For Information
on 10 July 2020

Legislative Council Panel on Health Services

Breast Cancer Screening

PURPOSE

This paper briefs Members on the key findings of the Government-commissioned study conducted by The University of Hong Kong ("HKU") on the risk factors associated with breast cancer for local women ("the Study") and the revised recommendations on breast cancer screening made by the Cancer Expert Working Group on Cancer Prevention and Screening ("CEWG") of the Cancer Coordinating Committee ("CCC").

BACKGROUND

2. Cancer is a major public health issue in Hong Kong and the burden of cancer on public health has been increasing. In 2017, there were 33 075 newly diagnosed cancer cases and breast cancer was the most common cancer among women. There were 4 373 newly diagnosed female breast cancer cases, accounting for 27.0% of all new cancer cases in female.[1] In 2018, breast cancer was the third leading cause of cancer deaths among women, causing 753 deaths, which amounts to 12.4% of all female cancer deaths.[2]

3. The Government attaches great importance to cancer prevention and control. As early as 2001, the Government established the CCC. Chaired by the Secretary for Food and Health and comprising members who are cancer experts, academics, doctors in public and private sectors, as well as public health professionals, the CCC formulates strategies on cancer prevention and control and steers the direction of work covering prevention and screening, surveillance, research and treatment.

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[1] Hong Kong Cancer Registry. Female Breast Cancer in 2017. Available at: https://www3.ha.org.hk/cancereg/pdf/factsheet/2017/breast_2017.pdf.

[2] Centre for Health Protection. Mortality of Female Breast Cancer in 2018. Available at: https://www.chp.gov.hk/en/healthtopics/content/25/53.html.

4. The CEWG set up under the CCC regularly reviews international and local evidence and makes recommendations on cancer prevention and screening applicable to the local situations. The CEWG adopted a list of criteria promulgated by the World Health Organization for instituting a screening programme as guiding principles in considering population-based screening (**Annex A**). Based on the above considerations, not all screening methods justify with evidence a population-based screening programme. Furthermore, all screening tests have their limitations as they are not 100% accurate. They include false positive and false negative results, leading to the possibility of over-diagnosis and over-treatment.

5. At present, the CEWG has made recommendations on prevention and screening for nine selected cancers, including breast cancer. Prior to the Study conducted by the HKU, the CEWG considered that there is insufficient scientific evidence to recommend for or against population-based mammography screening for women at average risk in Hong Kong.

THE STUDY

6. To bridge the knowledge gap for risk prediction of breast cancer in the local female population, the Government commissioned the HKU to conduct a study on risk factors associated with breast cancer for local women in October 2015, funded by the Health and Medical Research Fund administered under the Food and Health Bureau. The Study is conducted by the research team led by Professor Gabriel Leung, Chair Professor of Public Health Medicine at the HKU. Other research team members include Professor Ava Kwong from the Department of Surgery; Dr Irene Wong, Dr Wendy Lam, Professor Joseph Wu and Dr Kathy Leung from the School of Public Health; Professor Khoo Ui-soon from the Department of Pathology; and Professor Roger Ngan from the Department of Clinical Oncology of the HKU.

7. The aim of the Study is to formulate a risk prediction model for breast cancer in Hong Kong using a case-control study approach under which a comparison is made between women with and without breast cancer. It also aims to find out the relations between breast cancer development and its risk factors (including demographic characteristics, body mass index ratio, physical activity level, known breast cancer risk factors such as age at menarche, age at

first live birth or nulliparous, family history of breast cancer and prior benign breast disease diagnosis (hereafter collectively known as "Risk Factors")).

8. The Study has compared and analysed 3 501 breast cancer cases and 3 610 controls. The estimated averaged lifetime risk of invasive breast cancer among all local women was 6.8%, whereas the averaged lifetime risk of breast cancer mortality was 1.1%.

9. In addition to age-related risk, the relative risk of other risk factors for breast cancer is in the range of 1 to 2 –

	Risk Factors	**Relative risk**
(i)	Family history of breast cancer among first degree relatives	2.0
(ii)	Prior benign breast disease diagnosis	1.6
(iii)	Nulliparous	1.6
(iv)	Age at first live birth (≥30 years)	1.5
(v)	Body mass index (> 23 kg / m^2)	1.4
(vi)	Age at menarche (≤11 years)	1.2
(vii)	Lack of physical activity[3]	1.1

The larger the number of the relative risk, the higher the risk of developing breast cancer.

10. The Study estimated that biennial screening would allow breast cancer to be diagnosed 0.45 years earlier on average with substantial downstaging. The risk-based approach would be far more efficient than the conventional age-based or population-based breast cancer screening due to the reduction of unnecessary tissue biopsy or other invasive confirmatory tests

[3] Physical activity refers to exercising intensively such as lifting heavy objects, cardiovascular exercise and riding fast on bicycle at least once a week on average in the last ten years.

among healthy women at low risk who receive false-positive screening test results.

11. As part of the Study, the research team prospectively collected clinical and biological samples for establishing a biobank for future research projects. As at August 2019, the biobank contained blood samples from 1 449 case individuals and paired tissue samples from 646 case individuals, while 1 171 controls provided blood samples.

12. The Study was completed in December 2019. Based on data collected in relation to the Risk Factors, a personalised risk stratification model has been developed for estimating the risk of developing breast cancer.

REVISED RECOMMENDATIONS BY CEWG

13. The CEWG has taken into consideration the findings of the Study and available evidence and reviewed its recommendations for breast cancer screening. The revised recommendations were reported to, and endorsed by, the CCC at its meeting on 19 June 2020. The CEWG's revised recommendations on breast cancer screening for local population include –

(i) breast self-examination is not recommended as a screening tool for breast cancer for asymptomatic women; women are recommended to be breast aware (be familiar with the normal look and feel of their breasts) and seek medical attention promptly if suspicious symptoms arise;

(ii) there is insufficient evidence to recommend clinical breast examination or ultrasonography as a screening tool for breast cancer for asymptomatic women;

(iii) it is recommended that risk-based approach should be adopted for breast cancer screening; and

(iv) while recommendations on breast cancer screening for (a) women at high risk remain status quo, that for (b) women at moderate risk and (c) other women at general population are revised. Details of recommendations for women of different risk profiles are set out at

Annex B with major changes highlighted.

WAY FORWARD

14. Based on the findings of the Study at paragraphs 7 to 12 and CEWG's revised recommendations on breast cancer screening at paragraph 13 above, the Government will adopt a risk-based approach, instead of an aged-based or population-based approach, in determining the next step for breast cancer screening in Hong Kong. Apart from findings of the Study and CEWG's recommendations, other relevant factors to be considered include local prevalence of breast cancer, accuracy and safety of the screening tests, effectiveness in reducing incidence and mortality rates of breast cancer, feasibility of implementation of a screening programme, the capacity of the healthcare system with respect to resources, manpower and infrastructure, public acceptance and whether screening does more good than harm to the society. We will announce further details of the way forward of breast cancer screening within 2020.

ADVICE SOUGHT

15. Members are invited to note the contents of the paper.

Food and Health Bureau
Department of Health
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Annex A

Criteria for Instituting a Population-based Screening Programme[4]

(i) the condition sought should be an important health problem;

(ii) there should be an accepted treatment for patients with recognised disease;

(iii) facilities for diagnosis and treatment should be available;

(iv) there should be a recognizable latent or early symptomatic stage;

(v) there should be a suitable test or examination;

(vi) the test should be acceptable to the population;

(vii) the natural history of the condition, including development from latent to declared disease, should be adequately understood;

(viii) there should be an agreed policy on whom to treat as patients;

(ix) the cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole; and

(x) case-finding should be a continuing process and not a "once and for all" project.

[4] Source: Wilson JMG, Jungner G. *Principles and practice of screening for disease*. Geneva: WHO; 1968. Available at: http://www.who.int/bulletin/volumes/86/4/07-050112bp.pdf

Annex B

Revised Recommendations on Breast Cancer Screening by Cancer Expert Working Group on Cancer Prevention and Screening

(a) For women at high risk

Current Recommendations (**Remain *status quo***):

Local definition - with any one of the risk factors:

1. Carriers of *BRCA1/2* deleterious mutations confirmed by genetic testing.
2. Family history of breast cancer /ovarian cancer, such as
   - any first-degree female relative 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 being 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.
3. Personal risk factors
   - history of radiation therapy to chest for treatment between age ten and 30 years, e.g. Hodgkin's disease;
   - history of breast cancer, including ductal carcinoma in situ ("DCIS"); lobular carcinoma;
   - history of atypical ductal hyperplasia or atypical lobular hyperplasia.

Recommendation on screening

1. Should seek advice from doctors; and
   - Have mammography screening every year;
   - Begin screening at age 35 or ten years prior to the age at diagnosis of the youngest affected relative (for those with family history), whichever is earlier, but not earlier than age 30.
   - For confirmed carriers of *BRCA1/2* deleterious mutations or women who had radiation therapy to chest for treatment between

Current Recommendations (**Remain *status quo***):
age ten and 30 years (e.g. for Hodgkins disease), consider additional annual screening by Magnetic Resonance Imaging ("MRI"). **Recommendation on genetic testing** 1. Women who have any first-degree female relative with confirmed *BRCA1/2* deleterious mutations should be offered genetic testing to confirm or refute their carrier status. 2. For women at high risk due to other types of family history who wish to clarify their genetic risk or that of their family, referral to a specialist cancer clinic for advice, counselling and management should be discussed and considered. 3. Genetic testing should be performed by specialised cancer centres with expertise in genetic counselling, which should be provided before genetic testing. Health care professionals should discuss with their clients in detail about the uncertainties and implications of the test results. Confirmed carriers of *BRCA1/2* deleterious mutations who wish to consider prophylactic surgery/chemoprevention should also be referred to a specialist cancer clinic for advice and counselling.

(b) **For women at moderate risk**

Previous Recommendations	**Revised** Recommendations
1. Women at moderate risk (i.e. family history of only one first-degree female relative with breast cancer diagnosed at ≤50 years of age; or two first-degree female relatives diagnosed with breast cancer after the age of 50 years) should discuss with their doctors the pros and cons of breast cancer screening before deciding whether to start screening by mammography every two to three years. 2. MRI is not recommended for	1. Women at moderate risk (i.e. family history of only one first-degree female relative with breast cancer diagnosed at ≤50 years of age; or two first-degree female relatives diagnosed with breast cancer after the age of 50 years) are recommended to have mammography every two years and should discuss with their doctors the potential benefits and harms of breast cancer screening before starting screening.

women at moderate risk.	2. MRI is not recommended for breast cancer screening in women at moderate risk.

(c) **For other women at general population**

Previous Recommendations	**Revised** Recommendations
1. There is insufficient evidence to recommend for or against population-based mammography screening for asymptomatic women at average risk in Hong Kong. 2. There is insufficient evidence to recommend regular breast self-examination as a screening tool. Women are advised to be breast aware (be familiar with the normal look and feel of their breasts) and visit doctors promptly if suspicious symptoms appear. 3. There is insufficient evidence to recommend clinical breast examination as routine screening for asymptomatic women. 4. Individuals considering breast cancer screening should be adequately informed by doctors about the benefits and harms.	1. Women aged 44-69 with certain combinations of personalised risk factors (including presence of history of breast cancer among first degree relative, a prior diagnosis of benign breast disease, nulliparity and late age of first live birth, early age of menarche, high body mass index and physical inactivity) putting them at increased risk of breast cancer are recommended to consider mammography screening every two years. They should discuss with their doctors on the potential benefits and harms before undergoing mammography screening. 2. A risk assessment tool for local women (e.g. one developed by The University of Hong Kong) is recommended to be used for estimating the risk of developing breast cancer with regard to the personalised risk factors described above. 3. MRI is not recommended for breast cancer screening in women at general population.