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Hong Kong Breast Cancer Registry
An initiative of HK Breast Cancer Foundation
由香港乳癌基金會策動

Hong Kong Breast Cancer Registry Report No. 18

Published in 2026

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Suggested citation: Hong Kong Breast Cancer Registry Report No. 18, Published in 2026, Hong Kong Breast Cancer Foundation.

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Hong Kong Breast Cancer Registry
Report No. 18

ISSUE 2026

CONTENTS

FOREWORD 4
ABOUT THE HONG KONG BREAST CANCER FOUNDATION 5
ABOUT THE HONG KONG BREAST CANCER REGISTRY 6
AN OVERVIEW OF THE HONG KONG BREAST CANCER REGISTRY'S WORK 7
HONG KONG BREAST CANCER REGISTRY STEERING COMMITTEE 9
ABOUT THE PATIENT COHORT OF REPORT NO. 18 11
EXECUTIVE SUMMARY 12

CHAPTER 1 PREVENTION AND EARLY DETECTION OF BREAST CANCER 15
I. Introduction 16
II. Demographics 17
III. Risk Factors and Health Background 19
IV. Breast Health Care Practices 26

CHAPTER 2 DISEASE PATTERN, TREATMENT TREND AND CLINICAL OUTCOME OF BREAST CANCER IN HONG KONG 33
I. Introduction 34
II. Clinical Presentation 36
III. Cancer Characteristics 40
IV. Histological and Biological Characteristics 47
V. Treatment Methods 51
VI. Patient Status 71

CHAPTER 3 PHYSICAL AND PSYCHOSOCIAL IMPACT OF BREAST CANCER AND ITS TREATMENT 75
I. Introduction 76
II. Physical Discomfort after Treatment 77
III. Psychosocial Impact and Adjustments after Diagnosis and Treatment 79

APPENDICES **83**

APPENDIX I GLOSSARY 84

APPENDIX II AJCC CANCER STAGING SYSTEM (8th Edition) 88

APPENDIX III LIST OF TABLES AND FIGURES 93

APPENDIX IV REFERENCES 98

APPENDIX V BREAST CANCER RESEARCH CENTRE'S PUBLICATIONS AND PRESENTATIONS 102

APPENDIX VI ABSTRACTS OF REPORTS NOS. 1-17 107

APPENDIX VII HOW TO GET INVOLVED 124

APPENDIX VIII ACKNOWLEDGEMENTS 125

FOREWORD

Following the global call to create cancer registries advocated by the Union for International Cancer Control (UICC) at the World Cancer Congress in 2006, the Hong Kong Breast Cancer Foundation established the Hong Kong Breast Cancer Registry (HKBCR) in the subsequent year. With comprehensive data of local breast cancer cases being accumulated, we are able to conduct various in-depth research, eventually providing local evidence to support decision making on breast cancer prevention and control. Over the past few years, multiple research papers were published in local and international medical journals. The cost-minimisation analysis of the implementation of mammography (MMG) screening published in *BMJ Public Health* in May this year is the first local study of its kind. In addition, our findings from the HKBCR regarding prevention and early detection strategies for breast cancer control have been accepted for a poster presentation at the World Cancer Congress this year.

With more long-term follow-up data, we examined the clinical benefits of MMG screening again, but more thoroughly, ranging from patient characteristics and clinicopathological features to treatment use and survival outcomes. We compared the screen-detected group (asymptomatic patients who detected cancer primarily through MMG screening) with the symptom-detected group (patients who detected cancer based on symptoms) to identify their differences. It was found that our local data confirmed the well-established clinical benefits of MMG screening. Details of the study findings are set out in the accompanying theme paper (HKBCR Bulletin Issue 17).

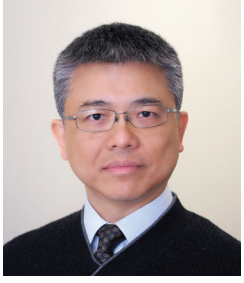
Our achievement would not be possible without the dedication and foresight of the HKBCR Steering Committee, the efforts of our research team, the generosity of our sponsors and supporters and, most importantly, the trust of Hong Kong breast cancer patients and survivors. Future patients will benefit 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 general public, to advocate and design plans for more effective cancer control. We will continue to study data and 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 continuous support 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 and breast screening, 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

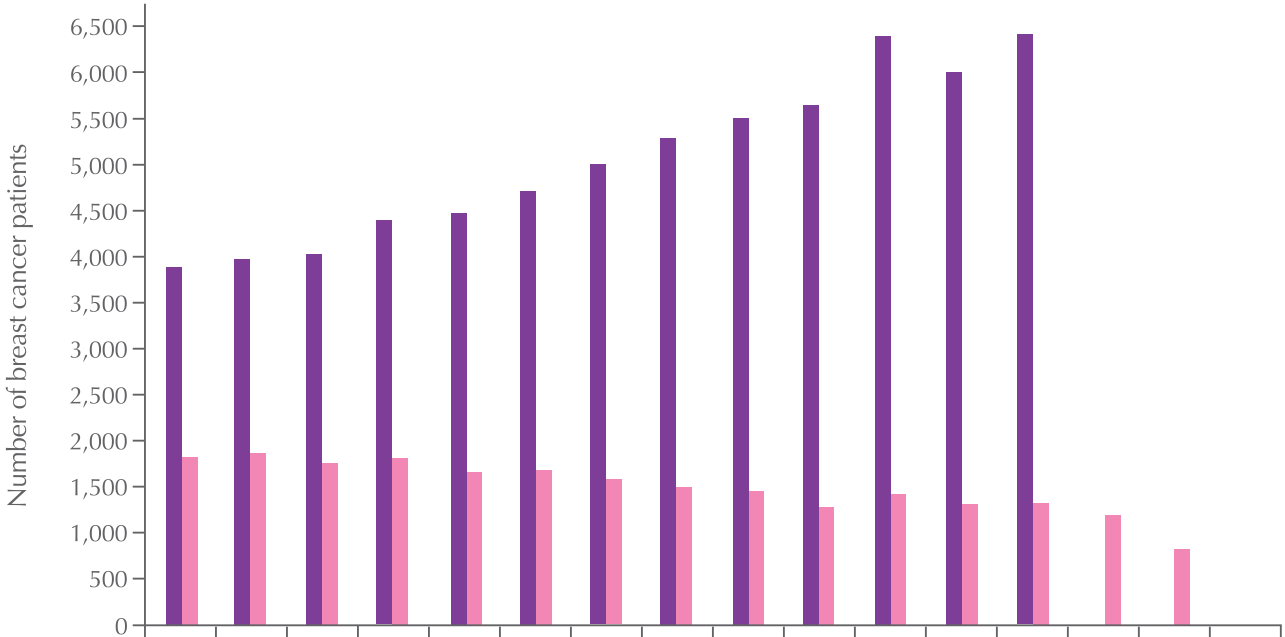
Breast cancer is the most common cancer among women in Hong Kong. In 1994, 1,266 women in Hong Kong were diagnosed with invasive breast cancer. The figure increased to 5,585 women in 2023, accounting for 28.9% of all new female cancer cases in that year. The cumulative lifetime risk of developing invasive breast cancer is also on the increase: from one in 21 women in 2008 to one in 13 women in 2023.[1]

Breast cancer has the third highest mortality rate among all female cancer deaths. In 2023, 834 women died of breast cancer.[1]

About 33,000 patients are registered with the Hong Kong Breast Cancer Registry

Between 2008 and February 2026, a total of 33,020 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



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
HKCaR	3903	3985	4041	4398	4475	4707	5009	5287	5498	5662	6400	6017	6416	0	0	0
HKBCR	1831	1868	1762	1824	1674	1683	1586	1511	1449	1287	1418	1322	1335	1189	825	10
HKBCR / HKCaR, %	46.9	46.9	43.6	41.5	37.4	35.8	31.7	28.6	26.4	22.7	22.2	22.0	20.8	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; Only the first diagnosed cases are included.

Participating hospitals and clinics

The HKBCR aims for maximum coverage of breast cancer cases in Hong Kong. Its progress heavily relies 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:

Public sectors

- 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
- Tseung Kwan O Hospital
- Tuen Mun Hospital
- United Christian Hospital
- Yan Chai Hospital

Private sectors

- CUHK Medical Centre *
- Hong Kong Adventist Hospital *
- Hong Kong Baptist Hospital *
- Hong Kong Sanatorium and Hospital *
- St. Paul's Hospital
- Tsuen Wan Adventist Hospital
- Union Hospital

and

- 38 Private clinics

* With multiple participating sites

Data collection

Upon receiving written consent from patients, the HKBCR research staff gathered information including demographics, lifestyle, health background, breast health care practices, physical discomfort after treatment, psychosocial impacts and lifestyle adjustments after diagnosis and therapy through standardised questionnaires. They also collected data on cancer characteristics and treatment modality from participants' medical records. Participant follow-up was conducted annually to assess long-term outcomes. Data regarding patient recurrence or metastasis, including the date and site of disease recurrence, were also collected.

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ABOUT THE PATIENT COHORT OF REPORT NO. 18

This report covered 29,336 patients who were diagnosed with breast cancer from 2006 onwards and provided data on patient profile, clinical presentation, tumour characteristics and/or use of treatment. The number of patients/cases used for analyses in different sections of this report is shown in Table I. All data were analysed as a single cohort. Missing data were coded as a separate "not known" category, but were excluded or omitted from relevant tables and figures.

Conclusions and observations in this report are drawn solely from the data analyses of the HKBCR participants, who are part of the breast cancer patient population. The HKBCR participants diagnosed between 2006 and 2023 covered about 30% of all the breast cancer cases reported by the Hong Kong Cancer Registry (HKCaR) of the Hospital Authority in those years. Increased participation from hospitals and clinics in Hong Kong has enabled more diversified data sources over the years. Since the publication of the first HKBCR report, the percentage of patients from public hospitals has increased from 41.7% in Report No. 2 to 70.5% in this report which is comparable to the estimated percentage (75%) of breast cancer patients who use public medical services.

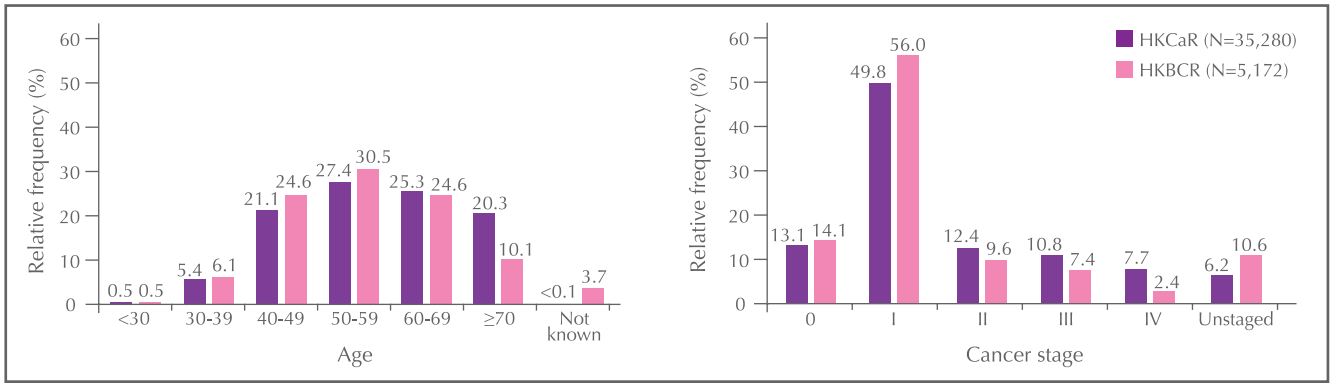
To illustrate the representativeness of our data, an analysis of recent breast cancer cases on diagnosis age and cancer stage distribution was performed and benchmarked against the official figures from the HKCaR. As shown in Figure II, both age and cancer stage distributions were comparable between the two groups.

Table I: Number of primary units of analysis in different sections of Report No. 18

	Data covered	Primary unit of analysis	Number
Chapter 1	Patient profile	Patient	28,806
Chapter 2 (II-V)	Clinical presentation, tumour characteristics and use of treatment	Case	25,618
Chapter 2 (VI)	Patient status	Patient	22,768
Chapter 3 (II)	Physical discomfort after treatment	Case	22,787
Chapter 3 (III)	Psychosocial impacts and lifestyle adjustments after diagnosis and therapy	Patient	21,727

Note: A single patient with synchronous or metachronous breast cancer may contribute multiple cases, provided these were diagnosed in or after 2006.

Figure II: Side-by-side comparisons on age and stage distributions in the 2018-2023 cohort



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

Note: The HKBCR distributions are based on the cases analysed in this report. The HKCaR applied prognostic staging to the 2018-2023 data, and the HKBCR data were harmonised accordingly to facilitate a side-by-side comparison.

EXECUTIVE SUMMARY

As of the end of February 2026, a total of 33,020 breast cancer patients had registered with the HKBCR. This report analysed data from patients diagnosed between 2006 and 2026 to enhance our understanding of breast cancer locally. In addition, to further examine the clinical benefits of mammography (MMG) screening, the screen-detected group (asymptomatic patients who detected cancer primarily through MMG screening) were compared with the symptom-detected group (patients who detected cancer based on symptoms) to identify their differences, including patient characteristics, clinicopathological features, treatment use and survival outcomes. Details of the study findings are set out in the theme paper (HKBCR Bulletin Issue 17).

Local facts of breast cancer in Hong Kong

Patient characteristics

- Of the 28,806 patients analysed, about 60% of the patients were aged between 40 and 59, with the median age at 53.4.
- About 60% of the patients had three or more common risk factors, while only 2.3% had none. The top four common risk factors were lack of exercise, no breastfeeding, being overweight/obese and high level of stress. As these are all modifiable factors, women are encouraged to take primary preventive actions, i.e. maintaining a healthy lifestyle, to help reduce their risk of breast cancer.
- Of the patients aged 40 or above, 63.3% had never undergone MMG screening, while less than a quarter had regular MMG screening. The findings suggested that breast health care practices were poor and highlighted the need for greater efforts to raise awareness of regular breast screening.

Disease pattern

- The primary method of first cancer detection was self-detection by chance.
- Compared to self-detected cases, MMG-detected cases had a higher proportion of stages 0-I disease and smaller invasive tumour sizes, reflecting that screening facilitates earlier cancer detection.
- The most common cancer stage at diagnosis was stage II (34.8%) followed by stage I (31.8%), stage III (12.9%) and stage IV (2.5%). In addition, 13.5% of the patients were diagnosed with stage 0 cancer.

Treatment

- Of the patients, 19.1% received full care at private medical services, 46.3% received full care at public medical services, and 34.5% received care at both private and public medical services.
- The number of treatment modalities increased with increasing cancer stage, indicating greater treatment intensity required for advanced disease.
- Nearly all patients underwent surgery as part of their treatment. The proportion of patients who underwent mastectomy increased with age.
- Sentinel node biopsy alone was more commonly performed in patients with negative clinical nodal status, while axillary dissection alone was more commonly performed in patients with positive clinical nodal status.
- The proportions of patients who underwent breast-conserving surgery followed by radiotherapy were similar across cancer stages, while the proportion of patients who underwent mastectomy followed by radiotherapy increased significantly with progressing cancer stage.

- The overall use of chemotherapy increased from stage I to III, along with its increased application in the neoadjuvant setting. The overall use of chemotherapy decreased across diagnosis year groups, particularly among patients with early-stage disease and those with hormone receptor (HR)-positive HER2-negative tumours.
- For HR-positive patients with invasive breast cancer, 95.5% received endocrine therapy, while for those with in situ disease, the proportion was only 17.4%. The use of endocrine therapy remained at about 85% across diagnosis year groups.
- Among HER2-positive patients, the use of anti-HER2 targeted therapy was much lower in stage I disease, and the proportions increased with progressing cancer stage among stage II or above patients. The use of anti-HER2 targeted therapy also increased markedly across diagnosis year groups.

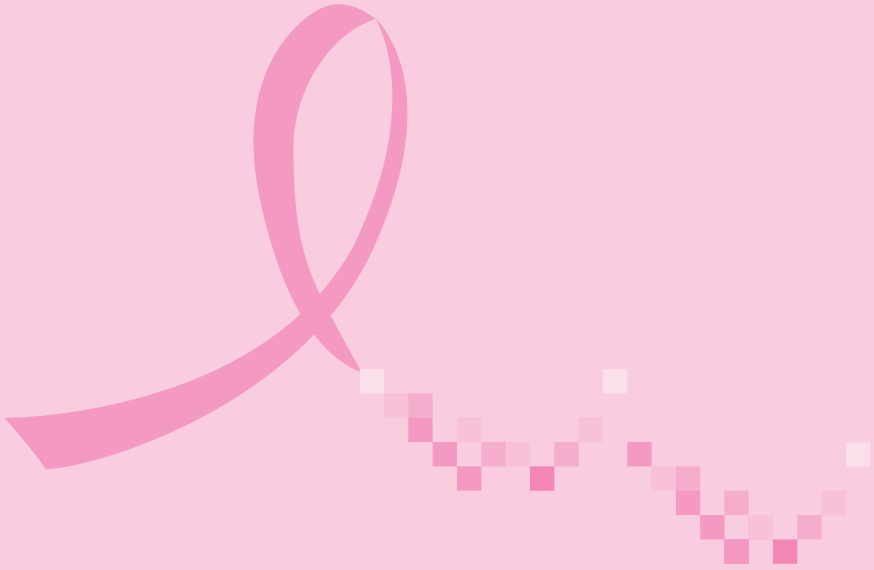
Patient status

- A total of 22,768 patients had been followed up at least once since registration, with a median follow-up period of 5.3 years, and 1,780 patients died from breast cancer.
- In the cohort, 2.3% experienced only locoregional recurrence, 2.9% experienced only distant recurrence, and 2.0% experienced both locoregional and distant recurrence.
- The most common sites for locoregional recurrence were breast (38.2%) and axilla (32.8%), while the top four organs involved in distant recurrence were bone (59.6%), lung (46.6%), liver (39.0%) and brain (15.5%).
- The estimated 10-year overall survival rate was 81.1%.

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 age, while the proportion of patients who always worried about recurrence decreased with age.

The theme paper on screen-detected versus symptom-detected breast cancer (i.e. HKBCR Bulletin Issue 17) is available 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 28,806 Hong Kong breast cancer patients diagnosed between 2006 and 2026 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 health care practices, 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 28,806 breast cancer patients diagnosed between 2006 and 2026 and recruited in the HKBCR.

- About 60% of the patients were aged between 40 and 59, with the median age at 53.4.
- About three-quarters 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)	75.2
No breastfeeding	66.0
Being overweight/obese	40.9
High level of stress (>50% of time)	37.1
No childbirth/first live birth after age 35	30.0
Family history of breast cancer	16.5
Early menarche (<12 years old)	14.7
Diet rich in meat/dairy products	13.4
Habit of drinking alcohol	6.2
Use of hormone replacement therapy	3.4

- In the cohort with an 80% response threshold, 62.8% of the patients had three or more common risk factors, while 34.8% had one to two risk factors. Only 2.3% of the patients had none of the common risk factors.

Breast health care practices

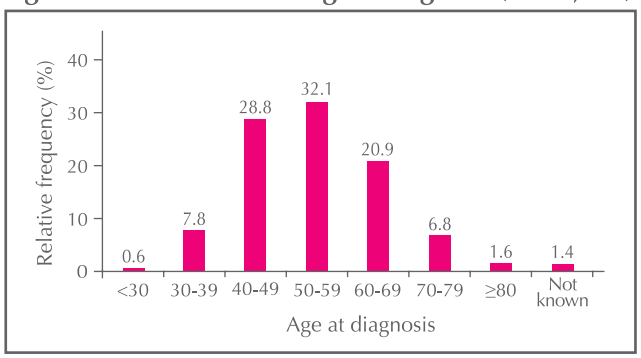
- Of the patients aged 40 or above, 63.3% had never undergone mammography (MMG) screening prior to cancer diagnosis, while about 20% had regular MMG screening.
- Patients with lower education levels had a lower proportion of undergoing regular MMG screening.
- Patients with lower monthly household income had a lower proportion of undergoing regular MMG screening.

II. Demographics

A. Age at diagnosis

1.2 The age at diagnosis ranged from 18 to 103 with about 60% of the patients aged between 40 and 59 (Figure 1.1), and the median was 53.4 years. It was found that patients in different age groups had different breast health care practices (Section IV below).

Figure 1.1: Distribution of age at diagnosis (N=28,806)

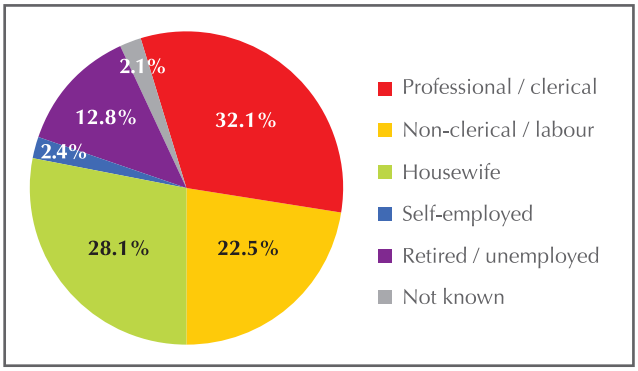


B. Occupation

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 reported that women in the general population worked a median of 42.0 hours per week,[5] which is consistent with the findings of the Hong Kong Breast Cancer Foundation (HKBCF). In this report, 57.0% 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, 8.5% had night shift duties, and the median number of nights they worked in a year was 54.0.

Figure 1.2: Occupation of patient cohort (N=28,806)



C. Education level and monthly household income

1.5 Studies conducted in Western countries and in Hong Kong 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.[6-9]

1.6 In this report, 73.6% 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 nearly 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=28,806)

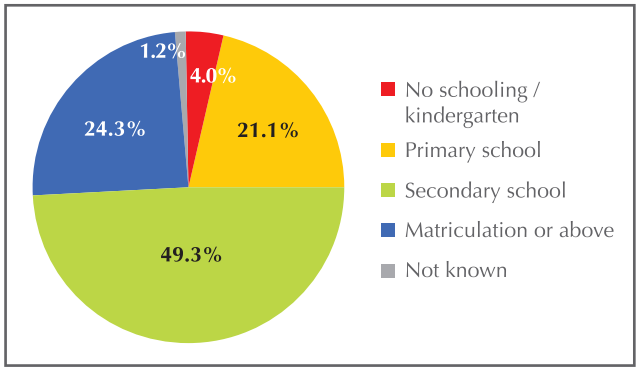
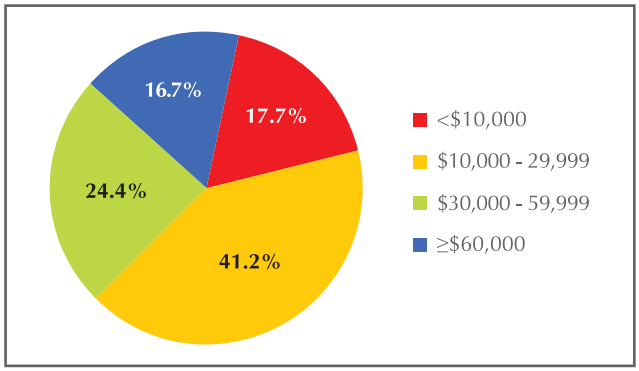


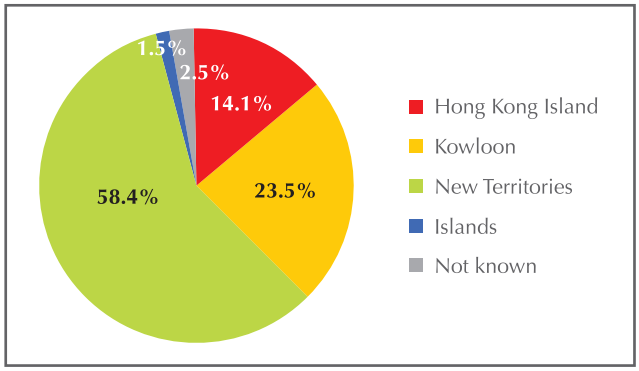
Figure 1.4: Monthly household income (HK$) of patient cohort (N=16,629)



D. District of residence

1.8 In the cohort, 58.4% of the patients resided in the New Territories, 23.5% resided in Kowloon, and 14.1% 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=28,806)



E. Bra band size and bra cup size

1.9 It is commonly perceived that women with large breast size may have higher risk of breast cancer. However, such a direct relationship lacks supporting evidence.[10,11] Breast size is usually determined by the amount of fatty tissues, while breast cancer is a matter of fibroglandular tissue. 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 women with the highest breast density had more than twice the risk of those with the lowest density.[15] Therefore, only an indirect relationship between breast size and breast cancer risk was suggested.

1.10 In the cohort, 29.6% of the patients had a bra band size of 34 inches (Figure 1.6). For breast cup size, about three-quarters had a cup size of B or smaller, while only a small proportion had a cup size of D or above (Figure 1.7).

Figure 1.6: Bra band size of patient cohort (N=23,020)

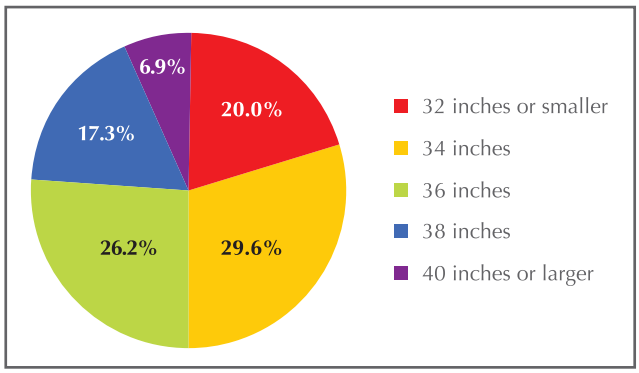
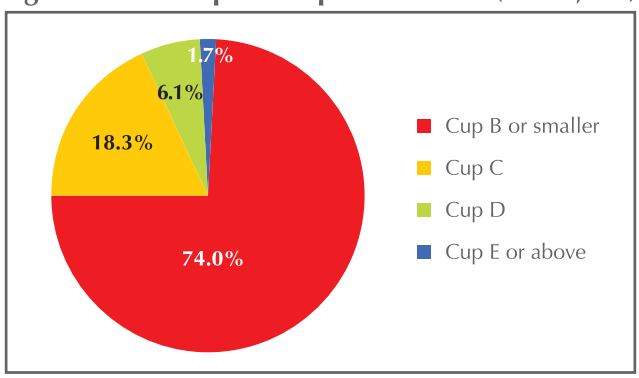


Figure 1.7: Bra cup size of patient cohort (N=20,064)



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] According to the Report of Health Behaviour Survey 2023 by the Hong Kong Department of Health, 4.8% of women had smoked cigarettes before.[16] Although the definitive relationship between active or passive smoking and breast cancer has yet to be established,[17] the HKBCF found that current or ex-smokers were linked to a higher breast cancer risk.[18]

1.12 In the cohort, 4.9% of the patients reported that they had smoked prior to cancer diagnosis, and 44.4% 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 3.7 per week in the preceding 12 months prior to cancer diagnosis.

B. Alcohol drinking

1.13 The IARC has classified alcohol consumption as Group 1 carcinogen for breast cancer for people of all ages.[3] 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] According to the Report of Health Behaviour Survey 2023 by the Hong Kong Department of Health, 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, 6.2% 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 41.1% 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, 71.5% of the patients had a balanced diet, while 13.4% ate a diet rich in meat or dairy products (Figure 1.8). About one-quarter 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, 37.1% 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=28,806)

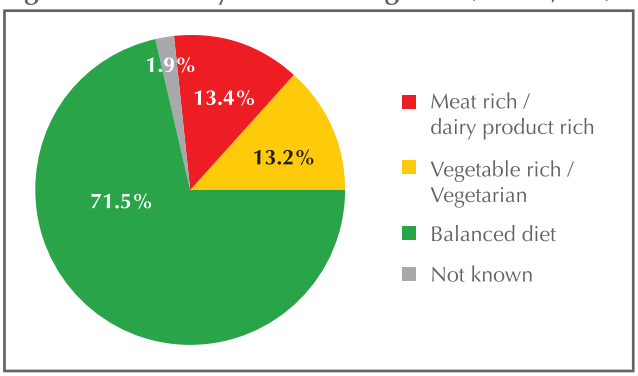


Figure 1.9: Exercise habits at diagnosis (N=28,806)

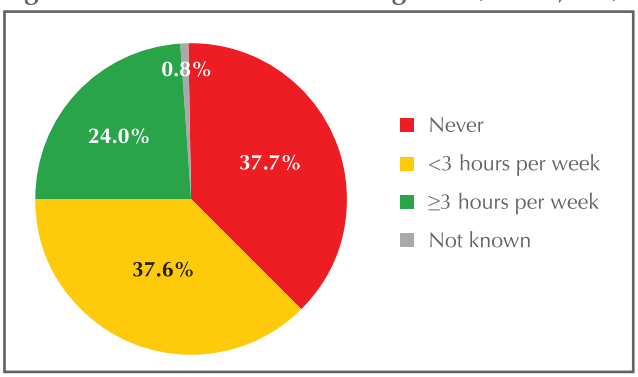
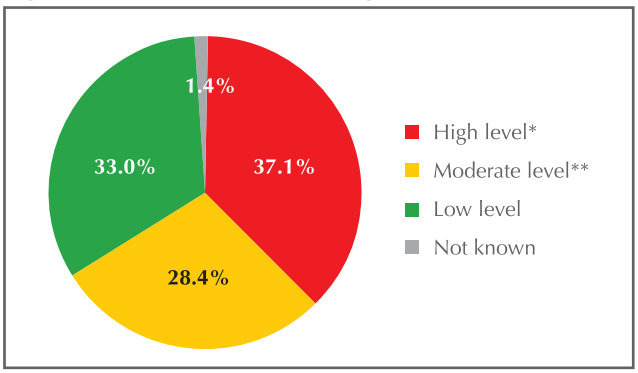


Figure 1.10: Stress level at diagnosis (N=28,806)



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

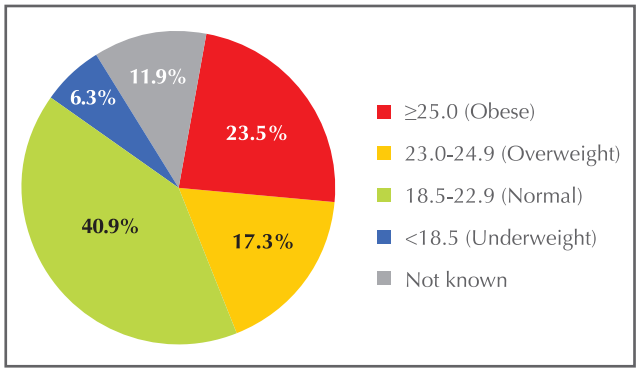
** Moderate level is defined as 25%-50% of the time

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 158.0 cm and an average weight of 57.8 kg. About two-fifths of the patients were overweight or obese (Figure 1.11).

Figure 1.11: Body mass index at diagnosis (N=28,806)



E. Family history of breast cancer

1.20 It was found that breast cancer risk was higher among women who had one first-degree relative with breast cancer, compared to women who had no first-degree relatives with the disease. The risk was even higher among women with multiple first-degree relatives affected by breast cancer, or with relatives who were diagnosed before the age of 50.[22,23] In the cohort, 16.5% of the patients had a family history of breast cancer (Table 1.1).

Table 1.1: Family history of breast cancer at diagnosis (N=28,806)

	Number	%
No	23,759	82.5
Yes with first-degree relative(s)	3,384	11.7
Yes with non first-degree relative(s) only	1,323	4.6
Yes but details not known	57	0.2
Family history not known	283	1.0

F. Personal history of non-breast tumours

1.21 International studies and research conducted in 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 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, 2.2% of the patients suffered from other types of malignant tumours prior to breast cancer diagnosis (Table 1.2), and the most common tumour was colon/rectum cancer (Table 1.3).

Table 1.2: Personal history of non-breast tumours at diagnosis (N=28,806)

	Number	%
No	23,506	81.6
Benign tumour	4,175	14.5
Malignant tumour	642	2.2
Nature of previous tumours not known	96	0.3
History of tumours not known	387	1.3

Table 1.3: Prior non-breast malignant tumours reported by patients (N=642)

	Number	%
Colon/rectum	100	15.6
Uterus	89	13.9
Thyroid	85	13.2
Lung	40	6.2
Cervix	39	6.1
Ovary	36	5.6
Nasopharynx	24	3.7
Lymphatic system	19	3.0
Others*	119	18.5
Not known	120	18.7

* 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 certain 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 associated with varying degrees of increased breast cancer risk.[32]

1.23 The proportion of patients who had history of benign breast disease was 14.0% (Table 1.4). Fibroadenoma, which does not increase the risk of breast cancer, was the most common (45.9%). In addition, 21 patients suffered from ADH and four suffered from LCIS prior to breast cancer diagnosis (Table 1.4).

Table 1.4: History of benign breast disease at diagnosis (N=28,806)

	Number	%
Have history of benign breast disease	**4,046**	**14.0**
Type of benign breast disease		
Fibroadenoma	1,856	45.9
Fibrocystic disease	602	14.9
Microcalcification	87	2.2
Inflammation	113	2.8
Papilloma	62	1.5
Papillomatosis	12	0.3
Hyperplasia	359	8.9
Lipoma	35	0.9
Atypical ductal hyperplasia	21	0.5
Lobular carcinoma in situ	4	0.1
Others (e.g. other benign tumours)	736	18.2
Not known	266	6.6

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 13.1, and 14.7% experienced early menarche (Table 1.5). Of the patients, 56.3% were postmenopausal. Among them, a small proportion experienced late menopause and the mean age at menopause was 50.1. In addition, the proportion of patients being nulliparous was 25.1%, and only 5.0% had their first childbirth after the age of 35 (Table 1.5). Among those who had given birth before, about 70% had two or more children (Table 1.6), and the mean age at first childbirth was 27.3.

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 14.5 months.

Table 1.5: Menarche, menopause and reproductive history at diagnosis

	Number	%
Menarche (N=28,806)		
Early menarche (<12 years old)	4,224	14.7
Normal menarche (≥12 years old)	22,294	77.4
Age at menarche not known	2,288	7.9
Menopause (N=16,213)		
Late menopause (>55 years old)	982	6.1
Normal menopause (≤55 years old)	12,860	79.3
Age at menopause not known	2,371	14.6
Reproductive history (N=28,806)		
No childbirth	7,227	25.1
First childbirth at early age (≤35 years old)	19,212	66.7
First childbirth at late age (>35 years old)	1,426	5.0
Age at first live birth not known	620	2.2
Reproductive history not known	321	1.1
Breastfeeding (N=28,806)		
Yes	9,384	32.6
No (had childbirth)	11,756	40.8
No (no childbirth)	7,195	25.0
No (reproductive history not known)	47	0.2
Not known	424	1.5

Table 1.6: Number of live births reported by patients (N=21,258)

	Number	%
1	6,437	30.3
2	9,640	45.3
3	3,327	15.7
4	1,096	5.2
5 or more	621	2.9
Not known	137	0.6

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 that, compared to non-users, past users had no excess risk after discontinuing use for five to 10 years or 10 years or more.[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 70.6% (Table 1.7). Of the hormonal contraceptive users, 81.3% were past users at diagnosis. Among those with known cessation timelines, 11.7% had discontinued use within five years prior to cancer diagnosis.

Table 1.7: Use of hormonal contraceptives at diagnosis (N=28,806)

	Number	%
Non-user	20,330	70.6
OC use <5 years	3,963	13.8
OC use 5-10 years	2,035	7.1
OC use >10 years	831	2.9
Length of OC use not known	1,204	4.2
Not known if OC was used	443	1.5

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 2.2% had used HRT for five or more years (Table 1.8).

Table 1.8: Use of hormone replacement therapy at diagnosis (N=16,213)

	Number	%
Non-user	15,022	92.7
HRT use <5 years	514	3.2
HRT use 5-10 years	286	1.8
HRT use >10 years	72	0.4
Length of HRT use not known	94	0.6
Not known if HRT was used	225	1.4

HRT: hormone replacement therapy

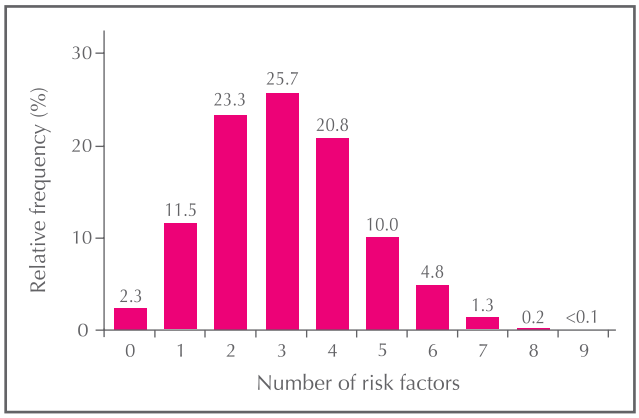
K. Ten most common risk factors associated with breast cancer in Hong Kong

1.30 Among all the risk factors studied, the majority of patients reported a lack of exercise, followed by no breastfeeding experience and being overweight or obese (Table 1.9). The combination of multiple risk factors multiplies the risk of getting breast cancer, with self-perceived high level of stress contributing independently to a more than two-fold increase in risk.[18] In the cohort with an 80% response threshold, 62.8% of the patients had three or more common risk factors, while 34.8% had one to two risk factors. Only 2.3% 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=28,806)

	Number	%
Lack of exercise (<3 hours/week)	21,675	75.2
No breastfeeding	18,998	66.0
Being overweight/obese	11,770	40.9
High level of stress (>50% of time)	10,692	37.1
No childbirth/first live birth after age 35	8,653	30.0
Family history of breast cancer	4,764	16.5
Early menarche (<12 years old)	4,224	14.7
Diet rich in meat/dairy products	3,853	13.4
Habit of drinking alcohol	1,776	6.2
Use of hormone replacement therapy	966	3.4

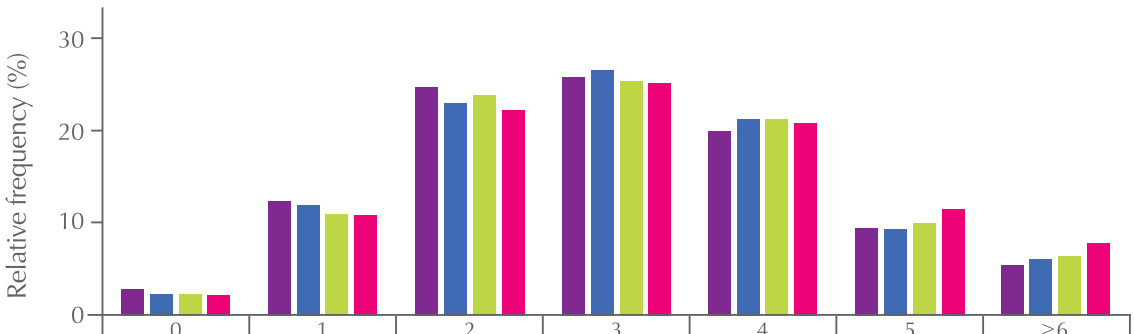
Figure 1.12: Distribution of risk factors among patients at diagnosis (N=28,357)



Note: This distribution only included patients who responded to at least 80% of the 10 risk factor items. For those with 1-2 missing responses, numbers were proportionally scaled to a total of 10 items.

1.31 When stratified by diagnosis year group, lack of exercise, no breastfeeding and being overweight/obese remained the top three most common risk factors over time (Table 1.10). Also, the proportion of having three or more risk factors was highly comparable across groups (Figure 1.13).

Figure 1.13: Distribution of risk factors by diagnosis year group (N=28,357)



	0	1	2	3	4	5	≥6
2006-2010 (N=6,458)	2.7	12.3	24.7	25.7	19.9	9.4	5.4
2011-2015 (N=8,804)	2.2	11.9	22.9	26.5	21.2	9.3	6.0
2016-2019 (N=6,030)	2.3	10.9	23.9	25.3	21.2	10.0	6.4
2020-2026 (N=7,065)	2.1	10.7	22.1	25.1	20.8	11.5	7.8

Note: This distribution only included patients who responded to at least 80% of the 10 risk factor items. For those with 1-2 missing responses, numbers were proportionally scaled to a total of 10 items.

Table 1.10: Ten most common risk factors for breast cancer by diagnosis year group (N=28,806)

	Diagnosis year group, %			
	2006-2010 (N=6,676)	2011-2015 (N=8,899)	2016-2019 (N=6,095)	2020-2026 (N=7,136)
Lack of exercise (<3 hours/week)	76.5	78.6	76.3	69.0
No breastfeeding	64.7	66.9	66.4	65.6
Being overweight/obese	37.4	39.2	41.0	46.0
High level of stress (>50 of time)	37.1	37.4	36.4	37.5
No childbirth/first live birth after age 35	24.0	28.3	30.9	37.1
Family history of breast cancer	14.2	14.7	17.0	20.7
Early menarche (<12 years old)	13.6	14.3	14.5	16.3
Diet rich in meat/dairy products	14.2	14.3	12.8	11.9
Habit of drinking alcohol	4.8	4.9	6.8	8.5
Use of hormone replacement therapy	4.4	3.5	2.9	2.7

IV. Breast health care practices

A. Breast health care methods

1.32 Breast health care is a proactive strategy of checking women's breasts when there are neither signs nor symptoms of breast cancer, which helps to achieve earlier detection. Early detection reduces mortality from breast cancer. The common methods used for breast health care include breast self-examination (BSE), clinical breast examination (CBE), breast ultrasound (USG) and mammography (MMG) screening. While MMG, which uses low-energy X-rays to examine women's breasts, is the current gold standard method for breast cancer screening, the combination of BSE, CBE, and USG is useful to build personal and clinical breast awareness. 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. Unlike the previous two methods, USG uses high-frequency sound waves to detect breast opacity and is considered as a complementary tool to MMG.

1.33 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 screening. In addition, MMG screening plus USG is suggested for women with dense breasts. As there is no population-based breast screening programme in Hong Kong, the breast health care practices prior to cancer diagnosis studied in the current report were self-initiated. Although the Government has recommended risk-based population screening in average risk women since July 2020,[40] and launched Phase I of The Breast Cancer Screening Pilot Programme in September 2021 and Phase II in June 2025 to provide screening services for women with increased risk,[41,42] these services should be expanded to a wider population for better cancer control.

B. Breast health care practices and age

1.34 The breast health care practices of the patient cohort were studied by age group (Table 1.11). For each age group, less than a quarter of the patients underwent regular BSE, USG or MMG screening (Table 1.11). Regular CBE was 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 1.11). 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, 63.3% of the patients aged 40 or above had never undergone MMG screening.

Table 1.11: Breast health care practices by age group

	Age group, %				
	<40	**40-49**	**50-59**	**60-69**	**≥70**
BSE (N=28,398)	**(N=2,426)**	**(N=8,299)**	**(N=9,235)**	**(N=6,023)**	**(N=2,415)**
Never	38.0	34.7	36.1	41.0	56.3
Occasional	42.4	42.3	41.2	39.4	29.7
Monthly	18.7	21.8	21.1	18.3	12.0
Not known	0.9	1.2	1.6	1.3	1.9
CBE (N=28,398)	**(N=2,426)**	**(N=8,299)**	**(N=9,235)**	**(N=6,023)**	**(N=2,415)**
Never	52.8	42.4	43.9	52.9	72.5
Occasional	14.6	16.0	16.8	18.0	13.0
Regular*	31.7	40.4	37.8	27.3	12.3
Not known	0.9	1.2	1.5	1.8	2.2
USG# (N=25,972)		**(N=8,299)**	**(N=9,235)**	**(N=6,023)**	**(N=2,415)**
Never	—	62.8	62.7	66.9	79.8
Occasional	—	12.9	14.0	14.6	10.1
Regular*	—	22.2	21.2	16.1	7.7
Not known	—	2.1	2.2	2.4	2.4
MMG screening# (N=25,972)		**(N=8,299)**	**(N=9,235)**	**(N=6,023)**	**(N=2,415)**
Never	—	65.6	59.1	60.8	77.1
Occasional	—	12.6	14.8	16.8	12.0
Regular*	—	20.3	24.4	20.8	8.7
Not known	—	1.4	1.6	1.7	2.2

BSE: breast self-examination; CBE: clinical breast examination; USG: breast ultrasound; MMG: mammography
* "Regular" is defined as engaging in the breast health care method every 1-3 years
Only included patients aged 40 or above



C. *Breast health care practices and education level*

1.35 Breast health care practices were further examined by patients' education level (Table 1.12). The findings suggested that patients with lower education levels engaged in lesser breast health care practices. In the cohort, 85.5% of the patients who had kindergarten level or no schooling had never undergone MMG screening, compared to 46.5% of the patients who attained matriculation level or above. Similar disparities were observed for other methods, with the corresponding figures at 65.4% compared to 26.9% for BSE, 75.7% compared to 32.5% for CBE, and 87.5% compared to 46.3% for USG.

Table 1.12: Breast health care practices by education level

	Education level, %			
	No schooling / Kindergarten	Primary school	Secondary school	Matriculation or above
BSE (N=28,460)	**(N=1,143)**	**(N=6,092)**	**(N=14,215)**	**(N=7,010)**
Never	65.4	48.4	38.0	26.9
Occasional	23.1	32.9	39.1	51.8
Monthly	10.8	17.6	21.4	19.6
Not known	0.6	1.0	1.4	1.7
CBE (N=28,460)	**(N=1,143)**	**(N=6,092)**	**(N=14,215)**	**(N=7,010)**
Never	75.7	62.2	48.2	32.5
Occasional	11.1	13.8	16.0	20.3
Regular*	12.4	23.0	34.2	45.6
Not known	0.8	0.9	1.6	1.6
USG# (N=25,655)	**(N=1,106)**	**(N=5,962)**	**(N=12,981)**	**(N=5,606)**
Never	87.5	77.4	66.2	46.3
Occasional	5.7	9.9	13.3	19.1
Regular*	6.0	11.1	18.3	31.9
Not known	0.8	1.6	2.2	2.7
MMG screening# (N=25,655)	**(N=1,106)**	**(N=5,962)**	**(N=12,981)**	**(N=5,606)**
Never	85.5	73.8	63.9	46.5
Occasional	7.4	11.7	14.1	19.1
Regular*	6.4	13.5	20.2	32.8
Not known	0.6	1.1	1.8	1.6

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

* "Regular" is defined as engaging in the breast health care method every 1-3 years

Only included patients aged 40 or above

D. Breast health care practices and monthly household income

1.36 Breast health care practices were also analysed according to patients' monthly household income level (Table 1.13). Figures show that patients with lower income had engaged in lesser breast health care practices. In the cohort, 70.7% of the patients with monthly household income of less than $10,000 had never underwent MMG screening, compared to 37.3% of the patients who had income of $60,000 or more. Similar differences were observed for other methods, where the corresponding figures were 42.0% compared to 21.7% for BSE, 58.9% compared to 22.1% for CBE, and 74.2% compared to 38.2% for USG.

Table 1.13: Breast health care practices by monthly household income (HK$)

	Monthly household income (HK$), %			
	<10,000	**10,000 – 29,999**	**30,000 – 59,999**	**≥60,000**
BSE (N=16,629)	**(N=2,942)**	**(N=6,854)**	**(N=4,051)**	**(N=2,782)**
Never	42.0	36.1	29.6	21.7
Occasional	40.8	42.9	49.4	56.6
Monthly	15.9	19.9	19.8	20.1
Not known	1.3	1.2	1.2	1.5
CBE (N=16,629)	**(N=2,942)**	**(N=6,854)**	**(N=4,051)**	**(N=2,782)**
Never	58.9	45.9	34.3	22.1
Occasional	15.8	16.2	18.7	21.0
Regular*	23.8	36.8	45.9	55.0
Not known	1.4	1.1	1.1	1.9
USG# (N=14,599)	**(N=2,753)**	**(N=6,089)**	**(N=3,357)**	**(N=2,400)**
Never	74.2	66.6	53.2	38.2
Occasional	11.7	13.3	16.9	21.2
Regular*	12.2	18.0	28.1	37.5
Not known	1.8	2.0	1.7	3.1
MMG screening# (N=14,599)	**(N=2,753)**	**(N=6,089)**	**(N=3,357)**	**(N=2,400)**
Never	70.7	64.2	52.5	37.3
Occasional	12.6	14.4	17.5	20.7
Regular*	15.2	19.9	28.8	40.3
Not known	1.5	1.5	1.2	1.7

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

* "Regular" is defined as engaging in the breast health care method every 1-3 years

Only included patients aged 40 or above

E. Breast health care practices and district of residence

1.37 Breast health care practices were further stratified by patients' district of residence (Table 1.14). For each breast health care method, higher proportions of patients living in Kowloon or the New Territories reported no breast health care practice than those living on Hong Kong Island. In addition, a higher proportion (31.2%) of patients living on Hong Kong Island had regular MMG screening than those living in Kowloon (18.5%) and the New Territories (19.0%).

Table 1.14: Breast health care practices by district of residence

	District of residence, %		
	Hong Kong Island	**Kowloon**	**New Territories**
BSE (N=27,674)	**(N=4,072)**	**(N=6,767)**	**(N=16,835)**
Never	30.5	42.1	39.1
Occasional	47.3	38.9	39.3
Monthly	19.5	17.4	20.7
Not known	2.7	1.6	0.9
CBE (N=27,674)	**(N=4,072)**	**(N=6,767)**	**(N=16,835)**
Never	34.1	53.8	50.1
Occasional	18.4	15.8	16.0
Regular*	44.6	28.8	32.9
Not known	3.0	1.6	1.0
USG# (N=25,020)	**(N=3,637)**	**(N=6,132)**	**(N=15,251)**
Never	50.5	68.2	68.2
Occasional	17.1	12.9	12.7
Regular*	27.7	16.7	17.7
Not known	4.7	2.2	1.4
MMG screening# (N=25,020)	**(N=3,637)**	**(N=6,132)**	**(N=15,251)**
Never	47.9	66.3	66.2
Occasional	17.9	13.5	13.8
Regular*	31.2	18.5	19.0
Not known	3.1	1.7	1.1

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

* "Regular" is defined as engaging in the breast health care method every 1-3 years

Only included patients aged 40 or above

F. Breast health care practices and diagnosis year group

1.38 When stratified by the diagnosis year group, the proportion of patients who underwent regular MMG screening remained at about 20% over time (Table 1.15). The proportions for other methods were also comparable across groups, with the corresponding figures of approximately 20% for monthly BSE, 30% for regular CBE and 20% for regular USG.

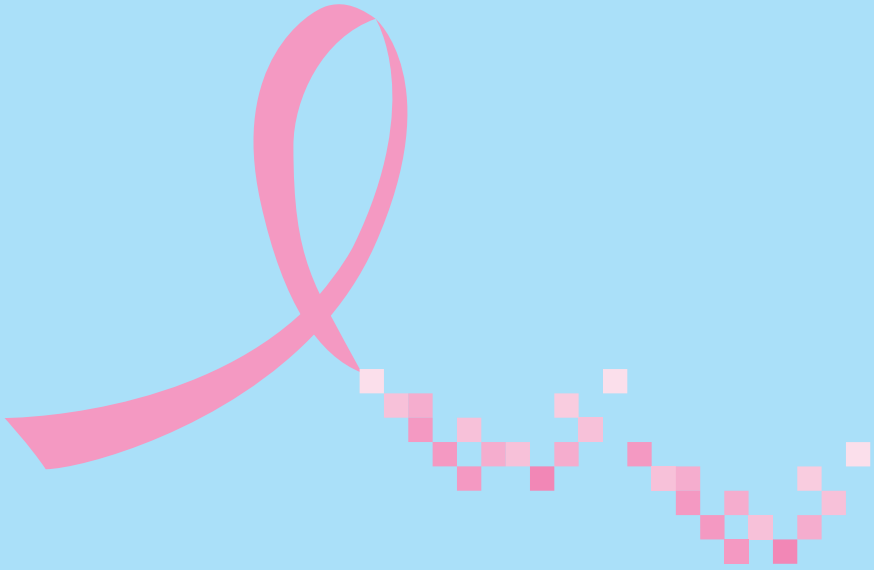
Table 1.15: Breast health care practices by diagnosis year group

	Diagnosis year group, %			
	2006-2010	**2011-2015**	**2016-2019**	**2020-2026**
BSE (N=28,806)	**(N=6,676)**	**(N=8,899)**	**(N=6,095)**	**(N=7,136)**
Never	40.6	39.6	37.7	36.3
Occasional	35.5	40.4	40.0	44.9
Monthly	21.9	19.2	21.0	17.0
Not known	2.0	0.8	1.3	1.8
CBE (N=28,806)	**(N=6,676)**	**(N=8,899)**	**(N=6,095)**	**(N=7,136)**
Never	46.9	50.2	49.9	46.4
Occasional	12.3	15.0	18.6	20.0
Regular*	38.9	33.7	30.3	31.7
Not known	1.9	1.0	1.2	1.9
USG# (N=25,972)	**(N=5,879)**	**(N=8,024)**	**(N=5,531)**	**(N=6,538)**
Never	70.5	71.5	63.0	54.9
Occasional	9.4	10.4	15.5	19.0
Regular*	15.8	16.9	19.9	24.0
Not known	4.3	1.2	1.5	2.1
MMG screening# (N=25,972)	**(N=5,879)**	**(N=8,024)**	**(N=5,531)**	**(N=6,538)**
Never	67.7	68.1	61.5	54.8
Occasional	10.3	11.8	16.4	19.2
Regular*	19.8	18.9	20.8	24.0
Not known	2.1	1.1	1.3	2.0

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

* "Regular" is defined as engaging in the breast health care method every 1-3 years

Only included patients aged 40 or above



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 25,618 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 25,618 breast cancer cases which were diagnosed between 2006 and 2026. The clinical outcome of 22,768 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 8.1% of self-detected cases were in situ breast cancer, 40.3% 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 (10.1%) 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 (2.1%).
- The most common cancer stage at diagnosis was stage II (34.8%) followed by stage I (31.8%) and stages III-IV (15.4%). In addition, 13.5% of the patients were diagnosed with stage 0 cancer.

Cancer characteristics

- The mean size of invasive tumours was 2.1 cm, and 59.4% 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, 21.5% of the invasive breast cancer cases were c-erbB2/HER2 positive.
- The mean size of in situ tumours was 1.9 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, 23.8% of in situ cases were HER2 positive.

Treatment

- Of the patients, 19.1% received care at private medical services, 46.3% received care at public medical services, and 34.5% 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 (98.8%) underwent surgery as part of their treatment. About two-thirds had mastectomy, while 35.8% had breast-conserving surgery. Nearly all (98.1%) of the patients with invasive breast cancer received nodal surgery and among them, 33.5% required axillary dissection (AD) alone, and 16.3% required AD after sentinel node biopsy (SNB).
  - For patients with in situ breast cancer, almost all (99.7%) underwent surgery. About half had breast-conserving surgery, while 45.3% had mastectomy. In addition, 64.4% received nodal surgery and among them, 89.0% 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 (64.4%), while AD alone was more commonly performed on the patients with positive clinical nodal status (68.4%).

- Radiotherapy
  - The majority of the 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 3.9% of stage 0 patients to 95.1% 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
  - Of the hormone receptor-positive patients, 87.3% were treated with endocrine therapy.
  - For patients with invasive breast cancer, 95.5% received endocrine therapy, while for patients with in situ breast cancer, only 17.4% received endocrine therapy.

- Targeted therapy
  - Of the patients with invasive HER2-positive breast cancer, 69.9% 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.

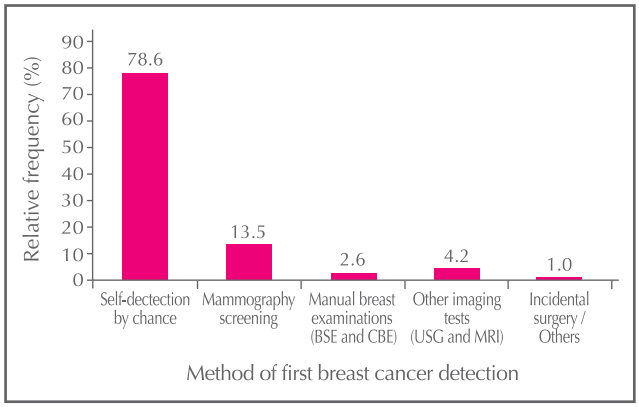
Patient status

- A total of 22,768 patients completed at least one follow-up, providing data to examine their survival aspects. The mean and median follow-up period were 6.3 and 5.3 years respectively.
- In the patient cohort, 2.3% experienced only locoregional recurrence, 2.9% experienced only distant recurrence, and 2.0% experienced both locoregional and distant recurrence.
- The most common sites for locoregional recurrence were breast (38.2%) and axilla (32.8%), while the top four organs involved in distant recurrence were bone (59.6%), lung (46.6%), liver (39.0%) and brain (15.5%).
- In the cohort, 1,780 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 (78.6%) (Figure 2.1). Detection through breast health care methods, including clinical breast examination (CBE), breast ultrasound (USG) and mammography (MMG) screening, constituted a small proportion. Compared to Western countries, the uptake of MMG screening, in particular, was low. A study in the United States, for instance, found that 43% of the breast cancer cases were detected through MMG screening.[43]

Figure 2.1: Methods of first breast cancer detection in the patient cohort (N=24,430)



BSE: breast self-examination; CBE: clinical breast examination;
USG: breast ultrasound; 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 (82.2%) or mixed public/private medical service users (80.7%) than among private medical service users (64.3%). In contrast, the proportion of the patients who first detected their breast cancer through MMG screening was higher among private medical service users (21.7%) than among public medical service users (12.4%) or mixed public/private medical service users (11.2%) (Table 2.1).

2.4 Studies have shown that MMG screening 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 8.1% of self-detected cases were in situ breast cancer, whereas 40.3% of MMG-detected cases were in situ breast cancer (Table 2.2). Such higher rate of in situ tumour detection was also reflected in Table 2.3, which shows that MMG screening detected a much higher proportion (84.4%) of early stage cancer cases (stages 0-I) than advanced stage cancer cases.

Table 2.1: Methods of first breast cancer detection by type of medical service users (N=24,430)

	Type of medical service users, %		
	Public (N=11,348)	Private (N=4,105)	Mixed public / private (N=8,977)
Self-detection by chance	82.2	64.3	80.7
Mammography screening	12.4	21.7	11.2
Manual breast examinations (BSE and CBE)	2.4	2.8	2.8
Other imaging tests (USG and MRI)	2.0	9.8	4.5
Incidental surgery / Others	1.0	1.5	0.9

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

Table 2.2: Methods of first breast cancer detection by type of cancer (N=24,271)

	Type of cancer, %	
	Invasive	In situ
Self-detection by chance (N=19,105)	91.9	8.1
Mammography screening (N=3,271)	59.7	40.3
Manual breast examinations (BSE and CBE) (N=619)	84.7	15.3
Other imaging tests (USG and MRI) (N=1,024)	73.0	27.0
Incidental surgery/Others (N=252)	78.2	21.8

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

Table 2.3: Methods of first breast cancer detection by cancer stage (N=23,373)

	Cancer stage, %					
	0	I	IIA	IIB	III	IV
Self-detection by chance (N=18,293)	8.5	30.0	27.1	14.8	16.5	3.1
Mammography screening (N=3,227)	40.9	43.5	9.9	3.0	2.2	0.6
Manual breast examinations (BSE and CBE) (N=608)	15.6	40.1	23.4	9.7	8.7	2.5
Other imaging tests (USG and MRI) (N=1,004)	27.5	52.2	12.9	3.2	3.1	1.1
Incidental surgery/Others (N=241)	22.8	42.3	18.3	5.4	7.5	3.7

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

2.5 Across the diagnosis year groups, self-detection by chance remained the most common method of first breast cancer detection, while the proportions of detection through imaging tests have increased in recent years (Table 2.4).

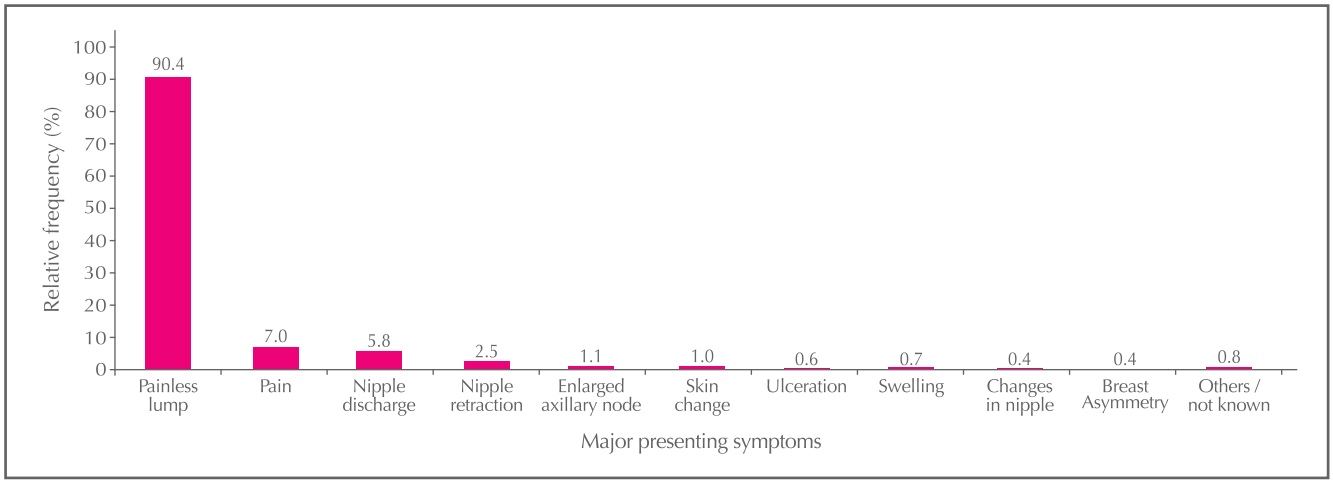
Table 2.4: Methods of first breast cancer detection by diagnosis year group (N=24,430)

	Diagnosis year group, %			
	2006-2010 (N=6,540)	2011-2015 (N=8,727)	2016-2019 (N=5,333)	2020-2026 (N=3,830)
Self-detection by chance	84.1	82.1	77.5	62.8
Mammography screening	9.7	11.5	14.5	23.2
Manual breast examinations (BSE and CBE)	3.2	2.5	2.5	1.8
Other imaging tests (USG and MRI)	2.5	3.2	4.5	9.3
Incidental surgery/Others	0.5	0.7	1.0	2.9

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

2.6 Of the patients who self-detected their cancer by chance, 90.4% found a painless lump on their breast(s), and 8.7% reported changes in the nipple(s) (such as nipple discharge, nipple retraction, redness, scaliness or thickening of nipple). Only 7.0% of the patients experienced breast pain at initial presentation, which shows that pain is usually not a symptom of breast cancer (Figure 2.2).

Figure 2.2: Major presenting symptoms of self-detected breast cancer in the patient cohort (N=19,210)



A. *Patient delay*

2.7 Longer patient delay (time from symptom onset to first 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 around 30% waited more than three months before seeking first medical consultation (Figure 2.3).

2.8 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 (40.2%) than among public medical service users (23.8%) (Table 2.5).

Figure 2.3: Time interval between symptom onset and first medical consultation for patients who self-detected their cancer (N=6,884)

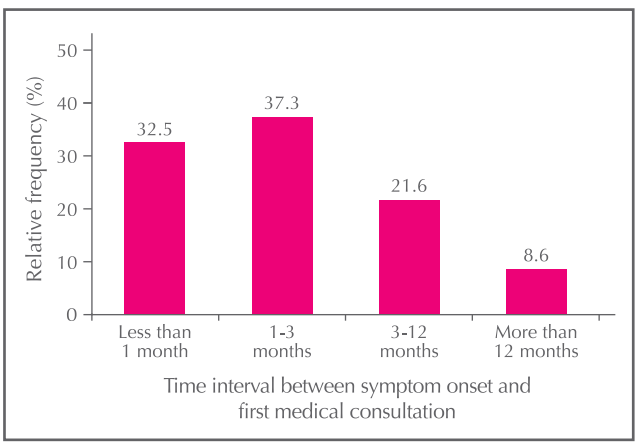


Table 2.5: Time interval between symptom onset and first medical consultation for patients who self-detected their cancer by type of medical service users (N=6,884)

	Type of medical service users, %		
	Public (N=2,929)	Private (N=1,435)	Mixed public / private (N=2,520)
Less than 1 month	23.8	40.2	38.2
1-3 months	38.1	35.1	37.5
3-12 months	26.9	18.2	17.5
More than 12 months	11.2	6.5	6.9

2.9 Patients with a patient delay of more than 12 months had a much higher proportion of stage IV disease than those with a delay of less than one month (10.1% vs 2.1%) (Table 2.6).

Table 2.6: Cancer stage at diagnosis among self-detected patients by time interval between symptom onset and first medical consultation (N=6,003)

	Time interval between symptom onset and first medical consultation, %			
	Less than 1 month (N=1,969)	1-3 months (N=2,268)	3-12 months (N=1,271)	More than 12 months (N=495)
Stage I	35.4	31.7	27.1	25.5
Stage IIA	32.8	31.4	28.7	24.6
Stage IIB	15.9	16.7	18.3	14.3
Stage III	13.7	17.1	20.7	25.5
Stage IV	2.1	3.1	5.1	10.1

III. Cancer characteristics

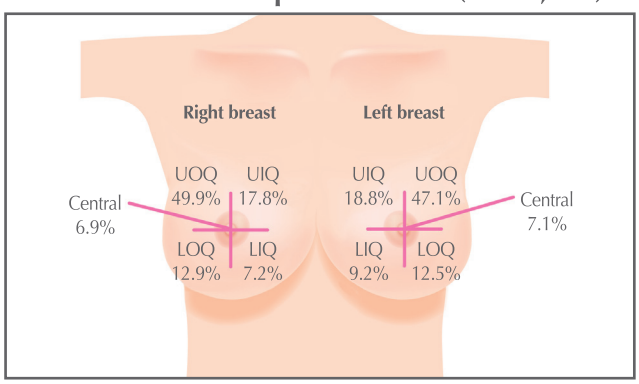
2.10 Breast cancer can occur in one (unilateral) or both (bilateral) breasts. In the cohort, the majority (89.6%) of the cases were unilateral breast cancer, while a small proportion (5.5%) were synchronous bilateral breast cancer at first diagnosis (Table 2.7).

Table 2.7: Laterality of breast cancer cases in the patient cohort (N=25,618)

	Number of patients	Number of cases	Median time interval for metachronous cases
Unilateral	**22,962**	**22,962**	—
Bilateral (synchronous)	**704**	**1,408**	—
Bilateral (metachronous) cases	**758**	**1,248**	**7.3 years**
Initial diagnosis during 2006-2026	490	980	5.4 years
Initial diagnosis before 2006	268	268	11.5 years

2.11 As regards the locations of malignant breast tumour, about half of the breast cancer cases in either the left or the right breast (47.1% and 49.9% 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=25,618)



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

2.12 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.

2.13 For cancer diagnosis, MMG was used on 86.5% of the patients, and USG on 82.6%, while MRI was used on only 12.0% of the patients (Table 2.8). 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 2.8: Sensitivity and diagnostic results of breast imaging tests (N=25,618)

	Mammography	Breast ultrasound	MRI
Proportion of patients using the test	**86.5%**	**82.6%**	**12.0%**
Overall sensitivity*	**85.4%**	**92.3%**	**97.3%**
BIRADS category, Number (%)			
Diagnostic/malignant (BIRADS 5)	7,332 (33.1)	7,744 (36.6)	2,412 (78.5)
Suspicious abnormality (BIRADS 4)	11,594 (52.3)	11,789 (55.7)	576 (18.8)
Probably benign (BIRADS 3)	1,006 (4.5)	981 (4.6)	42 (1.4)
Benign (BIRADS 2)	927 (4.2)	325 (1.5)	18 (0.6)
Normal (BIRADS 1)	1,144 (5.2)	303 (1.4)	20 (0.7)
Incomplete (BIRADS 0)	165 (0.7)	13 (0.1)	3 (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

2.14 Of the patients with BIRADS 4 or 5 MMG findings, 66.9% presented with opacity and 49.7% with microcalcification (Table 2.9). The mammographic density of breasts affects the sensitivity of MMG. Heterogeneously dense breasts may obscure small masses, while extremely dense breasts lower the sensitivity of MMG. In the patient cohort, 70.7% had heterogeneously dense breasts, 8.2% had extremely dense breasts (Figure 2.5). Mammographic density of breasts declines with increasing age. The proportion of patients with extremely dense breasts decreases significantly from 20.3% among patients aged below 30 to 2.5% among patients aged 70 and above (Table 2.10).

Table 2.9: Mammographic findings of patients diagnosed through mammography (N=18,926)

	Number	%
Opacity	12,659	66.9
Microcalcification	9,398	49.7
Architectural distortion	2,746	14.5
Asymmetric density	1,498	7.9
Unclassified	1,051	5.6

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=13,134)

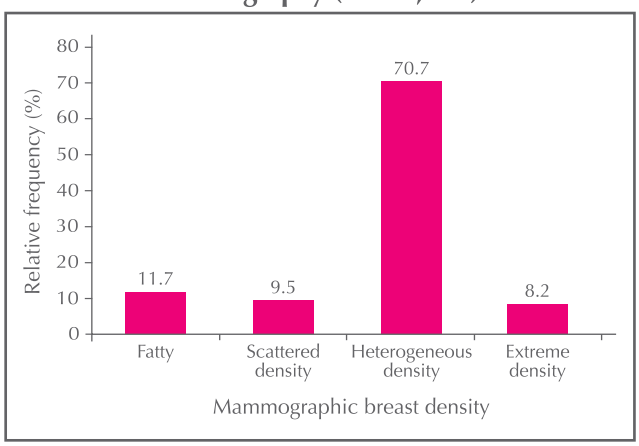


Table 2.10: Mammographic density of breasts of patients diagnosed through mammography by age group (N=12,801)

	Age group, %					
	<30 (N=64)	30-39 (N=932)	40-49 (N=3,699)	50-59 (N=4,331)	60-69 (N=2,726)	≥70 (N=1,049)
Fatty	4.7	4.3	6.8	11.6	15.8	26.0
Scattered density	4.7	4.7	6.1	9.4	13.4	16.9
Heterogeneous density	70.3	73.9	75.2	72.2	66.7	54.6
Extreme density	20.3	17.1	11.9	6.8	4.1	2.5

2.15 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 87.5% of the patients in the cohort and among them, 18.8% received only FNA, 59.2% received only CNB, while 22.0% received both FNA and CNB. In addition, 8.9% of the patients had excisional biopsy. Excisional biopsy had the highest overall sensitivity of 100%, followed by CNB (99.2%) and FNA (89.3%) (Table 2.11).

Table 2.11: Sensitivity and diagnostic results of breast tissue biopsies (N=25,618)

	FNA		CNB		Excisional biopsy	
Proportion of patients using the test	**35.8%**		**71.1%**		**8.9%**	
Overall sensitivity*	**89.3%**		**99.2%**		**100.0%**	
Class, Number (%)						
Diagnostic/malignant (Class V)	5,863	(64.0)	17,446	(95.8)	2,285	(100.0)
Suspicious (Class IV)	1,314	(14.3)	280	(1.5)	—	
Atypical (Class III)	1,004	(11.0)	334	(1.8)	—	
Benign (Class II)	321	(3.5)	101	(0.6)	—	
Scanty benign (Class I)	511	(5.6)	41	(0.2)	—	
Incomplete (Class 0)	147	(1.6)	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

2.16 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.

2.17 The proportion of patients with invasive breast cancer who did not have any cancer staging as part of their diagnosis and treatment was 48.2%. Among those patients who had cancer staging as part of their treatment, positron emission tomography (PET) scan was the most common method used (Table 2.12).

2.18 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 its low detection rate of metastases in patients with apparent early-stage disease. However, among those patients who had cancer staging, 31.1% of stage I and 50.3% of stage IIA patients had PET scan to determine the extent of their disease (Figure 2.6).

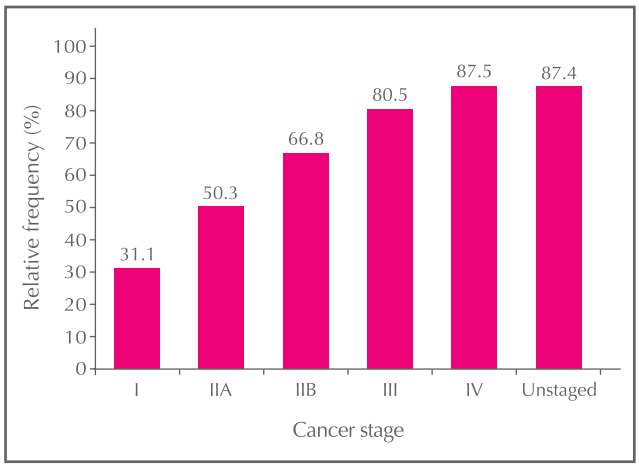
Table 2.12: Method of cancer staging among invasive breast cancer patients (N=10,787)

	Number	%
Positron emission tomography (PET) scan	6,230	57.8
Chest x-ray and abdominal ultrasound	3,631	33.7
Computed tomography (CT) of body parts*	729	6.8
Bone scan	244	2.3
Magnetic resonance imaging (MRI) of whole body	72	0.7
Others (e.g. bone x-ray)	564	5.2
Not known	395	3.7

* 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=10,787)



2.19 The American Joint Committee on Cancer (AJCC) breast cancer staging manual provides the gold standard for classifying the extent of the disease and its 8th edition introduced two distinct staging frameworks: anatomic and prognostic stage groups.[47] 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.

2.20 Although the prognostic stage group has been recommended for patient care and for reporting all breast cancer cases in the United States since 2018, the anatomic stage group was maintained for this report. It was because the majority of the cohort was diagnosed between 2006 and 2017, when clinical management was based on the prevailing anatomic stage group. Nonetheless, there is only minimal difference in the TNM anatomic staging between the 7th and 8th editions, with the most notable change being the elimination of LCIS.

2.21 The most common cancer stage at diagnosis was stage II (34.8%) followed by stage I (31.8%) and stages III-IV (15.4%). In addition, 13.5% of the patients were diagnosed with in situ cancer (stage 0) (Figure 2.7). Across the diagnosis year groups, the stage distributions were comparable (Figure 2.8).

Figure 2.7: Cancer stage at diagnosis (N=25,618)

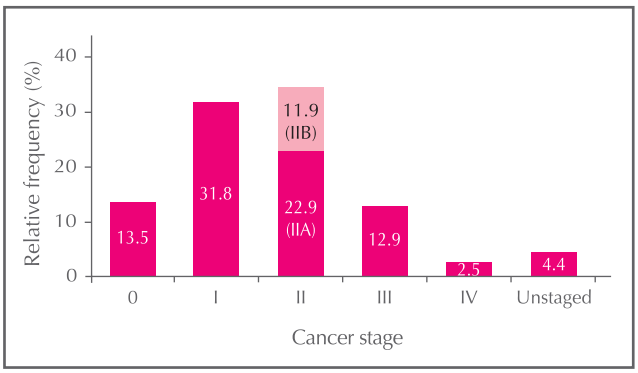
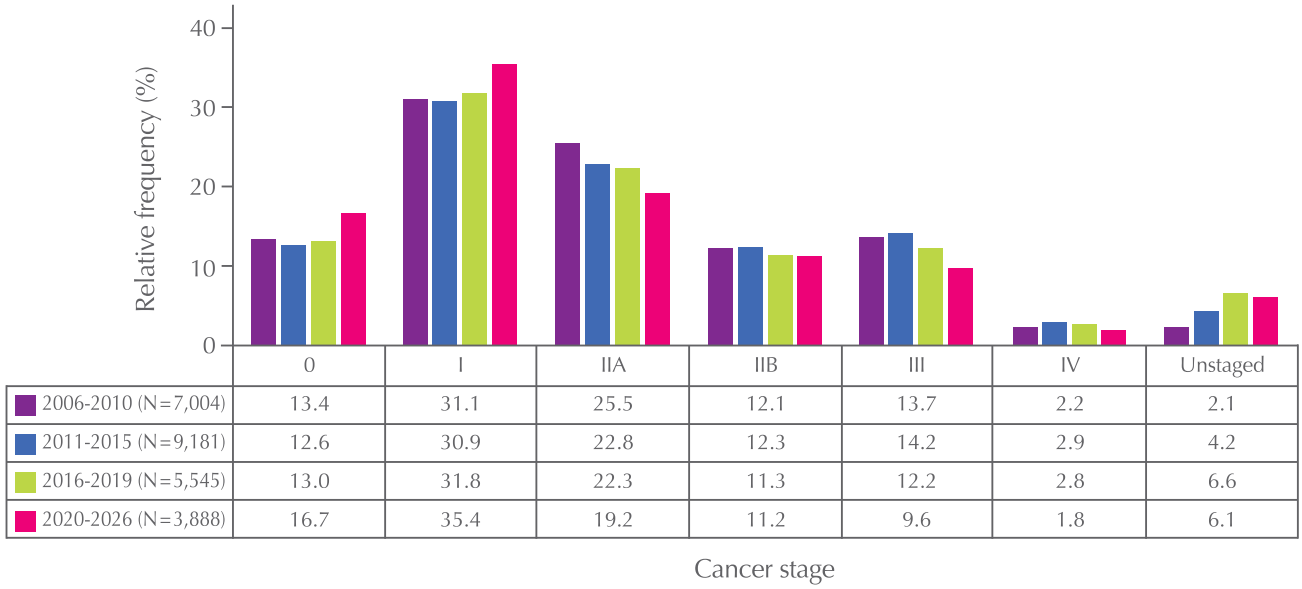


Figure 2.8: Distribution of cancer stage by diagnosis year group (N=25,618)



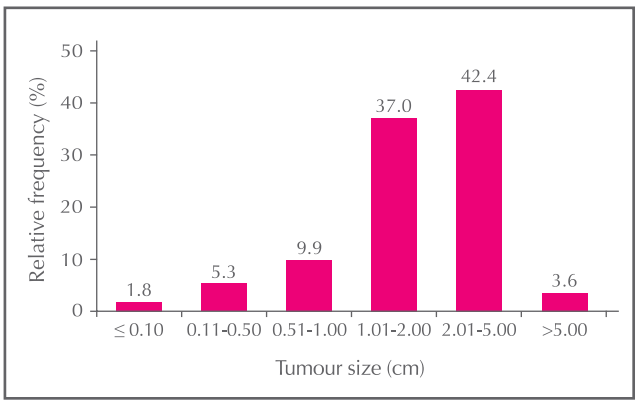
	0	I	IIA	IIB	III	IV	Unstaged
2006-2010 (N=7,004)	13.4	31.1	25.5	12.1	13.7	2.2	2.1
2011-2015 (N=9,181)	12.6	30.9	22.8	12.3	14.2	2.9	4.2
2016-2019 (N=5,545)	13.0	31.8	22.3	11.3	12.2	2.8	6.6
2020-2026 (N=3,888)	16.7	35.4	19.2	11.2	9.6	1.8	6.1

2.22 Of the 25,618 breast cancer cases analysed, data from 25,082 cases with available pathology data were used for subsequent analyses on cancer characteristics. A total of 21,616 patients were diagnosed with invasive cancer, while 3,450 patients were diagnosed with in situ cancer. In addition, 16 cases were diagnosed with occult primary breast cancer.

C. Characteristics of invasive breast cancer

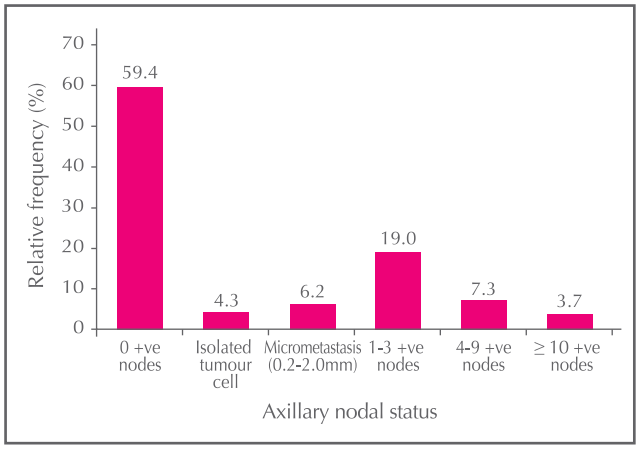
2.23 The mean size of tumours of invasive breast cancer was 2.1 cm (standard deviation: ±1.4 cm). Tumours of one cm or less in size were found in 17.0% of the patients, while tumours of sizes 1.01 to 2.00 cm and 2.01 to 5.00 cm were respectively found in 37.0% and 42.4% of the patients (Figure 2.9). Only 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: 1.3±1.0 cm vs. 2.3±1.4 cm; $p<0.001$).

Figure 2.9: Distribution of tumour size (cm) of invasive breast cancer (N=21,616)



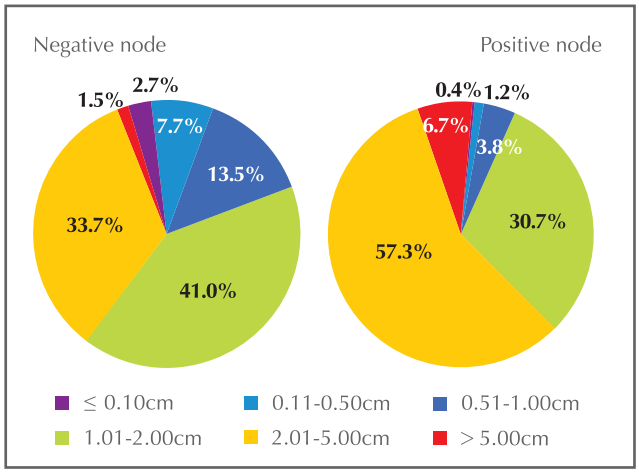
2.24 Lymph node status is one of the factors used for determining breast cancer stage. Multiple affected lymph nodes signify a higher disease stage. Of the patients with invasive breast cancer, 59.4% had no positive axillary lymph nodes, 4.3% had isolated tumour cells (metastasis size ≤ 0.2 mm or a cluster of fewer than 200 tumour cells), 6.2% had micrometastasis (metastasis size > 0.2 mm and ≤ 2 mm), while 30.0% had at least one positive axillary lymph node with metastasis size larger than two mm (Figure 2.10).

Figure 2.10: Number of positive axillary lymph nodes among patients with invasive breast cancer (N=18,733)



2.25 Of the patients with node-positive invasive cancer, 57.3% had tumours of 2.01 to 5.00 cm in size, while 6.7% had tumours larger than five cm. In contrast, more patients with node-negative invasive cancer (64.9%) had tumours of two cm or less, compared to patients with node-positive invasive cancer (36.1%) (Figure 2.11).

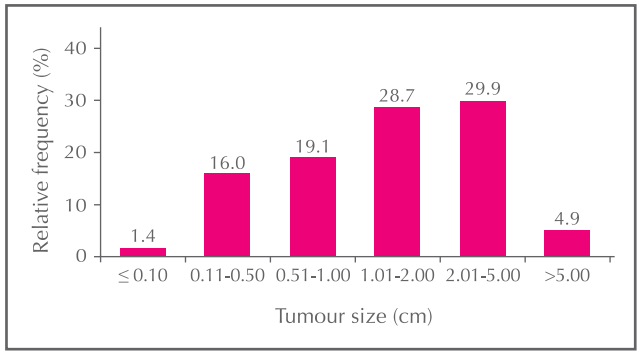
Figure 2.11: Distribution of tumour size (cm) in invasive cancer with negative or positive nodal status (N=17,816)



D. Characteristics of in situ breast cancer

2.26 The mean size of tumours of in situ breast cancer was 1.9 cm (standard deviation: ±1.6 cm). Tumours of one cm or less in size were found in 36.5% of the patients while tumours larger than five cm were found in 4.9% of the patients (Figure 2.12). Of the in situ breast cancer cases where MMG was performed, 64.0% showed microcalcification.

Figure 2.12: Distribution of tumour size (cm) of in situ breast cancer (N=2,822)



IV. Histological and biological characteristics

2.27 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 tumour size, grade, nodal status, hormone receptor (HR) status and HER2 oncogene status to help predict the likelihood of recurrence and response to treatment.

Table 2.13: Histological type of invasive breast cancer (N=21,616)

	Number	%
Invasive carcinoma of no specific type	18,986	87.8
Lobular	834	3.9
Mucinous (colloid)	731	3.4
Papillary	213	1.0
Tubular	147	0.7
Micropapillary	107	0.5
Mixed ductal and lobular	94	0.4
Metaplastic	86	0.4
Carcinoma with apocrine features	47	0.2
Adenoid cystic	22	0.1
Cribriform	11	0.1
Inflammatory	10	<0.1
Tubulo-lobular	7	<0.1
Secretory	4	<0.1
Squamous cell	3	<0.1
Paget's disease of nipple	3	<0.1
Acinic cell	1	<0.1
Borderline/malignant phyllodes	92	0.4
Sarcoma	3	<0.1
Others	133	0.6
Not known	82	0.4

A. Invasive breast cancer

2.28 As far as histological characteristics, grading, multifocality and multicentricity of invasive breast cancer in the patient cohort are concerned, 87.8% was invasive carcinoma of no specific type (Table 2.13), and 30.8% of the invasive tumours were of grade 3 (Table 2.14).

Table 2.14: Grading, multifocality and multicentricity of invasive breast cancer (N=21,616)

	Number	%
Grade		
Grade 1	3,709	17.2
Grade 2	8,576	39.7
Grade 3	6,656	30.8
Not known	2,675	12.4
Lymphovascular invasion	**5,278**	**24.4**
Multifocality	**2,202**	**10.2**
Number of foci		
2	1,215	55.2
3-4	391	17.8
5 or more	210	9.5
Not known	386	17.5
Multicentricity	**543**	**2.5**
Number of quadrants		
2	475	87.5
3	26	4.8
4	14	2.6
Not known	28	5.2

2.29 Of the patients with invasive breast cancer, almost all (97.9%) were tested for ER or PR status. Among them, 80.2% 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 hybridisation (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, 21.5% 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 2.15.

Table 2.15: Biological characteristics of invasive breast cancer (N=21,616)

	Number	%
Estrogen receptor (ER) [97.9% had the test]		
Positive	16,697	78.9
Negative	4,470	21.1
Progesterone receptor (PR) [97.7% had the test]		
Positive	14,101	66.8
Negative	7,015	33.2
c-erbB2/HER2 [97.0% had the test]		
Positive (IHC score 3)	3,960	18.9
Equivocal (IHC score 2) ISH positive	552	2.6
Equivocal (IHC score 2) ISH equivocal*	175	0.8
Equivocal (IHC score 2) ISH negative*	3,709	17.7
Equivocal (IHC score 2) ISH not done	2,064	9.8
Negative (IHC score 1)*	5,026	24.0
Negative (IHC score 0)	4,557	21.7
Negative (IHC score not known)	916	4.4
Ki-67 index [60.9% had the test]		
<14%	4,786	36.3
≥14%	8,383	63.7

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

2.30 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 2.15). 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 2.16. Overall, 67.4% of the invasive tumours were HR+ HER2-, 12.8% were HR+ HER2+, 8.7% were HR- HER2+ and 11.1% were TNBC.

Table 2.16: Biological subtypes of invasive tumours by cancer stage (N=20,194)

	Cancer stage, %				
	I (N=7,857)	IIA (N=5,695)	IIB (N=2,949)	III (N=3,159)	IV (N=534)
Luminal A	30.6	18.3	15.0	11.3	8.2
Luminal B (HER2 negative)	20.4	24.6	26.8	24.9	25.8
Luminal A/B (HER2 negative)	22.8	22.6	25.4	24.0	22.7
Luminal B (HER2 positive)	10.0	12.7	12.8	16.8	21.5
HER2 positive (HR negative)	7.3	8.4	7.8	12.0	13.1
TNBC	8.9	13.4	12.2	11.0	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

Note: These definitions apply to any subsequent tables and figures in this report that include subtype data.

2.31 In the past, patients with HR-positive breast cancer 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. Genomic tests, including Oncotype DX, MammaPrint, EndoPredict, and PAM50, can classify patients into groups based on genomic profiles that guide decision-making for chemotherapy.[50] Among the patients who had the Oncotype DX test, 80.8% were found with a Recurrence Score of 25 or below, indicating a low or moderate risk of recurrence.

B. In situ breast cancer

2.32 Ductal cancer was found to be the most common type of in situ breast cancer (94.6%). Table 2.17 shows the histological characteristics, grading, multifocality and multicentricity of in situ breast cancer in the patient cohort.

Table 2.17: Histological type, grading, multifocality and multicentricity of in situ breast cancer (N=3,450)

	Number	%
Histological type		
Ductal	3,262	94.6
Mixed	57	1.7
Papillary	45	1.3
Encapsulated papillary	19	0.6
Intracystic papillary	15	0.4
Apocrine	9	0.3
Neuroendocrine	4	0.1
Cribriform	1	<0.1
Micropapillary	1	<0.1
Others	26	0.8
Not known	11	0.3
Necrosis	**1,195**	**34.6**
Nuclear grade		
Low	911	26.4
Intermediate	1,186	34.4
High	1,159	33.6
Not known	194	5.6
Multifocality	**417**	**12.1**
Number of foci		
2	198	47.5
3	35	8.4
4 or more	22	5.3
Not known	162	38.8
Multicentricity	**64**	**1.9**
Number of quadrants		
2	55	85.9
3	3	4.7
Not known	6	9.4

2.33 Of the patients with in situ breast cancer, more than two-thirds (68.1%) were tested for ER or PR status. Among them, the majority (82.5%) were either ER or PR positive. In addition, 23.8% of in situ breast cancer patients were HER2 positive. Table 2.18 shows the biological characteristics of in situ breast cancer in the patient cohort.

Table 2.18: Biological characteristics of in situ breast cancer (N=3,450)

	Number	%
Estrogen receptor (ER) [68.1% had the test]		
Positive	1,917	81.6
Negative	432	18.4
Progesterone receptor (PR) [66.8% had the test]		
Positive	1,683	73.0
Negative	621	27.0
c-erbB2/HER2 [62.2% had the test]		
Positive (IHC score 3)	509	23.7
Equivocal (IHC score 2) ISH positive	2	0.1
Equivocal (IHC score 2) ISH equivocal	1	<0.1
Equivocal (IHC score 2) ISH negative	24	1.1
Equivocal (IHC score 2) ISH not done	680	31.7
Negative (IHC score 1)	520	24.2
Negative (IHC score 0)	370	17.2
Negative (IHC score not known)	41	1.9
Ki-67 index [46.0% had the test]		
<14%	1,012	63.7
≥14%	576	36.3

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

V. Treatment methods

2.34 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. In this section, patients with unstaged disease were excluded from analysis. Of the patients, 19.1% received care at private medical services, 46.3% received care at public medical services, and 34.5% received care at both private and public medical services.

2.35 Table 2.19 shows the multimodality treatment pattern of the patients. In general, the number of modalities increased with increasing cancer stage. In the cohort, the majority (90.4%) of patients with stage 0 disease received two or less treatments. On the other hand, 78.9% of the patients with stage IIA, 92.2% of those with stage IIB and 96.4% of those with stage III disease received three or more modalities.

Table 2.19: Number of treatment modalities by cancer stage (N=24,480)

	Cancer stage, %					
	0 (N=3,468)	I (N=8,156)	IIA (N=5,860)	IIB (N=3,036)	III (N=3,310)	IV (N=650)
0	0.1	0.0	0.0	0.1	<0.1	0.8
1	38.5	6.2	2.6	1.4	0.9	6.6
2	51.8	31.8	18.4	6.4	2.7	13.2
3	8.2	43.6	37.1	26.7	16.7	28.3
4	1.3	15.0	35.5	54.6	63.7	37.1
5	0.1	3.4	6.3	10.9	16.0	14.0

A. Surgical treatment

2.36 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 on a delayed basis.

2.37 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.

2.38 In the cohort, 54.7% of the patients had surgery at private medical facilities, while 45.3% had surgery at public medical facilities.

2.39 For patients with invasive breast cancer, nearly all (98.8%) underwent surgery as part of their treatment. Of the patients with invasive cancer, 62.8% had mastectomy, while 35.8% had breast-conserving surgery. Among the patients who had mastectomy, 12.7% had either immediate or delayed reconstruction. The most common type of reconstruction was TRAM flap (71.3%) (Table 2.20). Nearly all (98.1%) the patients with invasive breast cancer received nodal surgery and among them, 33.5% required AD alone, and 16.3% required AD after SNB.

2.40 For patients with in situ breast cancer, almost all (99.7%) underwent surgery (Table 2.20). Slightly more than half (54.2%) had breast-conserving surgery, while 45.3% had mastectomy. In addition, about one-third (35.6%) did not receive nodal surgery, and among those who received nodal surgery, 89.0% had SNB only.

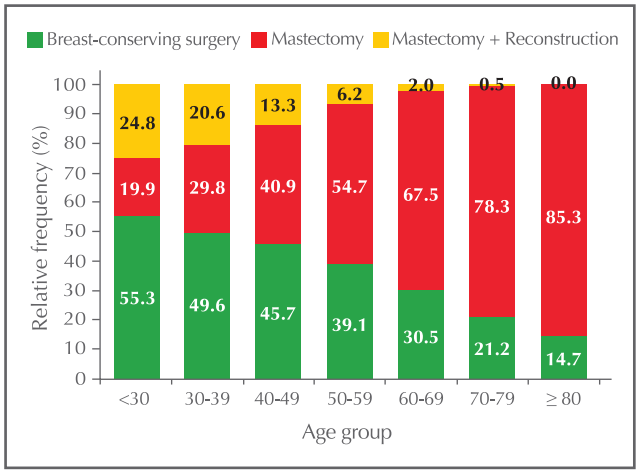
Table 2.20: Use of surgery for patients with invasive or in situ cancer

	Type of cancer, %	
	Invasive	**In situ**
Type of surgery (N=24,480)	**(N=21,012)**	**(N=3,468)**
No surgery	1.1	0.3
Breast-conserving surgery	35.8	54.2
Mastectomy	62.8	45.3
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=14,765)	**(N=13,194)**	**(N=1,571)**
Total mastectomy	92.8	85.6
Skin sparing	4.1	9.0
Areolar sparing	0.1	0.3
Nipple sparing	2.8	5.0
Type not known	0.2	0.1
Type of reconstruction (N=2,014)*	**(N=1,678)**	**(N=336)**
TRAM flap	71.3	62.2
Implant	15.2	28.3
LD flap	7.6	5.4
LD flap and implant	4.1	3.0
Type not known	1.8	1.2
Type of nodal surgery (N=22,842)	**(N=20,609)**	**(N=2,233)**
Sentinel node biopsy alone	49.6	89.0
Sentinel node biopsy followed by axillary dissection	16.3	2.1
Axillary dissection alone	33.5	8.2
Type not known	0.7	0.6

* Only included patients who had reconstruction after mastectomy

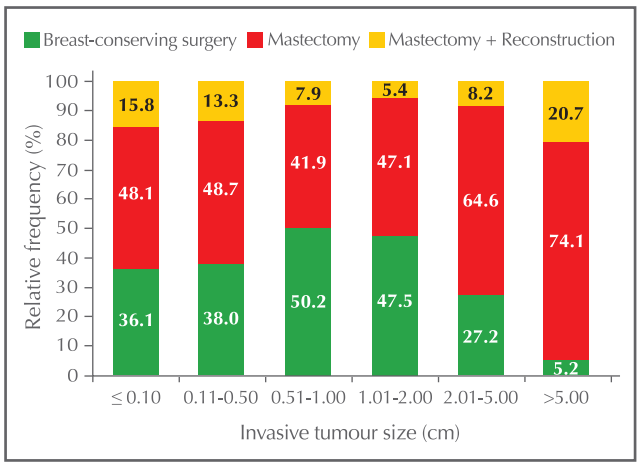
2.41 The percentage of patients who underwent mastectomy was positively correlated with increasing age, while the percentage of patients who underwent mastectomy with reconstruction was negatively correlated with increasing age (Figure 2.13).

Figure 2.13: Type of breast surgery by age group (N=23,507)



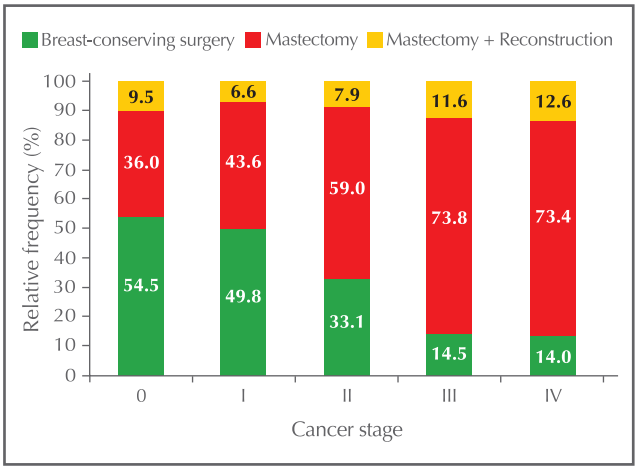
2.42 For patients with tumours larger than 0.5 cm in size, the proportion of patients who had breast-conserving surgery was negatively correlated with increasing tumour size (Figure 2.14).

Figure 2.14: Type of breast surgery by invasive tumour size (cm) (N=19,033)



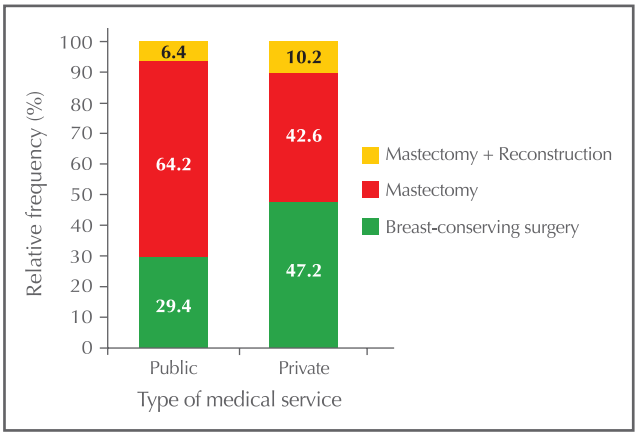
2.43 The proportion of patients who received breast-conserving surgery was negatively correlated with increasing cancer stage. The proportion of those who received mastectomy with reconstruction did not show any correlation with increasing cancer stage (Figure 2.15).

Figure 2.15: Type of breast surgery by cancer stage (N=24,167)



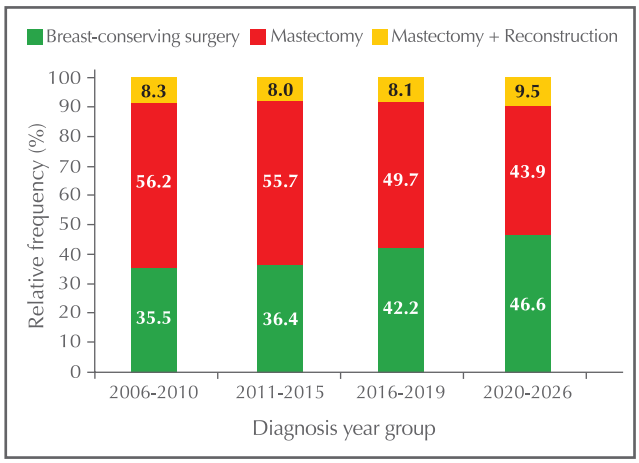
2.44 A higher proportion (47.2%) of patients who had surgery at private medical facilities underwent breast-conserving surgery than those who had surgery at public medical facilities (29.4%) (Figure 2.16).

Figure 2.16: Type of breast surgery by type of medical service (N=23,368)



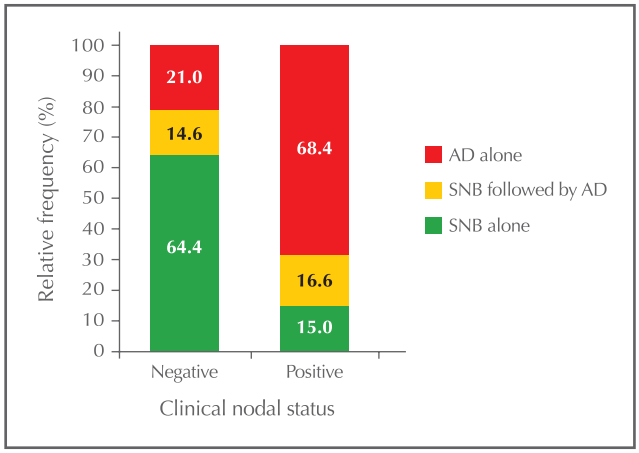
2.45 Across the diagnosis year groups, the use of breast-conserving surgery increased from 35.5% in 2006-2010 to 46.6% in 2020-2026, whereas the use of mastectomy decreased correspondingly from 56.2% to 43.9%. The proportion of patients who received mastectomy and reconstruction remained relatively stable at around 8% over time (Figure 2.17).

Figure 2.17: Type of breast surgery by diagnosis year group (N=24,167)



2.46 SNB alone was more commonly performed on patients with negative clinical nodal status (64.4%) than those with positive clinical nodal status (15.0%). On the other hand, AD alone was more commonly performed on patients with positive clinical nodal status (68.4%) than those with negative clinical nodal status (21.0%). Figure 2.18 shows the type of nodal surgery received by patients with positive or negative clinical nodal status in the patient cohort.

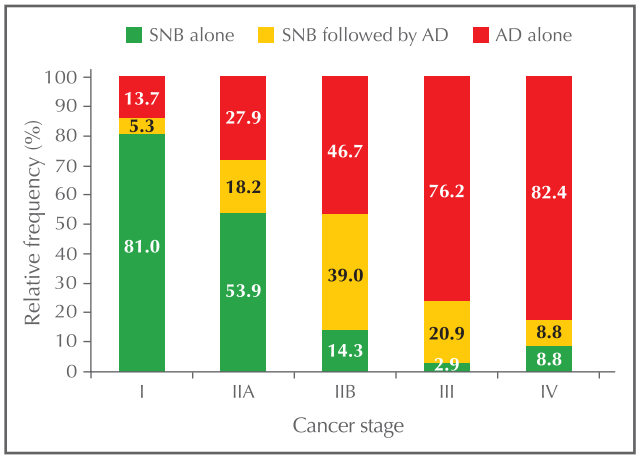
Figure 2.18: Type of nodal surgery by clinical nodal status (N=22,689)



SNB: sentinel node biopsy; AD: axillary dissection

2.47 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 2.19).

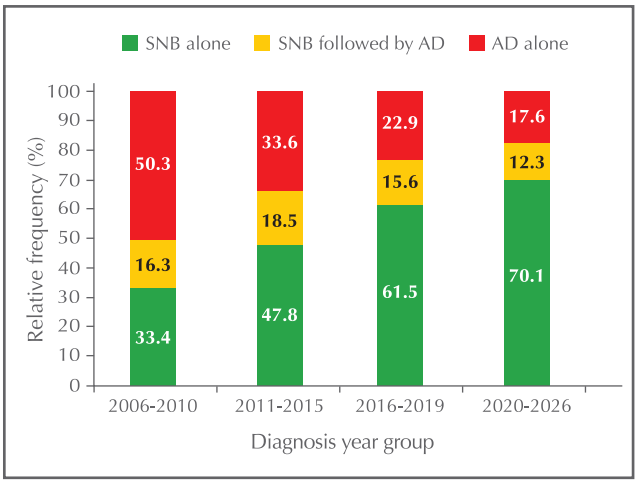
Figure 2.19: Type of nodal surgery for invasive cancer by cancer stage (N=20,474)



SNB: sentinel node biopsy; AD: axillary dissection

2.48 Across the diagnosis year groups, the use of SNB alone increased significantly from 33.4% in 2006-2010 to 70.1% in 2020-2026, while the use of AD alone declined from 50.3% to 17.6% (Figure 2.20).

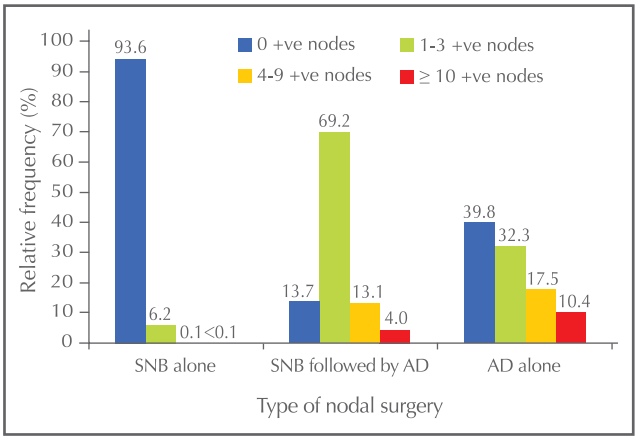
Figure 2.20: Type of nodal surgery for invasive cancer by diagnosis year group (N=20,474)



SNB: sentinel node biopsy; AD: axillary dissection

2.49 Of the patients with invasive cancer, 93.6% who underwent only SNB had no positive lymph nodes, while 39.8% who underwent only AD and 13.7% who underwent AD after SNB had no positive lymph nodes (Figure 2.21).

Figure 2.21: Number of positive nodes by type of nodal surgery (N=20,366)



SNB: sentinel node biopsy; AD: axillary dissection

B. Radiotherapy

2.50 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

2.51 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.

2.52 In the patient cohort, 64.0% of the patients had radiotherapy as part of their treatment, with almost all (99.8%) being adjuvant. The majority (82.7%) of the patients were treated with radiotherapy at public medical facilities, while the remainder had radiotherapy at private medical facilities.

2.53 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 2.22 and 2.23 respectively. The majority (over 95%) of the invasive breast cancer patients who underwent breast-conserving surgery also received radiotherapy (Figure 2.22). 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 2.23).

2.54 Of the patients with in situ cancer who had breast-conserving surgery, 92.5% received radiotherapy afterwards (Figure 2.22), while only 3.9% of the patients with in situ cancer who had mastectomy underwent radiotherapy (Figure 2.23).

Figure 2.22: Use of radiotherapy among patients who underwent breast-conserving surgery by cancer stage (N=9,340)

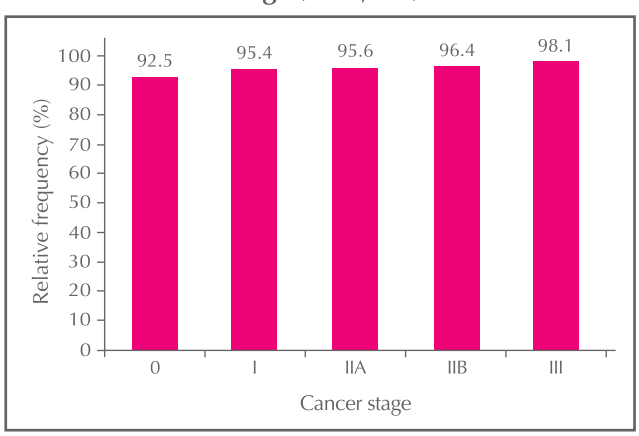
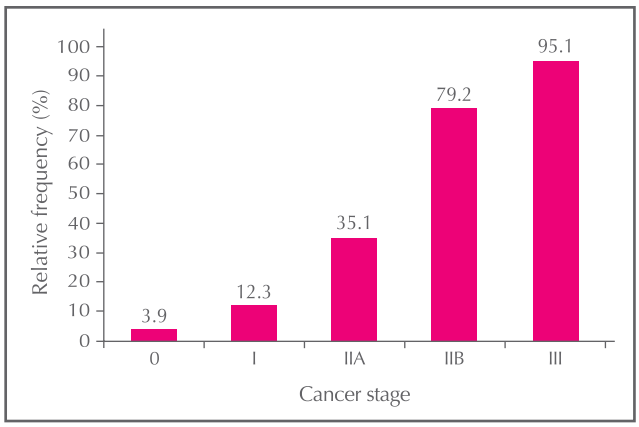


Figure 2.23: Use of radiotherapy among patients who underwent mastectomy by cancer stage (N=14,384)



2.55 Across the diagnosis year groups, the use of radiotherapy among patients who underwent breast-conserving surgery remained consistently high at about 95% (Figure 2.24). Among patients who underwent mastectomy, the use of radiotherapy was also generally stable over time (Figure 2.25).

Figure 2.24: Use of radiotherapy among patients with breast-conserving surgery by diagnosis year group (N=9,340)

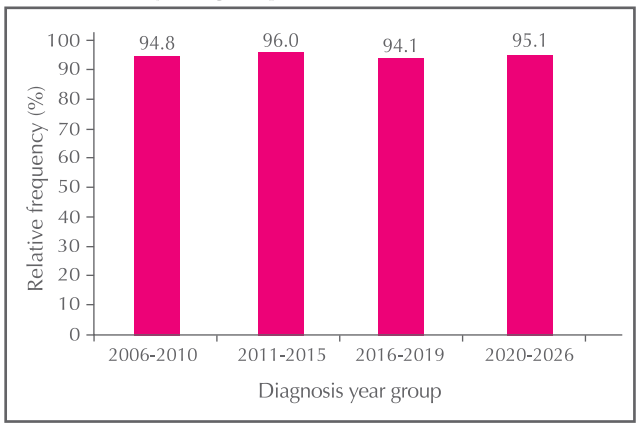
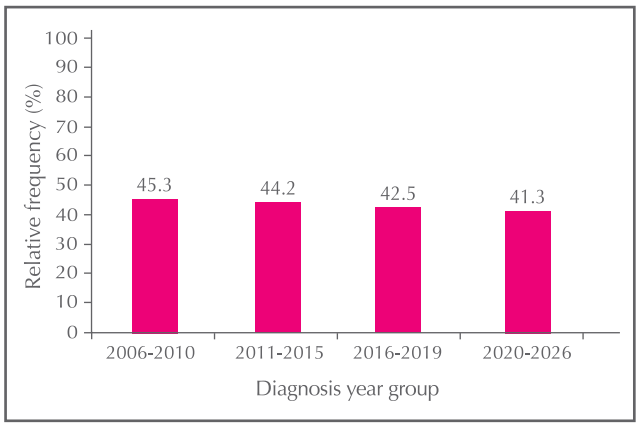


Figure 2.25: Use of radiotherapy among patients with mastectomy by diagnosis year group (N=14,384)



2.56 Radiotherapy for breast cancer involves localised irradiation of regions such as breast and chest wall, with or without regional nodes. Table 2.21 shows the irradiated regions of adjuvant locoregional radiotherapy among the patients who received radiotherapy by the type of surgery they underwent.

Table 2.21: Coverage of regional lymph nodes by adjuvant locoregional radiotherapy (N=9,017)

	Number	%
Breast-conserving surgery (N=4,993)		
Breast alone	4,266	85.4
Breast and regional lymph nodes	727	14.6
Mastectomy (N=4,024)		
Chest wall alone	985	24.5
Chest wall and regional lymph nodes	3,039	75.5

ii. Palliative radiotherapy

2.57 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, 64.2% underwent palliative radiotherapy to various sites.

C. Chemotherapy

2.58 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.

2.59 Of the patients with invasive cancer, 64.3% underwent chemotherapy. Of these patients, 83.0% had adjuvant chemotherapy, 13.0% had neoadjuvant chemotherapy, and 4.0% had palliative chemotherapy. The majority (82.6%) of the patients received chemotherapy in public medical facilities, and the remainder in private medical facilities.

2.60 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 (83.7%) of the patients with stage IV cancer underwent palliative chemotherapy (Figure 2.26). For all cancer stages, the use of chemotherapy among patients aged 70 or above was much lower than that among patients aged below 70. Table 2.22 shows the percentage of patients who received chemotherapy in the same age group and cancer stage.

2.61 Biological subtypes also had implications for chemotherapy use. Slightly more than one-third of patients with luminal A subtype received chemotherapy, while about 85% of TNBC patients did so (Figure 2.27).

Figure 2.26: Use of chemotherapy by cancer stage (N=20,960)

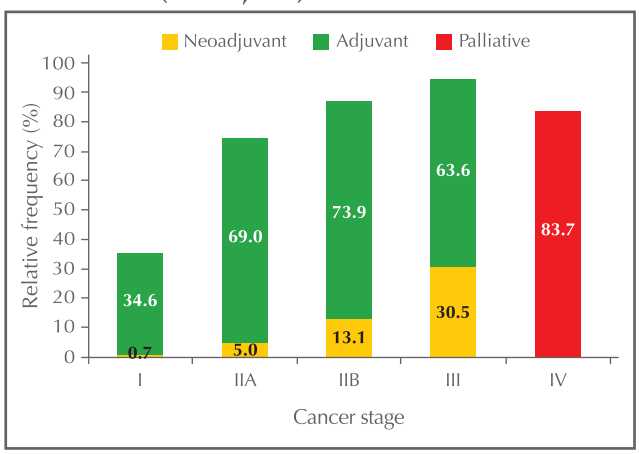
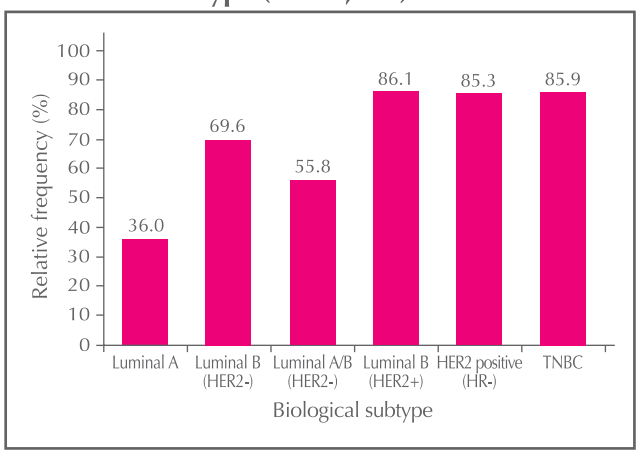


Figure 2.27: Use of chemotherapy by biological subtype (N=20,194)



Note: See Table 2.16 for subtype definitions.

Table 2.22: Use of chemotherapy by age group and cancer stage at diagnosis (N=20,368)

	Cancer stage, Number (% of patients in the same age group and cancer stage)									
	I		IIA		IIB		III		IV	
<30	25	(58.1)	28	(90.3)	19	(100.0)	19	(100.0)	4	(100.0)
30-39	317	(54.2)	431	(88.9)	237	(97.9)	255	(99.2)	41	(82.0)
40-49	1,014	(41.5)	1,363	(85.4)	831	(94.9)	969	(99.1)	180	(91.4)
50-59	971	(38.0)	1,527	(82.6)	910	(92.5)	1,057	(97.9)	191	(86.0)
60-69	421	(25.9)	791	(64.8)	528	(85.0)	610	(94.4)	86	(83.5)
≥70	44	(6.7)	69	(13.7)	50	(23.6)	95	(44.6)	23	(46.9)

2.62 The use of chemotherapy declined from 71.3% in 2006-2010 to 51.4% in 2020-2026 (Figure 2.28). Further stratified by stage and by subtype, decreasing rates were also observed in patients with early-stage disease (Table 2.23) as well as those with HR+ HER2- subtype (Table 2.24).

Figure 2.28: Use of chemotherapy by diagnosis year group (N=20,960)

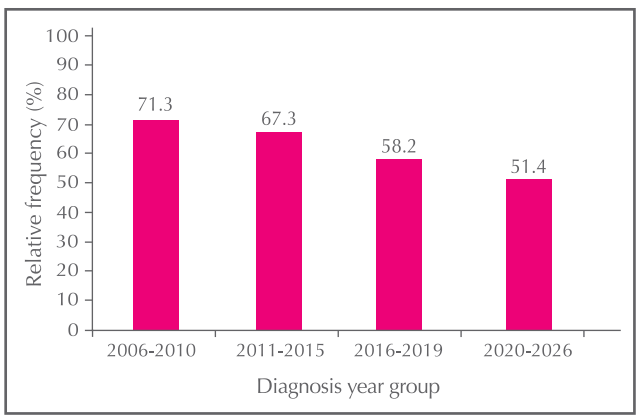


Table 2.23: Use of chemotherapy by cancer stage across diagnosis year groups (N=20,960)

	Diagnosis year group, Number (% of patients in the same cancer stage and diagnosis year group)							
	2006-2010		2011-2015		2016-2019		2020-2026	
Stage I	933	(42.9)	1,054	(37.1)	523	(29.6)	371	(27.0)
Stage IIA	1,473	(82.8)	1,619	(77.5)	802	(65.0)	430	(57.5)
Stage IIB	775	(91.5)	1,006	(89.3)	519	(83.6)	335	(77.4)
Stage III	903	(94.6)	1,210	(93.9)	620	(93.2)	352	(94.9)
Stage IV	131	(85.1)	239	(88.5)	121	(77.6)	53	(75.7)

Table 2.24: Use of chemotherapy by biological subtype across diagnosis year groups (N=20,194)

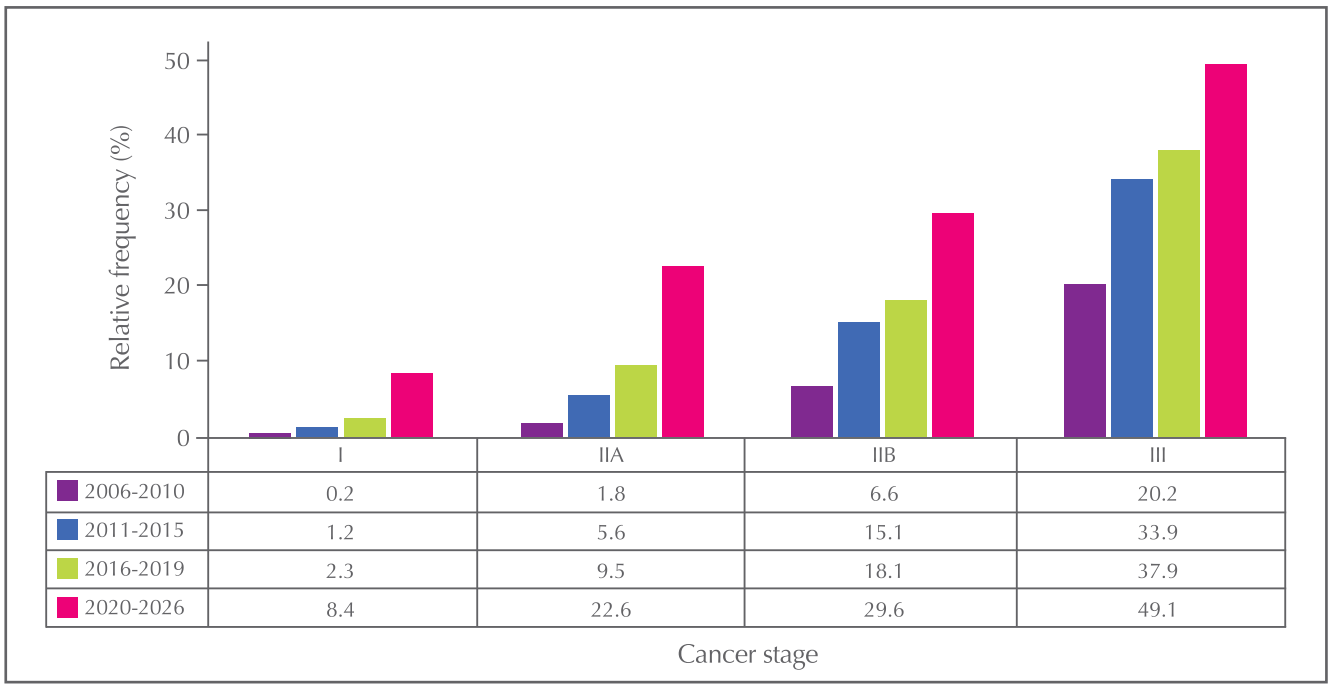
	Diagnosis year group, Number (% of patients in the same biological subtype and diagnosis year group)							
	2006-2010		2011-2015		2016-2019		2020-2026	
Luminal A	604	(52.6)	517	(39.4)	238	(25.3)	188	(20.9)
Luminal B (HER2 negative)	753	(82.8)	1,130	(76.1)	849	(63.3)	546	(56.0)
Luminal A/B (HER2 negative)	955	(61.2)	1,144	(55.9)	381	(49.4)	145	(44.1)
Luminal B (HER2 positive)	731	(81.9)	792	(87.5)	412	(89.8)	238	(88.1)
HER2 positive (HR negative)	436	(84.2)	614	(87.3)	267	(85.0)	160	(80.8)
TNBC	582	(88.9)	737	(85.0)	339	(83.5)	249	(85.6)

Note: See Table 2.16 for subtype definitions.

i. Neoadjuvant chemotherapy

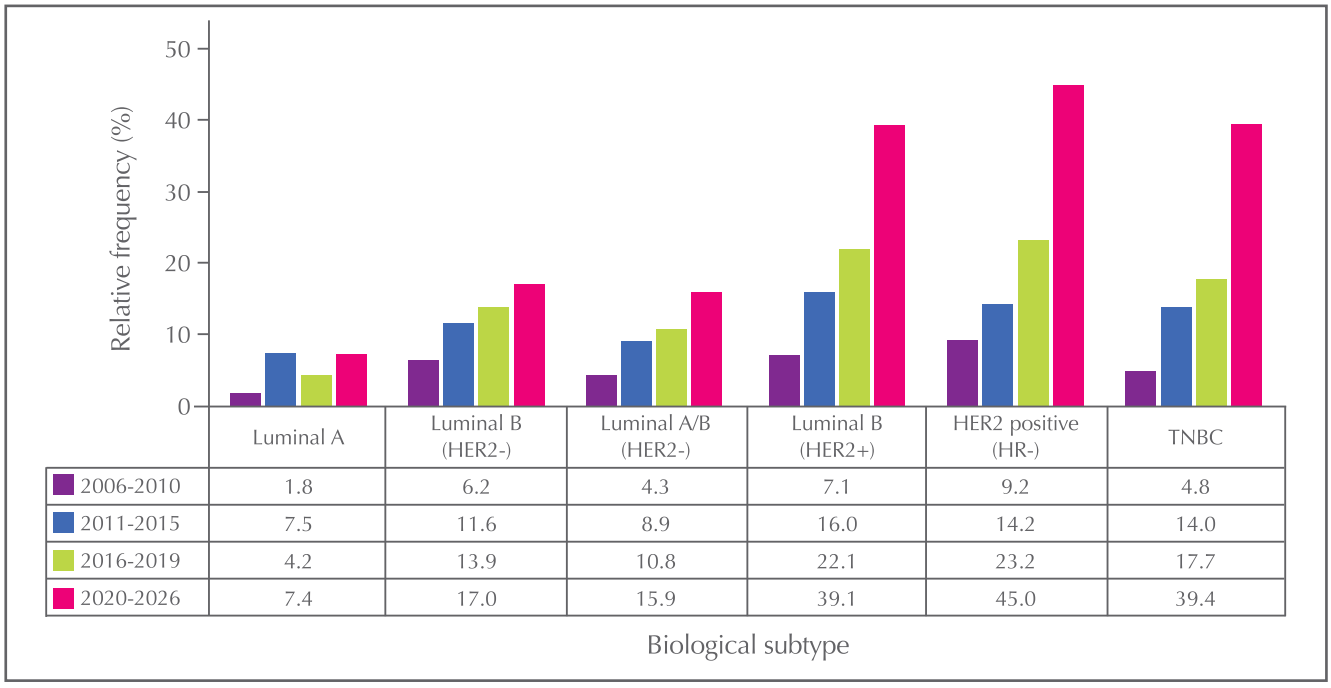
2.63 Of the 13,469 patients who underwent chemotherapy, 13.0% received it as neoadjuvant treatment. The use of neoadjuvant chemotherapy increased substantially with advancing cancer stage (Figure 2.26). Among those who received chemotherapy, the rate of neoadjuvant treatment also increased with both stage and period of diagnosis (Figure 2.29). A notable increase was observed in the 2020-2026 diagnosis year group for patients with HER2-positive disease or TNBC (Figure 2.30).

Figure 2.29: Use of neoadjuvant chemotherapy by cancer stage across diagnosis year groups (N=13,469)



	I	IIA	IIB	III
2006-2010	0.2	1.8	6.6	20.2
2011-2015	1.2	5.6	15.1	33.9
2016-2019	2.3	9.5	18.1	37.9
2020-2026	8.4	22.6	29.6	49.1

Figure 2.30: Use of neoadjuvant chemotherapy by biological subtype across diagnosis year groups (N=13,007)

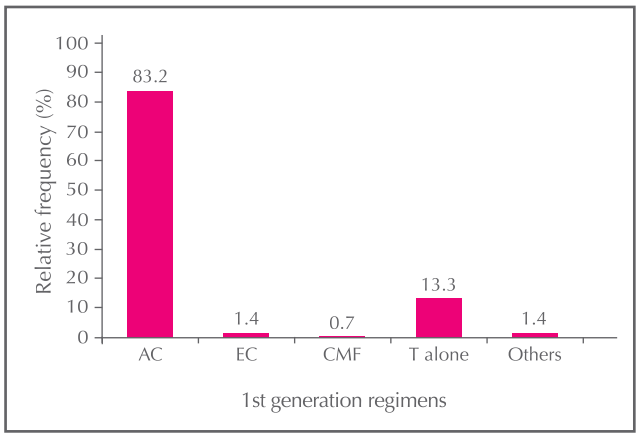


	Luminal A	Luminal B (HER2-)	Luminal A/B (HER2-)	Luminal B (HER2+)	HER2 positive (HR-)	TNBC
2006-2010	1.8	6.2	4.3	7.1	9.2	4.8
2011-2015	7.5	11.6	8.9	16.0	14.2	14.0
2016-2019	4.2	13.9	10.8	22.1	23.2	17.7
2020-2026	7.4	17.0	15.9	39.1	45.0	39.4

Note: See Table 2.16 for subtype definitions.

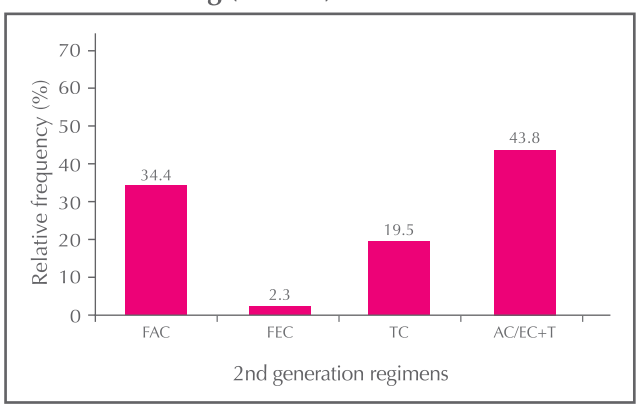
2.64 Figures 2.31, 2.32 and 2.33 show the use of chemotherapy regimens of the three generations in neoadjuvant setting among patients in the cohort. The use of HER2 regimens is shown in Figure 2.34. The types of chemotherapy regimens used by patients with different biological subtype in the cohort are shown in Figure 2.35.

Figure 2.31: Type of first generation chemotherapy regimens (non-HER2) used in neoadjuvant setting (N=143)



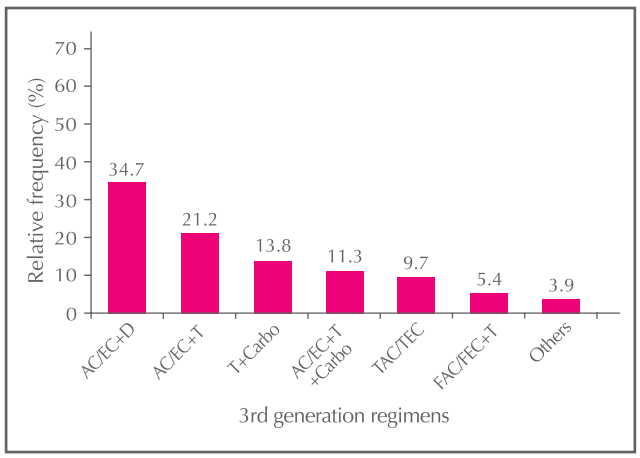
A: Doxorubicin; C: Cyclophosphamide; E: Epirubicin; M: Methotrexate; F: 5FU; T: Taxane

Figure 2.32: Type of second generation chemotherapy regimens (non-HER2) used in neoadjuvant setting (N=128)



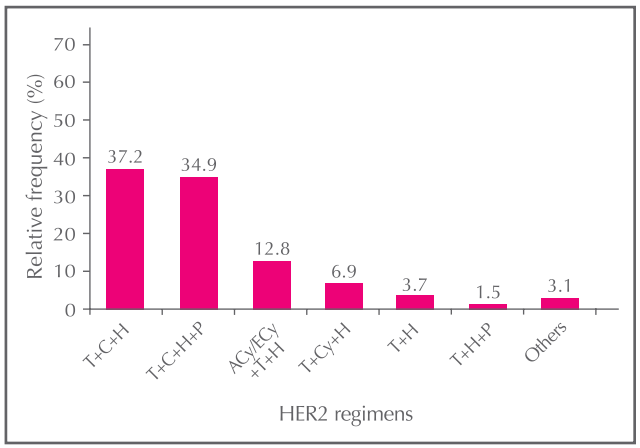
F: 5FU; A: Doxorubicin; C: Cyclophosphamide; E: Epirubicin; T: Taxane

Figure 2.33: Type of third generation chemotherapy regimens (non-HER2) used in neoadjuvant setting (N=698)



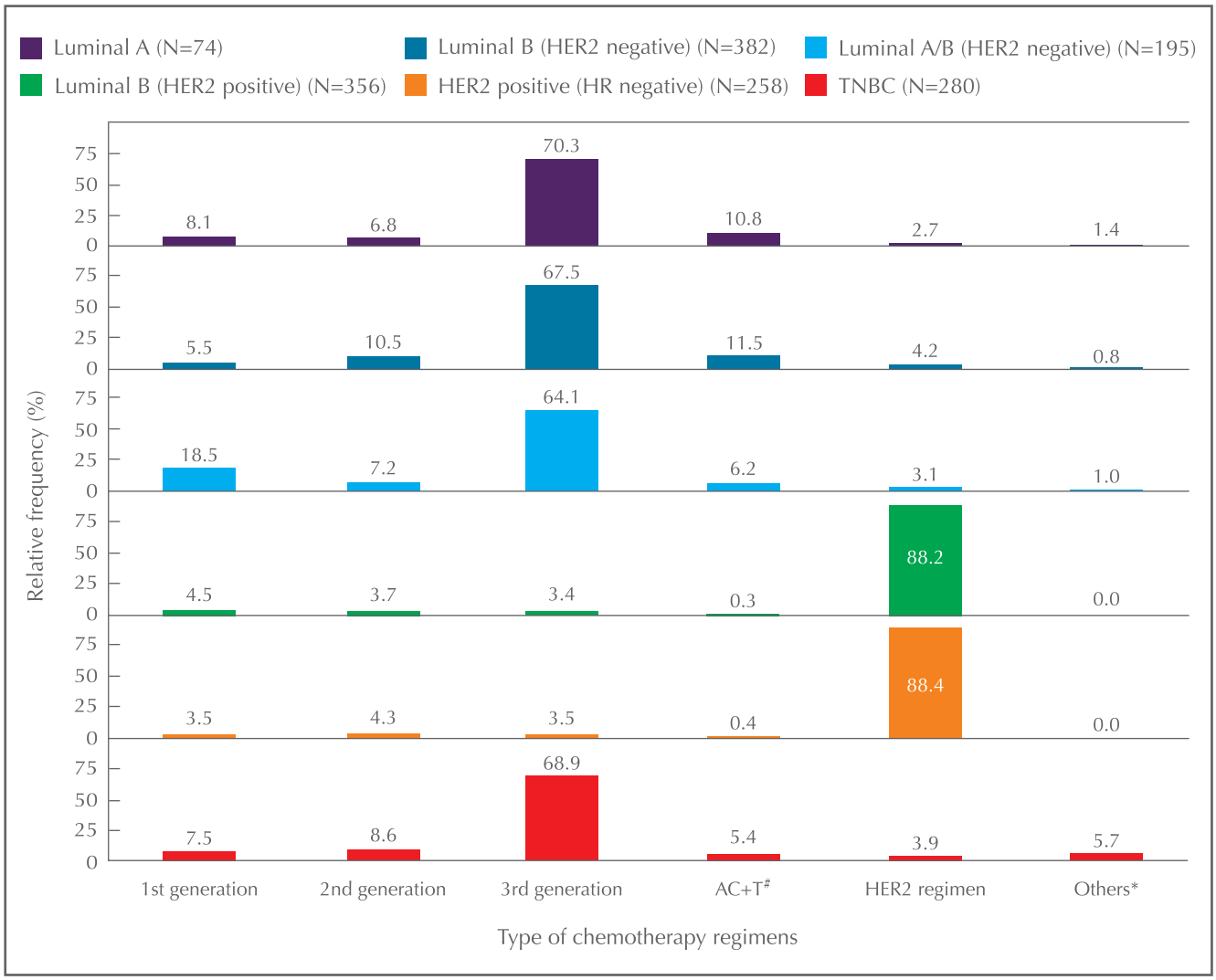
A: Doxorubicin; E: Epirubicin; C: Cyclophosphamide; D: Docetaxel; T: Taxane; Carbo: Carboplatin; F: 5FU

Figure 2.34: Type of HER2 regimens used in neoadjuvant setting (N=619)



T: Taxane; C: Carboplatin; H: Trastuzumab; P: Pertuzumab; A: Doxorubicin; E: Epirubicin; Cy: Cyclophosphamide

Figure 2.35: Type of chemotherapy regimens used by biological subtype in neoadjuvant setting (N=1,545)

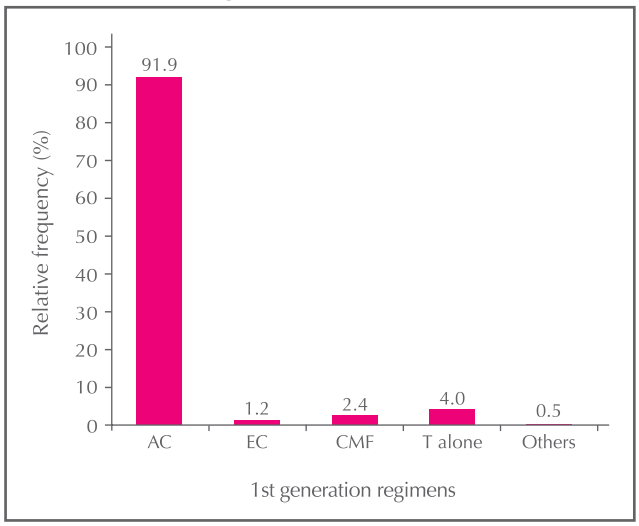


AC+T: uncertain 2nd/3rd generation due to uncertain week intervals
* Others included any non-HER2 regimens containing Capecitabine, Gemcitabine, or Vinorelbine
Note: See Table 2.16 for subtype definitions.

ii. Adjuvant chemotherapy

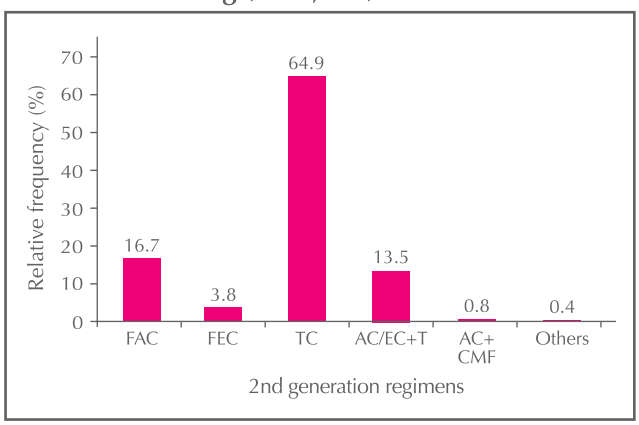
2.65 Of the 13,469 patients who underwent chemotherapy, 83.0% received it as adjuvant (stages I-III) treatment. Figures 2.36, 2.37 and 2.38 show the use of chemotherapy regimens of three generations in adjuvant setting among patients in the cohort. The use of HER2 regimens in adjuvant chemotherapy is shown in Figure 2.39. Figures 2.40 and 2.41 show the relative frequency for different types of regimens used by biological subtype and cancer stage, respectively.

Figure 2.36: Type of first generation chemotherapy regimens (non-HER2) used in adjuvant setting (N=1,489)



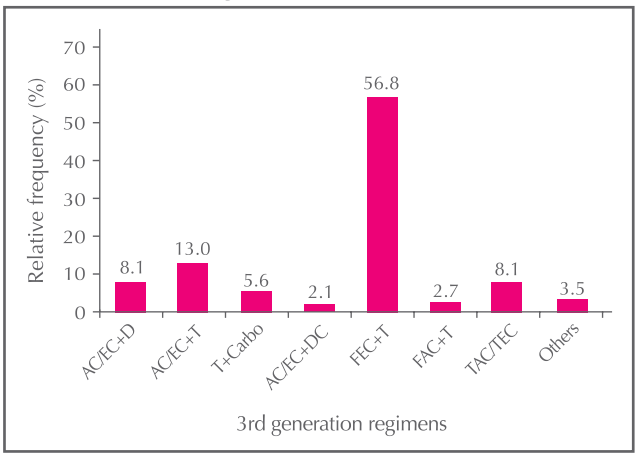
A: Doxorubicin; C: Cyclophosphamide; E: Epirubicin; M: Methotrexate; F: 5FU; T: Taxane

Figure 2.37: Type of second generation chemotherapy regimens (non-HER2) used in adjuvant setting (N=2,683)



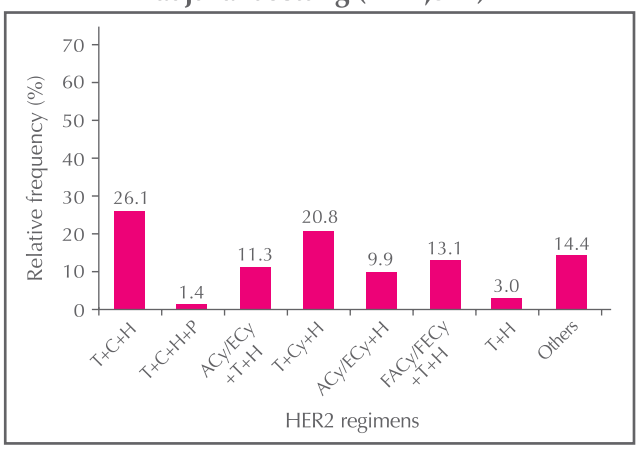
F: 5FU; A: Doxorubicin; C: Cyclophosphamide; E: Epirubicin; T: Taxane; M: Methotrexate

Figure 2.38: Type of third generation chemotherapy regimens (non-HER2) used in adjuvant setting (N=2,840)



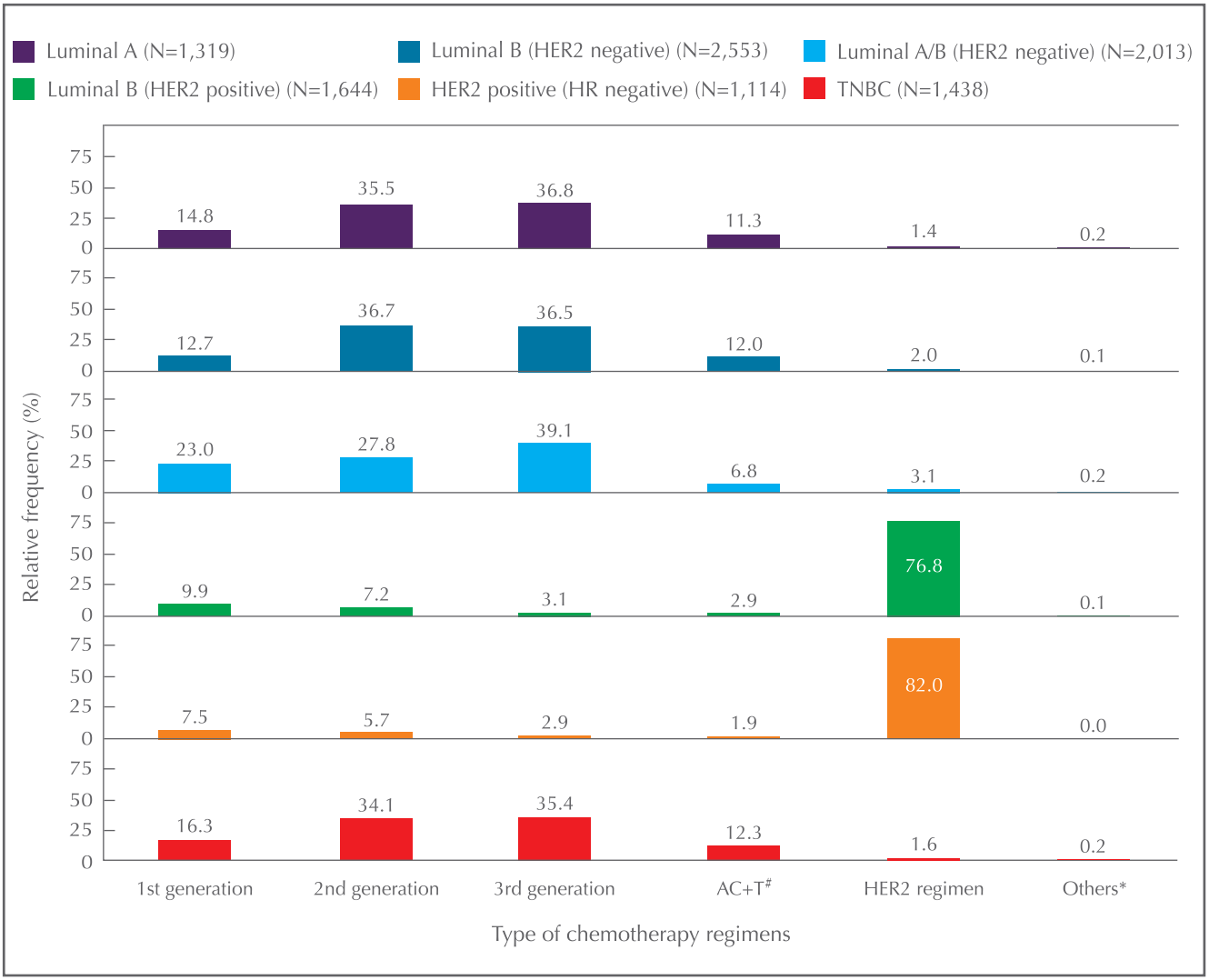
A: Doxorubicin; E: Epirubicin; C: Cyclophosphamide; D: Docetaxel; T: Taxane; Carbo: Carboplatin; F: 5FU

Figure 2.39: Type of HER2 regimens used in adjuvant setting (N=2,371)



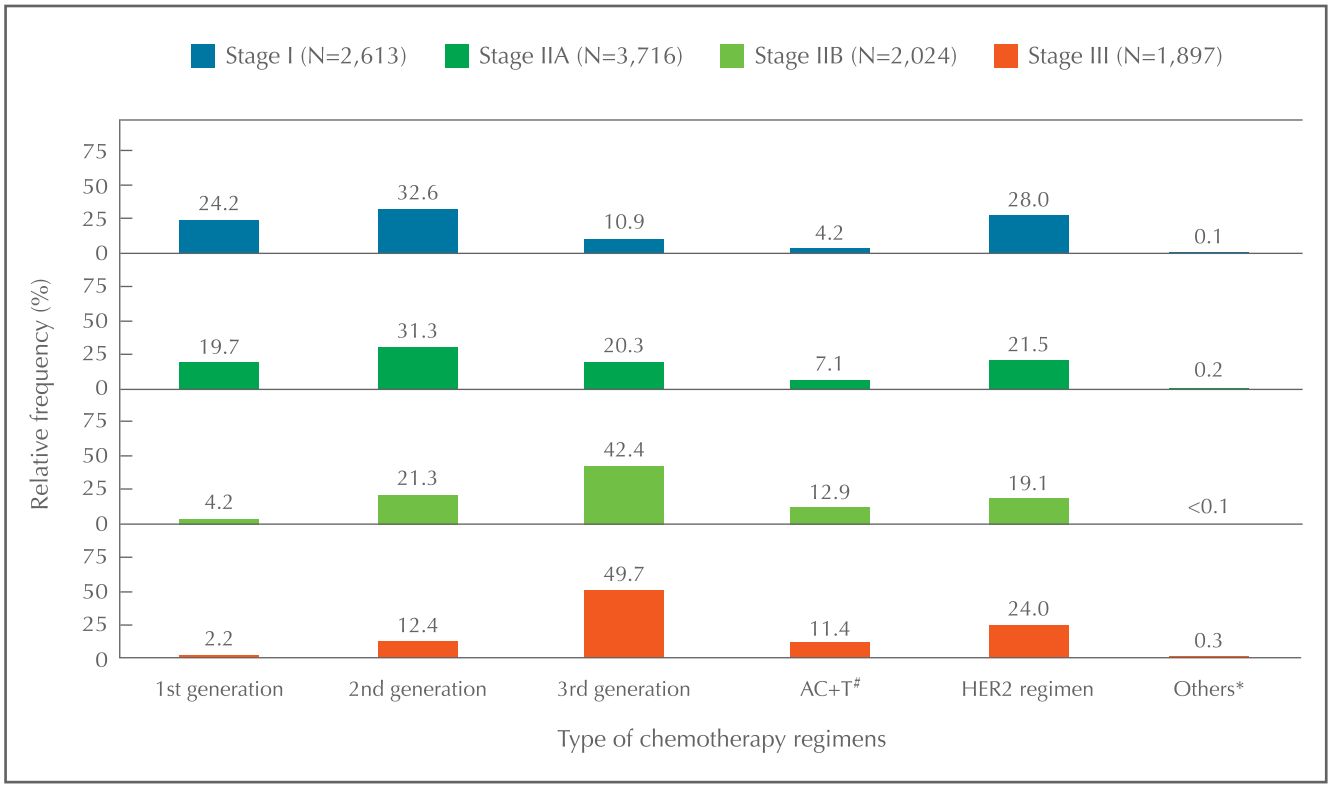
T: Taxane; C: Carboplatin; H: Trastuzumab; P: Pertuzumab; A: Doxorubicin; E: Epirubicin; Cy: Cyclophosphamide; F: 5FU

Figure 2.40: Type of chemotherapy regimens used by biological subtype in adjuvant setting (N=10,081)



AC+T: uncertain 2nd/3rd generation due to uncertain week intervals
* Others included any non-HER2 regimens containing Capecitabine, Gemcitabine, or Vinorelbine
Note: See Table 2.16 for subtype definitions.

Figure 2.41: Type of chemotherapy regimens used by cancer stage in adjuvant setting (N=10,250)

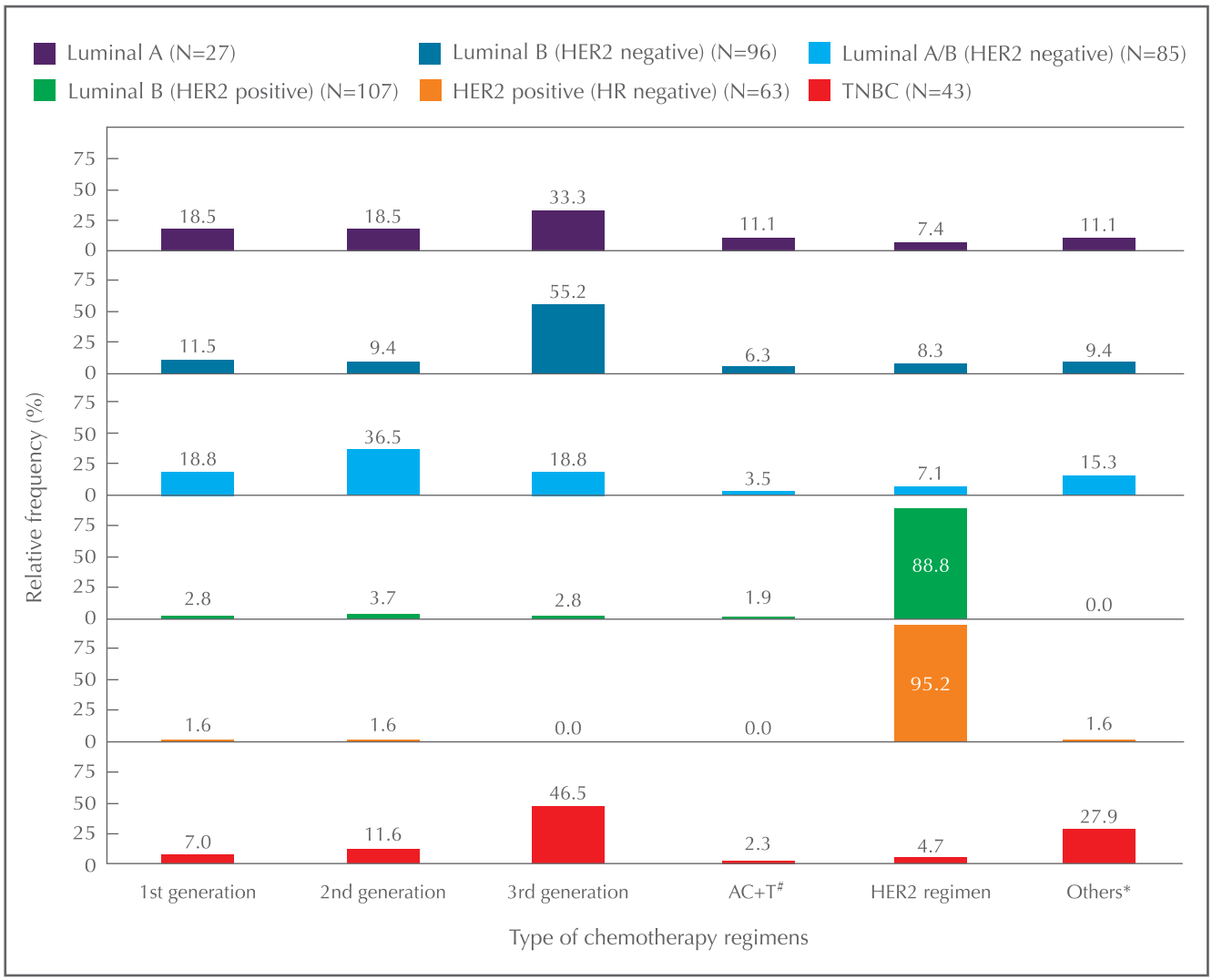


AC+T: uncertain 2nd/3rd generation due to uncertain week intervals
* Others included any non-HER2 regimens containing Capecitabine, Gemcitabine, or Vinorelbine

iii. Palliative chemotherapy

2.66 Of the 13,469 patients who underwent chemotherapy, 4.0% received it as palliative (stage IV) treatment. Figure 2.42 shows the relative frequency for different types of regimens used by biological subtype.

Figure 2.42: Type of chemotherapy regimens used by biological subtype in palliative setting (N=421)



AC+T: uncertain 2nd/3rd generation due to uncertain week intervals
* Others included any non-HER2 regimens containing Capecitabine, Gemcitabine, or Vinorelbine
Note: See Table 2.16 for subtype definitions.

D. Endocrine therapy

2.67 Endocrine therapy plays an important role in all stages of the treatment and prevention strategy for HR-positive breast cancer. Breast cancer develops from abnormal breast cells that are often sensitive to sex hormones, such as estrogen and progesterone. Endocrine therapy drugs inhibit tumour cell growth by different mechanisms on the hormonal pathways.

2.68 In the cohort, 87.3% of the HR-positive patients were treated with endocrine therapy. Among them, the majority (97.4%) were adjuvant, while neoadjuvant (0.9%) and palliative (1.7%) accounted for small proportions. In addition, the majority (86.4%) of the patients received endocrine therapy at public medical facilities, while the remainder received at private medical facilities.

2.69 For patients with invasive breast cancer, 95.5% received endocrine therapy, while for patients with in situ breast cancer, only 17.4% received endocrine therapy (Figure 2.43). The use of endocrine therapy remained at about 85% across the diagnosis year groups (Figure 2.44).

2.70 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 decrease the level of estrogen in the body. Aromatase inhibitors, including anastrozole, letrozole and exemestane, are only effective for women who are postmenopausal. Figure 2.45 shows the use of tamoxifen and aromatase inhibitors by age group in the patient cohort.

Figure 2.43: Use of endocrine therapy by cancer stage (N=18,323)

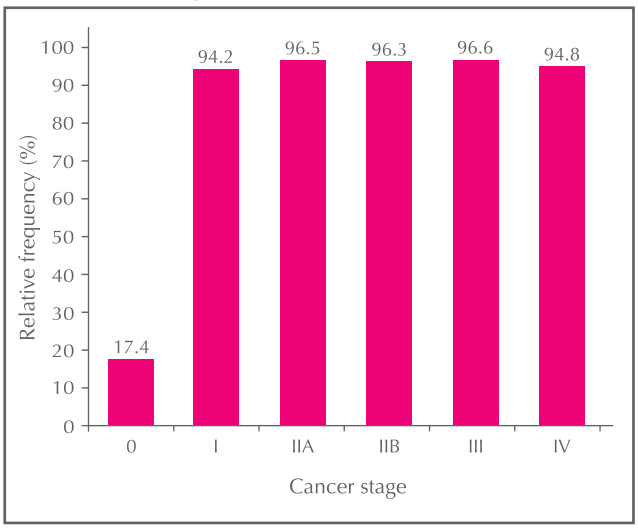


Figure 2.44: Use of endocrine therapy by diagnosis year group (N=18,323)

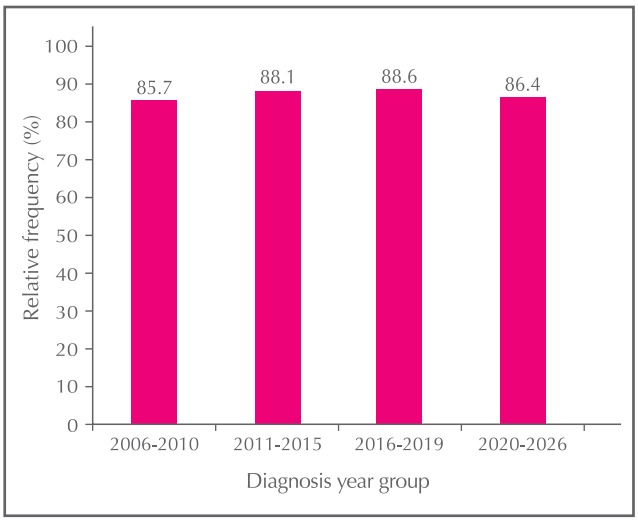
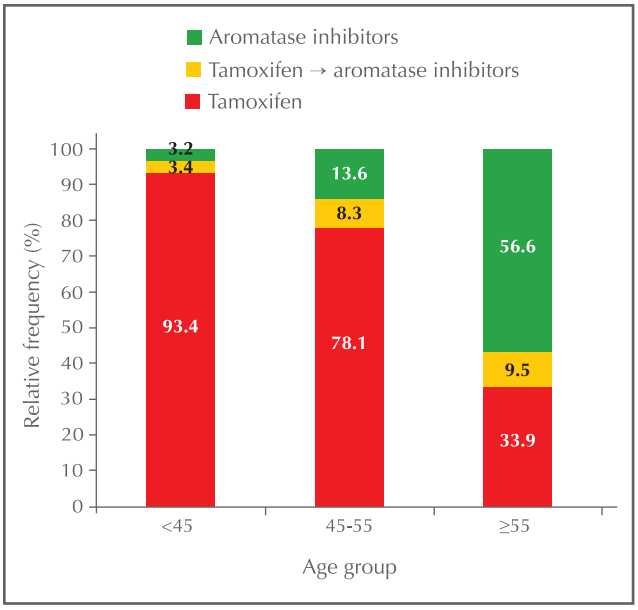


Figure 2.45: Forms of endocrine therapy by age group (N=14,587)



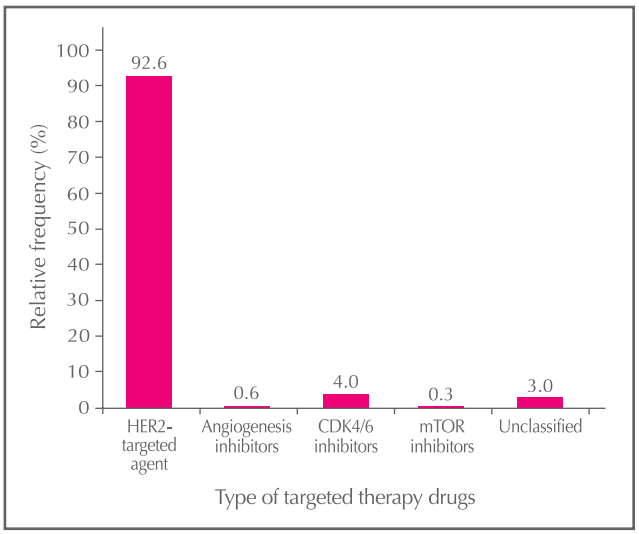
E. Targeted therapy

2.71 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. For example, anti-HER2 targeted therapy is used for treating patients with invasive breast cancer cells that over-express HER2 oncogene (HER2-positive breast cancer).

2.72 In the patient cohort, 14.6% received targeted therapy, particularly HER2-targeted agents (92.6%) followed by CDK4/6 inhibitors (4.0%) (Figure 2.46). Of the patients with invasive HER2-positive breast cancer, 69.9% underwent anti-HER2 targeted therapy. Among them, 76.6% were adjuvant, 18.0% were neoadjuvant and 5.3% were palliative. In addition, the majority (83.6%) of the patients received anti-HER2 targeted therapy at public medical facilities, and the remainder at private medical facilities.

2.73 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 2.47). The use of anti-HER2 targeted therapy in HER2-positive patients also increased markedly from 45.0% in 2006-2010 to 85.1% in 2020-2026 (Figure 2.48).

Figure 2.46: Type of targeted therapy drugs used (N=3,569)



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 2.47: Use of anti-HER2 targeted therapy in HER2-positive patients by cancer stage (N=4,262)

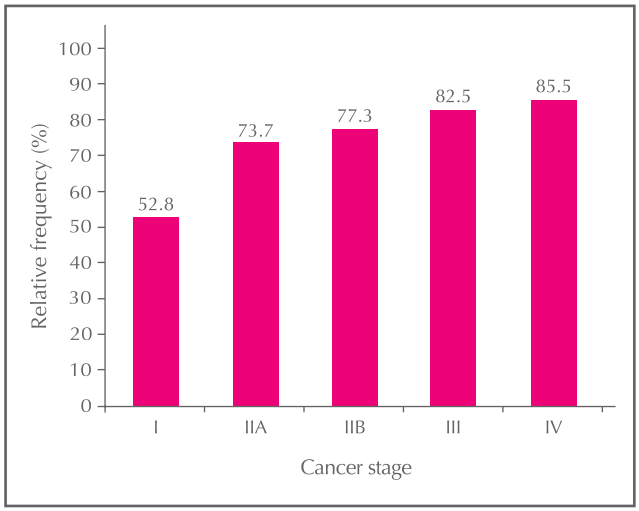
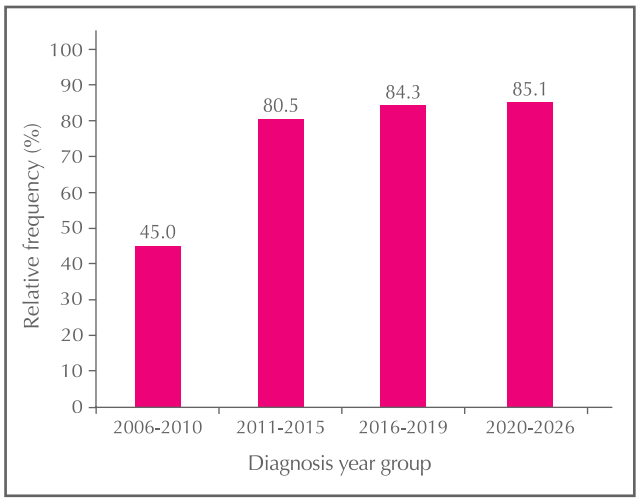


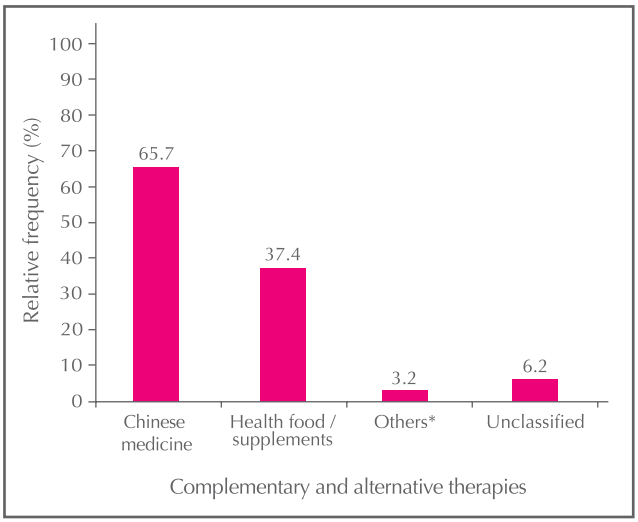
Figure 2.48: Use of anti-HER2 targeted therapy in HER2-positive patients by diagnosis year group (N=4,262)



F. Complementary and alternative therapies

2.74 Apart from the standard medical treatments and care of breast cancer described above, patients may seek different kinds of complementary and alternative therapies, such as taking traditional Chinese medicines, health foods and supplements. A total of 7,700 (31.5%) 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 2.49).

Figure 2.49: Type of complementary and alternative therapies used (N=7,700)



* 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

2.75 Once treatment is completed, the HKBCR will follow up with the registered patients annually to ascertain the efficacy of the treatment. As of June 2026, a total of 22,768 patients completed at least one follow-up, with 52.2% having a follow-up duration of five or more years (Table 2.25). The mean and median follow-up period were 6.3 and 5.3 years respectively. Of the surviving patients, 21.3% had their last follow-up within the past two years.

2.76 Of the patients who have been followed up, 2.3% experienced only locoregional recurrence (LRR), 2.9% experienced only distant recurrence (DR), and 2.0% experienced both LRR and DR concurrently or sequentially. The mean and median time to recurrence are shown in Table 2.26.

Table 2.25: Follow-up of patients (N=22,768)

	Number	%
Follow-up period		
<1 year	2,353	10.3
1-2 years	2,558	11.2
2-5 years	5,931	26.0
5-10 years	6,224	27.3
≥10 years	5,658	24.9
Not known	44	0.2
Mean (95% CI)	6.3 years (6.27-6.39)	
Median (95% CI)	5.3 years (5.20-5.40)	
Mortality		
No. of deaths from breast cancer	1,780	7.8
No. of deaths from unrelated causes	1,123	4.9
No. of deaths with causes not known	161	0.7

CI: confidence interval

Table 2.26: Recurrence pattern of patients (N=21,995)

	Number	%
Locoregional recurrence only		
No. of patients	503	2.3
Mean time (95% CI)	5.2 years (4.83-5.55)	
Median time (95% CI)	4.2 years (3.70-4.50)	
Distant recurrence only		
No. of patients	641	2.9
Mean time (95% CI)	4.5 years (4.29-4.78)	
Median time (95% CI)	3.8 years (3.40-4.10)	
Locoregional and distant recurrence		
No. of patients	432	2.0
Mean time (95% CI)	4.0 years (3.75-4.34)	
Median time (95% CI)	3.3 years (3.00-3.70)	

CI: confidence interval

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

2.77 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 1.2% of stage I patients to 8.4% of stage III patients, while the proportion of the patients with both LRR and DR increased from 0.8% of stage I patients to 5.0% of stage III patients (Table 2.27).

Table 2.27: Locoregional and distant recurrence among invasive breast cancer patients by cancer stage (N=18,413)

	Cancer stage, %			
	I (N=7,136)	IIA (N=5,364)	IIB (N=2,829)	III (N=3,084)
Locoregional recurrence only	2.1	2.2	1.1	1.9
Distant recurrence only	1.2	2.5	4.3	8.4
Locoregional and distant recurrence	0.8	1.8	2.8	5.0
No recurrence	95.8	93.5	91.8	84.7

2.78 Table 2.28 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 2.28). The two most common sites for LRR were breast (38.2%) and axilla (32.8%) (Table 2.29).

Table 2.28: 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	94/3,474 (2.7)	76/1,910 (4.0)	23/674 (3.4)	27/434 (6.2)	220/6,492 (3.4)
BCS without RT	10/139 (7.2)	10/83 (12.0)	2/22 (9.1)	1/7 (14.3)	23/251 (9.2)
MTX with RT	15/432 (3.5)	21/1,180 (1.8)	57/1,693 (3.4)	162/2,513 (6.4)	255/5,818 (4.4)
MTX without RT	93/3,085 (3.0)	107/2,186 (4.9)	26/435 (6.0)	21/119 (17.6)	247/5,825 (4.2)

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

Table 2.29: Sites involved in locoregional recurrence (N=935)

	Number	%
Breast	357	38.2
Axilla	307	32.8
Chest wall	263	28.1
Supraclavicular fossa	162	17.3
Internal mammary node	71	7.6
Infraclavicular fossa	8	0.9
Others	12	1.3
Unspecified	27	2.9

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

2.79 In the cohort, 1,073 patients experienced DR. Among them, the top four organs involved were bone (59.6%), lung (46.6%), liver (39.0%) and brain (15.5%) (Table 2.30). The median time for DR to these organs and the distribution of biological subtypes of the patients involved are shown in Table 2.31.

Table 2.30: Sites involved in distant recurrence (N= 1,073)

	Number	%
Bone	639	59.6
Lung	500	46.6
Liver	419	39.0
Brain	166	15.5
Intrathoracic node	223	20.8
Neck node	92	8.6
Pleura	73	6.8
Distant lymph node	49	4.6
Contralateral axillary node	45	4.2
Adrenal gland	37	3.4
Peritoneum	28	2.6
Pancreas	6	0.6
Ovary	5	0.5
Spleen	5	0.5
Uterus	4	0.4
Thyroid gland	3	0.3
Others	51	4.8
Unspecified	31	2.9

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

Table 2.31: Time for organ-specific metastasis and distribution of the biological subtypes of patients

	Bone (N=639)	Lung (N=500)	Liver (N=419)	Brain (N=166)
Median time for metastasis	**4.1 years**	**4.3 years**	**4.1 years**	**4.0 years**
Biological subtype, %				
Luminal A	12.4	8.0	9.3	6.0
Luminal B (HER2 negative)	25.5	22.2	25.8	18.7
Luminal A/B (HER2 negative)	28.0	27.6	30.8	19.9
Luminal B (HER2 positive)	14.1	14.2	13.6	18.1
HER2 positive (HR negative)	5.6	7.4	7.4	14.5
TNBC	8.6	13.8	7.9	18.1
Not known	5.8	6.8	5.3	4.8

Note: See Table 2.16 for subtype definitions.

2.80 In the cohort, 1,780 patients died from breast cancer. Half (50.2%) of them were stage III or IV at initial diagnosis. Median survival time decreased with advancing stage. Information on biological subtypes of these patients is shown in Table 2.32.

Table 2.32: Characteristics of breast cancer-specific deaths (N=1,780)

	Cancer stage at initial diagnosis						
	0	I	IIA	IIB	III	IV	Unstaged
No. of cases (% of breast cancer death cases)	**18 (1.0)**	**183 (10.3)**	**286 (16.1)**	**253 (14.2)**	**585 (32.9)**	**308 (17.3)**	**147 (8.3)**
Median survival time (years)	**9.3**	**6.6**	**6.1**	**6.1**	**5.2**	**4.0**	**3.8**
Median time from first diagnosis of distant recurrence to death (years)	**1.8**	**2.7**	**1.5**	**1.8**	**1.7**	**4.0**	**1.8**
Biological subtype, Number							
Luminal A	3	9	22	24	49	18	7
Luminal B (HER2 negative)	0	58	74	67	127	57	30
Luminal A/B (HER2 negative)	3	48	79	71	148	66	27
Luminal B (HER2 positive)	2	25	30	28	93	50	15
HER2 positive (HR negative)	3	15	21	8	50	25	5
TNBC	0	24	53	41	84	23	16
Not known	7	4	7	14	34	69	47

Note: See Table 2.16 for subtype definitions.

2.81 Overall survival (OS) was also examined, which was defined as the time interval between cancer diagnosis and death from any cause. The estimated 10-year OS rate was 81.1% (Figure 2.50). When stratified by cancer stage, the estimated 10-year OS rates for stage 0, I, II, III and IV were 94.6%, 90.3%, 83.9%, 64.7% and 28.4% respectively (Figure 2.51).

Figure 2.50: 10-year overall survival of the patient cohort (N=22,768)

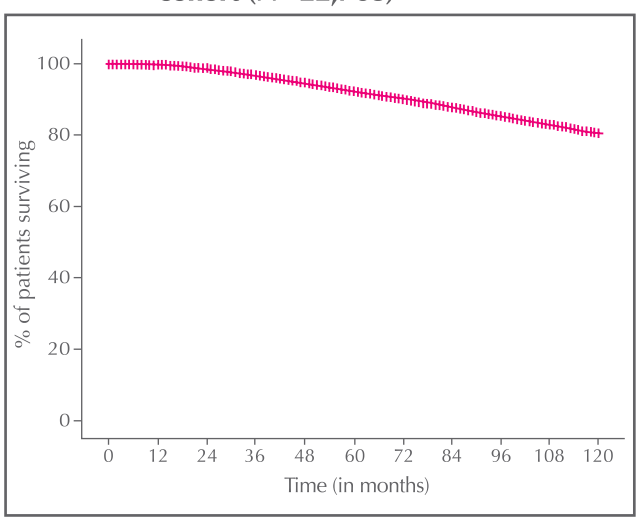
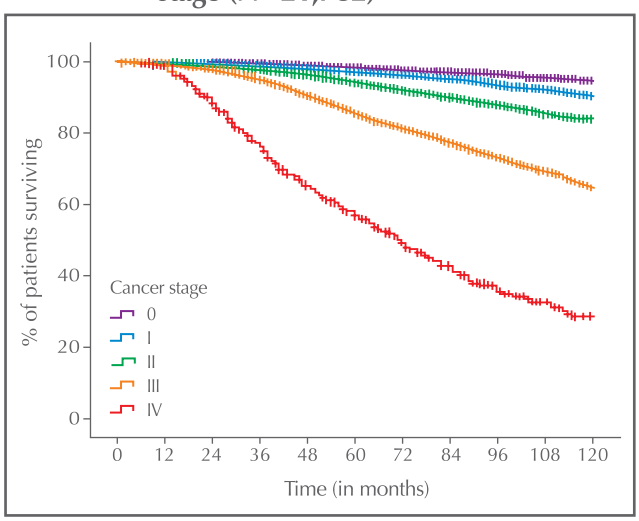
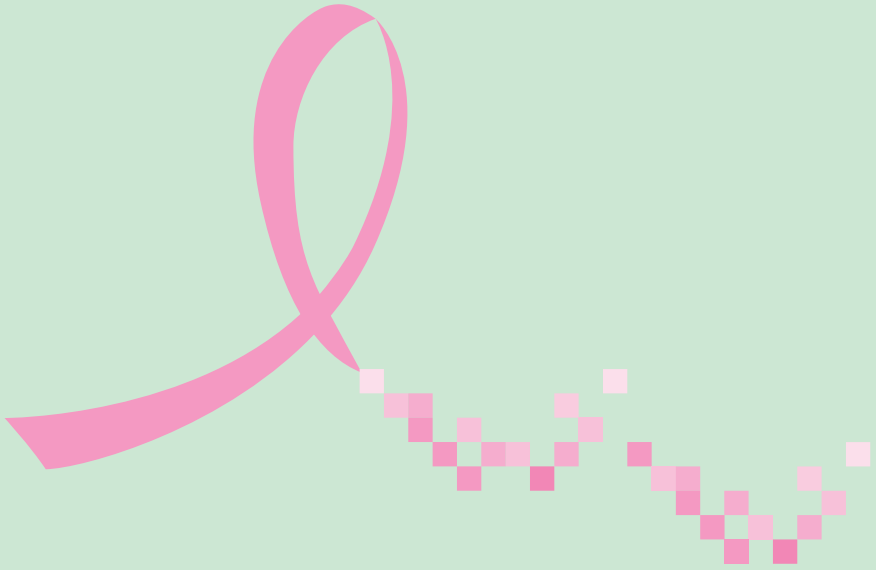


Figure 2.51: 10-year overall survival by cancer stage (N=21,782)





CHAPTER 3

PHYSICAL AND PSYCHOSOCIAL IMPACT OF BREAST CANCER AND ITS TREATMENT

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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 21,727 patients in the cohort.

HIGHLIGHTS

This chapter describes the physical discomfort after treatment and psychological impact of breast cancer on 21,727 patients who were diagnosed between 2006 and 2026.

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, 49.4% of the patients accepted their diagnosis with a calm or positive attitude, while 22.7% could not accept their diagnosis.
- Positive change in outlook on life and self-image were negatively associated with increasing age.
- In the cohort, 79.7% 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 9.1% 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 (13.4%) among those patients who had undergone both mastectomy and reconstruction (Figure 3.2).

Figure 3.1: Level of physical discomfort after surgery (N=21,307)

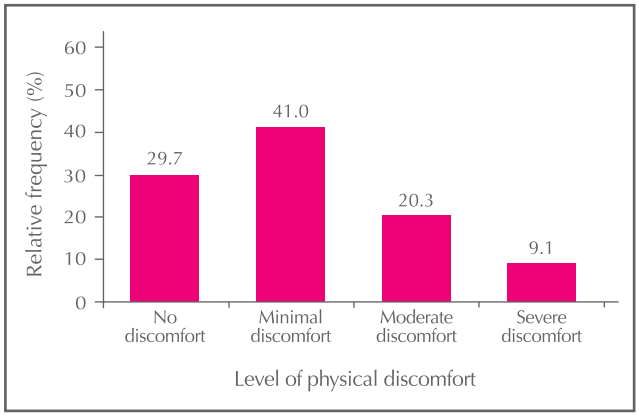
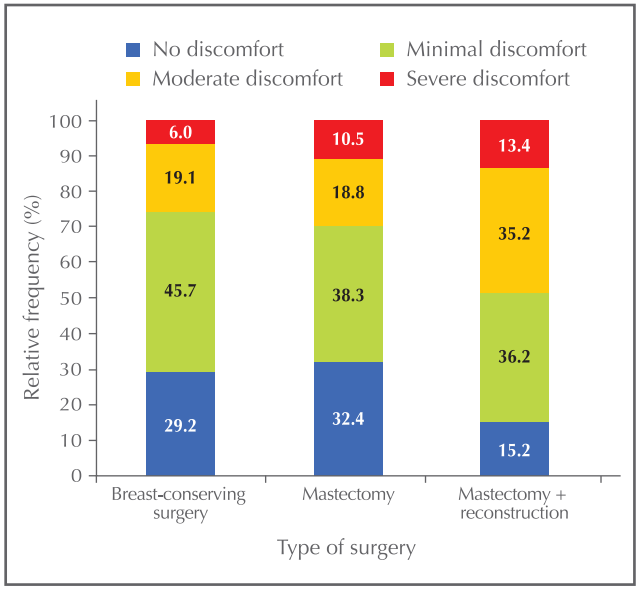


Figure 3.2: Level of physical discomfort by type of surgery (N=21,254)



B. *Physical discomfort after radiotherapy*

3.3 Among the patients who had radiotherapy, 69.0% 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=11,862)

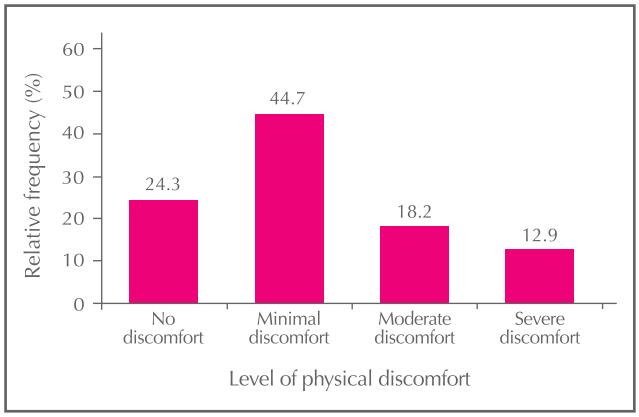
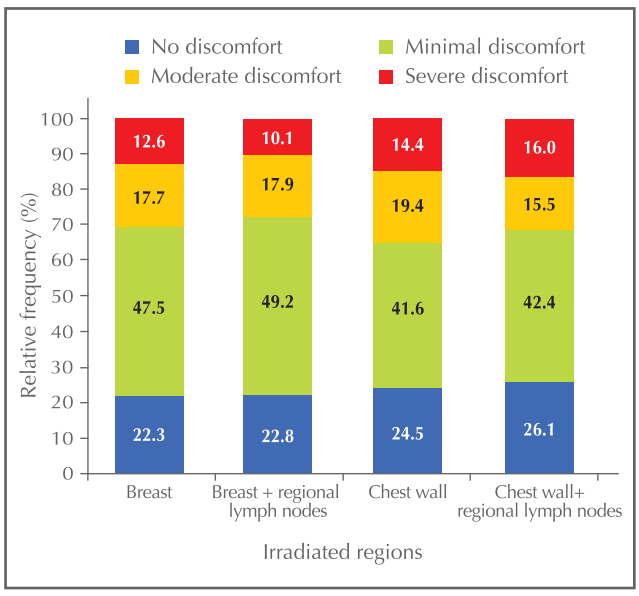


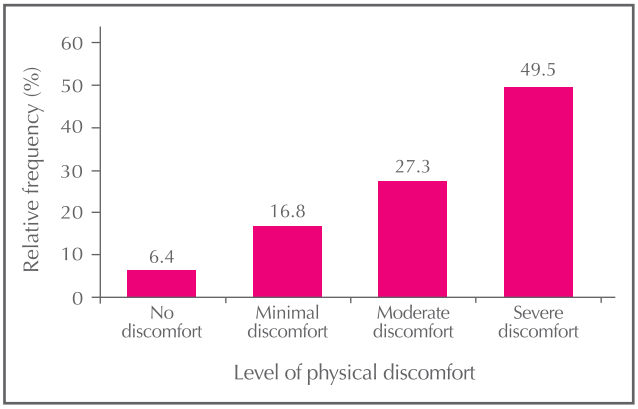
Figure 3.4: Level of physical discomfort after radiotherapy by irradiated regions (N=7,793)



C. *Physical discomfort after chemotherapy*

3.4 Of the patients who had chemotherapy, 49.5% experienced severe physical discomfort due to side effects (Figure 3.5).

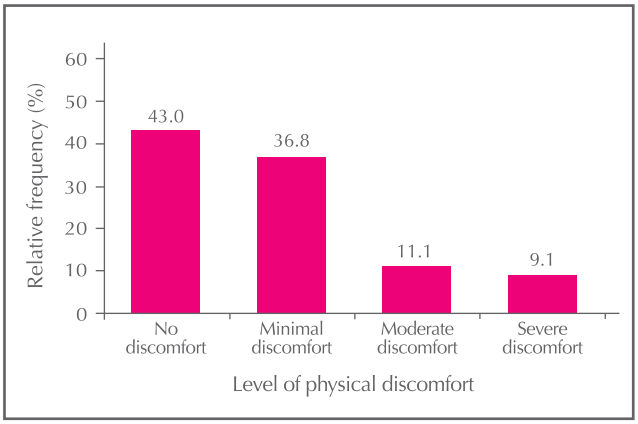
Figure 3.5: Level of physical discomfort after chemotherapy (N=11,835)



D. *Physical discomfort after endocrine therapy*

3.5 Of the patients who had undergone endocrine therapy, 79.8% experienced no or minimal discomfort (Figure 3.6).

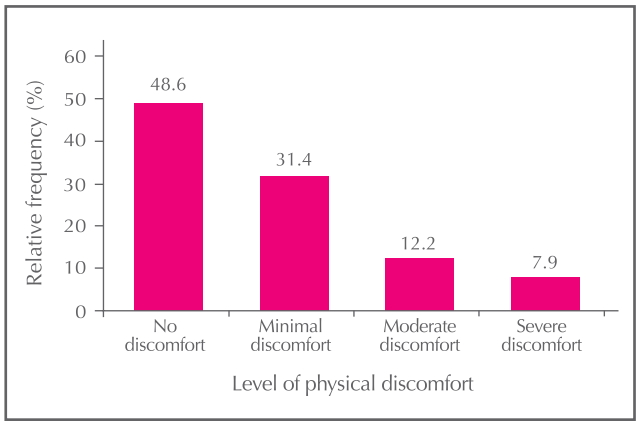
Figure 3.6: Level of physical discomfort after endocrine therapy (N=12,425)



E. Physical discomfort after targeted therapy

3.6 Of the patients who had undergone targeted therapy, 80.0% experienced no or minimal discomfort (Figure 3.7).

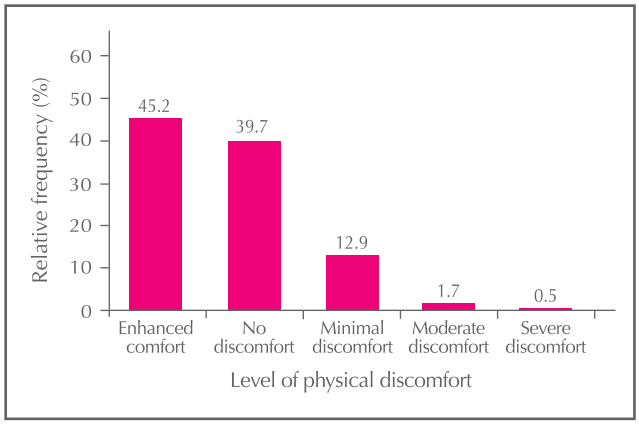
Figure 3.7: Level of physical discomfort after targeted therapy (N=2,522)



F. Physical discomfort after complementary and alternative therapies

3.7 Of the patients who received complementary and alternative therapies, 52.6% felt no or minimal discomfort, and 45.2% felt more comfortable (Figure 3.8).

Figure 3.8: Level of physical discomfort after complementary and alternative therapies (N=6,970)



III. Psychosocial impact and adjustments after diagnosis and treatment

A. Psychosocial impact after diagnosis and treatment

3.8 At diagnosis, 49.4% of the patients accepted their diagnosis with a calm or positive attitude. In contrast, 22.7% could not accept their diagnosis (Table 3.1). After treatment, 31.3% of the patients felt that cancer was a wake-up call that caught them by surprise. As for other changes, 50.3% reported having a positive change in their outlook on life and 40.3% 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=21,097)		
Acceptance and positive attitude to fight	4,770	22.6
Calm acceptance	5,661	26.8
Acceptance with depression	5,508	26.1
Lack of acceptance ("It cannot be true.")	4,779	22.7
Acceptance with anger ("Something must be wrong.")	379	1.8
Feelings after breast cancer treatments (N=15,540)		
Cancer was a wake-up call that caught patient by surprise	4,870	31.3
Life was not fair	8,862	57.0
Cancer changed patient's value system	868	5.6
Cancer took away something important from patient	940	6.0
Change in outlook on life (N=21,275)		
Positive	10,702	50.3
Negative	1,563	7.3
No change	9,010	42.4
Change in self-image (N=21,262)		
Positive	8,560	40.3
Negative	2,019	9.5
No change	10,683	50.2

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=20,981)

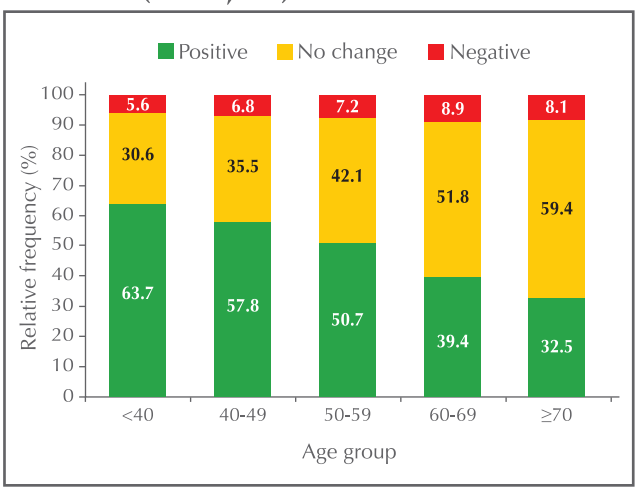
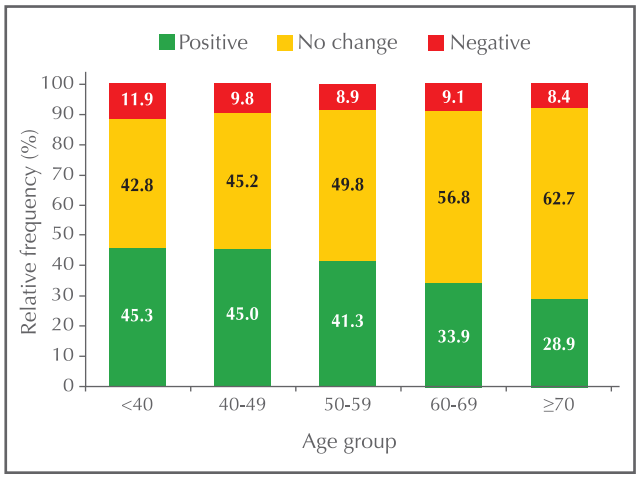


Figure 3.10: Change in self-image by age group (N=20,971)



B. Psychosocial adjustments and coping strategies

3.10 Of the 21,727 patients in the cohort, 79.7% reported having changes in their lifestyle after diagnosis with breast cancer. A change in diet (71.2%) was the most common lifestyle change, followed by increased exercise (60.6%). In addition, 11.0% 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 (60.6%) and diverting attention from negative emotions (34.3%) (Table 3.2).

C. Level of worry about recurrence

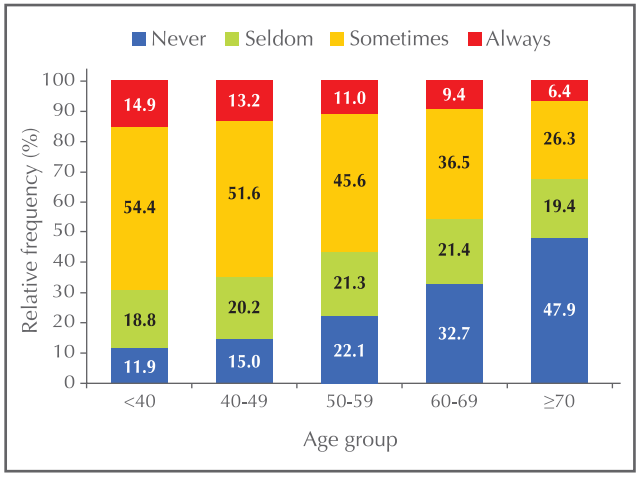
3.12 About a quarter of the patients did not worry about recurrence, while 56.6% always or sometimes worried about recurrence (Table 3.2). The level of worry about recurrence showed correlation with the patients' age: the proportion of patients who never worried about recurrence increased with increasing age, while the proportion of patients who always worried about recurrence decreased with increasing age (Figure 3.11).

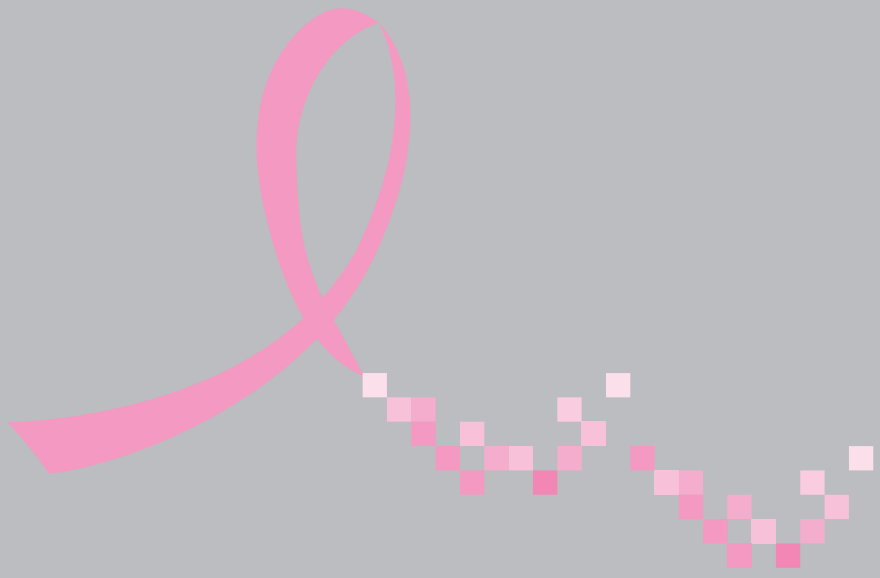
Table 3.2: Psychosocial adjustments and coping strategies for survivorship

	Number	%
Types of lifestyle changes (N=17,327)*		
Changing diet	12,337	71.2
Doing more exercise	10,492	60.6
Taking health supplements	3,688	21.3
Reducing workload	3,515	20.3
Quitting job	1,904	11.0
Ways of managing negative emotions (N=19,217)*		
Direct verbal expression	11,647	60.6
Diverting attention from them	6,595	34.3
Ignoring them	2,379	12.4
Feeling depressed	1,306	6.8
Others	79	0.4
Levels of worry about recurrence (N=21,302)		
Never	4,860	22.8
Seldom	4,395	20.6
Sometimes	9,622	45.2
Always	2,425	11.4

* 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=21,003)





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 manual provides the gold standard for classifying the extent of the disease and its 8th edition introduced two distinct staging frameworks: anatomic and prognostic stage groups.[47] 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 the prognostic stage group has been recommended for patient care and for reporting all breast cancer cases in the United States since 2018, the anatomic stage group was maintained for this report. It was because the majority of the cohort was diagnosed between 2006 and 2017, when clinical management was based on the prevailing anatomic stage group. Nonetheless, there is only minimal difference in the TNM anatomic staging between the 7th and 8th editions, with the most notable change being the elimination of LCIS.

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

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
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

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
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.

LIST OF TABLES

		Page
Table I	Number of primary units of analysis in different sections of Report No. 18	11
Table 1.1	Family history of breast cancer at diagnosis (N=28,806)	21
Table 1.2	Personal history of non-breast tumours at diagnosis (N=28,806)	21
Table 1.3	Prior non-breast malignant tumours reported by patients (N=642)	22
Table 1.4	History of benign breast disease at diagnosis (N=28,806)	22
Table 1.5	Menarche, menopause and reproductive history at diagnosis	23
Table 1.6	Number of live births reported by patients (N=21,258)	23
Table 1.7	Use of hormonal contraceptives at diagnosis (N=28,806)	24
Table 1.8	Use of hormone replacement therapy at diagnosis (N=16,213)	24
Table 1.9	Ten most common risk factors for breast cancer in patient cohort (N=28,806)	25
Table 1.10	Ten most common risk factors for breast cancer by diagnosis year group (N=28,806)	26
Table 1.11	Breast health care practices by age group	27
Table 1.12	Breast health care practices by education level	28
Table 1.13	Breast health care practices by monthly household income (HK$)	29
Table 1.14	Breast health care practices by district of residence	30
Table 1.15	Breast health care practices by diagnosis year group	31
Table 2.1	Methods of first breast cancer detection by type of medical service users (N=24,430)	36
Table 2.2	Methods of first breast cancer detection by type of cancer (N=24,271)	37
Table 2.3	Methods of first breast cancer detection by cancer stage (N=23,373)	37
Table 2.4	Methods of first breast cancer detection by diagnosis year group (N=24,430)	37
Table 2.5	Time interval between symptom onset and first medical consultation for patients who self-detected their cancer by type of medical service users (N=6,884)	39
Table 2.6	Cancer stage at diagnosis among self-detected patients by time interval between symptom onset and first medical consultation (N=6,003)	39
Table 2.7	Laterality of breast cancer cases in the patient cohort (N=25,618)	40
Table 2.8	Sensitivity and diagnostic results of breast imaging tests (N=25,618)	41
Table 2.9	Mammographic findings of patients diagnosed through mammography (N=18,926)	41
Table 2.10	Mammographic density of breasts of patients diagnosed through mammography by age group (N=12,801)	42
Table 2.11	Sensitivity and diagnostic results of breast tissue biopsies (N=25,618)	42

		Page
Table 2.12	Method of cancer staging among invasive breast cancer patients (N=10,787)	43
Table 2.13	Histological type of invasive breast cancer (N=21,616)	47
Table 2.14	Grading, multifocality and multicentricity of invasive breast cancer (N=21,616)	47
Table 2.15	Biological characteristics of invasive breast cancer (N=21,616)	48
Table 2.16	Biological subtypes of invasive tumours by cancer stage (N=20,194)	49
Table 2.17	Histological type, grading, multifocality and multicentricity of in situ breast cancer (N=3,450)	50
Table 2.18	Biological characteristics of in situ breast cancer (N=3,450)	51
Table 2.19	Number of treatment modalities by cancer stage (N=24,480)	52
Table 2.20	Use of surgery for patients with invasive or in situ cancer	53
Table 2.21	Coverage of regional lymph nodes by adjuvant locoregional radiotherapy (N=9,017)	58
Table 2.22	Use of chemotherapy by age group and cancer stage at diagnosis (N=20,368)	59
Table 2.23	Use of chemotherapy by cancer stage across diagnosis year groups (N=20,960)	60
Table 2.24	Use of chemotherapy by biological subtype across diagnosis year groups (N=20,194)	60
Table 2.25	Follow-up of patients (N=22,768)	71
Table 2.26	Recurrence pattern of patients (N=21,995)	71
Table 2.27	Locoregional and distant recurrence among invasive breast cancer patients by cancer stage (N=18,413)	72
Table 2.28	Locoregional recurrence by type of surgery received and cancer stage at diagnosis	72
Table 2.29	Sites involved in locoregional recurrence (N=935)	73
Table 2.30	Sites involved in distant recurrence (N=1,073)	73
Table 2.31	Time for organ-specific metastasis and distribution of the biological subtypes of patients	73
Table 2.32	Characteristics of breast cancer-specific deaths (N=1,780)	74
Table 3.1	Psychosocial impact of breast cancer	80
Table 3.2	Psychosocial adjustments and coping strategies for survivorship	81

LIST OF FIGURES

		Page
Figure I	Distribution of year of diagnosis of HKBCR participants in the past 15 years	7
Figure II	Side-by-side comparisons on age and stage distributions in the 2018-2023 cohort	11
Figure 1.1	Distribution of age at diagnosis (N=28,806)	17
Figure 1.2	Occupation of patient cohort (N=28,806)	17
Figure 1.3	Education level of patient cohort (N=28,806)	18
Figure 1.4	Monthly household income (HK$) of patient cohort (N=16,629)	18
Figure 1.5	District of residence of patient cohort (N=28,806)	18
Figure 1.6	Bra band size of patient cohort (N=23,020)	19
Figure 1.7	Bra cup size of patient cohort (N=20,064)	19
Figure 1.8	Dietary habits at diagnosis (N=28,806)	20
Figure 1.9	Exercise habits at diagnosis (N=28,806)	20
Figure 1.10	Stress level at diagnosis (N=28,806)	20
Figure 1.11	Body mass index at diagnosis (N=28,806)	21
Figure 1.12	Distribution of risk factors among patients at diagnosis (N=28,357)	25
Figure 1.13	Distribution of risk factors by diagnosis year group (N=28,357)	25
Figure 2.1	Methods of first breast cancer detection in the patient cohort (N=24,430)	36
Figure 2.2	Major presenting symptoms of self-detected breast cancer in the patient cohort (N=19,210)	38
Figure 2.3	Time interval between symptom onset and first medical consultation for patients who self-detected their cancer (N=6,884)	38
Figure 2.4	Locations of malignant tumour on breasts within the patient cohort (N=25,618)	40
Figure 2.5	Mammographic density of breasts of patients diagnosed through mammography (N=13,134)	41
Figure 2.6	Use of PET scan among patients who had cancer staging by cancer stage (N=10,787)	44
Figure 2.7	Cancer stage at diagnosis (N=25,618)	44
Figure 2.8	Distribution of cancer stage by diagnosis year group (N=25,618)	45
Figure 2.9	Distribution of tumour size (cm) of invasive breast cancer (N=21,616)	45
Figure 2.10	Number of positive axillary lymph nodes among patients with invasive breast cancer (N=18,733)	46
Figure 2.11	Distribution of tumour size (cm) in invasive cancer with negative or positive nodal status (N=17,816)	46
Figure 2.12	Distribution of tumour size (cm) of in situ breast cancer (N=2,822)	46
Figure 2.13	Type of breast surgery by age group (N=23,507)	54
Figure 2.14	Type of breast surgery by invasive tumour size (cm) (N=19,033)	54
Figure 2.15	Type of breast surgery by cancer stage (N=24,167)	54

		Page
Figure 2.16	Type of breast surgery by type of medical service (N=23,368)	54
Figure 2.17	Type of breast surgery by diagnosis year group (N=24,167)	55
Figure 2.18	Type of nodal surgery by clinical nodal status (N=22,689)	55
Figure 2.19	Type of nodal surgery for invasive cancer by cancer stage (N=20,474)	55
Figure 2.20	Type of nodal surgery for invasive cancer by diagnosis year group (N=20,474)	56
Figure 2.21	Number of positive nodes by type of nodal surgery (N=20,366)	56
Figure 2.22	Use of radiotherapy among patients who underwent breast-conserving surgery by cancer stage (N=9,340)	57
Figure 2.23	Use of radiotherapy among patients who underwent mastectomy by cancer stage (N=14,384)	57
Figure 2.24	Use of radiotherapy among patients with breast-conserving surgery by diagnosis year group (N=9,340)	57
Figure 2.25	Use of radiotherapy among patients with mastectomy by diagnosis year group (N=14,384)	58
Figure 2.26	Use of chemotherapy by cancer stage (N=20,960)	59
Figure 2.27	Use of chemotherapy by biological subtype (N=20,194)	59
Figure 2.28	Use of chemotherapy by diagnosis year group (N=20,960)	59
Figure 2.29	Use of neoadjuvant chemotherapy by cancer stage across diagnosis year groups (N=13,469)	61
Figure 2.30	Use of neoadjuvant chemotherapy by biological subtype across diagnosis year groups (N=13,007)	61
Figure 2.31	Type of first generation chemotherapy regimens (non-HER2) used in neoadjuvant setting (N=143)	62
Figure 2.32	Type of second generation chemotherapy regimens (non-HER2) used in neoadjuvant setting (N=128)	62
Figure 2.33	Type of third generation chemotherapy regimens (non-HER2) used in neoadjuvant setting (N=698)	62
Figure 2.34	Type of HER2 regimens used in neoadjuvant setting (N=619)	62
Figure 2.35	Type of chemotherapy regimens used by biological subtype in neoadjuvant setting (N=1,545)	63
Figure 2.36	Type of first generation chemotherapy regimens (non-HER2) used in adjuvant setting (N=1,489)	64
Figure 2.37	Type of second generation chemotherapy regimens (non-HER2) used in adjuvant setting (N=2,683)	64
Figure 2.38	Type of third generation chemotherapy regimens (non-HER2) used in adjuvant setting (N=2,840)	64
Figure 2.39	Type of HER2 regimens used in adjuvant setting (N=2,371)	64
Figure 2.40	Type of chemotherapy regimens used by biological subtype in adjuvant setting (N=10,081)	65
Figure 2.41	Type of chemotherapy regimens used by cancer stage in adjuvant setting (N=10,250)	66
Figure 2.42	Type of chemotherapy regimens used by biological subtype in palliative setting (N=421)	67
Figure 2.43	Use of endocrine therapy by cancer stage (N=18,323)	68
Figure 2.44	Use of endocrine therapy by diagnosis year group (N=18,323)	68
Figure 2.45	Forms of endocrine therapy by age group (N=14,587)	69

		Page
Figure 2.46	Type of targeted therapy drugs used (N=3,569)	69
Figure 2.47	Use of anti-HER2 targeted therapy in HER2-positive patients by cancer stage (N=4,262)	70
Figure 2.48	Use of anti-HER2 targeted therapy in HER2-positive patients by diagnosis year group (N=4,262)	70
Figure 2.49	Type of complementary and alternative therapies used (N=7,700)	70
Figure 2.50	10-year overall survival of the patient cohort (N=22,768)	74
Figure 2.51	10-year overall survival by cancer stage (N=21,782)	74
Figure 3.1	Level of physical discomfort after surgery (N=21,307)	77
Figure 3.2	Level of physical discomfort by type of surgery (N=21,254)	77
Figure 3.3	Level of physical discomfort after radiotherapy (N=11,862)	78
Figure 3.4	Level of physical discomfort after radiotherapy by irradiated regions (N=7,793)	78
Figure 3.5	Level of physical discomfort after chemotherapy (N=11,835)	78
Figure 3.6	Level of physical discomfort after endocrine therapy (N=12,425)	78
Figure 3.7	Level of physical discomfort after targeted therapy (N=2,522)	79
Figure 3.8	Level of physical discomfort after complementary and alternative therapies (N=6,970)	79
Figure 3.9	Change in outlook on life by age group (N=20,981)	80
Figure 3.10	Change in self-image by age group (N=20,971)	81
Figure 3.11	Level of worry about recurrence by age group (N=21,003)	81

REFERENCES

1. Hong Kong Cancer Registry, Hospital Authority. Female Breast Cancer in 2023. Published August 2025. Accessed July 17, 2026. https://www3.ha.org.hk/cancereg/pdf/factsheet/2023/breast_2023.pdf
2. International Agency for Research on Cancer. *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Volume 98. Painting, Firefighting, and Shiftwor*k. Lyon: International Agency for Research on Cancer; 2010.
3. International Agency for Research on Cancer. List of classifications by cancer sites with sufficient or limited evidence in humans, IARC Monographs Volumes 1 to 141. Updated May 18, 2026. Accessed July 17, 2026. https://monographs.iarc.who.int/wp-content/uploads/2019/07/Classifications_by_cancer_site.pdf
4. Papantoniou K, Castaño-Vinyals G, Espinosa A, et al. Breast cancer risk and night shift work in a case-control study in a Spanish population. *Eur J Epidemiol*. 2016;31(9):867-878. doi:10.1007/s10654-015-0073-y
5. Census and Statistics Department (HK). 2025 Report on Annual Earnings and Hours Survey. Published March 2026. Accessed July 17, 2026. https://www.censtatd.gov.hk/en/wbr.html?ecode=B10500142025AN25&scode=210#section_5
6. Hvidberg L, Pedersen AF, Wulff CN, Vedsted P. Cancer awareness and socio-economic position: Results from a population-based study in Denmark. *BMC Cancer*. 2014;14(1):581. doi:10.1186/1471-2407-14-581
7. Gürdal SÖ, Saraçoğlu GV, Oran EŞ, Yankol Y, Soybir GR. The effects of educational level on breast cancer awareness: A cross-sectional study in Turkey. *Asian Pac J Cancer Prev*. 2012;13(1):295-300. doi:10.7314/APJCP.2012.13.1.295
8. Yeung MPS, Chan EYY, Wong SYS, Yip BHK, Cheung PSY. Hong Kong female's breast cancer awareness measure: Cross-sectional survey. *World J Clin Oncol*. 2019;10(2):98-109. doi:10.5306/wjco.v10.i2.98
9. Hong Kong Breast Cancer Foundation. *Hong Kong Breast Cancer Registry Bulletin Issue 2: Socio-Economic Disparities in Breast Cancer Screening Practice and Cancer Staging in Hong Kong*. Hong Kong Breast Cancer Foundation; 2012.
10. Jansen LA, Backstein RM, Brown MH. Breast size and breast cancer: A systematic review. *J Plast Reconstr Aesthet Surg*. 2014;67(12):1615-1623. doi:10.1016/j.bjps.2014.10.001
11. Li X, Zhou C, Wu Y, Chen X. Relationship between formulaic breast volume and risk of breast cancer based on linear measurements. *BMC Cancer*. 2020;20:989. doi:10.1186/s12885-020-07499-5
12. del Carmen MG, Halpern EF, Kopans DB, et al. Mammographic breast density and race. *AJR Am J Roentgenol*. 2007;188(4):1147-1150. doi:10.2214/AJR.06.0619
13. Kato I, Beinart C, Bleich A, Su S, Kim M, Toniolo PG. A nested case-control study of mammographic patterns, breast volume, and breast cancer (New York City, NY, United States). *Cancer Causes Control*. 1995;6(5):431-438. doi:10.1007/BF00052183
14. Ko SY, Kim MJ. Associations of age, body mass index, and breast size with mammographic breast density in Korean women. *J Med Life Sci*. 2023;20(1):21-31. doi:10.22730/jmls.2023.20.1.21

15. Lynge E, Vejborg I, Lillholm M, Nielsen M, Napolitano G, von Euler-Chelpin M. Breast density and risk of breast cancer. *Int J Cancer*. 2023;152(6):1150-1158. doi:10.1002/ijc.34316
16. Non-communicable Disease Branch, Centre for Health Protection, Department of Health (HK). Report of Health Behaviour Survey 2023. Published January 2025. Accessed July 17, 2026. https://www.chp.gov.hk/files/pdf/dh_hbs_2023_report_eng.pdf
17. Cancer: Breast cancer. In: U.S. Department of Health and Human Services. *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2014:230.
18. Yeo W, Yuen LW, Tsoi KKF, et al. Modifiable risk factors including self-perceived stress for breast cancer in Hong Kong: A case-control study of 10 757 subject. *Clin Med Insights Oncol*. 2025;19:11795549251314434. doi:10.1177/11795549251314434
19. World Cancer Research Fund / American Institute for Cancer Research. Diet, nutrition, physical activity and breast cancer. *Continuous Update Project Expert Report 2018*. Published May 2018. Accessed July 20, 2026. https://www.wcrf.org/wp-content/uploads/2024/10/Breast-cancer-report.pdf
20. Cheraghi Z, Poorolajal J, Hashem T, Esmailnasab N, Doosti Irani A. Effect of body mass index on breast cancer during premenopausal and postmenopausal periods: A meta-analysis. *PLoS One*. 2012;7(12):e51446. doi:10.1371/journal.pone.0051446
21. Non-communicable Disease Branch, Centre for Health Protection, Department of Health (HK). Report of Population Health Survey 2020-22 (Part II). Published April 2023. Accessed July 20, 2026. https://www.chp.gov.hk/files/pdf/dh_phs_2020-22_part_2_report_eng_rectified.pdf
22. Collaborative Group on Hormonal Factors in Breast Cancer. Familial breast cancer: Collaborative reanalysis of individual data from 52 epidemiological studies including 58 209 women with breast cancer and 101 986 women without the disease. *Lancet*. 2001;358(9291):1389-1399. doi:10.1016/S0140-6736(01)06524-2
23. Pharoah PDP, Day NE, Duffy S, Easton DF, Ponder BAJ. Family history and the risk of breast cancer: A systematic review and meta-analysis. *Int J Cancer*. 1997;71(5):800-809. doi:10.1002/(sici)1097-0215(19970529)71:5<800::aid-ijc18>3.0.co;2-b
24. Kwong A, Shin VY, Ho JCW, et al. Comprehensive spectrum of BRCA1 and BRCA2 deleterious mutations in breast cancer in Asian countries. *J Med Genet*. 2016;53:15-23. doi:10.1136/jmedgenet-2015-103132
25. Kwong A, Shin VY, Au CH, et al. Detection of germline mutation in hereditary breast and/or ovarian cancers by next-generation sequencing on a four-gene panel. *J Mol Diagn*. 2016;18(4):580-594. doi:10.1016/j.jmoldx.2016.03.005
26. Ibrahim EM, Abouelkhair KM, Kazkaz GA, Elmasri OA, Al-Foheidi M. Risk of second breast cancer in female Hodgkin's lymphoma survivors: A meta-analysis. *BMC Cancer*. 2012;12:197. doi:10.1186/1471-2407-12-197
27. Caini S, Boniol M, Botteri E, et al. The risk of developing a second primary cancer in melanoma patients: A comprehensive review of the literature and meta-analysis. *J Dermatol Sci*. 2014;75(1):3-9. doi:10.1016/j.jdermsci.2014.02.007

28. Jégu J, Colonna M, Daubisse-Marliac L, et al. The effect of patient characteristics on second primary cancer risk in France. *BMC Cancer*. 2014;14:94. doi:10.1186/1471-2407-14-94
29. Youlden DR, Baade PD. The relative risk of second primary cancers in Queensland, Australia: A retrospective cohort study. *BMC Cancer*. 2011;11:83. doi:10.1186/1471-2407-11-83
30. Chuang SC, Scélo G, Lee YCA, et al. Risks of second primary cancer among patients with major histological types of lung cancers in both men and women. *Br J Cancer*. 2010;102(7):1190-1195. doi:10.1038/sj.bjc.6605616
31. Chaturvedi AK, Kleinerman RA, Hildesheim A, et al. Second cancers after squamous cell carcinoma and adenocarcinoma of the cervix. *J Clin Oncol*. 2009;27(6):967-973. doi:10.1200/JCO.2008.18.4549
32. Zhou WB, Xue DQ, Liu XA, Ding Q, Wang S. The influence of family history and histological stratification on breast cancer risk in women with benign breast disease: A meta-analysis. *J Cancer Res Clin Oncol*. 2011;137:1053-1060. doi:10.1007/s00432-011-0979-z
33. Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and hormonal contraceptives: Collaborative reanalysis of individual data on 53 297 women with breast cancer and 100 239 women without breast cancer from 54 epidemiological studies. *Lancet*. 1996;347(9017):1713-1727. doi:10.1016/S0140-6736(96)90806-5
34. Mørch LS, Skovlund CW, Hannaford PC, Iversen L, Fielding S, Lidegaard Ø. Contemporary hormonal contraception and the risk of breast cancer. *N Engl J Med*. 2017;377(23):2228-2239. doi:10.1056/NEJMoa1700732
35. Urban M, Banks E, Egger S, et al. Injectable and oral contraceptive use and cancers of the breast, cervix, ovary, and endometrium in black South African women: Case-control study. *PLoS Med*. 2012;9(3):e1001182. doi:10.1371/journal.pmed.1001182
36. Li CI, Beaber EF, Tang MTC, Porter PL, Daling JR, Malone KE. Effect of depo-medroxyprogesterone acetate on breast cancer risk among women 20 to 44 years of age. *Cancer Res*. 2012;72(8):2028-2035. doi:10.1158/0008-5472.CAN-11-4064
37. Sweeney C, Giuliano AR, Baumgartner KB, et al. Oral, injected and implanted contraceptives and breast cancer risk among U.S. Hispanic and non-Hispanic white women. *Int J Cancer*. 2007;121(11):2517-2523. doi:10.1002/ijc.22970
38. Shapiro S, Rosenberg L, Hoffman M, et al. Risk of breast cancer in relation to the use of injectable progestogen contraceptives and combined estrogen/progestogen contraceptives. *Am J Epidemiol*. 2000;151(4):396-403. doi:10.1093/oxfordjournals.aje.a010219
39. Strom BL, Berlin JA, Weber AL, et al. Absence of an effect of injectable and implantable progestin-only contraceptives on subsequent risk of breast cancer. *Contraception*. 2004;69(5):353-360. doi:10.1016/j.contraception.2003.12.015
40. Department of Health (HK). LC Paper No. CB(2)1269/19-20(03) Legislative Council Panel on Health Services. Breast Cancer Screening. Issued July 6, 2020. Accessed July 20, 2026. https://www.legco.gov.hk/yr19-20/english/panels/hs/papers/hs20200710cb2-1269-3-e.pdf
41. Breast Cancer Screening Pilot Programme to be launched on September 6 (with photos). HKSAR Government Press Releases. Published September 2, 2021. Accessed July 20, 2026. https://www.info.gov.hk/gia/general/202109/02/P2021090100619.htm

42. DH to subsidise high-risk women for breast cancer screening services from June 10 (with photo/video). HKSAR Government Press Releases. Published May 29, 2025. Accessed July 20, 2026. https://www.info.gov.hk/gia/general/202505/29/P2025052900401.htm
43. Roth MY, Elmore JG, Yi-Frazier JP, Reisch LM, Oster NV, Miglioretti DL. Self-detection remains a key method of breast cancer detection for U.S. women. *J Womens Health (Larchmt)*. 2011;20(8):1135-1139. doi:10.1089/jwh.2010.2493
44. Ernst MF, Roukema JA, Coebergh JW, et al. Breast cancers found by screening: Earlier detection, lower malignant potential or both? *Breast Cancer Res Treat*. 2002;76(1):19-25. doi:10.1023/A:1020213817562
45. Richards MA, Westcombe AM, Love SB, Littlejohns P, Ramirez AJ. Influence of delay on survival in patients with breast cancer: A systematic review. *Lancet*. 1999;353(9159):1119-1126. doi:10.1016/S0140-6736(99)02143-1
46. National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology for Breast Cancer (Version 5.2020). Published July 2020.
47. Amin MB, Edge S, Greene F, et al. (eds). *AJCC Cancer Staging Manual (8th Edition)*. New York, NY: Springer International Publishing; 2017.
48. Wolff AC, Hammond MEH, Allison KH, et al. Human epidermal growth factor receptor 2 testing in breast cancer: American Society of Clinical Oncology/College of American Pathologists clinical practice guideline focused update. *Arch Pathol Lab Med*. 2018;142(11):1364-1382. doi:10.5858/arpa.2018-0902-SA
49. Goldhirsch A, Wood WC, Coates AS, et al. Strategies for subtypes—dealing with the diversity of breast cancer: Highlights of the St Gallen International Expert Consensus on the Primary Therapy of Early Breast Cancer 2011. *Ann Oncol*. 2011;22(8):1736-1747. doi:10.1093/annonc/mdr304
50. National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology for Breast Cancer (Version 6.2026). Published July 2026.
51. Anampa J, Makower D, Sparano JA. Progress in adjuvant chemotherapy for breast cancer: An overview. *BMC Med*. 2015;13:195. doi:10.1186/s12916-015-0439-8
52. Byers T, Nestle M, McTiernan A, et al. American Cancer Society guidelines on nutrition and physical activity for cancer prevention: Reducing the risk of cancer with healthy food choices and physical activity. *CA Cancer J Clin*. 2002;52(2):92-119. doi:10.3322/canjclin.52.2.92

BREAST CANCER RESEARCH CENTRE'S PUBLICATIONS AND PRESENTATIONS

Institutional reports and thematic research

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)
17. Hong Kong Breast Cancer Registry Report No. 17 (September 2025)

Bulletin

Issue No.	Title	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
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
16.	Risk factors for distant recurrence of breast cancer	2025

Articles published in medical journals

1. Cheung P, Hung WK, Cheung C, et al. Early data from the first population-wide breast cancer-specific registry in Hong Kong. *World J Surg*. 2012;36(4):723-729. doi:10.1007/s00268-012-1426-2
2. Chor JS, Lam HC, Chan A, et al. Socioeconomic disparity in breast cancer detection in Hong Kong—a high income city: Retrospective epidemiological study using the Breast Cancer Registry. *PLoS One*. 2014;9(10):e107630. doi:10.1371/journal.pone.0107630
3. Yeo W, Lee HM, Chan A, et al. Risk factors and natural history of breast cancer in younger Chinese women. *World J Clin Oncol*. 2014;5(5):1097-1106. doi:10.5306/wjco.v5.i5.1097
4. Chan SW, Cheung C, Chan A, Cheung PS. Surgical options for Chinese patients with early invasive breast cancer: Data from the Hong Kong Breast Cancer Registry. *Asian J Surg*. 2017;40(6):444-452. doi:10.1016/j.asjsur.2016.02.003
5. Yau TK, Chan A, Cheung PS. Ductal carcinoma in situ of breast: Detection and treatment pattern in Hong Kong. *Hong Kong Med J*. 2017;23(1):19-27. doi:10.12809/hkmj154754
6. Chan YS, Hung WK, Yuen LW, Chan HYY, Chu CWW, Cheung PSY. Comparison of characteristics of breast cancer detected through different imaging modalities in a large cohort of Hong Kong Chinese women: Implication of imaging choice on upcoming local screening program. *The Breast Journal*. 2022;3882936. doi:10.1155/2022/3882936
7. Chan YHY, Kwok CCH, Tse DMS, Lee HM, Tam PY, Cheung PSY. Preoperative considerations and benefits of neoadjuvant chemotherapy: Insights from a 12-year review of the Hong Kong Breast Cancer Registry. *Hong Kong Med J*. 2023;29(3):198-207. doi:10.12809/hkmj219333
8. Yeo W, Yuen LW, Tsoi KKF, et al. A case-control study of 10,757 individuals to assess potentially modifiable risk factors, including stress, for breast cancer among Chinese patients in Hong Kong (abstract). *J Clin Oncol*. 2023;41(suppl 16):e22522. doi:10.1200/JCO.2023.41.16_suppl.e22522
9. Kwok CCH, Wong HCY, Wong CYH, Yuen LW, Yau CC, Cheung PSY. Use of ^{18}F-fluorodeoxyglucose positron emission tomography coupled with computed tomography in early breast cancer management: Consensus-based local recommendations by the Hong Kong Breast Cancer Foundation PET/CT Study Group. *Hong Kong Med J*. 2025;31(6):426-433. doi:10.12809/hkmj2411789
10. Yeo W, Yuen LW, Tsoi KKF, et al. Modifiable risk factors including self-perceived stress for breast cancer in Hong Kong: A case-control study of 10 757 subject. *Clin Med Insights Oncol*. 2025;19:11795549251314434. doi:10.1177/11795549251314434
11. Yeung NCY, Lau STY, Mak WWS, et al. Roles of unmet supportive care needs, supportive cancer care service disruptions, and COVID-19-related perceptions in psychological distress among recently diagnosed breast cancer survivors in Hong Kong. *Hong Kong Med J*. 2025;31(3):208-217. doi:10.12809/hkmj2311302
12. Hao Z, Lam A, Hu Y, et al. Real-world evidence of mammography screening from the Hong Kong Breast Cancer Registry: a cost minimization analysis of 15 144 patients with breast cancer. *BMJ Public Health*. 2026;4:e004452. doi:10.1136/bmjph-2025-004452
13. Yeo W, Yuen LW, Soong I, et al. Survival outcomes of high and intermediate-risk hormone receptor (HR)-positive human epidermal growth receptor-2 (HER2)-negative early breast cancer patients (EBC) who did and did not receive (neo)adjuvant chemotherapy (abstract). *J Clin Oncol*. 2026;44(suppl 16):e12530. doi:10.1200/JCO.2026.44.16_suppl.e12530

Conference presentations

1. Cheung P. Screen-detected breast cancer showed earlier staging than incidental self-detected cancer. Lecture presented at: CUHK Breast Cancer Conference 2009; November 2009; Hong Kong.
2. Cheung P, Hung WK, Cheung C. Initial result from the Hong Kong Breast Cancer Registry. Paper presented by Hung WK at: International Surgical Week 2011; August 2011; Yokohama, Japan. (Nominated for Breast Surgery International Best Paper Award)
3. Chan A, Lee M, Cheung P. Risk factors for breast cancer in Hong Kong: a case-control study. Poster presented by Chan A at: 33rd Annual Meeting of the International Association of Cancer Registries; October 2011; Balaclava, Mauritius. (Abstract originally published as "Risk factors for breast cancer in Hong Kong" by Chan in *33rd Annual Meeting of the International Association of Cancer Registries: Book of Abstracts*; Abstract No. 08)
4. Cheung P. Local data from the Hong Kong Breast Cancer Registry. Lecture presented at: CUHK Breast Cancer Conference 2011; November 2011; Hong Kong.
5. Kwok C. Breast cancer facts in Hong Kong. Lecture presented at: 4th Global Chinese Breast Cancer Organizations Alliance Conference; April 2012; Los Angeles, CA, USA.
6. Cheung P. Hong Kong Breast Cancer Registry: Evidence for improving cancer control and treatment. Lecture presented at: CUHK Breast Cancer Conference 2015; October 2015; Hong Kong.
7. Cheung P, Kwok CCH, Chan A, Lee HM, Lai DCY. Pathological response rate: Analyzing the outcome of neoadjuvant chemotherapy for patients enrolled in Hong Kong Breast Cancer Registry. Poster presented by Kwok CCH at: 24th Annual Scientific Meeting of Hong Kong College of Radiologists; November 2016; Hong Kong.
8. Tsang J, Cheung P, Lee HM, et al. Elders with breast cancer tend to delay seeking medical care and present with a later cancer stage. Paper presented by Tsang J at: 4th Symposium on Primary Breast Cancer in Older Women; March 2017; Nottingham, England.
9. Cheung P. Hong Kong Breast Cancer Registry. Lecture presented at: CUHK Breast Cancer Conference 2017; October 2017; Hong Kong.
10. Chan YHY, Kwok CCH, Lee HM, Tam PY, Cheung PSY. Neoadjuvant chemotherapy in Hong Kong breast cancer patients and its clinical implications. Poster presented by Chan YHY at: 48th World Congress of Surgery 2019; August 2019; Krakow, Poland. (Abstract originally published with alternative authorship [Chan, Kwok, Lee & Cheung] in *48th World Congress of Surgery WCS 2019 Abstract Book*; Abstract ID PE105)
11. Lau S, Tsang J, Lee M, Yuen L, Cheung P. Breast cancer in elderly patients: Tumour characteristics, treatment choices and clinical outcomes. Poster presented by Lau S at: 48th World Congress of Surgery 2019; August 2019; Krakow, Poland. (Abstract originally published with alternative authorship [Lau, Tsang, Lee & Cheung] in *48th World Congress of Surgery WCS 2019 Abstract Book*; Abstract ID PE117)
12. Cheung P. Risk factors for breast cancer in Hong Kong women: A case control study. Lecture presented at: CUHK Breast Cancer Conference 2019; October 2019; Hong Kong.
13. Cheung P. A 15-year trend of breast cancer diagnosis and treatment: Data from the Hong Kong Breast Cancer Registry. Lecture presented at: CUHK Breast Cancer Conference 2021; October 2021; Hong Kong.
14. Yeo W. 10-year survival analysis, data from Hong Kong Breast Cancer Foundation. Lecture presented at: HKBCF Annual Breast Cancer Update 2022; November 2022; Hong Kong.

15. Li L, Tsoi K. Hong Kong Breast Cancer Registry – Health economic study, self vs mammogram detected breast cancer. Lecture jointly presented at: HKBCF Annual Breast Cancer Update 2023; November 2023; Hong Kong.
16. Cheung P. Hong Kong Breast Cancer Registry – Building up big data for the local population. Lecture presented at: Best of SABCS Review 2023 cum 10th Anniversary Scientific Symposium; January 2024; Hong Kong.
17. Cheung PSY, Yuen LW, Yau CC, Li LPK, Hung WK, Fok E. Building up big data for the population of breast cancer patients in Hong Kong. Poster presented by Yuen LW at: 2024 International Association of Cancer Registries Scientific Conference; November 2024; Beijing, China.
18. Kwok C. Recap HKBCR Bulletin 15: De novo metastatic breast cancer data from HKBCR. Lecture presented at: HKBCF Annual Breast Cancer Update 2024; November 2024; Hong Kong.
19. Yeo W, Yuen LW, Kwok C, et al. Real-world data on high and intermediate-risk hormone receptor (HR)-positive HER2-negative early breast cancer patients prior to adjuvant CDK4/6i era. Poster presented by Yeo W at: San Antonio Breast Cancer Symposium 2024; December 2024; San Antonio, TX, USA.
20. Yeo W, Yuen LW, Kwok C, et al. 10-year survival outcomes of early-staged breast cancer patients with intermediate- and high- risk hormone receptor-positive her2-negative disease. Poster presented by Yeo W at: San Antonio Breast Cancer Symposium 2025; December 2025; San Antonio, TX, USA.
21. Yeo W, Yuen LW, Soong I, et al. Prognostic values of tumour grade and Ki67 beyond tumour stage in hormone receptor (HR)-positive HER2-negative early breast cancer. Poster presented by Yeo W at: ESMO Breast Cancer 2026; May 2026; Berlin, Germany.
22. Cheung P, Yau CC, Li L. Insights from Hong Kong Breast Cancer Registry data to inform prevention and early detection strategies. Poster presented by Cheung P at: World Cancer Congress 2026; September 2026; Hong Kong.

ABSTRACTS OF REPORTS NOS. 1 - 17

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 addition, 52% of the patients had two to three of the above risk factors while less than 3% of the patients had no known risk factor.

To help reduce breast cancer risk, the Hong Kong Breast Cancer Foundation encourages women to act on the 2002 Guidelines on Nutrition and Physical Activity for Cancer Prevention from the American Cancer Society.[52] The key recommendations include:

1. Maintain a healthy body weight throughout life
2. Adopt a physically active lifestyle
3. Follow a healthy diet, with an emphasis on plant sources
4. 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 patients in the cohort had a bra cup size of B or smaller, while 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 breast cancer characteristics and treatment methods according to the type of medical service sector attended. Of the 2,130 patients studied, 23.1% were classified as receiving total private medical care, 24.0% as total public medical care and 52.9% as a mix of private and public medical care.

A significant difference in the distribution of cancer stage at diagnosis was identified. Patients receiving total private medical care were more likely to be diagnosed early at stage 0 (in situ breast cancer) than those receiving only public medical care (13.6% vs 5.7%). In addition, the tumour size of invasive breast cancer at diagnosis was generally larger in patients receiving total care at public medical facilities.

Treatment patterns also varied across the types of medical service sectors attended. The mastectomy rate of patients who were treated in public medical facilities was approximately twice that of patients treated in private medical facilities. The proportion of 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 significant difference in the patterns of using the chemotherapy drugs anthracycline, taxane and other drugs between the private and public sectors. Similarly, the use of tamoxifen, the most commonly prescribed endocrine therapy, showed no notable variation across medical service sectors or cancer stages.

Overall, the findings of this report highlighted a higher proportion of advanced breast cancer cases in the public medical service 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 mammography (MMG) 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 the benefits of regular breast screening in facilitating earlier detection.

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

More than half of the breast cancer patients in Wan Chai, the district with the highest median household income, had undergone regular MMG screening before diagnosis. In contrast, in the low-income districts of Kwun Tong, Kwai Tsing and Sham Shui Po, about 70%-80% of the patients had never received MMG screening, with Kwun Tong accounting for the highest proportion among all districts. Similarly, the percentages of no prior MMG screening were also high in North District, Tuen Mun and Tai Po (about 70%). According to the Census and Statistics Department statistics in 2008, these districts had a median household income below the overall median 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 earlier-stage breast cancer at diagnosis. 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 caused 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 in Hong Kong were diagnosed in patients aged between 40 and 70 (79.7%), while 14.0% were under 40 years old and 5.1% were over 70 years old 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 a higher proportion of young patients were diagnosed at an early breast cancer stage (76.6%), they were also more likely to present with more aggressive biological features and adverse prognostic features, including higher nuclear grade (Grade 3) of tumours (45.2%), lymphovascular invasion (40.8%), multifocality (15.3%), higher expression of human epidermal growth factor receptor 2 (HER2) (28.7%), and triple negative breast cancer (13.0%). Also, 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 revealed that younger patients were less likely to accept their diagnosis calmly or positively (16.2%), and more likely to worry about recurrence all the time (12.3%). The number of patients who adopted changes in 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 exhibited a higher prevalence of breast cancer risk factors, presented with more aggressive tumour biology, and were more worried about recurrence, which could profoundly affect their quality of life.

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 treatment patterns of two patient groups aged 40 or above: one consisting of patients diagnosed by regular mammography screening in the absence of symptom(s) (screen-detected group), and one comprising patients who presented with symptoms and had not undergone regular screening (self-detected group).

Results showed that 45.0% of patients in the screen-detected group were diagnosed with in situ breast cancer, compared to 9.0% in the self-detected group, indicating that the proportion of stage 0 cases in the screen-detected group was nearly five times as high as that in the self-detected group. The mean invasive tumour size was also smaller in the screen-detected group (1.3 cm) than in the self-detected group (2.3 cm).

Slightly less than half (46.3%) of the patients in the screen-detected group underwent a total mastectomy, while two-thirds (67.4%) of those in the self-detected group did so. 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, patients with breast cancer detected through regular screening generally presented with smaller tumours and earlier-stage disease. Their requirement for total mastectomy and/or chemotherapy was thus lower. Women, therefore, should engage in regular breast cancer screening to maximise the chance of early detection, thereby reducing the need for aggressive treatments.

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 receiving medical care from the onset of symptoms, which comprised "self-delay" (patients' delay in seeking the first medical consultation after symptom onset) and "care delay" (medical systems' delay in diagnosis and/or the initiation of treatment). Potential factors associated with these delays were also examined.

Among the 2,242 patients with self-detected breast cancer, the median duration 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 duration was 20.0 days and 80.9% of the patients started their first treatment within a month of diagnosis, in line with international standards. Overall, 45.7% of patients received their first treatment at least three months after symptom onset.

Self-delay was associated with more adverse disease characteristics. Patients who delayed seeking medical consultation for three or more months were 50% more likely to present with larger tumours and 30% more likely to have node-positive disease at diagnosis, thereby 70% more likely to be diagnosed with stage III or IV cancer.

Three factors, namely occupation, marital status and a history of benign breast conditions, were identified as predictors of self-delay. Non-clerical (low-skilled) or labour workers were approximately 60% more likely than unemployed patients to delay seeking medical consultation. Widowed patients were also more likely to self-delay compared with unmarried patients, while patients with previous benign breast conditions had an almost 50% higher likelihood of self-delay.

Overall, the clinical and financial implications of delayed presentation point to a bigger unresolved public health issue in Hong Kong.

Widows or women who are non-clerical or labour workers should be considered as priority groups for breast health promotion, particularly with regard to breast cancer symptoms and the importance of prompt medical consultation for any breast changes. More specifically, they should be made aware of their breast health and seek medical care promptly upon noticing any changes. 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 chronological change in the use of sentinel node biopsy (SNB) in Hong Kong. Unlike axillary dissection (AD), SNB avoids unnecessary extensive lymph node removal, associating with a substantially lower risk of post-operative complications like lymphoedema, thereby improving patients' quality of life.

According to the findings, the use of SNB increased over time. SNB alone was performed more frequently in patients with clinically node-negative status than in those with clinically node-positive 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, increasing from 45.7% in 2006 to 76.6% in 2012.

The use of SNB (including both SNB alone and SNB followed by AD) was more common in patients with smaller tumours and showed a positive linear trend over the study period. For tumours of sizes 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. For tumours of sizes larger than two cm up to five cm, SNB use increased from 34.2% in 2006 to 54.2% in 2012.

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 from 44.8% in 2006 to 28.9% in 2012.

In summary, SNB had become a preferred method of nodal assessment for more surgeons and patients over the study period. Both surgeons' clinical judgement and patients' personal decisions affect the use of SNB in place of 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 on 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. As the risk of breast cancer increases with age, it is anticipated that the number of elderly affected by the disease will increase over time.

According to the findings, upon the onset of symptoms, a higher proportion of elderly patients delayed seeking medical consultation for more than a year compared with the patients of all ages (17.7% vs 10.8%, p=0.005). These elderly patients tended to be diagnosed with stage III or IV disease compared to those seeking medical consultation within three months of symptom onset (29.7% vs 14.5%, p=0.068). Despite this, invasive tumours in elderly patients exhibited more favourable biological features than those in patients of all ages, including more grade 1 tumours (26.5% vs 19.2%, p<0.001) and no 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 (HER 2) negative (83.6% vs 78.7%, p=0.001), compared to those in 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 compared to patients of all ages. Comorbidity may be associated with treatment choices among elderly patients. Although age is an important consideration in cancer treatment decision-making, it should not be the sole determinant.

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, 2006-2010 and 2011-2015, 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 a significant increase in the use of NAC between the two study periods in Hong Kong breast cancer patients: from 4.8% in 2006-2010 to 9.4% in 2011-2015 ($p<0.001$). The increase was particularly observed within the triple negative, HER2 positive (ER and PR negative) and luminal B (HER2 positive) subtypes, as well as among patients with clinical stage IIB or III cancer at diagnosis. In addition, the administration of NAC was positively correlated with cancer stage at diagnosis, with the proportion of patients receiving NAC increasing from 2.9% for stage IIA disease to 25.8% for stage III disease.

NAC was found to be effective in downsizing tumour, in that 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 among patients with HER2 positive (ER and PR negative) subtype, in that almost half (48.6%) of them achieved pCR ($p<0.001$). Patients with luminal B (HER2 positive) and triple negative subtypes achieved pCR rates of 28.0% and 29.6% respectively, which were significantly higher than those observed in the other subtypes. Furthermore, higher proportions of clinical stage IIA or IIB patients treated with NAC underwent breast-conserving surgery, 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 risk factors for breast cancer, namely (1) non-modifiable; (2) modifiable and lifestyle-related; (3) modifiable and behavioural-related; and (4) modifiable and medical-related, to improve understanding of factors that may have contributed to the rising incidence of breast cancer in Hong Kong.

As expected, having first-degree relative(s) suffering from breast cancer (aOR=2.88; 95% CI, 2.43-3.41) and having menarche before 12 years old (aOR=1.35; 95% CI, 1.19-1.52) were both 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).

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 a higher level of stress (feeling stressed for more than half of the time) were also at higher risk (aOR=3.40; 95% CI, 3.09-3.73). In addition, consuming a diet rich in meat or dairy products, rather than a balanced diet, was associated with a higher risk of breast cancer (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 a 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. They should also be breast aware and seek medical help promptly if they notice any abnormalities in their breasts. Anyone with significant risk factors (non-modifiable and/or modifiable) is recommended to undergo regular breast screening for early detection and 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 a family history of breast cancer, and had a habit of drinking alcohol, whereas fewer used hormone replacement therapy prior to cancer diagnosis. No changes, however, were observed in dietary and exercise habits or stress level.

The proportions of patients who had undergone mammogram or breast ultrasound screening increased over time, but the rates of regular participation decreased. Self-detection by chance remained 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.

When 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 overall use of chemotherapy (all settings) significantly decreased among patients with early stage (I-IIB) disease, the use of NAC increased substantially, and 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 improvements were observed in patients' breast screening habits or risk exposures over the years. These findings suggested that the past efforts to promote a healthy lifestyle as a means of preventing breast cancer were insufficient 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 mammography (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 doctors on self-discovered breast cancer symptoms. The asymptomatic group refers to patients who were not aware of any breast changes, and whose tumours were detected through MMG screening, USG, clinical breast examination, other imaging tests (such as CT and MRI), or incidentally 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 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 those with breasts of fatty or scattered density. 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 breasts, making it an important feature in the diagnosis of breast cancer 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 for larger tumours, which are more easily differentiated between benign and malignant lesions 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 its performance is not affected by breast density.

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

The sensitivity of clinical staging was significantly higher among patients who had PET scan (70.3%) than among 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 for:
    a. breast screening
    b. clinically benign breast diseases
    c. T0 and T1 breast cancer
2. PET should be considered for:
    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 an increasing trend in the use 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 differences 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 the 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 estimated OS rate at 10 years was 87.7%. The estimated 10-year OS rates 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 more 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 estimated DDFS rate 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 the younger age group. 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 outcomes and a 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 main 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 the MMG screen-detected cases were diagnosed at early stages (0: 33.2%; I: 48.3%; II: 15.3%), while only 3.2% were at stages III or IV. In contrast, of the self-detected cases, 5.4% were diagnosed at stage 0, 31.5% at stage I, 44.0% at stage II, and about 20% at advanced stages (III: 17.1%; IV: 1.9%). In addition, the estimated 10-year overall survival rate was higher in MMG screen-detected patients, with corresponding figures 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 significant reduction in treatment cost, mainly because of less intensive cancer treatment required. Estimated by a Markov model using local real-life data, the average cost of treatment per patient with MMG screen detection was lower by 28.4% compared with self-detection. The overall cost of treatment increased substantially 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 initiating MMG screening at age 40 could result in a total gain of 27,932 life-years and savings of $774.6 million in total treatment costs over the long term.

In conclusion, MMG screen-detected cases entailed lower treatment cost, demonstrating the potential economic benefits of screening for the healthcare system. Limitations, including the current 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 (dnMBC), 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 of various patient factors between dnMBC patients (stage IV) and patients with early breast cancer (eBC) (stage I-II), it was found that 76.2% of dnMBC patients had never engaged in regular breast health care practices[1], and 42.2% had never engaged in any breast health care practices[2]. Also, a higher proportion of dnMBC patients delayed seeking medical consultation for more than three months after symptom onset. 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 examined 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 rate was 51.8%. When analysing by tumor biological subtypes, there were no statistically significant differences in survival distributions between different subtypes (X^2=4.25, p=0.236). However, 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 tumor 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 health care practices, reflecting lower 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 relying solely on subtype, assessing multiple factors together, such as receptor status, sites and extent of metastases, would provide more accurate analysis on dnMBC patients' prognosis. Therefore, there is a need for further subclassification of stage IV disease to facilitate more accurate prognostic assessment and the development of more effective and personalised therapeutic strategies for this patient population.

Note:

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

[2] Any breast health care practices include BSE, CBE, USG and MMG screening.

Hong Kong Breast Cancer Registry Report No. 17 (Report No. 17 published in 2025)

- early diagnosis reduces distant recurrence of breast cancer

To understand more fully the risk factors of distant recurrence, also known as recurrent metastatic breast cancer (rMBC), the HKBCR Report No. 17 conducted case-control analysis using data from patients diagnosed with stage I–III breast cancer between 2006 and 2013 who underwent breast surgery. It compared 611 patients who experienced distant recurrence within 10 years to 3,619 patients without recurrence in 10 years. In addition, to examine the factors varying the time to recurrence, study subjects were stratified into three metastasis-free interval (MFI) subgroups for further exploration: (1) ≤24 months, (2) >24-60 months, and (3) >60 months. The median follow-up duration was 83 months after diagnosis of primary cancer.

The results revealed that the risk of distant recurrence was higher for patients with more advanced stage disease, of younger age (especially under age 40), and with high Ki-67 tumours, grade 3 tumors, or lymphovascular invasion (all $p<0.001$). Yet, there was no significant difference in distant recurrence risk among biological subtypes. For the timing of metastasis, patients with MFI ≤24 months had more grade 3 tumors or lymphovascular invasion. Furthermore, TNBC patients generally experienced distant recurrence earlier than HR+ patients. The median MFI was 58.0 months for HR+HER2-, 46.0 months for HR+HER2+, 31.5 months for HR-HER2+, and 28.0 months for TNBC.

Besides, it was indicated that survival outcomes in rMBC patients differed by cancer stage and biological subtype. In both HR+HER2- and TNBC subgroups, patients with higher stage had poorer overall survival (OS) and metastasis-free survival (MFS). Additionally, TNBC patients had significantly worse 3-year post-distant relapse survival (PDRS), with a shorter median of 14.0 months compared to 30.0 months in HR+HER2- patients ($p< 0.008$).

In conclusion, higher cancer stage is the predominant factor in increased risk of distant recurrence. Higher distant recurrence risk and shorter MFI were closely related to the aggressive clinicopathological features of the primary tumor, especially an advanced stage, higher tumour grade, and nodal involvement. The elevated recurrence risk identified in patients under the age of 40 highlights a critical public health deficit, underscoring the paramount importance of implementing targeted public education programmes to raise breast cancer awareness.

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 the HKBCR. Whether you are recently diagnosed, undergoing treatment, living with metastatic disease or many years beyond treatment, your input is important to us.

Registration:

I. Download and sign the Consent Form from the link below: https://www.hkbcf.org/en/our_research/main/54

II. Return the completed form to the HKBCR by post or through your doctor. By providing consent, you authorise the HKBCR research team to collect your personal data and access your medical records for analysis.

III. Complete the questionnaires provided.

IV. The HKBCR research team will contact you and your doctor annually to update your health records. Follow-up information will be collected by email, post or phone.

All information collected will be kept strictly confidential in accordance with the Personal Data (Privacy) Ordinance (Laws of Hong Kong Special Administrative Region, Chapter 486) and will be used solely for aggregate analysis and research purposes, without identifying individual participants.

2. Subscribe to the Hong Kong Breast Cancer Registry Report

Please contact us by email at hkbcr@hkbcf.org and provide the following information: *Name, Organisation (if applicable), Address, Telephone number, and Email address*.

Registration and subscription enquiries:

Breast Cancer Research Centre Tel: 3143 7353 Email: hkbcr@hkbcf.org

3. Make a Donation

Your generous donation will support our ongoing research and contribute to a better understanding of breast cancer and the improvement of breast cancer care in Hong Kong.

Personal Donation

For donation details, please visit the HKBCF website:
https://www.hkbcf.org/en/get_involved/donation/

Corporate Donation

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

Donation enquiries:

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ACKNOWLEDGEMENTS

Contributors

The report was prepared by the Breast Cancer Research Centre (BCRC) of the Hong Kong Breast Cancer Foundation. We would like to express our gratitude to:

- Patients/survivors registered with the Hong Kong Breast Cancer Registry (HKBCR)
- Institutions and individuals working with the HKBCR to facilitate data collection at clinics and hospitals throughout the territory
- The Hong Kong Breast Cancer Registry Steering Committee
- Research Associates, Dr. Jessica HUNG, Prof. Hoyeon LEE, Dr. Karen LI, Dr. Grace LO, Dr. Ching TANG and Dr. Henry WONG for conducting research with the BCRC
- The editorial board of the HKBCR Report No. 18, Ms. Kennix CHIM, Mrs. Justina LAM, BBS and Dr. Lawrence LI for advising on the content and editing the report

Funding support

The Hong Kong Breast Cancer Foundation would like to thank the following individuals and organisations for their support to the HKBCR in 2025-2026:

Sapphire Sponsors

MSD

NOVARTIS

Pearl Sponsors

Daiichi-Sankyo | AstraZeneca

DIAGNOSTIX Group

Pfizer

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And donors who choose to remain anonymous

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Hong Kong Breast Cancer Registry is a HKBCF initiative and a member of the International Association of Cancer Registries (IACR).

Website: https://www.hkbcf.org/en/our_research/main/32/