Executive Summary of the Hong Kong Breast Cancer Foundation
Policy Address Submission on Population-wide Breast Screening

Increasing threat of breast cancer in Hong Kong

1. Since 1994, breast cancer has been the most common cancer among women and ranks third in mortality among all cancer types in women. Detected early, survival rate is more than 90%. However, the majority of the breast cancer cases in Hong Kong were detected by self-examination when symptomatic, and the percentage of breast cancer detected at the advanced stages of III and IV was high. This is unacceptable in a modern and wealthy society like Hong Kong.

Present strategy inadequate

2. At present, the Government's recommendation that "**women at high risk of breast cancer** see a doctor and undergo mammography screening every year, starting at age 35 or 10 years prior to the age at diagnosis of the youngest affected relative (for those with a family history), whichever is earlier, but not earlier than age 30", is inadequate, as the majority of the breast cancer cases in Hong Kong do not fall into the high risk group. Also, **notwithstanding the recommendation of the Cancer Expert Working Group, there is no screening programme in place even for high risk women**.

Overseas population-wide screening produces positive results

3. At least 34 countries/places, including Taiwan, have population-wide breast screening programmes in place. Their experiences provide ample and convincing evidence that population-wide screening results in reduced mortality and advanced stage breast cancer cases.

4. The universal biennial mammography screening in Taiwan, which is predominately Chinese, was associated with a **41% mortality reduction and a 30% reduction in stage II+ breast cancer**. The experience of the United Kingdom shows that the successful detection of every three cases of pre-invasive cancer (DCIS or ductal carcinoma in situ) can prevent a case of invasive cancer from happening.

5. Designed to minimise false negatives, screening programmes carry with them an inherent degree of false positives. The way to deal with it is to continuously refine the tests, not to dismiss screening.

Population-wide screening available for cervical and colorectal cancer, but not breast cancer

6. It is scientifically proven that screening can reduce mortality of breast cancer, cervical

cancer and colorectal cancer. Screening programmes have been implemented for cervical cancer and colorectal cancer but not for breast cancer. In fact, no pilot study has ever been conducted on breast cancer screening despite convincing overseas evidence of the positive effect of population-wide breast screening on mortality and advanced stage cancer cases.

Need to raise awareness and provide financial assistance for screening

7. Awareness of breast cancer among women in Hong Kong is low and the cost for mammography screening may deter women especially those with financial needs. A 2011 study found that more than 80% of breast cancer patients residing in Kwun Tong (a district with low household income) had never undertaken mammography screening before diagnosis. The study also found that the proportion of advanced stage breast cancers in low-income districts was higher, e.g. 14.4% in Kwun Tong compared to 3.8% in Wanchai (the district with the highest household income).

8. The Government should strengthen public education on breast cancer awareness and also consider subsidised screening. A co-payment arrangement between the Government and screening service users maybe a good start to encouraging women to take preventive care for themselves.

Need for Public Private Partnership

9. To make good use of society's resources, the Government should seek greater involvement of the private sector and non-governmental organisations (NGOs) in providing timely and prompt cancer diagnostic services in the overall screening programme. It adds immediately to the available capacity in the community and spares the Government of most of the logistics.

Recommendations

10. The Hong Kong Breast Cancer Foundation (HKBCF) strongly urges the Government to consider <u>population-wide screening in the mid to long term</u>. Early detection of breast cancer and reduction of advanced cancer cases will not only save lives and lower treatment costs to individuals, but also decrease the overall healthcare and social costs to society as a whole.

11. The Government should critically review its strategy in regard to breast cancer and consider <u>implementing a district-based pilot scheme for average risk women</u> to better assess the feasibility, resources required (funds, facilities and manpower) and the logistics and operation model (detection methods, age groups to be covered and screening intervals) for a population-wide screening programme. The district-based pilot scheme should give priority to those in need, for instance, women living in lower income districts with higher rate of advanced stage breast cancer and lower cancer screening rate.

12. The Government should put in place a screening programme for high risk women as soon as possible, as per current government strategy. As capacity may be an issue, the resources and facilities in the private sector and NGOs can be mobilised. The Government should also consider greater collaboration with the private sector and NGOs to boost capacity for mammography screening. The HKBCF has been operating two Breast Health Centres since 2011 and is known for providing professional, accessible and affordable breast cancer screening. The HKBCF is most willing to be involved in the planning and execution, as well as implementation of the meaningful pilot/initiatives recommended above. (Ends)

Population-wide Breast Screening for Breast Health
Submission from the Hong Kong Breast Cancer Foundation

Table of Contents

Population-wide Breast Screening for Breast Health
Submission from the Hong Kong Breast Cancer Foundation

I. Purpose

1. This submission sets out the views of the Hong Kong Breast Cancer Foundation (HKBCF) in support of population-wide breast cancer screening in Hong Kong.

II. The Hong Kong Breast Cancer Foundation aims to mitigate breast cancer threat

2. The HKBCF is a non-profit, charitable organisation founded in 2005 to mitigate the threat of breast cancer to the local community through education, support, research and advocacy. The HKBCF works mainly on three fronts:

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

III. Increasing threat of breast cancer in Hong Kong

3. Of all existing cancer types, breast cancer has been the most common among women in Hong Kong since 1994. Over the past three decades, there has been an increase in new cases and deaths of female breast cancer. According to the Hong Kong Cancer Registry (HKCaR), female breast cancer cases diagnosed in Hong Kong tripled from 1,266 in 1994 to 3,900 in 2015, accounting for 26.1% of all new cancer cases among women. One in every four women suffering from cancers was diagnosed with invasive breast cancer, and the number of new cases of breast cancer in 2015 was almost equal to that of lung cancer and colorectal cancer combined in women. On average,

about 10 women are diagnosed with breast cancer every day and one in 16 women will develop breast cancer in her lifetime. In 2015 alone, 637 women died of breast cancer, making breast cancer the third most common cause of cancer deaths among women in Hong Kong.[1] The 2015 HKCaR figures show that breast cancers were more frequently detected at stage II, and an alarming 24% of breast cancers were detected at the advanced stages of III and IV, indicating that early detection of cancer in Hong Kong is the minority.

4. The survival rate of breast cancer reaches more than 90%[2] if detected early. Secondary prevention is therefore equally, if not more, important as primary prevention in the case of breast cancer. The Government's existing strategy of advising only high risk women to seek advice from doctors on regular screening is obviously inadequate in mitigating the threat of breast cancer, not to mention that no action has yet been taken to walk the talk for high risk women i.e. there is no screening programme in place for them. The experiences of overseas countries/places show that population-wide screening programmes have resulted in reduced mortality and beneficial stage shifting, i.e. increase in early stage breast cancer and decrease in advanced stage breast cancer. The HKBCF considers that the Government should delay no more in taking further actions towards making a decision on introducing population-wide screening for women, regardless of risk levels. The Government should also take immediate action to implement its strategy and motivate high risk women to undertake regular breast cancer screening. Government-subsidised screening, as in the case of colorectal cancer, or introducing a co-payment scheme, should be considered.

IV. Benefits of population-wide screening as proven by early randomised controlled trials and other studies increasingly recognised

A. Randomised Controlled Trials

5. Randomised controlled trial (RCT) is a study in which a number of similar people are randomly assigned to two (or more) groups to test a specific drug, treatment or other intervention. One group (the experimental group) has the intervention being tested, the other (the comparison or control group) has an alternative intervention, a dummy intervention (placebo) or no intervention at all. During the 70s and 80s when breast cancer screening had not yet been universally recognised, a total of eight RCTs were conducted to study the effects of mammography screening in five places, i.e.

[1] Hong Kong Cancer Registry, Hospital Authority 2017.
[2] American Cancer Society. Cancer Facts & Figures 2018. Atlanta: American Cancer Society; 2018. Available from https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2018/cancer-facts-and-figures-2018.pdf [Accessed 29 August 2018].

Canada,[3] Scotland,[4] Sweden,[5] the United Kingdom (UK)[6] and the United States (US).[7] These RCTs are the only ones ever carried out on mammography screening over the world, and provide valuable insights on the impact of mammography screening in terms of mortality reduction, advanced breast cancer outcomes and treatment-related morbidity.

(i) Reduction in Breast Cancer Mortality

6. An important indicator of the impact of mammography screening is reduction in mortality due to breast cancer. According to a meta-analysis on the seven RCTs (Table 1),[8] the impact of breast cancer screening on reducing breast cancer mortality was evaluated in terms of the relative risks of dying from breast cancer and number of deaths reduced per 10,000 women screened of the listed age groups. 'Relative risks' examines the comparison of the risk of dying from breast cancer between women who undertake screening and those who do not. In this regard, mammography screening showed positive effect on lowering the risk of dying from breast cancer for women aged 50 to 69.

Table 1: Results from seven RCTs on mortality reduction of breast cancer

Age group	**Relative risks (95% CI)***	**No. of deaths reduced per 10,000 women screened for 10 years***
39-49	0.92 (0.75 to 1.02)	2.9 (-0.6 to 8.9)
50-59	0.86 (0.68 to 0.97)	7.7 (1.6 to 17.2)
60-69	0.67 (0.54 to 0.83)	21.3 (10.7 to 31.7)
50-69 (Combined)	0.78 (0.68 to 0.90)	12.5 (5.9 to 19.5)
70-74	0.80 (0.51 to 1.28)	12.5 (-17.2 to 32.1)

* The brackets following the listed numbers contain the confidence intervals of that particular number

[3] Miller AB, Baines CJ, To T, *et al.*, Canadian National Breast Screening Study: 1. Breast cancer detection and death rates among women aged 40 to 49 years. *CMAJ* 1992;147:1459-76.

[4] Alexander FE, Anderson TJ, Brown HK, *et al.* 14 years of follow-up from the Edinburgh randomized trial of breast-cancer screening. *Lancet* 1999;353:1903-8.

[5] Tabar L, Fagerberg G, Chen HH, *et al.* Efficacy of breast cancer screening by age. New results from the Swedish Two-County Trial. *Cancer* 1995;75:2507-17.

[6] Moss SM, Cuckle H, Evans A, *et al*. Trial Management Group. Effect of mammographic screening from age 40 years on breast cancer mortality at 10 years' follow-up: a randomised controlled trial. *Lancet* 2006;368:2053-60.

[7] Shapiro S, Venet, W, Strax P, *et al.* Ten-to fourteen-year effect of screening on breast cancer mortality. *J Natl Cancer Inst* 1982;69(2):349-55.

[8] Nelson HD, Fu R, Cantor A, *et al.*, Effectiveness of Breast Cancer Screening: Systematic Review and Meta-analysis to Update the 2009 U.S. Preventive Services Task Force Recommendation. *Ann Intern Med.* 2016;164(4):244-55. doi: 10.7326/M15-0969. The RCT done in Scotland is not included in the meta-analysis as it has significant baseline differences in screening and control groups when compared to the RCTs of the other countries, hinting at a possible case of inadequate randomisation.

7. Furthermore, it was found that for every 10,000 women screened for 10 years, 12.5 deaths could have been prevented for women aged 50 to 69. The respective numbers of deaths prevented for women who were younger (aged 39 to 49) or older (aged 70 to 74) were not statistically significant. Many countries, therefore, have implemented breast cancer screening programmes that mainly cover women aged between 50 and 69.

8. Dr. Peter Gøtzsche,[9] who is a strong critic of breast cancer screening, also acknowledged the effect of breast cancer screening on mortality reduction. Initially in the Cochrane Review he published in 2000,[10] which discarded six of the eight RCTs, he stated that breast screening was not able to reduce mortality rate in a population. Later in 2013, however, Dr Gøtzsche conducted another round of meta-analysis on seven of the eight RCTs and concluded that breast cancer screening would likely reduce breast cancer mortality.[11]

(ii) Reduction in Advanced Breast Cancer Cases

9. The impact of the RCTs is also measured by their ability to reduce advanced breast cancer cases. By comparing the risk of diagnosing with advanced breast cancer between different age groups, the RCTs indicated that there was no difference in terms of the risk of diagnosing with advanced breast cancer among women aged between 39 and 49. Women aged 50 or older, however, were found to have reduced their relative risk of being diagnosed with advanced breast cancer by 38%.[12]

B. Other studies

10. Apart from the age-group-specific RCTs, there is a mass of data from countries with population-based breast screening unanimously suggesting a reduction in breast cancer mortality. For instance, time-trend studies[13,14,15] were carried out to compare

---

[9] Dr. Peter Gøtzsche is a Danish physician who runs the famous Nordic Cochrane Centre in Denmark. Dr Gøtzsche is famous for his critique of many medical-related issues, including placebos, antidepressants and mammography screening. In 2012, he published the book *Mammography Screening: Truth, Lies and Controversy*. He also published the book *Deadly Medicines and Organised Crime: How Big Pharma Has Corrupted Healthcare*, stating that chemotherapy is poisoning patients and is only a tool to benefit pharmaceutical companies.

[10] Gøtzsche PC, Olsen O. Is screening for breast cancer with mammography justifiable? *Lancet* 2000;355:129-34.

[11] Gøtzsche PC, Jørgensen KJ. Screening for breast cancer with mammography. *Cochrane Database of Systematic Reviews.* Published Online First: April 2013. doi:10.1002/14651858.cd001877.pub5

[12] Nelson HD, Fu R, Cantor A, *et al.*, Effectiveness of Breast Cancer Screening: Systematic Review and Meta-analysis to Update the 2009 U.S. Preventive Services Task Force Recommendation. *Ann Intern Med.* 2016;164(4):244-55. doi: 10.7326/M15-0969.

[13] Gorini G, Zappa M, Miccinesi G, *et al.*, Breast cancer mortality trends in two areas of the province of Florence, Italy,where screening programmes started in the 1970s and 1990s. *Br J Cancer* 2004;90:1780-3.

[14] Ascunce EN, Moreno-Iribas C, Barcos Urtiaga A, *et al.*, Changes in breast cancer mortality in Navarre (Spain) after introduction of a screening programme. *J Med Screen* 2007;14:14-20.

[15] Duffy SW, Tabar L, Olsen AH, *et al.*, Absolute numbers of lives saved and overdiagnosis in breast cancer screening,

breast cancer mortality before, during and after the introduction of the respective breast cancer screening programmes and reported a notable mortality reduction ranging from 28% to 35%. By estimating breast cancer mortality from a cohort of women not invited for screening or from historical and current control groups, incidence-based mortality studies indicated a breast cancer mortality reduction of 25% for women invited to screening and 38% for those actually screened.[16] Furthermore, case-control studies produced similar results of reduced mortality: an odds ratio of 0.69 (i.e. 31% reduced risk) for women invited to screening and 0.52 (i.e. 48% reduced risk) for those actually screened.[17]

V. International criteria for screening

11. There are internationally recognised criteria for evaluating screening as a measure for preventing disease. In 1968, the World Health Organization (WHO) commissioned public health experts James Maxwell Glover Wilson and Gunner Jungner to evaluate screening as a measure of preventing diseases. They subsequently developed a set of 10 international criteria,[18] which was later called the Wilson-Jungner Criteria for screening. The criteria have been held as a public health classic in assessing the feasibility of screening programmes.[19] These 10 criteria are:

a) The condition sought should be an important health problem;
b) There should be a recognisable latent or early symptomatic stage;
c) The natural history of the condition, including development from latent to declared disease, should be adequately understood;
d) There should be a suitable test or examination;
e) The test should be acceptable to the population;
f) There should be an accepted treatment for patients with recognised disease;
g) There should be an agreed policy on whom to treat as patients;
h) Facilities for diagnosis and treatment should be available;
i) Cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care

---

from a randomized trial and from the Breast Screening Programme in England. *J Med Screen*. 2010;17:25-30.

[16] Broeders M, Moss S, Nyström L, *et al.*, The impact of mammographic screening on breast cancer mortality in Europe: a review of observational studies. *J Med Screen.* 2012;19 Suppl 1:14-25.

[17] Broeders M, Moss S, Nyström L, *et al.*, The impact of mammographic screening on breast cancer mortality in Europe: a review of observational studies. *J Med Screen.* 2012;19 Suppl 1:14-25.

[18] Wilson, JMG, Jungner G, & World Health Organization. Principles and practice of screening for disease / J. M. G. Wilson, G. Jungner. Geneva : World Health Organization. 1968. Available from: http://www.who.int/iris/handle/10665/37650 [Accessed 29 August 2018]

[19] Dobrow MJ, Hagens V, Chafe R *et al*. Consolidated principles for screening based on a systematic review and consensus process. *CMJA* 2018;190: E422-9.

as a whole; and

j) Case-finding should be a continuing process and not a "once and for all" project.

12. It is obvious that breast cancer in Hong Kong fits most, if not all, of the criteria. The HKBCF urges the Government to, in due course, implement a district-based, average-risk pilot study on population-wide screening to enable assessments be made on the resources required, in terms of funds, facilities and manpower, and exact arrangements, such as detection methods, age groups to be covered and screening intervals, for a population-wide screening programme.

VI. Countries/places with population-wide screening programmes

13. Following the positive results of the RCTs and other studies, different countries and places started to implement population-wide breast cancer screening, aiming to expand the benefits to more women. At present, at least 34 countries/places have put in place population-wide breast screening.[20] In Asia-Pacific countries/places, such as Singapore and Taiwan and those with lower age-standardised incidence rates of breast cancer such as South Korea and Japan, population-based breast cancer screening programmes have already been implemented. A table of these 34 countries/places are at Appendix I.

VII. International Cancer Screening Network

A. General characteristics of screening programmes of member countries/places

14. The International Cancer Screening Network (ICSN) is a voluntary consortium of 26 countries/places that run population-based cancer screening or have adopted policies on national breast cancer screening and programme implementation.[21] According to its data (Appendix II), 19 of the 26 countries/places have enacted national breast screening policies, while the rest of them have established state/provincial/regional screening and programme implementation.

15. Apart from minor differences, the mode of population-wide screening programmes among the 26 countries/places is similar in terms of detection methods, age groups covered and recommended intervals. Mammography screening is integral to

[20] National Cancer Institute. International Cancer Screening Network.

[21] Breast Cancer Screening Programs in 26 ICSN Countries, 2012: Organization, Policies, and Program Reach. International Cancer Screening Network; Atlanta. Available from: http://appliedresearch.cancer.gov/icsn/breast/screening.html. [Accessed on 24 May 2018].

the routine application of population-wide screening worldwide. Seventeen of the 26 countries/places, such as Sweden and UK, include screen-film mammography in its routine practice of population-wide breast cancer screening, while the remaining nine countries/places, such as Denmark and Finland, use digital mammography in lieu of screen-film as the former is more accurate in detecting breast cancer. The data of ICSN also show that most of the countries/places provide more than one screening method, including clinical breast examination, ultrasound screening and digital mammography, in their routine screening practice.

16. Regarding the lower and upper limit of age eligible for screening, while there are minor variations, all the 26 countries/places cover those aged 50 to 69 years, as per the positive results of the said RCTs. There are also little differences in the recommended intervals of screening: 23 of the 26 countries/place recommend women to undertake breast screening every two years after 50 years old, while the rest of the countries/places either recommended women to undertake breast screening every one year or every three years.

17. Fourteen of these countries/places have available data regarding the impact of their respective screening programmes on mortality reduction. Among them, 11 countries/places, i.e. Australia,[22] Denmark,[23] Finland,[24,25] Italy,[26] Netherlands,[27,28] New Zealand,[29] Norway,[30] Spain (Catalonia),[31] Spain (Navarra),[32] Switzerland[33] and

[22] Roder D, Houssami N, Farshid G, *et al.*, Population screening and intensity of screening are associated with reduced breast cancer mortality: evidence of efficacy of mammography screening in Australia. *Breast Cancer Res Treat.* 2008;108(3):409-16. doi: 10.1007/s10549-007-9609-5.

[23] Jorgensen KJ, Zahl P-H, Gotzsche PC. Breast cancer mortality in organised mammography screening in Denmark: comparative study. *BMJ* 2010;340:c1241–c1241.

[24] Sarkeala T, Heinävaara S, Anttila A. Organised mammography screening reduces breast cancer mortality: a cohort study from Finland. *Int J Cancer.* 2008;122(3):614-9.

[25] Anttila A, Sarkeala T, Hakulinen T, *et al.*, Impacts of the Finnish service screening programme on breast cancer rates. *BMC Public Health.* 2008;8:38. doi: 10.1186/1471-2458-8-38.

[26] Gorini G, Zappa M, Miccinesi G, *et al.,* Breast cancer mortality trends in two areas of the province of Florence, Italy, where screening programmes started in the 1970s and 1990s. *British Journal of Cancer* 2004;90:1780–3.

[27] Otto SJ, Fracheboud J, Verbeek AL, *et al.*, Mammography screening and risk of breast cancer death: a population-based case-control study. *Cancer Epidemiol Biomarkers Prev.* 2012;21(1):66-73. doi: 10.1158/1055-9965.EPI-11-0476.

[28] van Schoor G, Moss SM, Otten JD, Donders R, Paap E, den Heeten GJ, Holland R, Broeders MJ, Verbeek AL. Increasingly strong reduction in breast cancer mortality due to screening. *Br J Cancer.* 2011;104(6):910-4. doi: 10.1038/bjc.2011.44.

[29] Taylor R, Gregory M, Sexton K, *et al.*, Breast cancer mortality and screening mammography in New Zealand: Incidence-based and aggregate analyses. *J Med Screen*. 2018:969141318776039. doi: 10.1177/0969141318776039.

[30] Weedon-Fekjær H, Romundstad PR, Vatten LJ. Modern mammography screening and breast cancer mortality: population study. *BMJ.* 2014;348:g3701. doi: 10.1136/bmj.g3701.

[31] Pons-Vigués M, Puigpinós R, Cano-Serral G, *et al.*, Breast cancer mortality in Barcelona following implementation of a city breast cancer-screening program. *Cancer Detect Prev*. 2008;32(2):162-7. doi: 10.1016/j.cdp.2008.05.002.

[32] Ascunce EN, Moreno-Iribas C, Barcos Urtiaga A, *et al.*, Changes in breast cancer mortality in Navarre (Spain) after introduction of a screening programme. *J Med Screen.* 2007;14(1):14-20.

[33] Herrmann C, Vounatsou P, Thürlimann B, *et al.*, Impact of mammography screening programmes on breast cancer mortality in Switzerland, a country with different regional screening policies. *BMJ Open.* 2018;8(3):e017806. doi:

UK,[34] have achieved mortality reduction in certain age groups (Appendix III).

B. Experiences of some member countries/places

(i) United Kingdom

18. The UK commenced its population-wide screening programme in 1988. Under the National Health Service (NHS) Breast Screening Programme in England, all eligible women aged 50 to 70 are invited for free screening every three years.[35] Currently, there is a trial to examine the effectiveness of offering some women one extra screening before the age of 50 and one after 70.[36] Figures for years 2016 to 2017 showed that the uptake rate of screening in England was 71% in 2017; a total of 2,199,342 women aged over 45 were screened and among them, 18,402 women were detected with breast cancer regardless of tumor size. Women with ductal carcinoma in situ (DCIS) or micro-invasive breast cancer accounted for 20.8% of all cancers detected. DCIS is also called intraductal carcinoma or stage 0 breast cancer. It is pre-invasive and refers to early stage cancer that has not invaded into adjacent tissues yet.[37] In addition, 41.5% of all breast cancer cases detected are only invasive cancers with tumor size of less than 15 mm, indicating that more cancers are detected at stage I.[38]

19. A study based on population-wide screening data in the UK also showed that the successful detection of every three cases of DCIS can, on average, prevent a case of invasive breast cancer from happening in a three yearly screening round.[39] In other words, the finding demonstrates both a healthy trend of shifting to early stage breast cancer cases and a reduction in advanced stage breast cancer cases at the same time, following the implementation of population-wide breast cancer screening.

20. In another study which examined the impact of screening on breast cancer

---

10.1136/bmjopen-2017-017806.

[34] Massat NJ, Dibden A, Parmar D, *et al.*, Impact of Screening on Breast Cancer Mortality: The UK Program 20 Years On. *Cancer Epidemiol Biomarkers Prev.* 2016;25(3):455-62. doi: 10.1158/1055-9965.EPI-15-0803.

[35] Massat NJ, Dibden A, Parmar D, *et al.*, Impact of Screening on Breast Cancer Mortality: The UK Program 20 Years On. *Cancer Epidemiol Biomarkers Prev.* 2016;25(3):455-62. doi: 10.1158/1055-9965.EPI-15-0803.

[36] Moser K, Sellars S, Wheaton M, *et al.*, Extending the age range for breast screening in England: pilot study to assess the feasibility and acceptability of randomization. *J Med Screen.* 2011;18(2):96-102. doi: 10.1258/jms.2011.011065.

[37] American Cancer Society. Available from https://www.cancer.org/cancer/breast-cancer/understanding-a-breast-cancer-diagnosis/types-of-breast-cancer/dcis.html [Accessed on 22 August 2018]

[38] Breast Screening Programme, England - 2016-17. A report from the NHS in the UK. Available from https://files.digital.nhs.uk/pdf/m/f/breast_screening_programme__england__2016-17_-_report__v2.pdf [Accessed on 22 August 2018]

[39] Duffy SW, Dibden A, Michalopoulos D, *et al.*, Screen detection of ductal carcinoma in situ and subsequent incidence of invasive interval breast cancers: a retrospective population-based study. *Lancet Oncol.* 2016;17(1):109-14. doi: 10.1016/S1470-2045(15)00446-5.

mortality for 20 years straight, it was found that there was a notable mortality reduction for women aged 47 to 73 who were diagnosed with breast cancer.[40] Another study also showed that UK's population-wide screening programme can prevent 5.7 breast cancer deaths per 1,000 women screened for 20 years starting at age 50.[41]

21. It was revealed during a parliamentary meeting in May 2018 that NHS of England failed to send 450,000 women aged 68 to 71 invitations to attend regular breast screening sessions since 2009 due to a computer error. The Secretary of State for Health and Social Care had to apologise for the matter. It was estimated that the blunder possibly shortened the lives of between 135 and 270 women whose cancers could have been spotted had they been invited to screening.[42]

(ii) Australia

22. The Australian Government established the "BreastScreen Australia" programme in 1991 to provide free population-wide mammography every two years to women aged 50 to 69.[43] In 2013, the upper age limit of the programme was extended to 74. As of 2015, the participation rate of the breast cancer screening programme, according to the Australia Institute for Health and Welfare, reached 54%. [44] Participation rate has been between 54% and 55% since 2010 and 2011.[45]

23. Since the commencement of the programme, breast cancer mortality has decreased from 74 deaths per 100,000 women aged 50 to 74 in 1991 to less than 50 deaths per 100,000 since 2010, according to a report.[46] Findings from the same report suggested that the fall in breast cancer mortality in women aged 50 to 74 has been attributed in part to the early detection of breast cancer, along with advances in the management and clinical treatment of breast cancer. The latest number in 2014

---

[40] Massat NJ, Dibden A, Parmar D, *et al.*, Impact of Screening on Breast Cancer Mortality: The UK Program 20 Years On. *Cancer Epidemiol Biomarkers Prev.* 2016;25(3):455-62. doi: 10.1158/1055-9965.EPI-15-0803.

[41] Duffy SW, Tabar L, Olsen AH, *et al.*, Absolute numbers of lives saved and overdiagnosis in breast cancer screening, from a randomized trial and from the Breast Screening Programme in England. *J Med Screen.* 2010;17(1):25-30. doi: 10.1258/jms.2009.009094.

[42] Breast screening error 'shortened up to 270 lives' – Hunt. BBC. Available from https://www.bbc.com/news/health-43973652 [Accessed on 22 August 2018]

[43] BreastScreen Australia. *Spectrum March 2012*. Available from: http://www.minnisjournals.com.au/articles/Breastscreen%20Spectrum%20March%2012.pdf [Accessed on 27 August 2018].

[44] BreastScreen Australia Monitoring Report 2014-15. Australian Institute of Health and Welfare, Australian Government. Available from https://www.aihw.gov.au/reports/cancer-screening/breastscreen-australia-monitoring-2014-15/contents/table-of-contents [Accessed on 27 August 2018].

[45] BreastScreen Australia Monitoring Report 2014-2015. Australian Institute of Health and Welfare, Australian Government. Available from https://www.aihw.gov.au/getmedia/04ac86ad-666f-4004-ad33-7c5c3c3f9260/20460.pdf.aspx?inline=true [Accessed on 27 August 2018].

[46] Australian Institute of Health and Welfare 2017. BreastScreen Australia monitoring report 2014–2015. Cancer series no. 106. Cat. no. CAN 105. Canberra: AIHW.

provided by the Australian Government is that population-wide screening programme can prevent eight breast cancer deaths per 1,000 people aged 50 to 74 screened for 25 years.[47] According to the Australia Institute for Health and Welfare,[48] after correcting the lead time bias and screening selection bias, the hazard ratio of risk of death from breast cancer is 0.58 (i.e. 42% reduced risk) for screen-detected cancer, statistically significantly lower than that for breast cancers diagnosed in women who had never screened through the national mammography screening programme.

(iii) South Korea

24. South Korea is one of the Asian countries belonging to ICSN. The South Korean Government places strong emphasis on screening as an essential measure for cancer control in general. As for breast cancer, the South Korean Ministry of Health and Welfare launched its screening programme in 1999.[49] It offers mammography and clinical breast examination every two years to women aged 40 or above and waives the cost of screening for women in the bottom half of national income distribution. The health service adopts the practice of contacting those who are scheduled to undergo screening in a given year. The breast cancer screening programme has achieved a substantial participation rate: from 33% in 2004 to 66% in 2014, after free coverage was greatly expanded.[50]

25. The programme has led to a possible tendency of beneficial stage-shifting. From 2001 to 2005, it was found that 37% of newly diagnosed cases of breast cancer were stages 0 or I and 14% were stages III or IV. The respective figures became 53% and 12% in 2012.[51] Data from the national screening programme also suggested that the programme may have improved the detection of early stage breast cancers and decreased the occurrence of late stage breast cancer among Korean women. For instance, women who have been screened were more likely to be diagnosed with early stage breast cancer than patients who have not (OR: 1.41; 95% CI: 1.28-1.55).[52]

26. Intermediate outcomes also indicate that the introduction of breast cancer

---

[47] Cancer Australia. Position statement on overdiagnosis from mammographic screening. [Accessed on 30 August 2018].
[48] Australian Institute of Health and Welfare 2018. Analysis of cancer outcomes and screening behaviour for national cancer screening programs in Australia. Cancer series no. 111. Cat. no. CAN 115. Canberra: AIHW.
[49] Ministry of Health and Welfare. *Yearbook of Health and Welfare Statistics, Seoul, Republic of Korea, 1999.*
[50] 1 Mina Suh et al., "Trends in Cancer Screening Rates among Korean Men and Women: Results from the Korean National Cancer Screening Survey, 2004-2013", Cancer Research and Treatment, 2015; National Cancer Centre, Cancer Facts & Figures 2015, 2015.
[51] Zisun Kim et al., 2015; Keun-Young Yoo, "Cancer Epidemiology in Korea", Pitt University presentation, 2010, www.pitt.edu/~super4/41011-42001/41121.pdf
[52] Choi KS, Yoon M, Song SH, et al. Effect mammography screening on stage at breast cancer diagnosis: results from the Korea National Cancer Screening Program. *Sci Rpeo.* 2018;8:8882.

screening for the average risk population will also lead to increased chance of survival among breast cancer patients in Korea.[53] Further future studies, however, will have to be done on whether the national screening programme has indeed induced lower mortality rate among breast cancer patients given the short history of its programme.

VIII. The experience of Taiwan

27. Taiwan is not a member of ICSN but the health service unit of Taiwan has been offering free breast screening to women aged 50 to 69 since 2004.[54] Since 2010, the scope of free breast screening has been expanded to cover those aged 40 to 49, as the health authorities in Taiwan deemed it cost-effective to implement the programme: spending just over US$30,000 for every quality-adjusted life year using mammography.[55] As regards participation rate, only 7% of the target population participated in the programme in 2007 but the figure increased to 38% in 2015.[56] The significant increase could be due to measures taken to boost participation, e.g. the dispatch of vans with mammography screening machines to women living in remote areas or to companies and factories where women workers predominate.

28. The findings of a major study conducted between 1999 and 2009 covering 1.43 million asymptomatic women enrolled in three phases of a screening programme: universal biennial mammography, risk-based biennial mammography and annual clinical breast examination[57] are as follows:

a) detection rates were the highest for universal biennial mammography, followed by risk-based and lowest for annual clinical breast examination;
b) universal biennial mammography screening, compared with annual clinical breast examination, was associated with a 41% mortality reduction and a 30% reduction of stage II+ breast cancer;

---

[53] Choi KS, Yoon M, Song SH, et al. Effect mammography screening on stage at breast cancer diagnosis: results from the Korea National Cancer Screening Program. *Sci Rpeo*. 2018;8:8882.
[54] The Economist Intelligence Unit. Breast Cancer in Asia: The challenge and response. 2016. Available from: https://www.eiuperspectives.economist.com/sites/default/files/EIU%20Breast%20Cancer%20in%20Asia_Final.pdf [Accessed 30 August 2018].
[55] Quality-adjusted life year (QALYS) is a measure of the state of health of a person or group in which the benefits, in terms of length of life, are adjusted to reflect the quality of life. One QALY is equal to one year of life in perfect health. The Economist Intelligence Unit. Breast Cancer in Asia: The challenge and response. 2016. Available from: https://www.eiuperspectives.economist.com/sites/default/files/EIU%20Breast%20Cancer%20in%20Asia_Final.pdf [Accessed 30 August 2018].
[56] The Economist Intelligence Unit. Breast Cancer in Asia: The challenge and response. 2016. Available from: https://www.eiuperspectives.economist.com/sites/default/files/EIU%20Breast%20Cancer%20in%20Asia_Final.pdf
[57] Yen AM, Tsau HS, Fann JC, *et al*., Population-Based Breast Cancer Screening with Risk-Based and Universal Mammography Screening Compared With Clinical Breast Examination: A Propensity Score Analysis of 1 429 890 Taiwanese Women. *JAMA Oncol.* 2016;2(7):915-21. doi: 10.1001/jamaoncol.2016.0447.

c) risk-based mammography screening was not associated with a statistically significant mortality reduction and only achieved an 8% reduction of stage II+ breast cancer when compared with clinical breast examination; and
d) estimates of overdiagnosis was only 13% higher than clinical breast examination for universal mammography and considered an acceptable rate in population-based cancer screening.

IX. Common arguments against population-wide screening

29. The common arguments against or problems cited about population-wide breast screening raised are overdiagnosis leading to over-treatment, psychological burden generated by false-positive results from screening, and the radiation risk of breast cancer screening.

A. Overdiagnosis leading to over-treatment

30. Overdiagnosis refers to the detection of and subsequent actions taken for a cancer that would not have progressed to become symptomatic throughout a woman's lifetime. Although overdiagnosis is often used in evaluating the deficiency of a screening test, it is highly controversial given the difficulty in estimating and measuring overdiagnosis. For instance, the reported figures of overdiagnosis for population-wide breast screening can span over a wide range of a minimum 0% to a maximum 50%.[58,59,60,61,62] However, if the temporal trends, risk factors and lead time of population-wide breast screening are taken into consideration, the level of overdiagnosis can be lowered to 0% to 10%.[63] There is no agreed mathematical model to evaluate the rate of overdiagnosis.

31. While most critics argue that overdiagnosis derived from population-wide breast screening would have an adverse impact on the well-being of women, the focus should be on over-treatment. At present, there is no scientific evidence to predict

[58] Morrell S, Barratt A, Irwig L, *et al.*, Estimates of overdiagnosis of invasive breast cancer associated with screening mammography. *Cancer Causes Control.* 2010 Feb;21(2):275-82. doi: 10.1007/s10552-009-9459-z.
[59] Baines CJ, To T, Miller AB. Revised estimates of overdiagnosis from the Canadian National Breast Screening Study. *Prev Med.* 2016 Sep;90:66-71. doi: 10.1016/j.ypmed.2016.06.033.
[60] Paci E, Miccinesi G, Puliti D, *et al.*, Estimate of overdiagnosis of breast cancer due to mammography after adjustment for lead time. A service screening study in Italy. *Breast Cancer Res.* 2006;8(6):R68.
[61] Heinävaara S, Sarkeala T, Anttila A. Overdiagnosis due to breast cancer screening: updated estimates of the Helsinki service study in Finland. *Br J Cancer.* 2014 Sep 23;111(7):1463-8. doi: 10.1038/bjc.2014.413.
[62] Puliti D, Duffy SW, Miccinesi G, *et al.*, Overdiagnosis in mammographic screening for breast cancer in Europe: a literature review. *J Med Screen.* 2012;19 Suppl 1:42-56.
[63] Puliti D, Duffy SW, Miccinesi G, *et al.*, Overdiagnosis in mammographic screening for breast cancer in Europe: a literature review. *J Med Screen.* 2012;19 Suppl 1:42-56.

whether or not a case of breast cancer would progress during a woman's lifetime. In that case, the possibility of a small percentage of overdiagnosis should not deter women from breast screening given the substantial benefit in mortality reduction.[64] What would cost a woman more: to risk overdiagnosis or delayed detection and treatment of breast cancer?

32. In addition, the purpose of medical science is not to deter the identification of DCIS. More recent researches are instead steering towards stratifying early cancers (i.e. DCIS) into various grades (e.g. high-grade comedo types, low-grade non-comedo types), and aiming to look at the outcome of active surveillance only for low grade DCIS. Over the past few years, a gene-expression profiling test has been introduced as a tool to delineate DCIS biology, and profiling of tumour immune microenvironment may provide insights into the aetiology of and treatment approaches for the highest risk DCIS lesions.[65]

B. Psychological burden from false-positive screening results

33. A false-positive screening result refers to an abnormal mammogram even though no cancer is actually present. It requires additional test(s) such as ultrasound, biopsy to find out if the abnormality is cancer. Psychological distress is a common repercussion associated with false-positive screening results. Although the effect of false-positive screening results on heightening patient's anxiety has long been raised by critics, the magnitude of the problem may have been exaggerated as borne out by studies. For instance, in a survey of over 1,200 women with a six-question anxiety scale to understand the short term and long term impact of a recall examination, women involved in the digital mammographic imaging screening trial demonstrated only transient, limited anxiety increase after a false-positive mammogram when compared with those with a negative mammogram. There was also no difference between the groups' intention to undergo mammography screening again in subsequent two years.[66]

34. A survey done in the US reported that 96% of American women who experienced a false-positive mammogram were glad that they had undergone the test and remained supportive of screening.[67] Moreover, most women agreed that the

[64] BreastScreen Australia Monitoring Report 2014–2015. Australian Institute of Health and Welfare. Available from https://www.aihw.gov.au/getmedia/04ac86ad-666f-4004-ad33-7c5c3c3f9260/20460.pdf.aspx?inline=true. [Accessed on 22 August 2018]

[65] Fallowfield L, Francis A. Overtreatment of Low-Grade Ductial Carcinoma In Situ. *JAMA Oncology*. 2016;2(3).

[66] Tosteson AN, Fryback DG, Hammond CS, *et al*. Consequences of false-positive screening mammograms. *JAMA Intern Med* 2014;2014174:954-61.

[67] Schwartz LM, Woloshin S, Fowler FJ, *et al.* Enthusiasm for cancer screening in the United States. *JAMA* 2004;291:71-8.

anxiety, inconvenience, and the few image-guided needle biopsies using local anaesthesia associated with a recall from screening would not be equivalent to dying from breast cancer.[68] In other words, they would rather undergo the negative emotions generated by the false-positive screening results than dying from breast cancer. A local pilot study also revealed that despite some anxiety about the abnormal film, women were somehow positive about their mammographic experience. Some women reported that a routine check-up would give them peace of mind and would recommend mammography screening to their friends.[69]

35. In the long term, advances in technology will bring about improvements to screening methods, such as the introduction of 3D mammography; thus increasing the accuracy of screening and reducing incidences of false-positive results.

C. Radiation risk

36. Concerns have been raised about mammography for fear that the test will cause unnecessary overdose of radiation and, consequently, cancer. The average radiation dose for a mammography examination is, in fact, only 0.4 mSv,[70] which is equivalent to the dose of seven weeks of cumulative background radiation in the US, or taking four chest radiographs, or taking around four long-haul flights. In a review paper written by Hendrick and Helvie, it was estimated that a woman aged 40 to 49 years old would need to take 76,000 to 97,000 mammograms to induce one cancer.[71] The radiation risk of mammography screening is insignificant if not non-existent. A 2010 report of the Government's Cancer Expert Working Group on Cancer Prevention and Screening[72] in fact reversed its comments in 2004 in this regard and stated that "Mammography screening is safe in general and only a very small dose of radiation is used in the procedure."[73]

---

[68] Schwartz LM, Woloshin S, Fowler FJ *et al.* Enthusiasm for cancer screening in the United States. *JAMA* 2004;291:71-8.

[69] Fielding R, Lam LH. The impact of a false-positive result from breast cancer mammography: a qualitative pilot study. *Hong Kong Med J* 2007;13(Suppl 1):S16-9.

[70] Radiation Dose in X-Ray and CT Exams. RadiologyInfo.org. Available from: https://www.radiologyinfo.org/en/info.cfm?pg=safety-xray [Accessed on 30 August 2018].

[71] Hendrick RE, Helvie MA. United States Preventive Services Task Force screening mammography recommendations: science ignored. *AJR Am J Roentgenol*. 2011 Feb;196(2):W112-6.

[72] The Cancer Expert Working Group on Cancer Prevention and Screening was set up by the Government in 2002 to regularly review and discuss latest scientific evidence, local and worldwide, with a view to providing recommendations on suitable cancer prevention and screening measures for the local population.

[73] Cancer Expert Working Group on Cancer Prevention and Screening. Prevention and Screening for Breast cancer - Information for women and their families. Available from: https://www.chp.gov.hk/files/pdf/breast_ca_en.pdf. [Accessed on 1 September 2018]

X. Population-wide screening for Hong Kong

A. Increasing risk of breast cancer

37. As set out in paragraph 3 above, the threat of breast cancer in Hong Kong is increasing. It is now the most common cancer among women and the third most common cause of cancer deaths among women in Hong Kong. In 2015, female breast cancer cases diagnosed in Hong Kong tripled that of 1994, and the new breast cancer cases diagnosed was almost equal to that of lung cancer and colorectal cancer combined. In addition, breast cancer accounted for 26.1% of all new cancer cases among women in 2015, and one in 16 women will develop breast cancer during her lifetime. It is clear that primary prevention alone cannot mitigate the threat of breast cancer. Secondary prevention measures, including population-wide screening, must be put in place without further delay. The HKBCF stated this at a Legislative Council public hearing on cancer strategy on 2 March 2018.[74]

B. Low awareness of breast cancer threat

38. Despite the soaring numbers, there has not been much public awareness drawn to the problem of breast cancer. According to a local survey conducted in 2007,[75] the proportion of Hong Kong Chinese women aged 50 or above who have ever undertaken breast cancer screening was only 34%, and among them 74% received mammography screening as part of their regular medical check-up. Another report[76] published in 2005 revealed that 58% of the interviewees had never heard of mammography screening. Among those who had heard of mammography screening, 58% would participate in yearly screening and clinical breast examination. The main reasons given by the interviewees for not undergoing regular screening were lack of time and the cost of screening.

39. In 2011, HKBCR Report No. 3[77] published by the HKBCF revealed disparities in breast screening awareness among districts in terms of income level. In Wanchai, the district with the highest household income, more than half of the interviewed breast cancer patients had had regular mammography screening before diagnosis. It was the other way round in districts with lower household income: more than 80% of breast

---

[74] Special meeting of the Legislative Council Panel on Health Services on 2 March 2018

[75] Ho SSM, Choi KC, Wong CL, *et al*. Uptake of breast screening and associated factors among Hong Kong women aged ≥50 years: a population-based survey. *The Royal Society for Public Health.* 2014;128:1009-16.

[76] Chua MST, Mok TSK, Kwan WH, *et al.* Knowledge, Perceptions, and Attitude of Hong Kong Chinese Women on Screening Mammography and Early Breast Cancer Management. *The Breast Journal.* 2005;11(1):52-6.

[77] Hong Kong Breast Cancer Registry Report No. 3, published in 2011, Hong Kong Breast Cancer Foundation. Available from https://www.hkbcf.org/en/our_research/main/424/. [Accessed on 30 August 2018].

cancer patients residing in Kwun Tong had never undertaken mammography screening before diagnosis. It was also found that the proportion of advanced stage breast cancers in low-income districts was higher, e.g. the proportion of advanced stage breast cancer cases were 3.8% in Wanchai and 14.4% in Kwun Tong.

C. Evidence from local opportunistic screening programmes

40. Among the few opportunistic breast cancer screening providers in Hong Kong, the HKBCF Breast Health Centres[78] and the Kwong Wah Hospital[79] are the only ones with screening data available for evaluation. Their data reveal that the rate of cancer detection, biopsy rate, early stage (stage 0 or I) breast cancer detection rate, etc. are comparable to international standards.

41. According to HKBCR Report No. 5,[80] in the screened patient group where earlier stages of breast cancer are diagnosed by screening, the need for chemotherapy is cut by almost two-thirds (from 66% to 25%), and the need for total mastectomy is cut by almost one-third (from 67% to 46%), when compared to the non-screened patient group who present with symptoms and more advanced stage at diagnosis. The health costs saved are huge and the reduction in suffering to women enormous.

D. Screening programmes only available for cervical cancer and colorectal cancer

42. At present, there is good evidence that screening can reduce the mortality of cervical cancer, breast cancer and colorectal cancer.[81] In Hong Kong, the Department of Health (DH) launched a territory-wide cervical cancer screening programme in March 2004. There was also a pilot programme for colorectal cancer screening which started in September 2016. The Government-subsidised Colorectal Cancer Screening Programme is now regularised and will be extended to asymptomatic Hong Kong residents aged between 50 and 75 in phases. No pilot study, however, has been conducted on population-wide screening for breast cancer notwithstanding the increasing threat of the disease, the fact that survival rate is more than 90% if detected early and the ample evidence provided by overseas countries/places that population-wide screening regardless of risk levels resulted in reduced mortality and beneficial

[78] Hung WK. Experience of a Community-based Breast Health Centre. Oral presentation at: Breast Cancer Conference 2017; November, 2017; HKSAR

[79] Lui CY, Lam HS, Chan LK, Tam KF, Chan CM, Leung TY, Mak KL. Opportunistic breast cancer screening in Hong Kong; a revisit of the Kwong Wah Hospital experience. Hong Kong Med J. 2007;13(2):106-13.

[80] Hong Kong Breast Cancer Registry Report No. 5, published in 2013, Hong Kong Breast Cancer Foundation. Available from https://www.hkbcf.org/en/our_research/main/424/. [Accessed on 30 August 2018].

[81] World Health Organization. Cancer Control. Knowledge into Action Who Guide for Effective Programmes. 2007. Available from http://www.who.int/cancer/modules/Early%20Detection%20Module%203.pdf. [Accessed on 23 August 2018].

stage-shifting.

E. Position of the Government

43. At present, the Government advises that all women should be 'breast aware', stay vigilant of the disease and report any change to their doctors. The Government only recommends that "women at high risk of breast cancer see a doctor and undergo mammography screening every year, starting at age 35 or 10 years prior to the age at diagnosis of the youngest affected relative (for those with a family history), whichever is earlier, but not earlier than age 30".[82] According to DH, women are at high risk of breast cancer only if they have any one of the risk factors below:

a) Carriers of BRCA1/2 deleterious mutations confirmed by genetic testing

b) Family history of breast cancer or ovarian cancer, such as
   - any first-degree female is a confirmed carrier of BRCA1/2 deleterious mutations
   - any first- or second-degree female relative with both breast cancer and ovarian cancer
   - any first-degree female relative with bilateral breast cancer
   - any male relative with a history of breast cancer
   - 2 first-degree female relatives with breast cancer and one of them diagnosed at age ≤50 years
   - ≥2 first- or second-degree female relatives with ovarian cancer
   - ≥3 first- or second-degree female relatives with breast cancer or a combination of breast cancer and ovarian cancer

c) Personal risk factors
   - history of radiation therapy to chest for treatment between age 10 and 30 years, e.g. Hodgkin's disease
   - history of breast cancer, including DCIS; lobular carcinoma
   - history of atypical ductal hyperplasia or atypical lobular hyperplasia

44. The majority of breast cancer patients in Hong Kong, however, do not exhibit the high risk factors as defined by the Government. Data from the latest HKBCR Report No. 10 published in September 2018 by the HKBCF found that only 14.6% of 16,743 breast cancer patients had family history of breast cancer in first or non-first degree relatives.[83] The findings from the Hong Kong Hereditary Breast Cancer Family Registry quoted by the Government also indicated that BRCA mutation was only found

[82] Lam TH, Wong KH, Chan KK, *et al.* Recommendations on prevention and screening for breast cancer in Hong Kong. *Hong Kong Med J.* 2018;24(3):298-306. doi: 10.12809/hkmj177037.

[83] Hong Kong Breast Cancer Registry Report No. 10, published in 2018, Hong Kong Breast Cancer Foundation. Available from https://www.hkbcf.org/en/our_research/main/424/. [Accessed on 30 August 2018].

in 9.6% of patients among 2,549 clinically high-risk breast or ovarian cancer patients.[84] These figures clearly show that the majority (over 95%) of the breast cancer cases in Hong Kong are not hereditary.

45. Furthermore, according to HKBCR Report No.10,[85] 83.3% of the breast cancer patients in Hong Kong had their first diagnostic mammogram leading to the diagnosis of their cancer only when they developed breast symptoms. The predominant stage of cancer at first diagnosis was stage II invasive cancer (42.4%), and the majority of the breast cancer patients noticed their symptoms through incidental discovery of breast lump. Stage II cancer requires more invasive and expensive treatment, such as chemotherapy, causing the patient and the society more medical expenses. The emotional distress caused to the patient and her family is also higher. The impact of breast screening on the overall healthcare costs and quality of life of patients have never been studied in the local setting.

F. Public-private partnership important to providing screening services

46. At present, limited screening services are provided by the Government and the non-profit sector.[86] Since the 90s, the three Women Health Centres of DH in Lam Tin, Chai Wan and Tuen Mun had started to provide screening to all women who wished to have breast screening, but, in recent years, the centres have been turning away screening requests of average risk women to focus on high risk screening only.

47. While the charges of the Women Health Centres are relatively low, there is often a long queue, hence a long waiting time of many months. As for services provided by the private sector, they are more readily available but the charges are much higher than the public sector. For instance, the average charge for mammography screening in the private sector is about HK$1,700, which is unaffordable for financially challenged women. NGOs, such as the HKBCF, also provide screening services but at more affordable charges and may provide free screening for women with financial difficulties.

48. The present mode and availability of affordable breast cancer screening in Hong Kong are not conducive to facilitating the early diagnosis of the disease and risk delaying the detection of asymptomatic breast cancer. The Government should consider how private and NGO service providers can be involved in providing

[84] Hong Kong Hereditary Breast Cancer Family Registry 2017.
[85] Hong Kong Breast Cancer Registry Report No. 10, published in 2018, Hong Kong Breast Cancer Foundation. Available from https://www.hkbcf.org/en/our_research/main/424/. [Accessed on 30 August 2018].
[86] The facilities include two Well Women Clinics in Tung Wah Group of Hospitals, three existing Woman Health Centres as well as other non-governmental organisations.

professional, accessible and affordable screening services whether on a population-wide basis, or for high risk women first as per the current government strategy.

XI. Conclusions and Recommendations

A. Conclusions

49. In conclusion, the HKBCF submits that:

a) Early detection saves lives

While the threat of breast cancer is increasing over the past three decades, if detected early, the survival rate is more than 90%. However, the majority of the breast cancer cases in Hong Kong were detected by self-examination by chance and only a small proportion was detected through mammography screening. Furthermore, the high percentage of 24% of breast cancer detected at the advanced stages of III and IV was unacceptable in a modern and wealthy society like Hong Kong.[87] These findings clearly highlight the opportunity for earlier detection of breast cancer through screening to improve public health;

b) Majority of breast cancer cases are not hereditary

At present, the Government only recommends women with increased risk of breast cancer, instead of those with **moderate or average risk** of breast cancer also to consider having regular mammogram screening. However, as the majority of the breast cancer cases in Hong Kong are average risk, the Government needs to reconsider whether its present policy is conducive to mitigating the threat of breast cancer to women in Hong Kong;

c) Overseas experiences proved population-wide screening produces positive results in reduced mortality and beneficial stage shifting

At present, at least 34 countries/places, including Taiwan which is predominately Chinese, have population-wide breast screening programmes in place, with positive results in reduced mortality and beneficial stage shifting. The Government should consider putting in place population-wide screening arrangements to help women detect breast cancer early. At the very least and to gather more data for analysis, the Government should implement its strategy in regard to breast cancer and provide mandatory regular screening to high risk women immediately and introduce a district-based, average-risk pilot programme to determine if and how population wide screening should be considered in Hong Kong;

[87] Hong Kong Cancer Registry, Hospital Authority 2017.

d) **Myths of over-diagnosis, false positive results should not deter implementation of population-wide screening**

Overseas experiences acknowledge that while a certain degree of over-diagnosis and false positive results are inevitable in screening programmes for any type of cancer, the appropriate approach is to continuously develop improved methods of detection rather than abandoning screening. The Government should not use these as reasons for not considering population-wide screening when saving lives clearly outweigh these concerns;

e) **Educating women about the threat of breast cancer and providing financial assistance for screening are necessary**

Awareness of the threat of the disease among women in Hong Kong is low and the cost for mammography screening deters women to undertake screening. The Government should step up public education on the threat of breast cancer and provide subsidised screening for women especially those with financial difficulties. It is important that women should not be deprived of regular screening because of the costs involved. Ultimately, the reduction in cancer cases and advanced cancer cases will not only reduce medical costs to the women concerned, but also reduce the overall healthcare and social costs to families and society as a whole; and

f) **Public Private Partnership could be effective in mitigating the breast cancer threat**

In addition to DH and the Hospital Authority, the private sector and NGOs also provide screening services. To make good use of the community's resources, the Government should seek greater involvement of the private sector and NGOs in providing timely and accessible cancer diagnostic services in the overall screening programme. Co-payment between the Government and screening service users could be considered as the default arrangement.

B. Recommendations

50. The HKBCF strongly urges the Government to consider implementing population-wide breast cancer screening for women in Hong Kong in the face of the increasing threat of the disease. Early detection will not only save lives but the patient will also be subject to less traumatic treatment and incur lower medical expenses, while society as a whole will benefit from the lower medical and social costs from reduced

mortality and beneficial stage shifting.

51. The HKBCF recommends a phased approach in this regard. As a start, the Government should consider implementing a district-based pilot scheme for average risk women to enable it to better assess the feasibility, resources required in terms of funds, manpower and facilities and work out the exact arrangements, including detection methods, age groups to be covered and screening intervals, for a population-wide screening programme. The district-based pilot scheme should cover a broader segment of the women population in Hong Kong, for instance, women living in lower income districts that recorded higher rate of advanced stage breast cancer and lower cancer screening rate. In addition, the Government should consider seeking the collaboration of the private sector and NGOs in providing capacity for mammography screening.

52. In any event, the Government should act on its current strategy in regard to breast cancer and mandate high risk women to regular screening. If capacity is an issue, the manpower and facilities in the private sector and NGOs can be mobilised and deployed.

Appendix I

34 Countries/Places with population-based Breast Cancer Screening Programme (2008)

Region	Country/Place	Age-Standardized Incidence Rate
Asia-Pacific Group	Australia	84.8
	Japan	42.7
	Korea	38.9
	Malaysia	37
	Saudi Arabia	22.4
	Singapore	59.9
Eastern European Group	Czech Republic	67.7
	Hungary	57.9
	Poland	48.9
Latin American and Caribbean Group	Brazil	42.3
	Uruguay	90.7
Western European and Others Group	Belgium	109.4
	Canada	83.2
	Denmark	89.1
	Finland	86.6
	France	99.7
	Germany	81.8
	Greece	44.9
	Iceland	86.2
	Ireland, Republic of	93.9
	Israel	90.8
	Italy	86.3
	Luxembourg	82.3
	Netherlands	96.8
	New Zealand	89.4
	Norway	76.2
	Portugal	60
	Spain	61
	Sweden	82.7
	Switzerland	89.4
	Turkey	28.3
	United Kingdom	87.9
	United States	76
	Taiwan	52.8

Appendix II

Summary of Breast Cancer Screening Programmes provided by Places within the International Cancer Screening Network (2016)

Region/ Country	Programme Type[1]	Year Programme Began	Detection Methods in Routine Use	Age Groups Covered	Recommended Interval for Average Risk for Mammography		Participation Rate (2010)
					Age 40-49	Age 50+	
Australia	NS	1991	MM, DM	40-75+	2 years	2 years	Data no available
Canada	NS	1988	MM, DM, CBE	50-69	1 year	2 years	47.30%
China	NS	2009	MM, CBE, U	40-59	3 years		Data no available
Denmark	S	1991	DM	50-69	NA	2 years	73.00%
Finland	N	1987	DM	50-64	NA	2 years	85.00%
France	N	1989	MM, DM, CBE	50-74	NA	2 years	52.30%
Iceland	N	1987	DM, CBE	40-69	2 years	2 years	60.00%
Israel	N	1997	MM, DM	50-74	NA	2 years	72.00%
Italy	NS	2002	MM, DM	50-69	NA	2 years	60.50%
Japan	NS	1977	MM, DM, CBE	40-75+	2 years	2 years	19.00%
Korea	N	1999	MM, DM	40-75+	2 years	2 years	39.30%
Luxembourg	N	1992	DM	50-69	NA	2 years	64.00%
Netherlands	N	1989	MM, DM	50-74	NA	2 years	80.70%
New Zealand	N	1998	MM, DM	45-69	2 years	2 years	67.50%
Norway	N	1996	DM	50-69	NA	2 years	76.00%
Poland	N	2006	MM, DM	50-69	NA	2 years	39.00%
Portugal (Central Region)	S	1990	DM	45-69	2 years	2 years	63.00%
Portugal (Alentejo Region)	S	1997	DM	45-69	2 years	2 years	58.40%
Saudi Arabia	S	2007		40-64		2 years	19.00%
Spain (Catalonia)	NS	1995	MM, DM	50-69	NA	2 years	65.00%
Spain (Navarra)	NS	1990	DM	45-69	2 years	2 years	87.30%
Sweden	S	1986	MM, DM	40-74	18 months	2 years	70.00%
Switzerland	NS	1999	MM, DM	50-69	NA	2 years	48.20%
United Kingdom	N	1988	MM, DM	50-69		3 years	73.30%
United States	O	1995	MM, DM, CBE	40-75+	1-2 years	1-2 years	66.50%
Uruguay	O	1990	MM, CBE, U, BSE	40-69	2 years	1 year	Data not available

Notes

[1] Programme Types: N (National screening policy with national programme implementation); NS (National screening policy with state/provincial/regional screening programme implementation); S (State/Provincial/Regional screening and programme implementation); O (Other)

[2] Detection Methods: MM (screen-film mammography); DM (digital mammography); U (Ultrasound); CBE (Clinical Breast Examination); BSE (Breast Health Examination)

Appendix III

Summary of Mortality Reduction Observed in ICSN Member Countries/Places with Breast Cancer Screening Programmes

Region/ Country	Mortality reduction
Australia	41% for age 45-80
Denmark	63% for age 50-54
Finland	22% for age 50-69
Italy	40.9% for age 35-85+ in early screening area; 11.3% for age 35-85+ in late screening area
Netherlands	65% for age 50-69 (Nijmegen)
	48% for age 50-75 (Southwest region)
New Zealand	17% for age 45-74
Norway	28% for age 50-79
Spain	17% for age 50-74 (Catalonia)
	42% for age 50-69 (Navarra); 25% for aged 30-75+
Sweden	43% for age 40-70 in 13 areas
	29% for age 40-49
Switzerland	43% [age unknown]
United Kingdom	39% for age 47-73