

Cancer Care in Hong Kong

A Policy Brief

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September 2022

Updated version in October 2022

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This study is led by Professor Yeoh Eng-Kiong, Director of Centre for Health Systems and Policy Research at JC School of Public Health and Primary Care of the CUHK. The Centre for Health Systems and Policy Research funded by the Tung Foundation is acknowledged for the support throughout the conduct of this study.

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Preamble

This policy brief is a summation of evidence on cancer care and financing in Hong Kong. The research was conducted by Centre for Health Systems and Policy Research, JC School of Public Health and Primary Care at the Chinese University of Hong Kong with the following objectives:

- To review the literature on epidemiology of cancer, cancer cost, and cancer screening and care in Hong Kong;
- To interview relevant stakeholders on their knowledge and attitudes towards cancer screening and treatment, cancer screening practices, level of need and demand for screening services;
- To assess the impact of cancer on the health system and patients; and
- To identify attributes to incentivise cancer screening for cancer prevention and early diagnosis.

This brief provides a summary of evidence to inform policy options for cancer care in Hong Kong and in particular for the cancer screening. It also identifies the gaps in the current service delivery and financing system in the cancer control continuum. The study framework in Figure 1 presents the various factors influencing the stages in the cancer control continuum from cancer prevention, early detection, diagnosis, treatment, to survivorship and end-of-life care. The framework guides the structure of the policy brief and the findings which identify the gaps and barriers in the current service delivery and financing in the cancer control continuum, and population behavioral factors that affect cancer control and uptake of cancer screening. Literature and document reviews, interviews with stakeholders, and questionnaire surveys (Appendix) are used to generate data for evidence synthesis for each component of the framework.

Figure 1: Study Framework of cancer control, influencing factors, and outcomes.

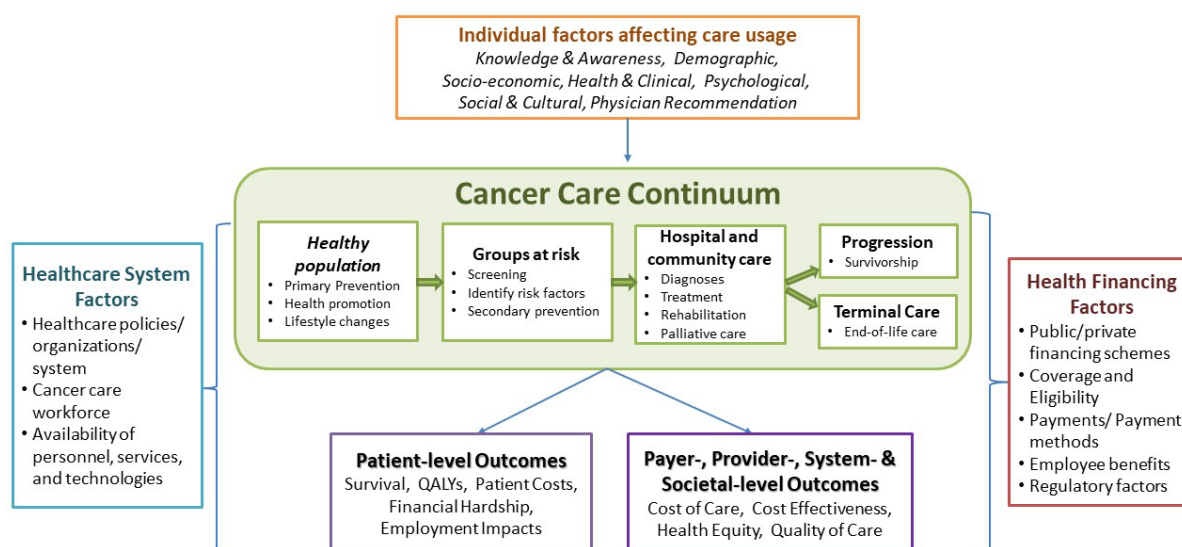


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Executive Summary

As the population continues to age, Hong Kong will encounter considerable challenges (i) in meeting the healthcare demands arising from the projected incidence of cancer and the advances and innovations in diagnostic technologies and treatment modalities and (ii) in financing escalating costs of cancer care arising not only from the per-capita costs of cancer care but also from new costs generated from more treatable cancers. Hong Kong SAR government has published a Cancer Strategy in 2019 that sets out a vision to reduce the cancer burden in the local population. The strategy does not consider how the vision can be actualised and financed in the health system. In light of the challenges and evidence needed to inform government on strategies and options to meet those challenges, the Centre for Health Systems and Policy Research, JC School of Public Health and Primary Care at the Chinese University of Hong Kong conducted a research for policy brief to summarize the evidence on 1) the service needs for holistic cancer care, 2) the gaps in public and private provision, 3) the roles of public and private financing and private medical insurance, and 4) the barriers and facilitators in accessing cancer care and population screening services encountered by affected individuals. Literature and document reviews, interviews with stakeholders, and questionnaire surveys are used to generate data for evidence synthesis.

Epidemiology of Cancer

Cancer incidence has been rising over the last two decades and is projected to continue increasing in the coming decades in Hong Kong. The rising cancer incidence was more substantial for younger populations aged under 65, contributed mainly by the increasing numbers of prostate cancer in men and breast cancer in women. As the top killer in Hong Kong, the number of cancer deaths has been rising at a rate of 1.5% per year. As evidenced from the 2019 Hong Kong Cancer Statistics, men still have a higher risk of developing cancer than women; however, in the past ten years, the gap has been narrowed. Older age is a major risk factor of cancer. For the increasing prevalence of cancer among the younger population, risk factors in lifestyles, e.g., physical inactivity, obesity, dietary factors, and alcohol consumption, have a major contribution. Data is available for the 5-year breast cancer survival rate in Hong Kong of 84.0%, which is similar to the OECD average of 84.8%. Further study is warranted to generate updated survival rates for other cancer types, e.g., lung cancer.

Cancer Control Continuum in Hong Kong

Prevention: 40% of cancer cases are preventable by adopting a healthy lifestyle. While the population smoking rating remains low, the prevalence of unhealthy diet and physical inactivity are of concern. The Hong Kong government has implemented multiple public campaigns to encourage a healthy lifestyle in the prevention of cancers. Our qualitative studies found that the general public and cancer patients generally had a high awareness of cancer prevention but commonly expressed difficulty in maintaining a healthy lifestyle.

Screening and early detection: Cancer screening enables early detection and treatment of cancer and improves survival rates. In Hong Kong, recommendations for screening have been formulated

by the government's Cancer Expert Working Group for top ten cancers. Government has initiated three screening programmes; two are population screening programmes for colorectal and cervical cancer. However, screening for breast cancer is piloted targeting women with moderate or high risk based on risk assessment. In comparison with high-income countries, government-initiated screening programmes in Hong Kong are falling behind in up-take rates, eligibility, funding, and promotional incentives, and there are also socio-economic inequities in cancer screening. Opportunistic screening initiated by healthcare professionals or by patients themselves are recommended for people at risk for the other types of cancers. Patients need to have the knowledge and awareness of the signs and symptoms which could be early signs of cancers for them to seek professional consultation for early detection. This knowledge is particularly important for population groups with risk factors for the most prevalent cancers. Timely access to primary care for an initial consultation followed by prompt referral to specialists and early treatment improves patient outcomes and survival.

Diagnostic care: Most patients are referred to the Hospital Authority (HA) Specialist Outpatient Clinics (SOPCs), for further investigation of suspected cancers and management of confirmed cancers. However, special diagnostic investigations such as positron emission tomography (PET) scans are only available in a few HA hospitals, and patients may need to make multiple visits to different hospitals to complete the required investigations, which results in avoidable delay for cancer care in HA. Our in-depth interviews with cancer patients showed that only a small proportion of patients were qualified for the fast-track diagnostic services in public hospitals. All other cancer patients can also access private hospitals' diagnostic services upon referral from public hospitals.

Treatment: The cancer treatments provided by HA include radiotherapy, surgery, chemotherapy, targeted therapy, hormonal therapy and immunotherapy. HA has implemented initiatives to integrate cancer care across the service network to improve cancer patient outcomes. The cancer drugs available in HA are listed in the HA Drug Formulary, where drugs are categorised into general drugs, special drugs and self-financed drugs. However, patient groups reflected that it may take up to five years for a new drug to be included in the HA Drug Formulary whereas private hospitals are more likely to provide new cancer drugs and other advanced cancer technologies earlier. In the in-depth interviews, cancer patients recalled having to wait for treatment even after a diagnosis had been made in public hospitals. In contrast, patients using private services meet with oncologists upon diagnosis and receive treatment promptly, raising questions on socioeconomic inequity in receiving cancer care.

Palliative and end-of-life care: Palliative care services provided by HA include inpatient, consultative, outpatient, day service and home care, targeting patients with different levels of need. Private providers of palliative services are mainly non-government organizations. End-of-life care in Hong Kong is also mainly provided by the public sector. Some of the cancer patients interviewed have used Chinese medicine during their patient journey. All agreed Chinese medicine played a supplementary role and could relieve pain and symptoms and reduce side-effects from cancer treatments such as chemotherapy.

Survivorship care: There are gaps in the service model for cancer survivors, including the role of primary care, absence of a surveillance protocol, inadequate rehabilitation, and community support

both in public and private sector. More recently, HA has been utilizing internal resources, in initiating collaboration with external parties including non-government organizations, district health centres and private providers to improve follow-up survivorship care in response to the growth needs of the population of cancer survivors.

In 2019, HA issued a Strategic Service Framework for Cancer Services which sets out the strategic directions for HA to improve adult cancer services.¹ The framework covers 5 major areas for improvement to address service gaps: governance and cluster service organisation, diagnosis, treatment, survivorship and performance monitoring. Tightening linkage and reinforcing cluster-based cancer services are the strategies to provide efficient and effective cancer service organisation. Timely access to cancer diagnostic services is to be provided through stratifying patients and provision of fast-track diagnostic services. To prompt patient-centred quality cancer treatment, HA will apply “Integrated Cluster Cancer Centre” model and streamline supportive care pathway and improve care coordination. Cancer survivorship is empowered through aligning survivorship care, facilitating transition to primary care, and supporting them in the community. HA will also strengthen data-driven performance monitoring and evaluation through collecting data systematically along the patient journey and identifying key domains and developing clinical indicators for continuous quality improvement.

Financing Cancer Care in Hong Kong

Globally, cancer care costs have been increasing over the decades, creating pressure on cancer care expenditures. Increasing disease prevalence and improved access to care are major factors that have contributed to increased expenditures. Another factor that has driven up cancer care costs has been the increasing per-capita costs of cancer care, due to 1) innovation and advances in the technology of treatment, diagnosis, and imaging, 2) overutilization of diagnostic technologies and overtreatment of patients, 3) low or unknown cost-effectiveness of new diagnostic and treatment technologies, 4) futile intensive treatments of advanced cancer patients in the end-of-life period. Without changes in healthcare system and government regulations, the increasing trend of cancer expenditure is likely to be unsustainable in the foreseeable future.

Cost increases will inevitably have to be borne by patients. “Financial toxicity” has been coined to refer to these harmful effects resulting from the high costs of treatment. Patients may face depression, anxiety, and stress. They may reduce daily spending to reduce expenditures, sell assets and even borrow in order to pay for treatment costs. The financial burden may also adversely impact patients’ access to care, leading to forgone care and socio-economic-related inequity in cancer treatments and, consequently, patient outcomes. In addition to the financial toxicity for individuals, rising cancer costs also threatens financial sustainability of health systems. Some countries facing increasing treatment costs recognise that current financial mechanisms and policies are not sustainable and are setting up specified cancer funding and negotiating with manufacturers for risk sharing agreements. Some countries may decide to reduce other health expenditures and reduce infrastructure investments, which could compromise general health service coverage and accessibility.

Patients receiving public cancer care services provided by HA pay low user charges. Established cancer drugs in the general and special categories of HA Drug Formulary are heavily subsidized,

while the category of Self-financed Drugs which cover new and advanced treatment such as targeted therapy require patients to pay for the costs. Patients with financial difficulties are protected by a means-tested safety net of the Samaritan Fund (the Fund) Programmes and the Community Care Fund (CCF). Cancer patients not eligible for assistance by the safety nets and in need for these treatments have to bear the cost out-of-pocket, if they are not covered by health insurance. A local survey found that the general public usually underestimates the expenses for terminal stage colorectal cancer treatment in public hospitals.

In the private sector, except for the publicly funded public-private partnership (PPP) programmes, healthcare is paid out-of-pocket and/ or from individuals or employer purchased private health insurance. Despite 47% of local population were covered by private health insurance, its effect on diverting demands from the public sector to private sector has been very limited - 43% of the inpatients covered by the insurance were treated in public hospital in 2016. Private health insurance policies for cancer care vary in terms of premiums, insured amounts, coverage of cancer medicines and treatment, particularly for new treatment modalities, and the management of cancer recurrences. Newer products of critical illness insurance supporting cancer care have been developed to address the complex cancer treatment journey. There are growing insurance products designed for cancer treatments with expanded coverage of ambulatory diagnostic services and therapies, new drugs/technologies, hospitalization, and/or transportation during the treatment period, in recent years.

Behavioural Factors Affect Cancer Screening

Knowledge of cancer is variable and more promotion and publicity is needed to increase awareness. Territory-wide screening programme subsidized by government as well as insurance to cover screening (employee or individual insurance) were perceived to be the most useful facilitators for cancer screening. Most of respondents (61.3%) had no prior experience on cancer screening before. 32.4% and 17.6% of the female respondents received cervical cancer screening and breast cancer screening respectively. Among all respondents, colorectal cancer (CRC) screening rates of colonoscopy (11.3%) and faecal occult blood test (FOBT) (10.3%) were reported. The discrete choice experiment (DCE) found that CRC mortality reduction (60% reduction) is the key non-monetary factor affecting the willingness to accept faecal immunochemical tests (FIT), followed by testing frequency (every 2 years), early detection (150% additional early detection), familiar physician, and reduction of false positive rate (8%). Out-of-pocket payment also substantially affects the willingness to accept FIT.

Policy Implications

- **Governance for a cancer control strategy**

The government has made a significant first step in publishing the Hong Kong Cancer Strategy 2019 which describes the governance and executive agents in the public sector. However, in view of the daunting challenges in meeting rising demand, financing escalating costs, bridging the gaps in public provision and co-ordinating private provision, the governance framework needs to include the private sector.

A **governance framework for a cancer control strategy** needs be informed by (i) estimates of future demand and evaluation of the current supply, (ii) assessments of gaps in the organisation of cancer services, (iii) design of an integrated cancer care model, (iv) referral mechanisms, protocols and clinical guidelines for co-ordination and continuity of care between public and private provision, (v) public financing models and strategic purchasing of cancer care, (vi) defining the roles of supplementary and complementary private financing, (vii) platform for public-private collaboration and patient and community engagement, (viii) mechanisms for monitoring, evaluation of progress and accountability, and (ix) enhancing research capacity to assess innovations in cancer control and management and impact of precision oncology.

- **Prevention**

There is general public awareness of life-style changes for prevention, but few persons interviewed had the motivation and even fewer who were confident they would be able to achieve the desired change. Government should consider the potential of **integrating health promotion programmes for the major chronic non-communicable diseases including cancer** which have common life-style risk factors for effectiveness. **Pre-implementation studies of the design, implementation strategy and plan, and method of evaluation of the programmes in a strategy for prevention** would be of value to achieve pre-defined targets. Research on the **role of the community, environments and policies to motivate and support behavioural changes and components of a prevention strategy** would be beneficial. More health promotion activities, such as promotional videos, distribution of health booklets, and health education events, could be organized for average-risk individuals to increase their awareness of the government screening programmes. The successful experience from anti-smoking campaign in local context could be instructive. A review of the infectious diseases, occupational and environmental preventable risk factors for cancer in Hong Kong would enable an assessment of the progress made in their control and whether further research and interventions are needed.

- **Vaccine preventable cancer**

The Hong Kong Childhood Immunisation Programme has included HPV vaccination for eligible female primary students to prevent cervical cancer. **Monitoring of take-up, evaluation of the programme and consideration of expanding eligibility** would further enhance effectiveness in preventing HPV infection. A steering committee for prevention and control of HPV which mirrors the committee for prevention and control of HBV which also includes screening for cervical cancer in a more integrated approach would be beneficial.

- **Screening and early detection of cancer**

Only 2 cancers are recommended for screening of the asymptomatic population, colonic and cervical cancer. The only fully subsidized screening programme is for FOB for colonic cancer. Take-up rates have not been optimal; one factor could be the colonoscopy that may be required after a positive FOB is provided with a co-payment. Take up of screening is more likely when it is provided by a physician the person is familiar with. It is important for the **primary care practitioners to deliver the cancer screening and prevention information to patients**, especially those with moderate or high risk for developing cancer. **Primary healthcare services**

need to be **strengthened to provide health promotion and cancer prevention**. The District Health Centre is a good platform to provide early risk assessment in addition to the health check on Hypertension and Diabetes. The findings from our discrete choice experiment in Chapter 4 would provide insights for government to reconsider how the current cancer prevention programme can be enhanced.

In our comparative study of 5 high income jurisdictions only the U.S. and Hong Kong did not provide a cervical cancer screening programme to the targeted population at no costs to the beneficiary. This has been one factor for the low take-up rates and government should reconsider the strategy to improve the uptake and integrate the programme with a cervical cancer control strategy coordinated by a steering committee as for HBV. **Co-ordination** is also necessary to ensure early access for confirmation of diagnosis and prompt treatment of the cancer.

The Cancer Expert Working Group does not recommend population screening for asymptomatic person for the other 7 major cancers and only recommends screening for individuals at risk for the cancer. **Preconditions for early detection** are (i) patient awareness of the signs and symptoms which leads to the cancer, (ii) early access to a physician for a consultation, (iii) physicians' knowledge of the recommended tests for the risk levels of different cancers, and (iv) referral to specialists for prompt confirmation of diagnosis and early treatment. **Development of early detection protocols and pathways for the major cancers supported by health education programmes and primary care physician training** should be considered for a cancer control strategy.

- **Cancer care in public hospitals and collaboration with the private sector**

Hong Kong healthcare system is segmented with parallel tracks of public and private systems of financing and provision. There are significant **gaps in referral for early diagnosis and treatment**, and **access to public cancer care is limited by the increasing demand** which is overwhelming the public provision. Public hospitals play a dominant role in treating cancer patients in Hong Kong and have been putting efforts to build up an **integrated service model** to improve the cancer patient outcomes. The Hospital Authority has published a strategic service framework for cancer services in 2019 with a vision for cancer services: all cancer patients receive timely, coordinated and patient-centered care in their cancer journey. The framework identifies gaps and key areas and strategies for improvement in five areas: (i) governance for efficient and effective cluster cancer service organisation, (ii) early cancer diagnosis, (iii) prompt patient-centered quality cancer treatment, (iv) empowered cancer survivorship, and (v) data-driven service planning and improvement and performance monitoring. Measures to implement the strategy are in place or in the pipeline along the patient journey from diagnosis, treatment, survivorship, and palliative to end-of-life care. The greater unpredictability in the COVID-19 pandemic presents an opportunity to **review progress made in the five strategic areas and the intervention needed to actualize the vision**. In addition to regular review of these services for overall service planning, more **evaluation is needed to monitor their performances**, including time from referral to consultation to diagnosis and to receiving treatment and improvements in patient outcomes and satisfaction.

The role of private sector and NGOs should also be **enhanced** to improve access to prompt care and relieve the pressure in the public sector in cancer care provision. A review and **evaluation of**

the capacity of the private health care sector would identify opportunities for collaboration in cancer care. The private sector role in provision could be either **complementary or supplementary to the public sector**. **Platforms for collaboration engagement and mechanism for communication** should be established.

- **Role of financing and private health insurance in access to cancer care**

Increasing cancer incidence, earlier onset, cancer care technological advancements, improving survival are some of the factors contributing to the **escalating cancer care cost** leading to questions on the financial sustainability of health systems and affordability and access to effective treatments for patients. The roles of private financing and provision need to be defined in order to harness the resources for a more efficient and effective system of cancer care. Out-of-pocket payments for cancer care will be catastrophic especially when patients had not been financially prepared. **Health insurance pools risks**, is prepaid and has the capacity to enable needed care and treatment and offers financial protection from the high costs. Private health insurance has the potential to play a role in diverting patients from public to private sector, reducing the stress of public sector and improving the access to early detection, timely diagnosis and prompt treatments and access to effective technologies. The impact can be enabled by the **development of the private insurance market**, especially in the growing insurance products targeting cancer care providing comprehensive coverage of cancer care in screening and early detection diagnoses, therapies, new drugs/technologies, hospitalization, palliative and survivorship care in the patient journey. Supplementary insurance products could also be designed to cover new technologies and treatment neither provided nor subsidized in the public sector.

Those less well-off group including low-income communities, and those with chronic diseases, however, are less likely to purchase individual health insurance, while employer-based insurance may provide less coverage for those from small companies and those from lower level of positions. These inequities in private insurance coverage can lead to inequity in access and adherence to cancer care, and further accentuating differential cancer outcomes. Therefore, **more attention** is needed on the **inequity in cancer care** relating to private health insurance and to examine the potential role in supplementary financing. Government could consider a policy to **identify disadvantaged groups and provide financial support such as conditional cash transfer in enabling them to access private health insurance**. For example, the Voluntary Health Insurance Scheme could be further modified to incorporate a standardized supplementary insurance for cancer care, which may charge a low premium affordable to low-income people, and also able to accept applications from many chronic disease patients.

Chapter 1: Epidemiology of Cancer

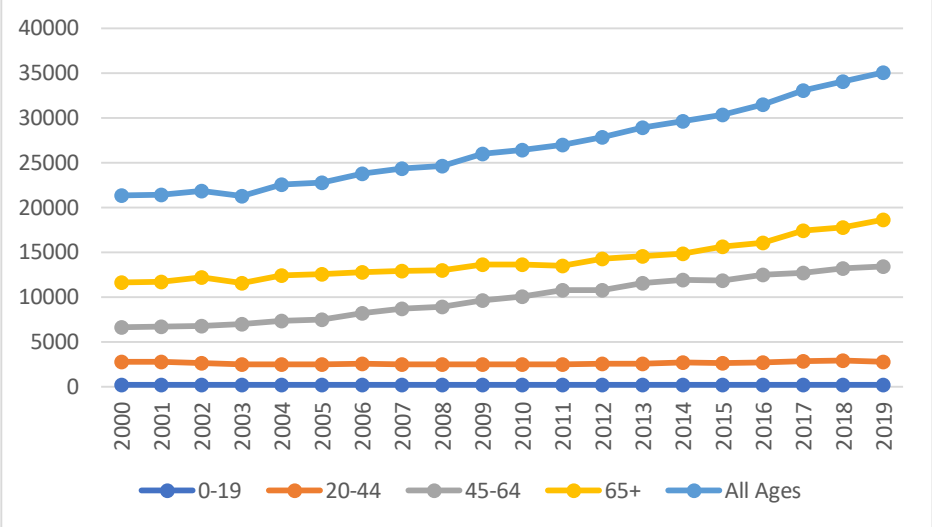
This chapter reviews the epidemiology of cancer, and presents data on cancer incidence, cancer mortality by gender and age group, cancer risk factors, and survival rates in Hong Kong, and in comparison with Organisation for Economic Co-operation and Development (OECD) countries.

1.1 Cancer incidence and mortality

Cancer is a major contributor to disease burden globally. Its incidence has been rising over the last two decades and is projected to continue increasing in the coming decades. There were 10.06 million new cases in all cancers globally in 2000,² and this has doubled to 23.6 million in 2019.³

Consonant with the global trend in Hong Kong the number of new cancer cases has been increasing every year from 21,349 cases in 2000 to 35,082 cases in 2019.⁴ The rate of increase of new cancer cases was 2.9% per annum in the last decade.⁵ The incidence rate per 100,000 population has also increased from 320.3 to 467.3 during the period. The rising cancer incidence rate was more substantial for younger populations, aged under 65, with the number of new cases increasing from 9,694 in 2000 by nearly 70% to 16,434 cases in 2019, with the corresponding incidence rates increasing significantly for the 45-64 age group (Figure 1.1). As seen from the cancer statistics of 2019 in Hong Kong, men continue to have a higher risk of developing cancer compared to women but the gender gap has been reducing over the past ten years (Figure 1.2). Women of younger age group were also more vulnerable to cancer, due to the gender-specific cancers, breast, cervix, corpus uteri and ovary. In the age group of 20-44, the gender difference in cancer incidence rate was more significant with women having twice the number of cancers than men (Figure 1.3).

Figure 1.1 Number of new cancer cases in Hong Kong by year and age group



The five most commonly diagnosed cancers in 2019 were lung cancer (15.9%), colorectal cancer (15.8%), breast cancer (13.7%), prostatic cancer (7.2%) and liver cancer (5.3%).⁴ These five types of cancer accounted for 58% of the newly diagnosed cancers in 2019. The increasing numbers of new cancer cases were mainly contributed by the increasing numbers of prostatic cancer in men and breast cancer in women, accounting for 71% and 62% of the increases. The types and orders of the five leading cancers have not changed over the decade.⁶ The top five cancers for males account for 64% of all new male cancers in 2019, these were cancers of the lung (19.4%), colorectum (18.3%), prostate (14.3%), liver (8.2%) and stomach (4.3%). For females, the top five cancers accounted for 65% of new female cancers in 2019, these were cancers of the breast (27.4%), colorectum (13.3%), lung (12.4%), corpus uteri (6.9%) and thyroid (4.7%).

Figure 1.2 Number of new cancer cases in Hong Kong by gender and year

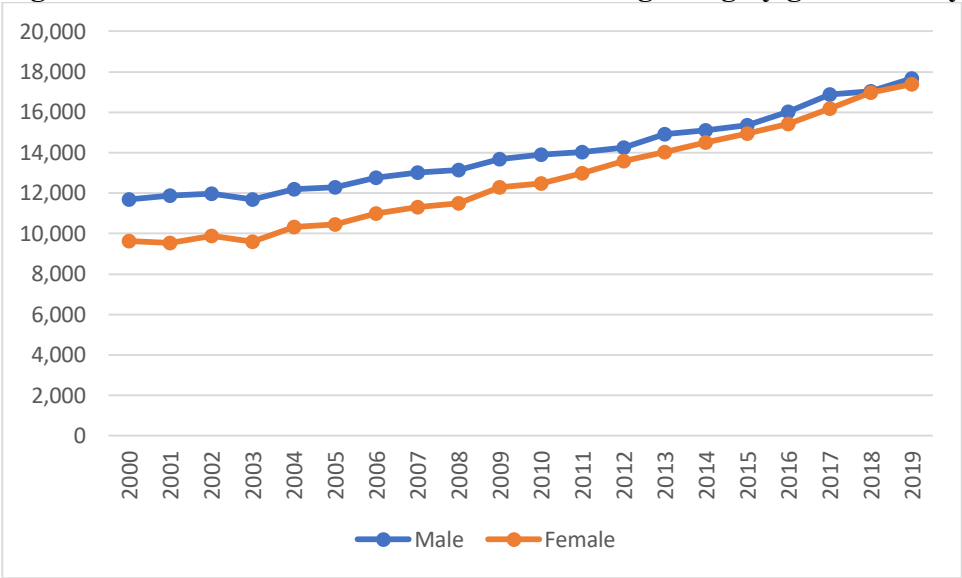


Figure 1.3 Number of new cancer cases in Hong Kong by gender and age group in 2019

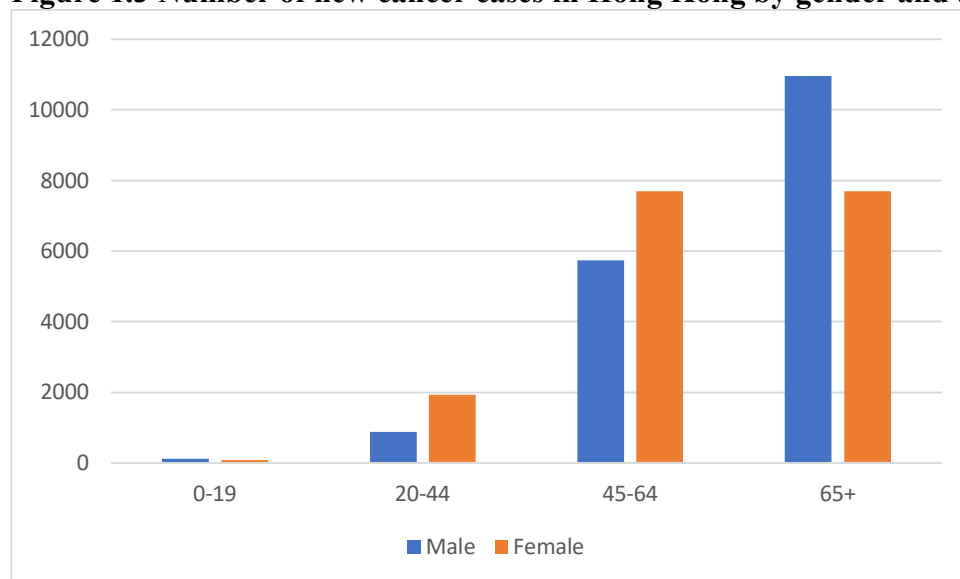
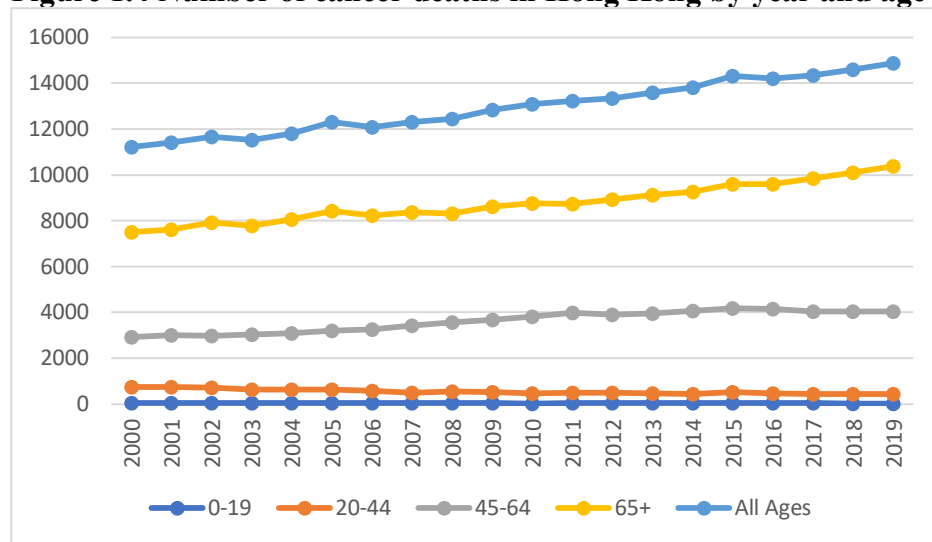


Figure 1.4 Number of cancer deaths in Hong Kong by year and age group



As the top killer in Hong Kong, cancer mortality rose from 11,222 deaths in 2000 to 14,871 deaths in 2019 (Figure 1.4). The overall number of cancer deaths has risen at an annual rate of 1.5%. The leading five types of deadliest cancer by rates per 100,000 population⁴ in 2019 were lung cancer (27.1%), colorectal cancer (14.6%), liver cancer (10.3%), breast cancer (5.8%) and pancreatic cancer (5.0%). About 58% of cancer deaths were in men in 2019. The crude annual mortality rates of cancer were 252.6 for males and 152.4 for females. The number of cancer deaths increased from 3,715 in 2000 to 4,493 in 2019 for people under 65 years. Global cancer deaths have also increased by 4 million cases during the period.^{2,3}

1.2 Risk factors

Older age is a major risk factor for cancer.⁷ The inseparable relationship between age and cancer incidence is illustrated by the similar incidence curves for the more common cancers, with rising trends after the age of 50.⁸ Aging is the accumulated exposures to cancer risks in a person's life, which include age-related comorbidities, life-style related risk behaviours and exposure to environmental carcinogens.⁹ Some of the same biologic mechanisms that regulate aging are also involved in the pathogenesis of cancer.¹⁰ Multiple studies had predicted increasing cancer incidence as a result of rapid increase in older people worldwide.¹¹⁻¹³ Population structure changes will contribute to future increases in cancer incidence and demand on health systems. However, the rising cancer incidence can be reversed with effective population preventive programmes.

An increasing prevalence of cancer among younger population was also observed. Physical inactivity, obesity and dietary factors are important risk factors for cancer. Physical inactivity is a major contributor to the rising prevalence of obesity, and may on its own increase risks of many cancers. Obesity is as one factor that has contributed to increasing cancer incidence among younger populations.¹⁴ Previous epidemiological studies have found an association of obesity with colorectal, breast (post-menopausal), kidney, pancreatic, bladder, liver and haematological malignancies.¹⁵ With the rising prevalence of obesity in many developed countries such as the US, evidence that obesity could be a causal factor of cancer has accumulated.¹⁶ Another risk factor that increases the risk of cancer is alcohol consumption. Research has found that alcohol consumption was associated with increased risk of breast cancer in younger populations.^{17,18} Cancers of the upper digestive tract, colorectum and liver have also been linked to alcohol use. In 2020, it was estimated that around 4.1% of new cancer cases globally were attributed to alcohol consumption.¹⁹ Smoking is a well-established risk factor for cancer especially for lung cancer. Current smokers, former smokers and increasing number of cigarettes consumption per day were associated with a higher risk of lung cancer compared with non-smokers, irrespective of gender.²⁰ These risk factors in lifestyles have a major contribution to cancer risk and it is estimated that 40% of cancers can be prevented if their health risks behaviours can be eliminated.²¹

Infectious agents are the second most important risk factors for cancer: six viral infections are associated with human cancers: Epstein-Barr virus (EBV), human papillomavirus (HPV), hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus type 1 (HIV-1), and human T-cell lymphotropic virus type 1 (HTLV-1). Infection by 3 other agents have also been established as risk factors for cancer; the bacterium *Helicobacter pylori* and the parasites, *Schistosoma haematobium* and *Opisthorchis viverrini*. These risk factors can be substantially reduced by prevention and control of these infections. HBV & HPV can be prevented with vaccines. *Helicobacter pylori* can be eradicated with antibiotics. HBV, HCV and HIV-1 infection can be controlled with antivirals, and *Schistosoma* and *Opisthorchis* infection by public health measures and antiparasitic drugs. Other risk factors for cancer are occupational and environmental exposure to asbestos, arsenic and silica dust, ionizing and non-ionizing radiation. These can be reduced by occupational and environmental health interventions and regulations.

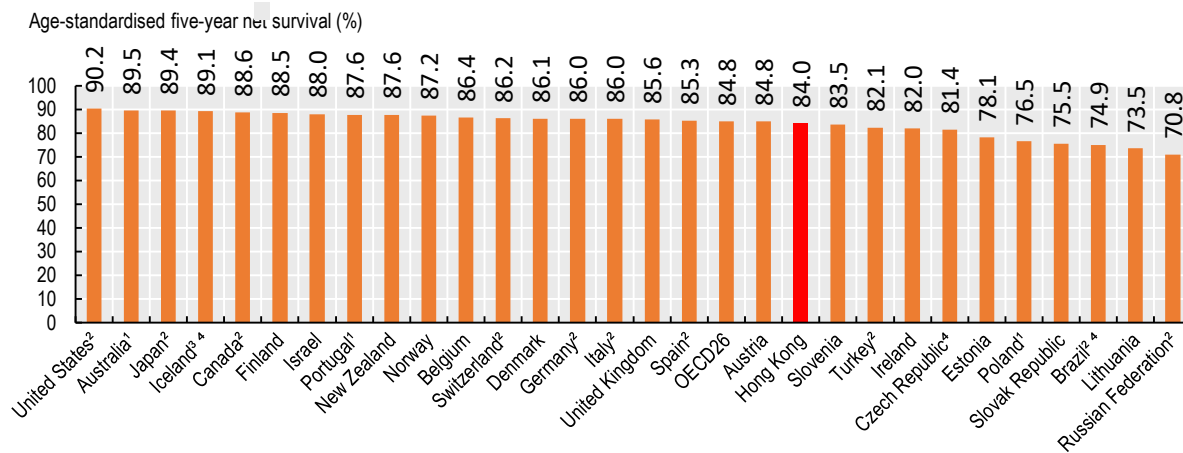
Genetic factors of high penetrance cancer genes are associated with a very substantial risk of cancer but the total case risk attributable is small. Recent research shows 10-15% of all cancers

may be associated with inherited genetic changes. A landmark study by Samadder et. al. showed 13% of patients with solid tumours.²²

1.3 Survival rate

Analysis of survival of breast cancer and colorectal cancer patients diagnosed in 2010-2017 with follow-up up to 2019 was made by the Hong Kong Cancer Registry. The analysis found the overall 5-year relative survival rate of breast cancer of 84.0%. In terms of specific stages, the 5-year survival rates for stage I, II, III and IV breast cancer patients were 99.3%, 94.6%, 76.2% and 29.8% respectively.⁶ Compared to OECD countries, there is a gap between Hong Kong and the best performing health systems in terms of 5-year breast cancer survival rate, and Hong Kong also has a lower survival rate compared to the OECD average of 84.8% (Figure 1.5).²³ For colorectal cancer, the overall 5-year relative survival rate was 58.2%. Although the 5-year relative survival rates were high for stage I and stage II, of 95.7% and 87.3% respectively, it dropped to 68.7% for stage III and declined substantially to 9.3% for stage IV. For lung cancer, the latest known data was from 2001, with a 5-year relative survival rate of 22.0%. There is a need for further analysis of updated survival rate for other cancer types to provide a more comprehensive assessment of cancer outcomes, which is critical for informing and evaluating cancer strategies and programmes.

Figure 1.5 Breast cancer age-standardized five-year net survival (%)



Chapter 2: Health System Cancer Care

The health system of Hong Kong operates as a dual public-private system. The Hospital Authority (HA) is a statutory body given the mandate and responsibility to manage all public healthcare services in Hong Kong, providing more than 90% of hospital care and around 30% of out-patient care throughout the territory. In relation to cancer care, public hospitals provide a comprehensive range of cancer services to patients, covering the cancer care journey from symptom presentation, diagnosis and treatment to survivorship, palliative and end-of-life care. Around 90% of the new cancer cases were diagnosed and treated in HA.²⁴ HA cancer services are organised into 7 geographical clusters with inter-cluster collaborations. Most of the cancer services in HA (e.g. diagnostic radiology, pathology, endoscopy, surgery, chemotherapy and palliative care) are provided in regional hospitals within each cluster. Radiotherapy treatment for cancer is currently available only at the 6 cluster-based clinical oncology centres, with the 7th cluster-based oncology centre being built.

In 2019, HA issued a Strategic Service Framework for Cancer Services which sets out the strategic directions for HA to improve adult cancer services.¹ The framework covers 5 major areas for improvement to address service gaps: governance and cluster service organisation, diagnosis, treatment, survivorship and performance monitoring. Tightening linkage and reinforcing cluster-based cancer service are the strategies to provide efficient and effective organisation of cancer services. Timely access to cancer diagnostic services is to be provided through stratifying patients and provision of fast-track diagnostic services. To prompt patient-centred quality cancer treatment, HA will apply “Integrated Cluster Cancer Centre” model and streamline supportive care pathway and improve care coordination. Cancer survivorship is empowered through aligning survivorship care, facilitating transition to primary care, and supporting them in the community. HA will also strengthen data-driven performance monitoring and evaluation through collecting data systematically along the patient journey and identifying key domains and developing clinical indicators for continuous quality improvement.

Although the care provided by HA is extensive, variations and gaps exist in service provision, timeliness, accessibility, quality, and survivorship care. The private healthcare sector, comprising of 13 private hospitals and thousands of clinics, operates in parallel with the public sector. All private hospitals in Hong Kong provide cancer-related services, in conjunction with private outpatient clinics and specialist medical centres for cancer diagnosis and treatment. The private sector provides a range of cancer services from screening to treatment. Operating under market principles, different providers are free to set their service charges independently. The service charges of private hospitals are much more costly compared with that of public hospitals and have been criticised as lacking in transparency.

This Chapter reviews the cancer care in Hong Kong along the patient journey from prevention to end-of-life care, in public and private sectors.

2.1 Prevention

40% of cancer cases are preventable. Adopting a healthy lifestyle reduces the exposures to the risk factors of cancers, including tobacco use, alcohol consumption, dietary, physical inactivity, and obesity. In Hong Kong, the proportion of population who had ever smoked cigarette in 2003/04 and 2014/15 were 24.6% and 27.1% respectively, and it decreased to 17.9% in 2018/19. However, the proportion of population with adequate daily intake of fruit and vegetables recorded a decline from 16.3% in 2003/04 to 5.6% in 2014/15 and remained static at 4.4% in 2018/19. The proportion of adults aged 18 or above who performed an exercise of 150 minutes per week also decreased slightly from 87% in 2014/15 to 83.2% in 2018/19.²⁵⁻²⁷

In view of the importance of healthy living, the Hong Kong government has implemented multiple campaigns to encourage Hong Kong citizens to adopt and maintain a healthy lifestyle for chronic disease and cancer prevention. The Hong Kong Council on Smoking and Health was established in 1987 by government. It has been promoting anti-smoking through mass publicity, health education and promotion projects in schools, and community health promotion campaigns, health talks and exhibitions. The government also prohibited indoor smoking through legislation to eliminate second-hand smoke and discourage smoking behaviors. At present, there are smoking cessation clinics operated by the Department of Health, Hospital Authority and several NGOs which provides counselling and follow-up services for current smokers to quit smoking. To improve dietary habits, the government established the Committee on Reduction of Salt and Sugar in Food in 2015. The Committee made recommendations for policy directions and work plans to reduce the intake of salt and sugar by the public and reduction of these contents in food. The Centre of Health Protection also promotes fruit and vegetable intake through the “Two Plus Three Every Day” recommendation. Policy interventions have also included the mandatory food labelling policy and health information leaflets and health promotion campaigns have also been conducted to encourage adopting a healthy diet. Campaigns and health promotions have also been implemented to motivate citizens to do more physical exercise.

From our in-depth interviews we found general awareness of cancer prevention and the lifestyle changes to prevent cancer among the general public and patients. Most of the interviewees were willing to reduce consumption of carcinogenic processed food and eat more freshly cooked food and also reduce salt and sugar intake. A few interviewees expressed their intentions to get more sleep and do more physical exercise. However, not all of them were confident they could maintain the lifestyle changes. Cancer patients were generally more aware of the benefits of healthy living. Although they were aware not all cancers are preventable, they were willing to maintain these habits. Furthermore, both the general public and patients were amenable to having more health check-ups including cancer screening which enables early detection of disease.

Effective vaccines are available for two of the viral infections associated with human cancers, HBV and HPV. In Hong Kong strategies for vaccination of eligible populations have been

implemented in 1985 for HBV and 2019 for HPV. The cancers associated with environmental and occupational risk factors can be prevented by regulatory instruments and Environmental and Occupational Health Programmes.

2.2 Screening and early detection of cancer

- **Early diagnosis**

Patients need to have the knowledge and be aware of the signs and symptoms which could be early signs of cancers. This knowledge is particularly important for population groups with risk factors for the most prevalent cancers. Access to primary care for an initial consultation and prompt referral to specialists for diagnosis can often lead to prompt treatment. Early detection and diagnosis can also be initiated by physicians who are familiar with the patient's medical history, the risk factors for the cancers and the methods of screening and diagnosis.

- **Screening**

Secondary prevention is the detection of early cancer when there is a high likelihood of cure as early cancers are more amenable to treatment. There are two strategies for early detection. First is early diagnosis which can be initiated either by the patient who has knowledge of the early signs and symptoms and has access to health care, or by a physician who is familiar with the patient and the methods of screening and detection. The second strategy is a screening programme of asymptomatic and apparently healthy individuals to detect precancerous or early stage disease and timely referrals for confirmation of diagnosis and prompt treatment.

When appropriate cancer treatment and care is delayed, the corresponding survival rate is reduced and the delay also generates higher treatment costs and expenses.²⁸ Screening is the identification of an unrecognized disease in apparently healthy and asymptomatic populations through tests, examinations and other procedures designed to detect disease. Cancer screening enables cancer care to be provided at early stages to increase the chance of successful treatment of the cancer. In general, there are three types of cancer screening approaches, including mass screening, where members of an entire population are eligible for screening; screening of selected individuals that have a higher risk of getting cancer, such as having a family history of the cancer or definitive genetic risk and; opportunistic screening, offered to individuals as a part of a health assessment, or on a doctor's advice.²⁹ The WHO has recommended a list of "best buys" for cancer screening which take cost-effectiveness into consideration.³⁰ They include, cervical cancer screening with pap smear and human papillomavirus infection, breast cancer screening using mammography, oral cancer screening in high-risk groups, and population-based colorectal cancer screening with a faecal occult blood test. Multiple studies have demonstrated the cost effectiveness of these cancer screenings. Compared with no screening, screening for colorectal cancer,^{31,32} breast cancer³³ and cervical cancer³⁴ have been demonstrated to be cost effective and reduces cancer mortality.

Currently in Hong Kong, recommendations for screening have been formulated by the government Cancer Expert Working Group for ten cancers. Of these only two have been recommended for population screening, colorectal and cervical cancer (Table 2.1). The colorectal cancer screening programme targets residents aged 50-75 and is organised and implemented using a public-private

partnership model. Eligible persons consult primary care doctors in the private sector and undergo a faecal occult blood test (FOBT). Patients with a positive result will be referred to specialists in the private sector for colonoscopy. Screening for FOBT is fully subsidized while the colonoscopy is partially subsidized by government. Although colonoscopy is also available in public hospitals, waiting times can exceed 1 year for a patient to undergo colonoscopy examination.³⁵ The other population cancer screening programme recommended is for cervical cancer. Woman Health Centres and Maternal and Child Health Centres of the Department of Health provide subsidized cervical cancer screening. The private healthcare sector provides screening for other eligible populations but have to pay for the costs out-of-pocket. A new Cervical Screening Information System (CSIS) has been implemented to enable sharing of screening records between public and private service providers with reminders for screening for the women registered in the system. Breast cancer screening is only recommended for women at moderate or high risk. However, a Breast Cancer Screening Pilot Programme was implemented in 2019 to provide mammography at a subsidized user charge in the Woman Health Centres of the Department of Health. Upon enrolling in the Woman Health Centres at an annual fee of \$310, eligible women will only need to pay \$225 for a mammogram.³⁶

Table 2.1 Recommendation on screening for cancers from Cancer Expert Working Group³⁷

Cancer Type	Age group	Recommendation (asymptomatic population)	Screening programme	Subsidy rate
Colorectal cancer	50 to 75	Annual or biennial faecal occult blood test (FOBT); or sigmoidoscopy every 5 years; or colonoscopy every 10 years	Colorectal Cancer Screening Programme	Fully subsidized for FOBT; maximum co-payment of \$1000 for follow-up colonoscopy
Breast cancer	44 to 69 at high or moderate risk	Mammography screening every two years (discuss with doctor in advance)	Breast Cancer Screening Programme	Partly subsidized for eligible women, annual fee of \$310 and \$225 per episode of mammogram
Cervical cancer	21-24 with increased risk (who ever had sexual experience and with risk factors for HPV acquisition/	Women may be screened by cytology every three years after two consecutive normal annual screenings, depending on doctor's assessment.	Cervical Cancer Screening Programme	Partly subsidized in government clinics, \$100 and \$205 per pap smear for eligible and non-eligible persons

Cancer Type	Age group	Recommendation (asymptomatic population)	Screening programme	Subsidy rate
	persistence or cervical cancer)			
	25 to 29	Women who ever had sexual experience are recommended to have cytology every three years after two consecutive normal annual screenings.		
	30 to 64	Women who ever had sexual experience are recommended to have cytology every three years after two consecutive normal annual screenings; or primary HPV testing every five years; or co-testing every five years		
	Aged 65 or above	Screening may be discontinued if routine screening within 10 years are normal, but should be screened if they never had cervical cancer screening		
Prostate Cancer	N/A	Insufficient scientific evidence to recommend for or against population-based prostate cancer screening in asymptomatic men by Prostate Specific Antigen and/or Digital Rectal Examination (discuss with doctor in advance)	N/A	N/A
Lung Cancer	N/A	Routine screening for lung cancer with chest X-ray or sputum cytology is not recommended; insufficient evidence to recommend for or against lung cancer screening by low dose computed tomography in asymptomatic persons or for mass screening	N/A	N/A

Cancer Type	Age group	Recommendation (asymptomatic population)	Screening programme	Subsidy rate
Liver Cancer	N/A	Routine screening with alpha-fetoprotein (AFP) or ultrasonography (USG) for asymptomatic persons at average risk is not recommended.	N/A	N/A
Nasopharyngeal Cancer	N/A	There is insufficient evidence to recommend a population-based nasopharyngeal cancer (NPC) screening programme using IgA against specific Epstein-Barr virus (EBV) viral antigens and EBV DNA test.	N/A	N/A
Thyroid Cancer	N/A	Screening for thyroid cancer is not recommended in asymptomatic persons at average risk	N/A	N/A
Ovarian Cancer	N/A	Screening for ovarian cancer is not recommended in asymptomatic women at average risk.	N/A	N/A
Pancreatic Cancer	N/A	Screening for pancreatic cancer (including screening by serum biomarker CA19-9) is not recommended in asymptomatic persons at average risk.	N/A	N/A

For the other seven cancers screening is only recommended for persons with moderate or high risk of the cancer and are available in the public sector on the recommendation of a doctor. Residents can also seek cancer screening in the private sector. Established cancer screening methods for the major cancers, are also available in private hospitals and health centres. Access to innovative and advanced screening methods are also available in the private healthcare sector such as a newly-developed non-invasive test, the M3 colorectal cancer screening test.³⁸

A comparison of government screening programmes with high-income countries

Health systems across the globe have formulated policies for cancer screening adapted to the local context in order to increase chance of survival and reduce treatment costs. We have conducted a

comparative analysis for three major population cancer screening programmes implemented in high income jurisdictions, the United Kingdom (UK), Australia, Taiwan, United States (US) against that of Hong Kong (HK). These jurisdictions have different healthcare financing and provision models which will provide a disparate perspective on Hong Kong's programmes. A common metric of indicators of eligibility, screening methods, take-up rates of screening, funding, co-payments and strategies for promotion is used for the comparison (Table 2.2).

The colorectal cancer screening participation rates in Hong Kong is the lowest among the 4 jurisdictions, of 22.6% and 21.4% in 2014/15 and 2018/19 respectively,^{26,27} compared with other health systems having a range of 40-55%.³⁹⁻⁴¹ The colorectal screening programme in UK has shown the greatest success in take-up rates. While the other health systems have an eligible age range of 50-74, the UK initially set it at 60-74, but has recently extended eligibility to 50-74. Despite this, their participation rate is 15% higher than the average of 40%.⁴⁰ This is in part due to the fact that the faecal immunochemical test (FIT) kit is sent to residents to be performed at home without having to visit general practitioners. As long as the resident is registered with their local general practitioner, kits are sent out automatically every two years to the eligible population. By contrast, other countries require the eligible persons to visit clinics/hospitals or, in Hong Kong, after consultation with a doctor. Since most people register with their general practitioners in the UK the process is much more streamlined and people have greater incentive to perform the test when it is sent to your door automatically.

Cervical cancer screening uses the Papanicolaou test, or colloquially referred to as the pap test, which looks for abnormalities in cervical cells and is the screening test generally recommended. Relative to other countries, Hong Kong's uptake rate is also the lowest with a participation rate of 47.3%,²⁷ compared to the participation rate in the other jurisdictions of 55%-70%.^{39,41-43} The most glaring difference between Hong Kong and the other jurisdictions is the cost to the participant for screening. In three of the other jurisdictions, screening provided by the government is completely free. In the United States, totally subsidized screening is only available for uninsured or under-insured women. Hong Kong provides free screening only to persons on social assistance, with the rest of the targeted population having to pay a fee of \$100 and the rest of the population at a fee of \$200.⁴⁴

Breast cancer screening has not been recommended for population screening in Hong Kong, the exception among the 4 jurisdictions. A pilot programme was recently implemented in 2019, and there is no data available regarding the up-take rate of mammography in Hong Kong. In other health systems, the uptake was in the range of 38-67%.^{41,45-47} The charge for breast cancer screening are also distinctive in Hong Kong's case. Where other jurisdictions provide the screening free of charge, in Hong Kong the population who are on social security do not have to pay a fee. However the rest of the population group targeted and eligible for subsidized screening have to pay an annual maternal and child health clinic membership fee of \$310 in addition to \$225 for mammography.³⁶ The non-targeted population who are ineligible for the subsidized rate will have to pay \$850 annually and \$510 per mammogram. While considerably less than the charges for private mammography, it is still a significant amount to those who wish to be screened regularly.

The cross-system comparison shows that promotion strategies also vary across the different systems. Taiwan provides mass communication programmes and referral services; UK has invited

celebrities to take part in a campaign film; Australia includes a myriad of advertisements and reminder forms; and US has initiatives that appeal to low income groups and the strategies were not just limited to a single type of cancer screening. In Hong Kong the colorectal cancer screening programme was intensely promoted through the traditional media platform of television and radio, and both breast cancer and cervical cancer screening are also promoted through the media to varying extents.

The differences in price that residents have to pay when participating in cancer screening programmes among different health systems are also apparent. In other health systems, fully subsidized tests are typically associated with take-up rates of above 50%. In Hong Kong, colorectal screening is the only one that is free of charge. However, the screening rate is still relatively low. This could be related to co-payment for follow-up colonoscopy if required which also impact on the budget for providing these screening services. Taiwan’s Health Promotion Administration (HPA) (which covers 4 screening programmes - oral, cervical, colorectal, breast) has a yearly budget of 917 million HKD.⁴⁸ In fact, some of the other countries have even larger budgets. For colorectal cancer screening, UK has invested 2 billion HKD every year for subsidizing FIT and colonoscopy.⁴⁹ The Australian government has also budgeted to spend 646 million HKD to enhance breast cancer and cervical cancer screening programmes in the 4 years from 2021.⁵⁰

Table 2.2 Comparison of government screening programmes across health systems

Cancer	Health system	Organizer	Eligibility	Type of Test	Participation	Co-payment
Cervical	HK	Government (DOH)	Non-virginal women 25-64	Pap smear test and +/- HPV test	47.3%	No co-payment for people receiving: <ul style="list-style-type: none"> - Comprehensive SSA - Level 0 voucher for elderly - Waiver of medical fees \$100 for people receiving: <ul style="list-style-type: none"> - Old Age Living Allowance - Working Family Allowance - Work Incentive Transport Subsidy - School Textbook Assistance Scheme
	Taiwan	Government (HPA)	Women aged 30+ Every 2 years	Pap smear test	55.2%	No co-payment
	UK	Government (NHS)	Women aged 25-64: 25-49 every 3 years; 50-	HPV test	70%	No co-payment

			64 every 5 years			
	Australia	Government (DOHAC)	Women aged 25-74 every 5 years	HPV test	56%	No co-payment
	US	Government (State government)	Women aged 21-64 who are uninsured/under-insured	HPV and pap smear test	66% over 2 years	No co-payment
Colorectal	HK	Department of Health	Residents aged 50-75	Faecal Occult Blood Test (FOBT) and colonoscopy upon positive FOBT results	22.6% in 2014/15 21.4% in 2018/19	No co-payment for FOBT \$1000 cap on co-payment for follow up colonoscopy
	Taiwan	Government (HPA)	Residents aged 50-74 every 2 years	Faecal Immunochemical Test (FIT)	40.7%	No co-payment
	UK	Government (NHS)	Residents aged 50-74 every 2 years	Faecal Immunochemical Test (FIT)	55.4%	No co-payment
	Australia	Government (DOHAC)	Residents aged 50-74 every 2 years	Faecal Immunochemical Test (FIT)	43.5%	No co-payment
Breast	HK	Government (DOH)	Women aged 44-69 at high or moderate risk	Mammography	Data after 2019 not available	No co-payment for people receiving: <ul style="list-style-type: none"> - Comprehensive SSA - Level 0 voucher for elderly - Waiver of medical fees Eligible person: Annual membership fee: \$310 Screening cost: \$225 per mammogram
	Taiwan	Government (HPA)	Women aged 40-69 or have	Mammography	38%	No co-payment

			close relatives with breast cancer Every 2 yrs			
	UK	Government (NHS)	Women 47-73	Mammography	64.2%	No co-payment
	Australia	Government (DOHAC)	Women 40-75	Mammography	55%	No co-payment
	US	Government (State government)	Women 40-64 who are uninsured/under-insured	Mammography	66.7% over 2 years	No co-payment

DOH: Department of Health
DOHAC: Department of Health and Aged Care
HPA: Health Promotion Administration
NHS: National Health Service

Inequity in cancer screening in international and local context

Inequity in cancer screening was widely reported in both international and local contexts. Despite the gradual decline in overall mortality rates of cancers over recent decades, the differential access to screening and care for breast, colon, and lung cancers has exacerbated the socioeconomic inequalities in cancer mortality.⁵¹ The extent of socioeconomic inequalities in cancer screenings varies by screening strategies. A European study reported that while the more educated individuals in Europe were more likely to have been screened for cervical, breast, and colorectal cancers, such inequalities were smaller, especially for cervical cancer, in countries with organized screening programme (i.e., population-based screening for targeted age range and sex at national or regional level with explicit policy support) than in those with opportunistic screening.⁵² The results support the expansion of cancer screening to population-based programme for inequality mitigation. Wools et al. concluded in a systematic review that low level of education, lower income, and ethnic minorities, along with female gender, younger age, and not having a spouse, were the most frequently reported barriers to colorectal cancer screening adherence.⁵³

Apart from socioeconomic position and ethnicity, pre-existing health conditions also play a role in the differential access to screening services. For example, Ramjan et al. reported that women with physical disabilities were facing disproportionately greater physical, environmental, psychological, and attitudinal barriers to screening services of both breast and cervical cancers, which in turn hinders timely cancer detection for preventing the associated morbidity and mortality.⁵⁴

In Hong Kong’s situation, in terms of socioeconomic position, it has been shown that among adult clients who attended community-based health check-up, lower income and unemployment, along with poorer knowledge and risk perception were the major barriers to colorectal cancer screening.⁵⁵ Several recent local studies also supported the importance of insurance coverage and

presence of a regular source of primary care on promoting colorectal cancer screening uptake among older adults in Hong Kong.⁵⁶⁻⁵⁸ Chor et al. further confirmed the socioeconomic inequality in breast cancer detection finding that women aged 40 years or above with lower household income and educational attainment tended to have a later stage of breast cancer at diagnosis.⁵⁹ The author speculated that such inequality could be attributed to the high out-of-pocket charges for mammographic screening provided by the private sector or NGOs given the lack of population-based breast cancer screening in the public sector in Hong Kong. Another study showed that lower educational attainment was one of the significant risk factors of cervical screening behaviour among women aged 50 years or above.⁶⁰

Ethnic minorities in Hong Kong also faced inequity in cancer screening as reported by previous studies. Several recent local studies on South Asian ethnic minorities in Hong Kong showed a lower uptake rate of colorectal (9.9%) and cervical cancer screening (around 40%)^{61,62} compared with the local population. Lower health literacy, language barriers, limited access to health information about cancers, poorer risk perception, and cultural norms were the major barriers to cancer screening uptake. Financial burden, in terms of low household income, high out-of-pocket charges for private healthcare services, and limited coverage of health insurance, was also identified as one of the key barriers to healthcare access among South Asian ethnic minority women in Hong Kong.⁶³

2.3 Cancer diagnosis

Most patients are referred to the HA Specialist Outpatient Clinics (SOPCs), for further investigation of suspected cancer and management of confirmed cancers. However, special diagnostic investigations such as positron emission tomography (PET) scans are only available in a few HA hospitals, and patients may need to make multiple visits to different hospitals to complete the required investigations,¹ which results in avoidable delay for cancer care in HA. To improve accessibility of diagnostic services and address the demand for radiological imaging services, the HA has rolled out a Public-Private Partnership Programme, namely “Project on Enhancing Radiological Investigation Services in Collaboration with the Private Sector” since 2012. Patients fulfilling specific clinical criteria for need can be referred to the private sector for radiological diagnostic examinations as part of their cancer care while only paying public sector rates.

From the in-depth interviews with cancer patients, it emerged that only a small proportion of patients met the criteria of severity and urgency to qualify for the fast-track diagnostic services in public hospitals. All other cancer patients can also access private hospitals’ diagnostic services upon referral from public hospitals. According to patients’ feedback, the waiting time in private hospitals was very short with timely establishment of the diagnosis. However, even after the referral discount offered by some private providers (usually of 30%), out-of-pocket co-payment of a few thousand dollars was still required for diagnostic services in the private sector. They thought that private diagnostic services were the only option they had because the waiting time for public diagnostic services exceeded two years. They were worried about the worsening and spread of cancer due to late diagnosis, and so decided to receive diagnostic services in private hospitals.

2.4 Cancer treatment

The cancer treatments provided by HA include radiotherapy, surgery, chemotherapy, targeted therapy, hormonal therapy and immunotherapy. Patients receive treatment in a range of settings from inpatient, outpatient and ambulatory care, to outreach home care. Cancer care is provided by multi-disciplinary teams and services are organised as networks in the hospital clusters. HA has implemented initiatives to integrate cancer care across the service network to improve cancer patient outcomes. One example is the Cancer Case Manager (CCM) programme to improve care coordination for patients with complex breast and colorectal cancer since 2010-11.⁶⁴ In the programme, CCMs act as the contact persons between patients and doctors and the care coordinators who navigate the patients along the patient journey and facilitate the coordination of the diagnostic and treatment processes. Initiated in 2014-15, the CCM programme is provided in all seven clusters. As of December 2019, a total of around 20 300 breast cancer new cases and 23 900 colorectal cancer new cases have benefited from the programme. The current practice of cancer treatment in public hospitals focuses more on medical than on spiritual, psycho-social and emotional needs.¹ In the interviews, both patients and their carers brought up that they both needed psychological support as they were under substantial stress throughout the patient's cancer journey. Psychological therapies and interventions had been found to be effective in improving cancer patients' psychosocial and treatment outcomes.^{65,66} NGOs have provided psycho-social support to cancer patients in collaboration with HA, such as the Maggie's Cancer Caring Centre, which provides psychological support for patients in Tuen Mun and other hospitals,⁶⁷ and the "Heart of Gold" Hospice Service Programme sponsored by the Li Ka Shing Foundation, which supported holistic palliative care and psychosocial care to cancer patients.⁶⁸ Nevertheless, most of the cancer patients we interviewed hoped that the public sector would provide more comprehensive psychological support to them.

The drugs available in HA are listed in the HA Drug Formulary, in which drugs are categorised into general drugs, special drugs and self-financed drugs. However, some patient groups made the observation that a number of new drugs for targeted therapy available in the private sector were not incorporated into the Drug Formulary of HA.⁶⁹ Patient groups also reflected that it may take up to five years for a new drug to go through the process of submission of an application for drug registration to the Pharmacy and Poisons Board and receiving approval for its registration, to the time it is included in the HA's Drug Formulary. As a result, cancer patients might not be able to access new drugs in time.⁷⁰ In contrast, the private market is more likely to have new cancer drugs and treatment technologies compared to public hospitals. For example, public and private hospitals can both provide Intensity-Modulated Radiotherapy, but more advanced technology like Volumetric Modulated Arc Therapy is more readily available in private hospitals.⁷¹ Cancer genomics profiling is a field in rapid development. Cancer diagnosis can be improved by using genomics and other molecular technologies such as liquid biopsy to facilitate early detection of cancer and monitor response to treatments. Cancer genomics has the potential to provide targeted treatment in precision oncology based on the genetic and molecular profile of the individual.

From Legislative Council Statistical Highlights in 2022, waiting time (90th percentile) to receive first treatment after diagnosis for colorectal, breast and nasopharynx cancer is 76, 64 and 60 days respectively in 2020-2021.⁷² In the in-depth interviews, cancer patients recalled having to wait for

treatment after diagnosis. In contrast, patients using private services met with oncologists upon diagnosis and received treatment promptly, raising questions on socioeconomic equity in receiving cancer care. One study found that low family income and having surgery in public hospitals as opposed to private hospitals were two independent risk factors for delay in breast cancer treatment. A third factor was patient delay (i.e., time between recalled symptom onset and first medical consultation) and system delay (i.e., time between first medical consultation and treatment).⁷³ Lee et al. also reported that the socioeconomically disadvantaged had greater excess mortality and were less likely to have received chemotherapy and rituximab in the treatment of diffuse large B-cell lymphoma compared to their more advantaged. Moreover, such inequity has been observed since early 2000s. The authors speculated that the observed inequity could be attributed to the inadequate coverage of health insurance and hence financial unaffordability for the cost of care.⁷⁴

2.5 Palliative care and end-of-life care

Palliative care, as opposed to curative care, is a disease management approach aiming at relieving symptoms, rather than curing or removing the physical cause of the disease, and at the same time addressing patient's physical, psychosocial or spiritual needs improving the overall quality of life. This approach is often adopted when faced with life-threatening or life-limiting illness where removing the cause of the disease is no longer possible. Palliative care is not equated with end-of-life care, and can be provided with certain curative treatment to support the patient, e.g. a chest infection, at any stage of a life-threatening illness and not only at the terminal stage. One of the aims of palliative care is to relieve symptoms and side-effects caused both by the illness and the treatment, and to reduce the need for admissions.⁷⁵ Palliative care services provided by HA include inpatient, consultative, outpatient, day service and home care. Inpatient and consultative services are for patients with more complex symptoms requiring medico-psycho-social interventions and support. Outpatient services allow continuity of care for discharged patients as well as specialty care for patients with symptoms or complicated psychosocial problem that can be managed in an ambulatory setting. Patients suffering from recurrent or chronic symptoms requiring one stop multidisciplinary care in an ambulatory setting may be referred to day care. Home care is suitable for patients who need intensive symptom monitoring but have difficulties travelling to hospitals or clinics.⁷⁶ There are currently 16 HA hospitals providing palliative care services, with approximately 360 beds in total.⁷⁷ Private hospitals mostly do not provide inpatient palliative services. Private providers of palliative services are mainly non-government organisations. For example, Haven of Hope Christian Service and the Society for the Promotion of Hospice Care provided inpatient services, with 124 and 30 beds respectively for palliative and hospice care.⁷⁸ The Hong Kong Anti-Cancer Society Jockey Club Cancer Rehabilitation Centre also provides palliative services for cancer patients.

Similar to palliative care, end-of-life care in Hong Kong is also mainly provided by the public sector. HA has issued guidelines related to end-of-life care, including Life-sustaining treatments for the terminally ill, Advance Directives in adults and Do-Not-Attempt Cardiopulmonary Resuscitation. HA has also facilitated collaboration between hospitals and Residential Care Homes for the Elderly (RCHes) by strengthening the outreach services of the Community Geriatric Assessment Team to provide on-site services for terminally-ill patients, including cancer patients,

and provide training for RCHE staff.⁷⁹ The Social Welfare Department has also supported RCHEs to provide end-of-life services by providing extra resources in new contract starting from 2015. The scope of end-of-life care includes enhancing social and family support, providing medical, nursing, psychological and bereavement care, and preparation for death and spiritual care.⁸⁰ In the private sector, non-government organisations also provided end-of-life services for terminally ill cancer patients. The Hong Kong Jockey Club Charities Trust launched the Jockey Club End-of-Life Community Care Project in 2015, and continued phase 2 of the project in 2019. The project partners with universities including The University of Hong Kong and The Chinese University of Hong Kong, and local non-government organisations such as Hong Kong Association of Gerontology, The Hong Kong Society for Rehabilitation and St James' Settlement. The NGOs provides home visit and psychological support for end-of-life patients and their families, while Universities generally provide education and training on end-of-life care for medical professionals. Some private doctors and private hospitals also provide home visit services to follow up end-of-life patients and their caretakers and assist with Advance Care Planning, sometimes including dying at home.

Some of the cancer patients interviewed have used Chinese medicine during their patient journey. Their views were that Chinese medicine as playing a supplementary role and could relieve pain and symptoms and reduce side-effects from cancer treatments such as chemotherapy. This complementary role of Chinese medicine in cancer treatment is also suggested in the literature.^{81,82} In light of the potential benefit of Chinese medicine for cancer, HA has commenced an Integrated Chinese Western Medicine (ICWM) Pilot Programme in designated hospitals to gather more experience. Cancer palliative care has been selected as one of four disease areas to be tested out in two designated public hospitals in the Pilot Programme.

2.6 Survivorship care

Cancer survivors generally refer to people who have had a diagnosis of cancer including people who do not have signs of cancer after completing treatment, those who received extended treatment over a very long period of time to control the cancer, and people with advanced cancer.⁸³ Cancer survivors have unique needs after their treatments, arising from the risks of recurrence and occurrence of other cancers, long-term side-effects of the prolonged cancer treatments, with significant morbidity and mortality preventable with health promotion, rehabilitation and psychosocial support.⁸⁴ With the ageing population, treatment advances and increasing survival rates of many cancers, more and more patients are living with and beyond cancer, presenting with an increasing need for survivorship care. The ideal cancer survivorship care should include: prevention of new and recurrent cancers and other late effects; surveillance for recurrence or new cancers, interventions for secondary illnesses arising from cancer and cancer treatment; and coordination between specialists and primary care providers.⁸⁵ Recent literature has also suggested the need for health promotion to improve health and wellness for cancer survivors, and promotion of psychological well-being and reducing their distress.⁸⁶ There are currently multiple cancer survivorship care models with different components, targeting different populations, and outcomes. Models of survivorship care vary because they are specific to the institution or setting where they are provided.⁸⁴ There have been gaps in the services for cancer survivors, including the role of primary care, absence of a surveillance protocol, inadequate rehabilitation, and community support both in public and private sector.¹ More recently, HA has been utilizing internal resources, in

initiating collaboration with external parties including non-government organizations, district health centres and private providers to improve follow-up survivorship care in respond to the growth needs of the population of cancer survivors.

Chapter 3 Financing Cancer Care

This chapter analyses the trends in rising cancer care costs, the contributory factors and the impact on individuals and on health care systems. An overview of public and private financing for cancer care in Hong Kong is also presented.

3.1 Escalating cancer care cost

Globally, cancer care costs, have been increasing over the decades creating pressures on the capacity to finance new improved cancer treatment modalities. In the US, cancer care expenditure has been increasing at an annualized rate of 2.9% from 1998 to 2012.⁸⁷ Direct cancer costs also nearly doubled in European countries from €52 billion in 1995 to €103 billion in 2018.⁸⁸ Correspondingly, Australia experienced an increase of cancer expenditure from AUD\$2.8 billion in 2001 to \$10.2 billion in 2016.⁸⁹ In Singapore, MediShield Life payments for cancer drugs surged by an annual compound rate of 20% to HKD\$2.1 billion in 2019.⁹⁰ Increasing disease prevalence and improved access to care² are two of the major factors that have contributed to increased expenditures.⁹¹ Another factor that has driven up cancer care costs has been the increasing per-capita costs of cancer care. Innovations and advances in technology have generated new approaches in cancer detection and imaging, new drugs, new surgical devices, and novel methods for cancer treatments. All these factors contributed to cost increases and to individual patient spending.⁹² Evidence has suggested the effectiveness of new treatment methods, such as targeted therapy, immunotherapy and CAR T-cell therapy on patient survival was significant.⁹³⁻⁹⁶ For example, an Axicabtagene Ciloleucel CAR T-cell therapy was found to have a 18-month overall survival rate of 52% for refractory large B-cell lymphoma patients.⁹⁷ However, the development of these new modalities in chemotherapy were associated with high research costs resulting in higher cancer treatment costs. Anticancer targeted therapy and immunotherapy drug prices also saw inflation of 1-5% every year, compounding the pressure on out-of-pocket payment for cancer patients.^{98,99}

In many countries, other factors contributing to the escalation of cancer care costs include the overutilization of diagnostic technologies and low value care measured by the expected benefit versus cost relative to alternatives.^{67,68,69} Unexplained variation in clinical management intensity in the cancer care spectrum has been documented in the US, from imaging overuse for breast and prostate cancer to overtreatment of small papillary thyroid cancer.⁷⁰ The mismatch between the rate of diffusion of innovations and technology and the evidence of effectiveness is also driving up cancer care costs. The diffusion in the use of proton beam therapy for clinically localised prostate therapy which delivers more precise radiation therapy has been in the absence of randomised clinical trials demonstrating its superiority over more conventional radiation therapy.⁷⁰ The rapid adoption of robotic surgery for prostate, bladder, and endometrial cancer has been driven in part by studies demonstrating superiority in blood loss and time needed for convalescence. However, the net benefit or value in terms of effectiveness in long-term outcomes and cost have not been evaluated.⁷⁰ Futile intensive treatments of advanced cancer patients and lack of end-of-

life planning has also contributed to increased per-capita cancer costs⁹². End-of-life costs of cancer patients living in a hospice providing palliative care has been reported to be lower than that of non-hospice users.¹⁰⁰ Furthermore, the concentration of cancer costs at the end-of-life period has been widely reported, and interpreted as an indication of inappropriate usage of intensive treatments, underutilization of palliative care and inadequate end-of-life planning for advanced cancer patients.¹⁰¹⁻¹⁰³ These catastrophic cancer expenditures pose great financial burdens for both healthcare systems and for many cancer patients and their families who may have to pay out-of-pocket for health care.

3.2 Financial impact of cancer care

Financial impact of cancer care on individuals

It is predicted cancer cost will continue to increase as a result of inexorable advances in cancer diagnosis and treatment and it is inevitable that some of the cost increases will have to be borne by patients. Consequently, patients face the prospect of having to bear higher co-payments and may experience catastrophic out-of-pocket expenses for cancer treatment. A study in the US estimated a 590% increase of chronic lymphocytic leukaemia management costs due to increasing disease prevalence, improved survivability and drug cost with the usage of oral targeted therapies from 2011 to 2025. Corresponding out-of-pocket costs were also estimated to increase by 520%, which will pose a financial burden of both patients and third party payers.¹⁰⁴ If patients do not have savings, these financial burdens could create negative effects on treatment outcomes, psychological health and quality of life. “Financial toxicity” has been coined to refer to these harmful effects resulting from the high costs of treatment.¹⁰⁵ Patients may face depression, anxiety and stress, may reduce daily spending to reduce expenditures, and may even sell assets and borrow in order to pay for treatment costs.¹⁰⁶ Financial toxicity also includes adverse impacts on patient’s access to care. Patients facing catastrophic out-of-pocket payments may decide to forego treatments and therapy sessions in order to reduce treatment expenses, which would affect the quality of care and compromise outcomes of treatment. Cancer diagnosis may also lead to loss of employment and income, reducing affordability of cancer treatment costs.¹⁰⁷ When there is an increasing cancer incidence among younger working populations, the risk of financial toxicity could be more prevalent. A local study has described the challenges encountered by younger cancer patients, arising from having to work reduced hours or losing their jobs, resulting in lower household income.¹⁰⁸

Financial impact of health equity

Differential financial capacity to access and adhere to cancer care, could lead to inequity between patients in different socioeconomic positions in cancer treatments, and differential outcomes. An international review pointed out that the higher incidence and increased mortality rates of cervical cancers in the socioeconomically disadvantaged could be attributed to their substantially lower rates of vaccination, screening, and treatment.¹⁰⁹ It was also reported that the socioeconomic inequalities in the burden of colorectal cancer are cumulative consequences of not only greater exposure to risk factors but also greater economic and structural barriers to accessing preventive measures and effective treatment, as well as lower capability in adhering to the therapeutic regime,

demonstrating the impact of socioeconomic disadvantage in the continuum of colorectal cancer care over the life course.¹¹⁰ There was also evidence of the socioeconomic inequalities in access to novel cancer treatments such as predictive biomarker tests and biological and precision therapy.⁵¹ Norris et al., concluded “low socioeconomic position remains a barrier to treatment access and cancer care, despite advances in treatment.”¹¹¹

Financial impact of cancer care on health system

In addition to the financial toxicity for individuals, rising cancer costs also threatens financial sustainability of health systems. The rapidly escalating cost trajectory of cancer treatments has been partly driven by the costs of high-priced new technologies, and the trajectory continues upwards at an unsustainable rate.⁹² Some countries facing the increasing treatment costs recognise current financial mechanisms and policies are not sustainable and are setting up specified cancer funding and negotiating with manufacturers for risk sharing agreements.¹¹² For financial sustainability, countries may decide to (i) reduce other health expenditures and infrastructure investments, which could compromise health service coverage and accessibility; (ii) incorporate new diagnostic and therapeutic modalities, and (iii) increase user co-payments.

3.3 Financing cancer care in Hong Kong

In Hong Kong, the Hospital Authority provides comprehensive cancer care of high quality with very low user charges for eligible residents. The costs of established cancer drugs in the HA Drug Formulary are heavily subsidized, while a category of Self-financed Drugs covering new and advanced treatment such as targeted therapy require patients to pay for the full costs. For specified self-financed cancer drugs, patients with financial difficulties are protected by a safety net provided by the Samaritan Fund (the Fund) Programmes and the Community Care Fund (CCF). In 2011 the CCF launched the First Phase Medical Assistance Programme (First Phase Programme) to provide financial assistance to eligible HA patients purchasing specific self-financed cancer drugs in which there had been rapidly accumulating medical scientific evidence of relatively high efficacy but had not been brought into the safety net of the Samaritan Fund.¹¹³ As at December 2020, the First Phase Programme covered 33 self-financed cancer drugs. The amount of subsidies granted in 2019-20 up to December 2019 was \$230.69 million. The financial assessment of the Fund and CCF follows the principle of targeted subsidy, which takes into consideration the expected patient’s affordable contribution to the drug costs, assessed from the patients’ household income. In 2019, both programmes revised the means test mechanism, confining the definition of “household” to immediate family members and modifying the calculation of annual disposable financial resources (ADFR) by discounting 50% of the net asset of a household. For the financial year 2020/21, 2869 applications were approved with a total subsidy amount approved of \$642.59 million.¹¹⁴ It is worth mentioning that the subsidy granted may be partial and the patient would need to contribute to part of the drug costs. Notably, although the Drug Formulary is regularly revised and updated, there are only around 30 targeted therapy drugs supported by the Samaritan Fund and Community Care Fund Medical Assistance Programme.¹¹⁵ Cancer patients not eligible for assistance by the funds and in need for these treatments have to bear the full cost out-of-pocket, if they are not covered by health insurance. In 2016, a local survey conducted by the Cancer Information Hong Kong Charity Foundation examining the public awareness of cancer care

expenditure, over half of the respondents thought that all the drugs (including targeted therapy) in public hospitals were subsidized by government. They thought that the median drug expenditure for terminal stage colorectal cancer treatment in public hospitals was \$13,500, whereas the actual costs could be \$266,677 (median), around 18 times the amount of drug cost they estimated.¹¹⁶

In the private sector, except for the publicly funded public-private partnership (PPP) programmes, healthcare is paid out-of-pocket and/ or from individual or employer purchased private health insurance. In 2019/20, 30% of total health expenditure was from household out-of-pocket payment, while privately purchased insurance and employer-purchased insurance accounted for 8.4% and 7.9%, respectively, although the proportion had been gradually increasing since the 1990s.¹¹⁷ Due to the limited regulatory requirements of private healthcare providers, patients in the private market (often referred to as a ‘free market’) currently are confronted with high prices, rising health expenditure,¹¹⁷ and variation in pricing across service providers with little transparency.¹¹⁸ The survey of cancer patients found that healthcare expenditure per patient could be up to \$1.3 million per hospital episode in private hospitals.¹¹⁶ To meet this market need, reference should be drawn to the US which has a predominant private healthcare market,¹¹⁹⁻¹²¹ where private health insurance has become a major financing mechanism for cancer care with improved access to cancer care and lowered financial risk arising from health expenditure.

According to Census and Statistics Department, in 2016, 3.26 million or 47% of local population were covered by health insurance, comprising 1.48 million with self-purchased individual health insurance, 0.86 million with group-based policies, and 0.92 million covered by both types of policies. The penetration rate of self-purchased individual health insurance in local population increased from 20% to 34% during 2006-2016. Self-purchased private health insurance reimburses expenses for inpatient care, however, 43% of the inpatients covered by the insurance were treated in public hospital in 2016, and for the insured people aged 65 and above this percentage is even higher at 55%. The limited effect on diversion of demand from the public sector has been attributed to limited coverage of some insurance products, uncertainties over eligibility of medical claims for reimbursement and implications on medical claims on policy premium upon renewal.

Private health insurance for cancer care in Hong Kong

Private health insurance policies for cancer care vary in terms of premiums, insured amounts, coverage of cancer medicines and treatment, particularly for new treatment modalities, and the management of cancer recurrences. From the interviews with front-line insurance agents, it was evident that there had been improvement in cancer-related insurance plans over the years. Traditionally, medical insurance packages cover claims for in-patient treatments (including diagnosis and established treatments). Critical illness insurance is one of the newer products targeting cancer care developed to cover the complex cancer treatment journey. For example, insurance plans allowing a maximum of 5 times 100%-compensation with a 3-year waiting period for unknown pre-existing conditions is available in the market. However, in our interviews, several private healthcare providers also expressed concerns on the feature of lump sum payment in critical illness insurance. The fixed reimbursement amount determined prior to knowing the total medical expenditure may not match patients’ financial need - if the patient needed complex cancer management and/or had multiple recurrences, the fixed amount of reimbursement would not be

adequate. For the fortunate patients with early stage curative cancer, reimbursements from the insurance might exceed the actual expenditures, and could pocket the difference which is inconsistent with the principle of indemnity. This structure of insurance products with lump sum payments was also reported in our interviews with patients who used public hospital for treatment and only needed to pay subsidized fees and charges.

Some of the more recent insurance products are designed for cancer treatments with expanded coverage of ambulatory diagnostic services and therapies, new drugs/technologies, hospitalization, and/or transportation during the treatment period. The insured usually consider these products as supplementary as they are anxious that their pre-existing medical insurance package is insufficient for financial protection. The products targeting cancer usually have a lower premium than other indemnity and critical illness plans that cover a bundle of conditions. These cancer-specific products also cover people who may have coexisting chronic conditions of high cholesterol, diabetes, and high blood pressure, who are ineligible to purchase other insurance products. Eight cancer care insurance products have been launched by the five major insurers in Hong Kong, with five critical illness plans with lump sum payment and three indemnity plans. The critical illness plans are generally basic plans while the indemnity plans can be either basic or add on plans. One of the plans covers the three most prevalent cancer conditions while the rest covers a more extensive cancer list (Table 3.1).

Insurance companies also designed multiple marketing strategies to promote cancer prevention and encourage private health insurance take-up. Given life-style changes is effective in reducing cancer incidence, a health promotion programme of walking exercise is promoted by multiple insurance companies. Insurance premium deduction is proportional to the insured's annual steps taken and anticipated to reduce future claims and reduction in claims ratio of the total product pool. In some policies, when an insurance product is purchased, a free health check (including blood test) with a general health assessment or a more extensive health check (involving a range of diagnostic procedures) at a discounted price is also offered. A senior private healthcare provider observed, however, that some of the results from these health checks would be labelled as pre-existing conditions and become reasons for exclusion from policy coverage. A typical example would be polyps in the colon where even though they are removed successfully during colonoscopy, client would become ineligible for coverage for colon cancer. Another example is that client might become ineligible for coverage for all types of cardiac diseases if ECG abnormalities or trivial mitral clicks are detected during health check. These exclusions of policy coverage are considered medically unjustified and may deter the insured from getting a health check-up. From the interview with front-line insurance agents, we were informed it is not usual to include regular cancer screening in an individual medical package since it is classified as an outpatient item which traditionally incurs a higher premium. Follow-up cancer diagnostic expenses are not covered unless there is a certified need by a medical doctor.

Table 3.1 the comparison of cancer medical insurance of five largest insurance companies in Hong Kong¹²²

Company	Insurance type	Product	Coverage	Age coverage	Reimbursement	10-year average premium per year ¹
Company A	Critical	Product A	Lung, colorectal, breast and prostate cancer	Up to the insured's age of 80	Specific Cancer: 100% advance payment Specific Carcinoma-in-situ or Early Stage Malignancy: 20% advance payment (subject to a maximum of HK\$400,000/US\$50,000 per life)	\$1,127
Company B	Critical	Product B	Cancer and early stage cancer	Up to the insured's age of 81	Cancer: 100% of the sum assured as a Major Cancer Benefit Early Stage Cancer: 25% of the sum assured as an Early Stage Cancer Benefit	\$1,788
Company B	Critical	Product C	Cancer	Up to the insured's age of 81	If diagnosed with a major cancer: \$100,000-150,000 according to the plan chosen	(30 year old non-smoking female, \$150,000 reimbursement amount) \$218
Company C	Critical	Product D	Cancer and early stage cancer	Up to the insured's age of 80	Cancer: lump sum benefit equivalent to 100% of the sum insured Carcinoma-in-situ or early stage cancer: lump sum payment equivalent to 30% of the sum insured is payable Medical Consultation and Caring Benefits: (available for 12 months from the date of diagnosis of cancer): Chinese Herbalist Consultation (Up to HK\$600 per visit, up to 20 visits) Dietician Consultation (Up to HK\$600 per visit, up to 10 visits) Psychological Counselling (Up to HK\$1,000 per visit, up to 10 visits) Palliative Care (Benefit Up to HK\$20,000)	\$3,167

¹ (25 year-old non-smoking male, \$1,000,000 reimbursement amount)

Company	Insurance type	Product	Coverage	Age coverage	Reimbursement	10-year average premium per year ¹
Company D	Critical	Product E	Cancer, Carcinoma-in-situ, Early Stage Malignancy / Early Thyroid Cancer	Up to the insured's age of 100	Cancer: 100% of the protection amount payable once Carcinoma-in-situ: 30% of the protection amount, Payable twice for different organs Early Stage Malignancy / Early Thyroid Cancer : 30% of the protection amount payable once (additional)	Unknown
Company A	Indemnity	Product F	Cancer (including carcinoma-in-situ)	15 days to age of 70	Semi-private room and worldwide coverage Covered Cancer Limit: 1 million, Lifetime Cancer Limit: 3 million Diagnostic tests, cancer treatment and monitoring fully covered CMP, physiotherapist and dietician: \$600 per visit/20times Psychological counselling: \$1200 per visit/20 times (Max. 1 visit for insured and 1 visit for 1 family member per day) Worldwide emergency assistance services: 5 million	\$816
Company E	Indemnity	Product G	Cancer and early stage cancer	Up to the insured's age of 100	Semi-private room and worldwide coverage Covered Cancer Limit: 1.05 million, Lifetime Cancer Limit: 3.15 million Diagnostic tests, cancer treatment and monitoring fully covered CMP, physiotherapist and dietician: \$750 per visit/30 times Psychological counselling: \$1500 per visit/10 times Home nursing: \$1500 per day/ 30 times	Unknown
Company D	Indemnity	Product H	Cancer and early stage cancer	15 days to age 65	Semi-private room and worldwide coverage Covered Cancer Limit: 1.5 million, Lifetime Cancer Limit: 4.5 million	Unknown

Company	Insurance type	Product	Coverage	Age coverage	Reimbursement	10-year average premium per year ¹
					Diagnostic tests, cancer treatment and monitoring fully covered CMP, physiotherapist and dietician: \$650 per visit/30 times Psychological counselling: \$1100 per visit/30 times Home nursing: \$1100 per day/ 90 times Rehabilitation: \$30,000	

In 2019, the Government launched the Voluntary Health Insurance Scheme (VHIS) to regulate private health insurance plans and incentivise individuals to purchase private health insurance with tax deductions of up to \$8000 for the premium paid. Ten minimum requirements are set out for certified plans for VHIS for better consumer protection, such as guaranteed renewal up to 100 years old. There are two types of certified plans, namely Standard Plans which provide basic protection and Flexi Plans providing enhanced benefits. The benefit package of Standard Plans includes cancer care, providing for \$20,000 reimbursement amount per policy year for prescribed diagnostic testing and \$80,000 per policy year for prescribed non-surgical cancer treatment.¹²³ It has been pointed out that the reimbursement amount of VHIS standard plan may not be sufficient due to the increased survival rate and advances in treatment of cancer patients.¹¹⁶ In our interviews it was disclosed some VHIS-cancer patients may have to make a 30% co-payment when using private sector diagnostic services such as CT, MRI, and PET scan and there are reimbursement limits for other diagnostic investigations. In cancer treatment, the standard plan of VHIS only covers limited inpatient expenses. However higher treatment coverage can be provided with a flexi-plan. Up to March 2021, there were only 791,300 individuals insured by VHIS policies, with a considerable proportion of the insured under VHIS transferred from pre-existing non-VHIS plans rather than newly insured.

Public preparedness to pay for cancer care, both in public and private sectors

The public hospital system in Hong Kong provides a safety net for all permanent residents, especially for disadvantaged population. However, with the high costs of advanced technologies, new drugs and new treatment options for advanced stages of diseases and recurrence and improvements in survival, expenditure for cancer care is escalating and this is challenging the capacity of public financing to meet demand. In a local survey of public awareness of cancer care expenditure, over half of the respondents thought all the drugs in public hospitals were subsidized by government, and they did not consider savings for cancer treatment.¹¹⁶ Given the increasing number of self-financed medicine in the HA Drug Formulary and the many in-indirect costs associated with cancer, such as transportation costs and job loss, the lack of preparedness for these costs reflects the vulnerability of the population to the potential financial risks arising from future cancer care.

From the interviews with front-line insurance agents and healthcare providers, it was a frequent observation that the insured cancer patients' concern of cancer care costs in private sector motivated them to seek cancer treatment in public hospitals. One explanation put forward could be the insufficient coverage of the insurance plan or an older insurance plan that does not cover new cancer treatments. Moreover, the protracted treatment period of cancer also increases the uncertainty of whether the insurance plans would be able to cover that enormous expenditure that could accumulate in the private sector during the prolonged treatment period. Patients may also lose their job and income in their long and uncertain cancer journey.

3.4 Projection of financial burden of cancer care

The projected increase in cancer care expenditure worldwide

The rising trend of cancer incidence has been estimated to increase overall cancer expenditures. In the US, cancer incidence was estimated to reach 2.3 million by 2030¹¹ and cancer-attributed Medicare cost in the US is projected to increase by 34% from USD\$183 billion in 2015 to \$246 billion in 2030, simply based on aging and population growth projections.¹²⁴ Singapore also experienced an increase of 30% in number of MediShield Life claims for cancer drugs from 2017 to 2020. If the current trajectory continues, Singapore's cancer drug spending was estimated to reach HKD\$15.2 billion by 2030, more than seven times that in 2019.⁹⁰ Increasing cancer prevalence and costs will create pressures on health systems' resource requirement and allocation, budget control, service provision and equity in accessing cancer care.¹²⁵

The projected increase in cancer care services and expenditure in Hong Kong

Hong Kong faces the similar substantial increases in future cancer care costs. Cancer care expenditure in Hong Kong, will increase not only from the increases in number of cancer patients, but also from the overall per capita cancer care costs in cancer patient journey: from cancer screening, diagnosis, treatment, rehabilitation to palliative care and end-of-life care. Furthermore, as public hospitals play the dominant role in treating cancer patients in Hong Kong's health system, there are future expansion plans of public cancer care services to meet demand.

The ageing population structure is associated with rising cancer incidence. It will be more obvious comparing to other high-income economies. Over the past 30 years, the population size of the group aged 65 or above has continued to rise.¹²⁶ It is projected that 2.44 million, one-third of Hong Kong's population, will be aged 65 or above in 2038. In contrast, the population size of people aged 18-64 and children are expected to decrease.¹²⁷ Hong Kong's public healthcare system already under stress with shortage of manpower and long waiting times will be subject to even greater pressures. Increasing cancer prevalence will also have significant economic impact due to productivity loss in the working population resulting from premature mortality. Countries worldwide with a high number of patients dying at working age, have experienced significant economic and manpower impact in their societies.¹²⁸⁻¹³⁰

Increase in costs associated with cancer screening, have been reported in several studies. In US, the cost of per breast cancer screening episode has been increasing from 2013 to 2019, attributed

to new screening technologies of higher costs.¹³¹ Hong Kong government launched mass screening programmes for colorectal, and cervical cancer, using traditional low-cost screening tools such as faecal occult blood test (FOBT) and pap smear. Newly discovered and advanced screening methods are being promoted and available from private healthcare providers in Hong Kong. For example, a newly developed M3 colorectal cancer screening test³⁸ costs \$3,500;¹³² a stool-based DNA test costs around \$3,000.¹³³ Emergence of cancer screening innovations will increase overall population cancer screening costs in the future when the technologies are sufficiently mature and evaluated and put pressures on health.

Innovations in chemotherapy, radiotherapy and surgery will benefit patients with more advanced stages of disease that were not previously candidates for treatment and for patients with recurrences. This will also contribute significantly to cancer care costs. There is increasing evidence of an upward trend in the prices of newer targeted therapy drugs with generally much higher per regimen costs compared to older drugs.^{134,135} Inflation has also caused drug manufacturers to increase drug prices. With limited competitive pressure in the cancer drug market, targeted therapy drugs have been permitted to increase their price post launch.¹³⁶ Per-capita spending on targeted therapies of common cancers has been reported to increase, irrespective of age groups and cancer types.^{99,137,138} Moreover, the proportion of cancer patients eligible to undergo genome-targeted therapy has also been rising over the years.^{139,140} One US study found an increase in eligibility from 5.16% of all cancer patients in 2006 to 13.6% in 2020, with most of the increase occurring after 2018.¹⁴⁰ The broadening access of cancer patients to targeted therapy will put additional pressures on expenditures in cancer care. Trends of increases in drug prices were also recorded in most of the anticancer therapies.¹⁴¹

Cancer genomics

Cancer genomics and cancer genomic profiling is already having an impact on treatment, and finding application in cancer classification, diagnosis, prognosis and in screening family members for the inheritable risk. There is the potential of precision oncology, in which individualised cancer treatment may be possible based on the patient's unique genetic and molecular profile. The costs of the technologies and their applications are prohibitive but need to be factored in the cost as when the field matures, there will be disruptive changes in cancer management and control.

Expansion of cancer services in public sector

In the public sector, the expenditure is expected to increase arising from four components of fixed cost. The expansion of coverage of cancer drugs in the HADF, expediting the upgrading and acquisition of medical equipment, increasing multi-specialty diagnostic and treatment capacity and enhancing holistic patient-centred approach in cancer treatment to expand palliative and rehabilitative care and programme for survivorship. Aside from the increase in fixed costs from infrastructures, these developments will also result in a rise in variable costs from increased patient numbers and wider technology and treatment applications demonstrated to be effective.

Although the process is perceived to be protracted, the public sector continuously updates the drug formulary, medical devices, and treatment options in light of medical and technology advances, research evidence of clinical effectiveness and rising public expectations in the context of resource

constraints. For example, HA plans to launch a pilot programme to subsidize certain patients with glioblastoma to receive tumour treating fields therapy, and also starts the development of Chimeric Antigen Receptor T-cell (also known as “CAR T-cell”) therapy.⁷⁰ Additionally, to provide more equitable support for the needy patients, HA has expedited the inclusion of self-financed drugs to the safety net coverage of Samaritan Fund and Community Care Fund Medical Assistance Programmes; with the frequency of prioritisation exercise increasing from once to twice a year, having regard to the latest development of evidence.⁵

The treatment capacity will be increased in tandem with the rolling out of the Hospital Development Plan (HDP). \$200 billion has been earmarked for the first Ten-year HDP, which includes three cancer care expansion projects planning to be completed by 2025 - 1) redevelopment of Grantham Hospital will include the provision of a new oncology centre, additional beds and three additional operating theatres; 2) the expansion of United Christian Hospital will incorporate a clinical oncology centre to provide one-stop services in radiotherapy, chemotherapy and psychosocial care to cancer patients in Kowloon East. 3) Oncology centre will be built into the New Acute Hospital in the Kai Tak Development Area. Initial planning work has also commenced for the second Ten-year HDP for which \$270 billion has been earmarked. In this second stage, new oncology treatment facilities are expected to be provided in the redevelopment of Princess Margaret Hospital and Prince of Wales Hospital Phase 2 (Stage 2), both planned to be completed by 2035.⁵ These new infrastructure investments are substantial and will generally even more formidable increases in recurrent health care expenditure.

The government has introduced various measures in the past few years to expedite the registration of new pharmaceutical products for the treatment of patients in Hong Kong. For example in 2018, the Pharmacy and Poisons Board of Hong Kong implemented the Enhanced Procedures for Registration of New Drugs, which shortened by two to three months for application to be processed.⁷⁰ Also, in keeping with the international trend of using genome sequencing technology to identify disease risk, HA has formulated a Strategic Service Framework for Genetic and Genomic Services to enhance these services, which includes provision of modern genetic and genomic tests for diagnosis/prognosis as early screening of family members of specific high-risk groups of cancer patients, particularly those with hereditary cancer syndromes.¹⁴² Cancer patients also turn to Chinese Medicine (CM) for treatment. The Hong Kong Cancer Strategy in July 2019 stressed that the Chinese Medicine Hospital (CMH) which is targeted to commence operation in late 2024 would consider providing CM services in the integrated Chinese-Western Medicine (ICWM) services for cancer patients.

Last but not least, cancer survival rates are improving due to earlier diagnosis and improved treatments, resulting in increasing number of cancer survivors who require continuous monitoring, intervention, and support.¹ Between 2007 and 2017, the age-standardised cancer mortality has decreased from 100 deaths per 100,000 persons to 84 deaths per 100,000 persons (Figure 1.5), leading to more cancer survivors.¹⁴³ As an integral part of holistic cancer care, Hong Kong health system will also address the needs of cancer survivors, who often experience physical and psychological morbidities that are associated with the cancer and its treatment, requiring medical, psycho-social spiritual and rehabilitative care and support.⁸⁵ The public healthcare system will not only allocate more human and medical resources for survivorship care, but also develop new care delivery models to improve effectiveness, efficiency and quality.

Chapter 4: Behavioural Factors Affecting Cancer Screening

This chapter presents the questionnaire survey results of the general public aged 18-49 on their knowledge, attitudes and practices in relation to cancer screening². Findings from the Discrete Choice Experiment (DCE) are also reported to identify factors affecting the willingness to accept cancer screening.

4.1 Knowledge of cancer screening

- For the top causes of cancer incidence in Hong Kong, only 27.2% of the respondents selected correct answers for all three types of cancers, while 56.1% selected correct answers for two types and 9.8% selected correct answers for one. 6.8% of the respondents did not know this information or selected all incorrect answers. (Table 4.1)
- Over half of respondents (59.3%) selected correctly the recommended colorectal cancer screening method out of a list of medical examinations, while 18.4% selected the incorrectly, and 22.3% reported that they did not know of this screening method.
- Most of the respondents understood that colorectal cancer screening is sometimes needed even if there are no symptoms (80.6%), and 94.6% understood that colorectal cancer does not only occur in males.
- Only 16.9% of the respondents selected correct answers to all the above questions, suggesting that their knowledge on cancer prevalence and prevention should be improved.

Table 4.1 Knowledge of cancer prevalence and colorectal cancer screening (n=408)

Knowledge items (% of respondents choosing the correct answer)	Frequency (%)
The three top causes of cancer incidence in Hong Kong (lung cancer, colorectal cancer and breast cancer)	
All correct	111 (27.2)
Correct about 2 only	229 (56.1)
Correct about 1 only	40 (9.8)
All incorrect	1 (0.2)
Do not know	27 (6.6)
The recommended colorectal cancer screening method from Centre of Health Protection (FOBT)	

² The sampling frame for this questionnaire survey was drawn from a participant panel that was established from previous surveys of our research team, and matched to the age and sex distribution of the Hong Kong population aged 18-49 years old.

Correct	242 (59.3)
Incorrect	75 (18.4)
Do not know	91 (22.3)
Colorectal cancer screening is not necessary if there are no symptoms. (False)	
Correct	329 (80.6)
Incorrect	42 (10.3)
Do not know	37 (9.1)
Colorectal cancer only occurs in males. (False)	
Correct	386 (94.6)
Incorrect	10 (2.5)
Do not know	12 (2.9)

4.2 Attitudes of cancer screening

- In the rating of importance of factors that would influence the decision to take up cancer screening (Table 4.2) (score range: 0-10, 0 for least important and 10 for most important), healthcare professionals’ advice for cancer screening (mean±SD: 7.36±2.36) and believing cancer screening is effective (7.33±2.37) were rated as the most important factors, followed by cost of cancer screening (7.02±2.65), perceived high individual risk of cancer (6.77±2.69), knowing someone diagnosed with cancer (5.91±2.72), fear of getting cancer (5.45±3.16), and discomfort during screening procedure (5.32±2.75).

Table 4.2 Importance of factors that influence your decision to take up cancer screening (0 for least important and 10 for most important)

Variable	N	Mean	Std. Dev.	Min	Max
Perceived high individual risk of cancer	408	6.77	2.69	0	10
Believe that cancer screening is effective in increasing life expectancy and quality of life	408	7.33	2.37	0	10
Healthcare professionals’ advice	408	7.36	2.36	0	10
Fear of getting cancer	408	5.45	3.16	0	10
Discomfort during cancer screening procedures	408	5.32	2.75	0	10
Cost of cancer screening	408	7.02	2.65	0	10
Someone that I know has been diagnosed with cancer	408	5.91	2.72	0	10

- For importance of source of cancer screening information (Table 4.3), respondents rated healthcare providers (8.00±2.24) as the most important information source, above that of family and friends (7.25±2.06) and the media (5.74±2.58).

Table 4.3 Importance of information sources of cancer screening that influence your decision to take up cancer screening

Variable	N	Mean	Std. Dev.	Min	Max
Healthcare providers	408	8.00	2.24	0	10
Family and friends	408	7.25	2.06	0	10
Media	408	5.74	2.58	0	10

- The respondents were also asked to indicate their perceptions on facilitators in motivating them to take up screening (Table 4.4). Territory-wide screening programme subsidized by government (88.9% slightly agree/agree/very agree) and insurance to cover screening (employee or individual insurance) (85.2% slightly agree/agree/very agree) were perceived to be the most important facilitators for cancer screening. Other important facilitators were simplified testing procedure (79.0% slightly agree/agree/very agree), invitation to screening programme (78.2% slightly agree/agree/very agree), and education from primary care professionals (75.7% slightly agree/agree/very agree). There were fewer respondents who perceived that screening carried out by familiar general physicians (69.6% slightly agree/agree/very agree; 6.3% slightly disagree/disagree/very disagree), media-based campaigns (66.2% slightly agree/agree/very agree; 7.7% slightly disagree/disagree/very disagree), and reducing screening frequency (61.6% slightly agree/agree/very agree; 12.1% slightly disagree/disagree/very disagree) were facilitators for screening.

Table 4.4 Facilitators for cancer screening

Variables (N (%))	Disagree	Neutral	Agree
Invitation to screening programme	26 (6.4)	62 (15.4)	316 (78.2)
Education from primary care professionals	27 (6.6)	72 (17.7)	308 (75.7)
Territory-wide screening programme subsidized by government	9 (2.2)	36 (8.9)	361 (88.9)
Insurance to cover screening (employee or individual insurance)	14 (3.5)	46 (11.4)	345 (85.2)
Media-based campaigns	31 (7.7)	106 (26.2)	268 (66.2)
Simplified testing procedures	19 (4.7)	66 (16.3)	319 (79.0)
Reducing screening frequency	48 (12.1)	104 (26.3)	244 (61.6)
Carried out by familiar general physician	25 (6.3)	96 (24.0)	279 (69.8)

*Disagree includes slightly disagree/disagree/very disagree; agree includes slightly agree/agree/very agree.

4.3 Experience of cancer screening

- A question on the actual experience of cancer screening was included in the questionnaire (Table 4.5). Most of the respondents (61.3%) had no prior experience of cancer screening. 32.4% and 17.6% of female respondents had received cervical cancer screening and breast

cancer screening respectively. For colorectal cancer screening, 11.3% of all respondents had conducted it with colonoscopy, and 10.3% with FOBT. Fewer respondents received screening for lung cancer (4.4%), stomach cancer (3.2%), liver cancer (2.0%), prostate cancer (1.8%) and other cancers (1.5%).

Table 4.5 Proportion of respondents who have ever conducted screening for the following cancers (n=408 for all respondents, n=238 for female respondents, n=170 for male respondents)

Types of cancer screening	Frequency (%)
Cervical cancer (female only)	77 (32.4)
Breast cancer (female only)	42 (17.6)
Colorectal cancer - FOBT	42 (10.3)
Colorectal cancer - colonoscopy	46 (11.3)
Lung cancer	18 (4.4)
Stomach cancer	13 (3.2)
Liver cancer	8 (2.0)
Prostate cancer (male only)	3 (1.8)
Others including parotid cancer, nasopharyngeal carcinoma and pancreatic cancer	6 (1.5)

- For those who received FOBT (n=42), 26.2% went for screening because of discomfort and other symptoms. Most received cancer screening in private clinics or hospitals (52.4%). Around 42.9% did not have a fixed schedule for FOBT, and 21.4% reported that they underwent FOBT every 2 years. 45.2% reported that their last test was conducted 2 years ago. Over half (54.8%) reported that they had paid less than HK\$1,000 for the most recent FOBT.
- For those who received colonoscopy (n=46), 65.2% did so in view of symptoms or discomfort. 78.3% underwent the procedure in private clinics or hospitals. 23.9% reported that they underwent colonoscopy every 4-5 years, and 19.6% reported that they did not have a fixed schedule. For expenditure related to the most recent colonoscopy, 21.7% reported an out-of-pocket payment of less than HK\$5,000, 19.6% between HK\$5,001-10,000, 23.9% between HK\$10,001-20,000, and 19.6% greater than HK\$20,000.

4.4 Factors affecting uptake of faecal immunochemical test

Factors affecting young adults' or persons below 50 years' acceptance for the faecal immunochemical test (FIT) from Discrete Choice Experiment (DCE)

- There has been an increase of early-onset colorectal cancer incidence and associated mortality over the last few decades, and evaluations and recommendations have been made by overseas healthcare professionals that people aged below 50 years could benefit from colorectal cancer (CRC) screening¹⁴⁴. In light of this, a discrete choice experiment (DCE) was conducted among

adults aged below 50 years in Hong Kong to find out what factors influenced their preference for faecal immunochemical test (FIT). DCE is a survey-based method to quantify stated preference on goods, services or health outcomes that can be described by a series of attributes¹⁴⁵, and has been adopted in an increasing number of studies in health research, including research on quality of life, health technology assessment, and evaluations of health interventions and services¹⁴⁶.

- Background information on CRC screening and 10 pairwise choice tasks with hypothetical FIT preference package alternatives were shown to each respondent for them to choose their preferred FIT package. The attributes of the choice set were developed from literature review¹⁴⁷⁻¹⁵¹ on health preference research on cancer screening (an example of a DCE choice set is shown in Table 4.6), and include:
 - 1) CRC mortality reduction
 - 2) Likelihood of CRC early detection
 - 3) False positive rate
 - 4) Frequency of FIT
 - 5) FIT service provider
 - 6) Out-of-pocket payment

Table 4.6. Example of a DCE choice set

	FIT Package 1	FIT Package 2
Frequency of FIT	Every 5 years	Every 10 years
Out-of-pocket payment (% of total price)	\$75 (25%)	\$0 (0%)
Likelihood of CRC early detection	2.5 times more likely than no FIT	2 times more likely than no FIT
FIT service provider	Familiar GP in private sector	Unfamiliar GP in private sector
CRC mortality reduction	60% reduction	20% reduction
False positive rate	15%	8%

1. Which FIT package would you prefer?
2. If the chosen FIT package is available in Hong Kong, would you actually take the FIT for CRC screening?

- Among 408 valid responses, there were only 5.2% (n=21) respondents who would refuse FIT irrespective of the stated attributes (i.e. refuse all the FIT alternatives shown to them), suggesting that most adults aged 18-49 years would be willing to consider receiving FIT if suitable testing options were provided.
- International studies have shown that FIT programmes in different countries and regions could reduce 22%-60% of CRC mortality, and are 35%-124% more likely to detect CRC at an early

stage¹⁵²⁻¹⁵⁷. Our results showed that respondents were more sensitive to the change in mortality reduction (from 20% to 60% mortality reduction) than the change in early detection (from 1.5 times to 2.5 times likelihood of detection compared with no screening). The respondents were over 4 times more likely to take FIT if it could achieve 60% mortality reduction compared with 20% mortality reduction, and were 43% more likely to take FIT if it achieved 2.5 times likelihood of early detection compared with 1.5 times. This implies that the ability of FIT in reducing CRC mortality should be emphasized in the risk communication promoting FIT among young adults.

- The false positive rate of FIT results also influences people's willingness to accept the test, since they would have to receive a colonoscopy which may be unnecessary and is invasive and relatively expensive. With reference to the false positive rate of 11% (95% confidence interval: 8%-15%) from a systematic review that synthesizes multiple studies on diagnostic accuracy of FIT^{158,159}, we provided two choices of either an 8% or 15% false positive rate for respondents to consider. The respondents were 22% more likely to accept the FIT with 8% false positive rate than that with 15%.
- For screening frequency, annual or biennial FIT is recommended for people aged 50 years and above^{160,161}, while younger people might not need to have the same frequency as older adults; hence, every 5 or 10 years was considered in our study in addition to every 2 years based on studies of natural progression from precursor lesions to colorectal cancer usually taking 10-15 years¹⁶². The respondents were found to prefer FIT with higher frequency. Increasing the frequency from every 10 years to every 5 years would increase the likelihood of accepting the test by 22%, and increasing from every 10 years to every 2 years would increase the likelihood of acceptance by 58%.
- The respondents were found to be 41% more likely to accept the test if it was provided by familiar general physicians than unfamiliar ones, which implies that the screening uptake could improve if a choice of providers was given rather than designating providers for the tests.
- The out-of-pocket payment for FIT also affects acceptance of the test. The findings showed that for every HK\$100 increase in out-of-pocket payment for one FIT (usually HK\$280 in private sector^{163,164}) there would be a 46% decrease, on average, in the likelihood of FIT acceptance. The respondents were over 80% less likely to accept FIT requiring HK\$280 payment compared with no payment. In a population programme, reimbursement for FIT in the private sector could improve the uptake rate of the testing service.
- The willingness-to-pay (WTP) for the FIT attributes based on the DCE outcome was also estimated. Compared with 20% CRC mortality reduction, the respondents were willing to pay an extra HK\$137 and HK\$259 for FIT programmes with 40% and 60% mortality reduction, respectively. Compared with 1.5 times CRC early detection rate, they were willing to pay an extra HK\$44 and HK\$58 for 2 times and 2.5 times CRC early detection rate, respectively.

They were also willing to pay an extra HK\$32 for reduction of false positive rate from 15% to 8%. For testing frequency, the extra WTP values were HK\$33 and HK\$75 for increasing the frequency from every 10 years to every 5 years and every 2 years, respectively. They were willing to pay an extra HK\$56 for FIT provided by a familiar physician.

- DCE found that mortality reduction (60% reduction) is the key non-monetary factor affecting the willingness to accept FIT tests, followed by testing frequency (every 2 years), early detection (2.5 times likelihood of early detection), familiar physician, and reduction of false positive rate (8%). Out-of-pocket payment also substantially affects the willingness to accept FIT tests.

4.5 Summary of key points

1. Knowledge of cancer is variable and more promotion and publicity are needed to increase awareness.
2. Territory-wide screening programme subsidized by government as well as insurance to cover screening (employee or individual insurance) were perceived to be the most useful facilitators for cancer screening.
3. Most of the respondents (61.3%) had no prior experience with cancer screening. 32.4% and 17.6% of the female respondents received cervical cancer screening and breast cancer screening respectively. Among all respondents, colorectal cancer screening rates of colonoscopy (11.3%) and FOBT (10.3%) were reported.
4. Overall, the DCE results showed that the consideration of CRC mortality reduction (60% reduction) is the key non-monetary factor affecting the willingness to accept FIT tests, followed by testing frequency (every 2 years), early detection (2.5 times likelihood of early detection), familiar physician, and reduction of false positive rate (8%). Out-of-pocket payment also substantially affects the willingness to accept FIT tests.

Chapter 5: Policy Implications

As the population continues to age, Hong Kong will encounter considerable challenges in (i) meeting the healthcare demands arising from the projected incidence of cancer and the advances and innovations in diagnostic technologies and treatment modalities and (ii) financing escalating costs of cancer care arising not only from the per-capita costs of cancer care but also from new costs generated from more treatable cancers and from the new diagnostic and treatment technologies. In 2019, the Hong Kong SAR government published a Cancer Strategy that sets out a vision to reduce the cancer burden in the local population. The government has taken steps to identify service gaps and set strategies to address the various possible stages along a patient's complex journey from prevention and screening, early detection and diagnosis, and treatment to palliative care and survivorship support. Our research on cancer control from (i) the global and local literature and policy documents, (ii) in depth interviews with key stakeholders, and (iii) questionnaire survey of the Hong Kong population, provides deeper insights on issues identified in the government's cancer strategy. In addition, we have also identified a number of critical issues for a cancer control strategy which have either not been examined in detail or not considered in the Hong Kong Cancer Strategy 2019. These are presented under the domains of governance for cancer control, prevention, provision, and financing.

5.1 Policy implications for cancer control

- **Governance for a cancer control strategy**

The government has made a significant first step in publishing the Hong Kong Cancer Strategy 2019 which describes the governance and executive agents in the public sector. However, in view of the daunting challenges in meeting rising demand, financing escalating costs, bridging the gaps in public provision and co-ordinating private provision, the governance framework needs to include the private sector.

A **governance framework for a cancer control strategy** needs be informed by (i) estimates of future demand and evaluation of the current supply, (ii) assessments of gaps in the organisation of cancer services, (iii) design of an integrated cancer care model, (iv) referral mechanisms, protocols and clinical guidelines for co-ordination and continuity of care between public and private provision, (v) public financing models and strategic purchasing of cancer care, (vi) defining the roles of supplementary and complementary private financing, (vii) platform for public-private collaboration and patient and community engagement, (viii) mechanisms for monitoring, evaluation of progress and accountability, and (ix) enhancing research capacity to assess innovations in cancer control and management and impact of precision oncology.

- **Prevention**

There is general public awareness of life-style changes for prevention, but few persons interviewed had the motivation and even fewer who were confident they would be able to achieve the desired change. Government should consider the potential of **integrating health promotion programmes for the major chronic non-communicable diseases including cancer** which have common life-style risk factors for effectiveness. **Pre-implementation studies of the design, implementation strategy and plan, and method of evaluation of the programmes in a strategy for prevention** would be of value to achieve pre-defined targets. Research on the **role of the community, environments and policies to motivate and support behavioural changes and components of a prevention strategy** would be beneficial. More health promotion activities, such as promotional videos, distribution of health booklets, and health education events, could be organized for average-risk individuals to increase their awareness of the government screening programmes. The successful experience from anti-smoking campaign in local context could be instructive. A review of the infectious diseases, occupational and environmental preventable risk factors for cancer in Hong Kong would enable an assessment of the progress made in their control and whether further research and interventions are needed.

- **Vaccine preventable cancer**

The Hong Kong Childhood Immunisation Programme has included HPV vaccination for eligible female primary students to prevent cervical cancer. **Monitoring of take-up, evaluation of the programme and consideration of expanding eligibility** would further enhance effectiveness in preventing HPV infection. A steering committee for prevention and control of HPV which mirrors the committee for prevention and control of HBV which also includes screening for cervical cancer in a more integrated approach would be beneficial.

- **Screening and early detection of cancer**

Only **2 cancers are recommended for screening of the asymptomatic population**, colonic and cervical cancer. The only fully subsidized screening programme is for FOB for colonic cancer. Take-up rates have not been optimal; one factor could be the colonoscopy that may be required after a positive FOB is provided with a co-payment. Take up of screening is more likely when it is provided by a physician the person is familiar with. It is important for the **primary care practitioners to deliver the cancer screening and prevention information to patients**, especially those with moderate or high risk for developing cancer. **Primary healthcare services need to be strengthened to provide health promotion and cancer prevention**. The District Health Centre is a good platform to provide early risk assessment in addition to the health check on Hypertension and Diabetes. The findings from our discrete choice experiment in Chapter 4 would provide insights for government to reconsider how the current cancer prevention programme can be enhanced.

In our comparative study of 5 high income jurisdictions only the U.S. and Hong Kong did not provide a cervical cancer screening programme to the targeted population at no costs to the beneficiary. This has been one factor for the low take-up rates and government should reconsider the strategy to improve the uptake and integrate the programme with a cervical cancer control strategy coordinated by a steering committee as for HBV. **Co-ordination** is also necessary to ensure early access for confirmation of diagnosis and prompt treatment of the cancer.

The Cancer Expert Working Group does not recommend population screening for asymptomatic person for the other 7 major cancers and only recommends screening for individuals at risk for the cancer. **Preconditions for early detection** are (i) patient awareness of the signs and symptoms which leads to the cancer, (ii) early access to a physician for a consultation, (iii) physicians' knowledge of the recommended tests for the risk levels of different cancers, and (iv) referral to specialists for prompt confirmation of diagnosis and early treatment. **Development of early detection protocols and pathways for the major cancers supported by health education programmes and primary care physician training** should be considered for a cancer control strategy.

- **Cancer care in public hospitals and collaboration with the private sector**

Hong Kong healthcare system is segmented with parallel tracks of public and private systems of financing and provision. There are significant **gaps in referral for early diagnosis and treatment, and access to public cancer care is limited by the increasing demand** which is overwhelming the public provision. Public hospitals play a dominant role in treating cancer patients in Hong Kong and have been putting efforts to build up an **integrated service model** to improve the cancer patient outcomes. The Hospital Authority has published a strategic service framework for cancer services in 2019 with a vision for cancer services: all cancer patients receive timely, coordinated and patient-centered care in their cancer journey. The framework identifies gaps and key areas and strategies for improvement in five areas: (i) governance for efficient and effective cluster cancer service organisation, (ii) early cancer diagnosis, (iii) prompt patient-centered quality cancer treatment, (iv) empowered cancer survivorship, and (v) data-driven service planning and improvement and performance monitoring. Measures to implement the strategy are in place or in the pipeline along the patient journey from diagnosis, treatment, survivorship, and palliative to end-of-life care. The greater unpredictability in the COVID-19 pandemic presents an opportunity to **review progress made in the five strategic areas and the intervention needed to actualize the vision**. In addition to regular review of these services for overall service planning, more **evaluation is needed to monitor their performances**, including time from referral to consultation to diagnosis and to receiving treatment and improvements in patient outcomes and satisfaction.

The role of the private sector and NGOs should also be **enhanced** to improve access to prompt care and relieve the pressure in the public sector in cancer care provision. A review and **evaluation of the capacity of the private health care sector** would identify opportunities for collaboration in cancer care. The private sector role in provision could be either **complementary or supplementary to the public sector**. **Platforms for collaboration engagement and mechanism for communication** should be established.

- **Role of financing and private health insurance in access to cancer care**

Increasing cancer incidence, earlier onset, cancer care technological advancements, improving survival are some of the factors contributing to the **escalating cancer care cost** leading to questions on the financial sustainability of health systems and affordability and access to effective treatments for patients. The roles of private financing and provision need to be defined in order to harness the resources for a more efficient and effective system of cancer care. Out-of-pocket

payments for cancer care will be catastrophic especially when patients had not been financially prepared. **Health insurance pools risks**, is prepaid and has the capacity to enable needed care and treatment and offers financial protection from the high costs. Private health insurance has the potential to play a role in diverting patients from public to private sector, reducing the stress of public sector and improving the access to early detection, timely diagnosis and prompt treatments and access to effective technologies. The impact can be enabled by the **development of private insurance market**, especially in the growing insurance products targeting cancer care providing comprehensive coverage of cancer care in screening and early detection diagnoses, therapies, new drugs/technologies, hospitalization, palliative and survivorship care in the patient journey. Supplementary insurance products could also be designed to cover new technologies and treatment neither provided nor subsidized in the public sector.

Those less well-off group including low-income communities, and those with chronic diseases, however, are less likely to purchase individual health insurance, while employer-based insurance may provide less coverage for those from small companies and those from lower level of positions. These inequities in private insurance coverage can lead to inequity in access and adherence to cancer care, and further accentuating differential cancer outcomes. Therefore, **more attention** is needed on the **inequity in cancer care** relating to private health insurance and to examine the potential role in supplementary financing. Government could consider a policy to **identify disadvantaged groups and provide financial support such as conditional cash transfer in enabling them to access private health insurance**. For example, the Voluntary Health Insurance Scheme could be further modified to incorporate a standardized supplementary insurance for cancer care, which may charge a low premium affordable to low-income people, and also able to accept applications from many chronic disease patients.

5.2 Conclusion

The government should consider how the vision for a cancer strategy can be actualised in a cancer control strategy for the health system and how it can be financed. Further research on the service needs for holistic cancer care, application of genomic profiling, precision oncology and other disruptive technologies on cancer management, the gaps in service provision and how they can be addressed in public and private provision is warranted. The roles of public and private financing and private medical insurance need further study to ensure financial sustainability of the health system, and to inform strategic purchasing decisions for cancer care. Addressing cost pressures of cancer care needs to be accompanied by mechanisms to monitor and evaluate effectiveness and cost-effectiveness of funded care.

Ethics

The Survey and Behavioral Research Ethics Committee has approved this study.

Role of the Funding Source

This research was supported by funding from AIA, which had no role in the design, conduct, or analysis; interpretation and reporting of the results; or writing of the report.

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Appendix

(A) Methodology

A mix of quantitative and qualitative methods was used in this study including

- (a) Literature review of (mainly taking reference to top journals or well-known international organizations, e.g., World Health Organisation.)
 - i. Cancer incidence and burden
 - ii. Comparison of cancer screening programmes e.g. cervical, breast and colorectal cancer in UK, US, Australia, and Taiwan

- (b) Focus groups/ individual interviews with
 - i. Insurance companies (n=3) and healthcare providers (n=3) on their views of service provision and financing model for cancer screening and treatment;
 - ii. Patients group/ general public on their knowledge, attitudes and practices towards cancer screening and treatment, level of need and demand for screening services, (n=17, recruitment stopped when data saturate)

- (c) Online questionnaire survey using Discrete Choice Experiment (DCE)³ (n=408) among general public aged 18-49 to assess knowledge, attitudes and behaviours towards cancer prevention, and to identify attributes and factors that would possibly facilitate or hamper the uptake of preventive measures e.g. cancer screening. The use of DCE could assess the preference of people for each of the attributes (e.g. the preference for testing time interval) and willingness-to-pay for/accept them (if monetary term is included as an attribute), which could be helpful in informing the design of the screening package and delivery of screening and follow-up services based on public acceptance to facilitate the uptake of cancer screening in the future.

³ The discrete choice experiment is a questionnaire-based method to find out the preference of respondents. It comprises of several (around eight) choice tasks for each respondent to choose based on their preferences under a hypothetical scenario set by the researchers. In our proposed study, each choice tasks consists of two alternatives. Each alternative describes a cancer screening package using a series of attributes related to screening methods and service delivery derived from literature review and qualitative studies, including but not limited to testing-specific factors (sensitivity and specificity of the test, etc.), efficacy/ outcomes (reduction of mortality, side effects, etc.), screening logistics/ delivery (testing time interval, type of healthcare professionals, etc.), and monetary factors (cost, remuneration). The respondents were asked to indicate which of the alternatives that they would prefer, and if they would choose to receive the screening services using the above-selected package or not.

Ref: Pignone, M. P., Crutchfield, T. M., Brown, P. M., Hawley, S. T., Laping, J. L., Lewis, C. L., ... & Wheeler, S. B. (2014). Using a discrete choice experiment to inform the design of programs to promote colon cancer screening for vulnerable populations in North Carolina. *BMC health services research*, 14(1), 1-9.

(B) Summary of enumeration results

Stakeholders	Target group	Methods	Sample Size	Recruitment Period
Insurance companies	Representatives from key insurance companies in HK	Individual interview (by phone)	3	16-22 August 2022
Healthcare providers	Public and private sector	Individual interview (by zoom)	4	4-29 August 2022
Patients Group/ General Public	Patient support group, patients, general public	(a) Individual interview (by phone)	(a) 7 cancer patients & 10 general public without cancer	(a) 8-22 August 2022
		(b) Questionnaire survey (online)	(b) 408 respondents	(b) 18-23 August 2022