increase in the risk of breast cancer (aOR = 1.46; 95%CI, 1.32-1.62).

For postmenopausal women, experiencing menopause after the age of 55 was associated with an increased risk of breast cancer (aOR = 1.71; 95%CI, 1.21-2.41). Nulliparous postmenopausal women also had 38% increased risk when compared to those who had first live birth at or before the age of 35 (aOR = 1.38; 95%CI, 1.13-1.68).

In general, the study results suggested that both non-modifiable and modifiable factors are associated with risk of breast cancer among local Chinese women. Women are, therefore, encouraged to maintain a healthy lifestyle in order to reduce their risk. In addition, women should be breast aware and seek medical help promptly if they found abnormalities in their breasts. Women who possess the significant non-modifiable and/or modifiable factors should undergo regular breast screening in order to detect cancer early and seek timely treatment.

Hong Kong Breast Cancer Registry Report No. 11 (Report No. 11 published in 2019)

- substantial changes in cancer treatment with no significant improvement in breast screening habits and risk exposures over time

The HKBCR Report No. 11 compared the risk exposures, cancer detection and treatment pattern between four cohorts classified by year of diagnosis (2006-2008, 2009-2011, 2012-2014 and 2015-2017) to examine the chronological changes among local breast cancer patients. Changes in treatment pattern were further investigated by cancer stage, age group, clinical nodal status, and/or biological subtype.

Compared to the 2006-2008 cohort, more patients in the 2015-2017 cohort had no breastfeeding experience, were overweight/obese, had no childbirth/first live birth after age 35, had family history of breast cancer, or had habits of drinking alcohol, while fewer patients used hormone replacement therapy prior to cancer diagnosis. No changes, however, were observed in dietary and exercise habits and stress level.

The proportions of patients who had undergone mammogram or breast ultrasound screening increased over time, but the proportions who regularly underwent these examinations decreased. Self-detection by chance was still the primary method of first breast cancer detection.

With advances in medical knowledge and technologies and new drug discoveries, there were significant increases in the use of breast-conserving surgery (BCS), sentinel node biopsy (SNB), neoadjuvant chemotherapy (NAC), anti-HER2 targeted therapy, and endocrine therapy, while the use of chemotherapy (all settings) decreased. Yet, the proportions of patients receiving radiotherapy, regardless of the type of surgery received, did not show significant changes.

Further stratified by cancer stage, substantial changes in treatment pattern were observed. While the significant increases in the use of SNB were observed for patients of all cancer stages, the use of BCS only increased among stage I patients. The use of radiotherapy slightly decreased among stage I or IIA patients with mastectomies, but increased among stage IIB patients with mastectomies. Although the proportions of receiving chemotherapy (all settings) significantly decreased among patients with early stage (I-IIB) disease, the proportions of receiving NAC greatly increased. The use of NAC even doubled among stage III patients over time. There were also increases in the use of anti-HER2 targeted therapy for all cancer stages. In addition, some changes were found in different age groups, clinical nodal status, and biological subtypes.

In general, the study results indicated that while there were substantial changes in cancer treatment to improve patients' quality of life, no significant improvement, however, could be observed in patients' breast screening habits and risk exposures over the years. These findings suggested that the efforts of promoting a healthy lifestyle as a means of preventing breast cancer in the past years were inadequate or ineffective and should be further reinforced in the community. Screening helps detect cancer early, and early detection saves lives. The importance of increasing breast awareness and having regular screening habits should also be emphasised during breast health promotion in Hong Kong.

Hong Kong Breast Cancer Registry Report No. 12 (Report No. 12 published in 2020)

- mammogram with complementary breast ultrasound improves cancer detection in young women with dense breasts

The HKBCR Report No. 12 examined the diagnostic accuracy associated with mammogram (MMG) and the additional benefit of breast ultrasound (USG) in different circumstances. Patients were divided into symptomatic and asymptomatic groups. The symptomatic group refers to patients who consulted doctor on self-discovered breast cancer symptoms. The asymptomatic group refers to patients who were not aware of any breast changes, and their tumours were picked up by MMG, USG, clinical breast examination, other tests (such as CT scan and MRI), or incidental finding during breast surgery. Results of MMG and USG are graded by Breast Imaging Reporting and Data System (BIRADS), with scores of 4-5 indicating positive for diagnosis of breast cancer.

MMG had a high diagnostic accuracy among the Hong Kong Chinese population, despite a high proportion of patients with heterogeneous and extreme breast density. MMG alone could detect 85.2% of the cancer, and its accuracy was higher in older patients and patients with fatty and scattered density breasts. Microcalcifications are common in in situ cancer. Suspicious microcalcifications (present in 35.2% of symptomatic patients undergoing MMG) could be visualised clearly, even when malignant opacities could be obscured in dense breast, making it an important feature of breast cancer diagnosis in dense breasts on MMG.

Cancer detection rate with USG was also high. USG alone could detect 91.9% of the cancer, and its accuracy was higher in bigger tumour size. When a tumour is bigger, it is easier to be characterised by benign or malignant features on USG. In MMG-negative cases, USG detected an additional 9.0% of all cancer cases, improving cancer detection rate to 94.3%. Compared to the symptomatic group (8.4%), USG picked up an additional 12.6% of tumours in the asymptomatic group, showing that USG is a useful adjunct screening tool as it is not hindered by breast density.

To conclude, MMG and USG have complementary role in achieving a high cancer detection rate, especially for young women with dense breasts. The study results supported the combined use of MMG and USG in breast cancer diagnosis.

Hong Kong Breast Cancer Registry Report No. 13 (Report No. 13 published in 2021)
- use of positron emission tomography (PET) in preoperative staging of breast cancer increases

The HKBCR Report No. 13 investigated the usage pattern and the diagnostic and therapeutic impact of positron emission tomography (PET) scan in preoperative staging of breast cancer. Characteristics of patients with and without preoperative PET scan were compared.

PET scan was more often performed on patients with stages III (71.4%) and IV (90.2%) breast cancer and less commonly used on early stage cancer, including stages 0 (13.6%) and I (21.2%) cancer. The findings also revealed an increase in the overall utilisation of PET scans from 25.7% in the 2006-2010 cohort to 61.0% in the 2016-current cohort. In addition, it was more often used on breast cancer of advanced stage or larger tumours. Yet, the data did not display any difference in utilisation of PET among molecular subtypes.

The sensitivity of clinical staging among patients who had PET scan (70.3%) was significantly higher than those who did not (30.4%), although the specificity among patients who did not have PET scan was slightly higher (99.3% compared to 91.3% in the PET group).

In addition, a short survey was conducted to learn about the practice in clinical setting among a group of local specialists. Based on the findings from the HKBCR and results of the survey, the HKBCR panel proposed some guidelines for the use of PET scan:

1. PET is not a routine investigation in:
    a. breast screening
    b. clinically benign breast diseases
    c. T0 and T1 breast cancer
2. PET should be considered in:
    a. T3 or above breast cancer
    b. suspected or confirmed node positive cancer
    c. suspected or confirmed metastatic disease
    d. neoadjuvant chemotherapy

In summary, there was a trend in increased usage of PET scan in preoperative staging over the past 15 years. It was more commonly used when the tumour was relatively big or of higher stage clinically. It appeared to have high sensitivity and reasonable specificity. However, the data did not demonstrate any obvious difference in its use for various molecular subtypes.

Hong Kong Breast Cancer Registry Report No. 14 (Report No. 14 published in 2022)

- lower risk of disease relapse and better survival among early stage patients highlighted the importance of early detection

The HKBCR Report No. 14 examined the 10-year overall survival (OS) and distant-disease-free survival (DDFS) of Chinese breast cancer patients in Hong Kong, using data on HKBCR participants who were diagnosed with breast cancer between 2006 and 2011. The median follow-up period of the study subjects was 127 months.

The OS at 10 years was 87.7%. The 10-year OS for stage 0, I, II, III and IV were 97.1%, 94.3%, 90.2%, 74.0% and 26.4% respectively, indicating poorer OS in patients with advanced stage disease. Differences between age groups were also observed, with patients aged above 70 showing poorer OS. Patients with HR+ HER2- subtype had better OS than those with TNBC subtype.

Among stages 0-III patients who received surgery, the DDFS at 10 years was 90.3%. Patients with advanced stage disease had poorer DDFS than those with early stage disease. Patients aged 40 or below showed poorer DDFS than those aged 41-50, which might be related to the higher proportion of grade 3 tumours in these patients. However, no significant differences in DDFS distributions were found among biological subtypes.

In general, cancer stage, age, and biological subtypes all showed significant effects on breast cancer survival. Patients with lower stage disease would have better survival and lower risk of disease relapse, highlighting the importance of early detection.

Hong Kong Breast Cancer Registry Report No. 15 (Report No. 15 published in 2023)

- mammogram screening saves lives, saves treatment cost

In response to the importance of early detection highlighted in the previous report, the HKBCR Report No. 15 aimed to bring better understanding of the clinical implications and economic impact of the two detection methods for breast cancer, namely self-detection and mammography (MMG) screening, and ultimately inform decision-makers and healthcare professionals about optimising breast cancer care strategies.

The retrospective cohort study results showed that the stage at diagnosis of MMG screen-detected breast cancer was lower than that of self-detected cases. Over 95% of MMG screen-detected cases were diagnosed at early stages of 0 (33.2%), I (48.3%) and II (15.3%), and only 3.2% were at stages III and IV. For self-detected cases, the corresponding figures were 5.4% stage 0, 31.5% stage I, 44.0% stage II, and about 20% were diagnosed at advanced stages of III (17.1%) and IV (1.9%). In addition, the 10-year overall survival was higher in MMG screen-detected patients, with an estimated rate of 95.7% compared to 88.4% in self-detected patients.

The downstaging of breast cancer at diagnosis with MMG screening further contributed to a significantly lower treatment cost, mainly due to less intensive cancer treatment required. Estimated by a Markov model using local real-life data, the average cost of treatment for each patient with MMG screen detection was lower by 28.4% compared with self-detection. The overall cost of treatment increased from $305,866 for each stage 0 breast cancer to $1,366,634 for each stage IV breast cancer. When simulating the implementation of MMG screening at different starting ages (40, 45 and 50) in a cohort of 100,000 average-risk women aged 40, it was found that 27,932 life-years and $774.6 million of total cost of treatment could be saved in the long run, if MMG screening was used for breast cancer detection from the age of 40.

In conclusion, MMG screen-detected cases entailed lower treatment cost, which demonstrated how screening would affect the medical system economically. Limitations, including the focus on treatment costs without considering other associated costs and the need for further exploration of overdiagnosis and the long-term impact on breast cancer incidence, should be noted.

Hong Kong Breast Cancer Registry Report No. 16 (Report No. 16 published in 2024)

- precise staging for de novo metastatic breast cancer (dnMBC) patients may enhance treatment

The HKBCR Report No. 16 focused on de novo metastatic breast cancer, which is defined as the presence of distant metastases at the time of initial diagnosis. According to the 8th Edition of the American Joint Committee on Cancer (AJCC) staging for breast cancer, any metastatic status would automatically equate to a stage IV disease regardless of the metastatic load. The study had two objectives: (1) to investigate the underlying factors that might account for the presentation of metastatic disease at diagnosis and (2) to examine the disease characteristics in relation to survival outcomes of dnMBC patients.

From the comparisons between dnMBC patients (stage IV) and patients with early breast cancer (eBC) (stages I-II) on various patient factors, it was found that 76.2% of dnMBC patients had never undergone regular breast screenings[1], and 42.2% had never had any breast screenings[2]. Also, more dnMBC patients delayed for more than three months from symptom onset to seek medical consultation. At diagnosis, more dnMBC patients had two or more symptoms and presented symptoms beyond a painless breast lump, such as nipple retraction and ulceration, compared to eBC patients.

In addition, the overall survival (OS) of dnMBC patients was studied as a whole group and by different subgroups. With a median follow-up period of 50 months, the median OS for the entire cohort was 63 months, and the 5-year OS was 51.8%. When analysing by tumour biological subtypes, there were no statistically significant differences in survival distributions between different subtypes (X^2=4.25, p=0.236). When applying the novel prognostic staging system proposed by Plichta and colleagues, which classified the patients with similar 3-year OS into stages IV A-D based on factors such as tumour characteristics, receptor status, number and sites of metastases, the differences in survival distributions among the four stage groups were statistically significant (X^2=14.60, p=0.002). Patients at stage IVD had poorer survival than those at stages IVA and IVB (p<0.008).

To conclude, the diagnosis of dnMBC was associated with longer patient delay in seeking medical consultation after symptom onset and poorer breast screening practices, reflecting poor breast health awareness of dnMBC patients. With the heterogeneous nature, the survival outcomes of dnMBC patients varied subject to disease characteristics. The survival results may suggest that rather than solely based on subtype, assessing multiple factors together, such as receptor status, sites and extent of metastases, would provide more accurate analyses on dnMBC patients' prognosis. Therefore, there is a need to further categorise stage IV disease, allowing for more effective and personalised therapeutic strategies for this disease entity.

Note:

[1] Regular means every month for breast self-examination (BSE) and every 1-3 years for clinical breast examination (CBE), mammography (MMG) and breast ultrasound (USG).

[2] Any breast screenings include BSE, CBE, MMG, and USG.

HOW TO GET INVOLVED

1. Join the Hong Kong Breast Cancer Registry (HKBCR)

Any woman or man who has experienced breast cancer is invited to join. Whether you are recently diagnosed, undergoing treatment, living with metastatic disease or years past treatment, your input is important to us.

What to do:

I. Download and sign the Consent Form (available at www.hkbcf.org/en/our_research/main/54).

II. Return the form to the HKBCR by post or through your doctor. Your consent will authorise the HKBCR to collect your personal data and to obtain your medical records for analysis purpose.

III. You will be asked to complete a set of questionnaires.

IV. The HKBCR staff will contact you and your doctor to update your record on a yearly basis. The follow-up data will be collected by email, post or phone.

All information is treated with strict confidentiality and is only used for the HKBCR's analysis and research purpose. Only aggregate data from the registry is released; the identity of individuals is protected.

Registration / Enquiry Tel: 2525 6033 Email: hkbcr@hkbcf.org

2. Subscribe to the Hong Kong Breast Cancer Registry Report No. 18 (to be published in September 2026)

Name_____ Organisation_____

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3. Make donations

Your generous donation will support our continued research through which we can contribute to a better understanding of breast cancer and improvement of breast cancer care in Hong Kong.

Corporate Donation

If you are interested in supporting our research work, please contact us by email at prc@hkbcf.org.

I wish to donate

☐ One-off donation HK$_____

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☐ Bank Deposit: Please make a deposit into the Hong Kong Breast Cancer Foundation's bank account (HSBC A/C: 094-793650-838), and send us the original bank payment slip / ATM slip with this form. Please keep a photocopy of the slip for your own record.

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Donation forms are available for download at the following link, or you may call us at 2525 6033 to request the forms.
https://www.hkbcf.org/en/get_involved/main/506/

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