HEALTH ADVICE ON PREVENTION AND SCREENING OF CANCER FOR THE HEALTHCARE PROFESSIONALS

I. Burden of Cancer in Hong Kong

Cancer has been a major cause of illness and the leading cause of death in Hong Kong. There were 21 861 new cases in 2002. The crude incidence rate per 100 000 population was 322.1. There were 11 510 deaths in 2003. The crude mortality rate per 100 000 population was 169.2. In general, 1 in 4 males and 1 in 5 females will have cancer in their lifetime while 1 in 7 males and 1 in 12 females will die from cancer in their lifetime. The burden of cancer in the population has been growing. The proportion of cancer deaths among all deaths has been increased from 27% in 1983 to 32% in 2003.

The most common cancers affecting men are lung cancer, colorectal cancer and liver cancer. Among females, the most common cancers are breast cancer, colorectal cancer and lung cancer. Comparing the age-standardized incidence rate of particular cancers over the past decade, those cancers that are on the increasing trend include prostate cancer and colorectal cancer in males, and breast cancer and ovarian cancer in females.

Cancer mainly affects elderly people in the population with the median age at diagnosis being 68 for males and 65 for females in 2002. Certain cancers are affecting people at relatively young age. These include nasopharyngeal cancer, breast cancer, thyroid cancer, uterine cancer and ovarian cancer, for which the median age at diagnosis of affected persons is around their fifties or even forties.

Upon the pledge in the Government's Policy Address, the Cancer Coordinating Committee, chaired by the Secretary for Health, Welfare and Food, was set up. Under this Committee, the Cancer Expert Working Group on Cancer Prevention and Screening was tasked to review the evidence of effectiveness of cancer control measures and formulate recommendations for cancer prevention and screening in Hong Kong. The Report of the Cancer Expert Working Group on Cancer Prevention and Screening was published in December 2004 and the full report is available at the Department of Health website www.dh.gov.hk and the Centre for Health Protection website www.chp.gov.hk

II. The Review Process and Methods

Selection of Cancers

Cancers of the lung, colon and rectum, liver, nasopharynx, breast, cervix and prostate were selected for review by using the following criteria: disease burden on the local population in terms of number of deaths, potential years of life lost (PYLL), increasing incidence, preventability and possibility of early detection, availability of effective interventions, local prevailing practices and degree of concern from the medical profession and the community.

Source of Scientific Evidences

Medical literature on each selected cancer was searched through the MEDLINE database and Cochrane Database of Systematic Review. Literature on the safety, efficacy and effectiveness of an intervention, particularly large and well-designed randomized controlled trials, meta-analysis and systematic reviews was an important source of evidence. Other sources of information included local literature and epidemiological data, national guidelines and reports published by international and state agencies.

Methods of Reviewing Scientific Evidences

The 'U.K. National Screening Committee Criteria for appraising the viability, effectiveness and appropriateness of a screening programme' was adopted for evaluating the effectiveness of prevention of cancer.

Thorough and independent critical appraisal of the relevant studies was carried out, and generally covered strengths and flaws of study design, use of blinding and randomization, control of confounder, statistical power and sample size, population characteristic, prior specification of hypothesis, data analysis and sources of bias including proportion of loss to follow-up. The Consolidated Standards of Reporting Trials (CONSORT) checklist was used to assess the validity of the results of randomized controlled trials. In parallel, the Standards for Reporting of Diagnostic Accuracy (STARD) checklist was used for assessing potential biases and generalizability of diagnostic accuracy studies.

Both primary and secondary preventive measures were reviewed for evidence of

effectiveness in the prevention of cancer. For primary prevention, criteria for effectiveness included evidence of biological effectiveness of risk reduction and safety. For screening test, criteria for effectiveness included screening test accuracy and potential impact on health outcome in terms of both benefits and harms.

Drawing up Recommendations

Health care research findings often describe the effect of interventions in best possible circumstances. Benefits observed under carefully controlled conditions may not be generalizable to ordinary clinical practice due to problems of feasibility, resource availability, compliance and acceptability. Therefore, cost-effectiveness and value judgement by the society should also be considered before provision of public health services.

Recommendations on primary prevention and screening of the seven selected cancers were developed both at a population level (i.e. mass screening) and for individuals at high risk (i.e. risk-based approach). The recommendations drawn up were based on scientific evidence of effectiveness of interventions, consultation with local and international experts and the local disease burden. For application of the recommendations in clinical practice, individual-specific factors need to be considered and discussed, such as the value the individual places on the clinical preventive action; its possible positive and negative outcomes; and the context and /or personal circumstances of the individual.

III. Prevention of Cancer

1. Primary Prevention

Primary prevention refers to preventing the onset of a condition by eliminating or minimizing exposure to the cancer-causing factors of cancer and altering individual susceptibility to such factors. Cancer is largely a preventable disease. Overall, the World Health Organization (WHO) indicates that at least one-third of 10 million newly diagnosed cancer cases every year worldwide are preventable by effective prevention initiatives. Among the cancer prevention methods, the most effective ones include tobacco control, healthy diet, physical activity, avoidance of obesity, reducing alcohol use, reducing carcinogenic occupational and environmental exposures, and immunization against viral hepatitis B infection.

2. Secondary Prevention

Secondary prevention measures include screening and early detection. They aim at stopping the progression of more severe stages of the disease by identifying the disease at an early and curable stage, where effective treatment prevents the disease or gives better outcomes.

(a). Screening of Cancer

Screening refers to the systematic use of simple tests applied to a healthy population in order to identify individuals who have a specific disorder, but do not yet have symptoms of that disorder, at a time when they will benefit from early treatment. Screening for cancers aims to detect cancer precursor or cancer when it is localized to the organ of origin without invasion of surrounding tissues or distant organs.

Screening test may not improve an individual's health or help the person live longer if the cancer detected is at advanced stage or has already spread to other parts of the body. It is not sure whether treating cancers found by screening can help a person live longer than if no treatment was given and treatments for cancer may have serious side effects.

Screening tests are not 100% accurate. There are false-positive and false-negative results. False-positive result is the wrong indication of the presence of a condition despite the fact that it does not exist. This may cause anxiety, unnecessary

investigation and medical intervention which may be harmful. False-negative result is the failure of the test to detect a condition despite the fact that it is present. This leads to false reassurance and may delay seeking medical care even if there are symptoms. The missed condition may get worse and eventually be lethal. Individuals considering a screening test should seek advice from health care professionals for assessment of need and obtain full information on benefits and potential hazards of having the test for an informed choice.

Apart from accuracy, issues like feasibility, resource availability, compliance and acceptability should also be considered before applying the test in mass screening programmes. The pre-requisite for a preventive action to be recommended is that its potential benefits clearly outweigh its potential harms to the target group. Health care professionals should provide individuals with detailed information regarding potential benefits and harm of screening to enable an informed choice about whether or not to proceed with the test.

(b). Early Recognition of Symptoms and Early Diagnosis

Cancer Awareness

Different types of cancer will have their own manifestations, depending on the cancer site, the size and its natural behaviour. Although some cancers (e.g. liver cancer, ovarian cancer) may have no or subtle symptoms in its early stage of development, in many cases, it is possible to detect recognizable symptoms or unusual lesions early, particularly for cancers of the breast, cervix, mouth, larynx, stomach, colon and rectum, and skin. Early diagnosis and early intervention are the cornerstones of effective cancer treatment and are correlated with a better survival rate. Health care professionals can play an important role in promoting cancer awareness, which includes educating people about normal body development, risk factors for cancer and what changes should be reported.

Self-examination

Early recognition of signs and symptoms of cancer is a crucial part for early detection of cancer that allows early diagnosis and treatment of potentially fatal cancers and usually improves the chance of cure. Although these signs and symptoms may not necessarily mean the presence of cancer, they alert the individual to watch out for changes and seek prompt medical attention.

There has been much debate about the benefits and drawbacks of self-examination and

there is so far no conclusive evidence that self-examination, such as breast self-examination and testicular self-examination, is an effective tool for early detection of cancer.

3. Tertiary Prevention

Tertiary prevention refers to the proper rehabilitation of patients with an established disease to minimize residual disabilities and complications. Action taken at this stage aims at improving the quality of life, even if the disease cannot be cured.

IV. Primary Preventive Measures

Evidence and recommendation on various types of primary preventive measures are detailed below. Health care professionals could make reference from the information and advise their clients as appropriate.

1. Diet and Nutrition

(a). Vegetables and Fruits

Evidence

- There is strong and consistent evidence showing that diets high in vegetables and fruits decrease the risk of many cancers, such as oral cancer, gastric cancer, oesophageal cancer and colorectal cancer, and probably lung cancer and breast cancer.
- Worldwide, it is estimated that increasing consumption of vegetables can potentially prevent up to 50% of gastric cancer and 29% of colorectal cancer.
- Increasing consumption of fruits can potentially prevent up to 45% of cases of oesophageal cancer and 50% of gastric cancer cases.
- The WHO, World Cancer Research Fund and American Institute for Cancer Research recommend fruits and vegetables of at least 400 grams a day.
- In the case of fibre, the evidence has been inconclusive.
- Frequent consumption of pickled or salted vegetables is associated with a higher cancer risk.

Recommendations

- Consume at least 400 grams or 5 or more servings (2 servings of fruits and 3 servings of vegetables) a day of a variety of vegetables and fruits.

  One serving of fruits is approximately defined as one of the following:

  - 2 pieces of small-sized fruits (e.g. plum).
  - 1 piece of medium-sized fruit (e.g. orange, apple, kiwifruit).
  - 1/2 piece of large-sized fruit (e.g. banana, grapefruit, star fruit).
  - 1/2 cup of cut-up fruits or berries (e.g. watermelon, cantaloupe, honeydew melon, cherries, strawberries).
  - 1/2 cup of other types of fruits (e.g. grapes, lychee).
  - 1/4 cup of dried fruits without added sugar or salt (e.g. raisin, prune).

- 3/4 cup of fresh fruit juice without added sugar (e.g. fresh orange juice with pulp).

(Remark: 1 cup = 240 ml)

One serving of vegetables is approximately defined as one of the following:

- 1 bowl of raw leafy vegetables (e.g. lettuce, purple cabbage).
- 1/2 bowl of cooked vegetables, sprouts, gourds or mushrooms (e.g. Chinese flowering cabbage, Chinese kale, spinach, white cabbage, bean sprouts, eggplant, carrot).
- 3/4 cup of fresh vegetable juice without added sugar (e.g. fresh tomato juice with pulp).
- 1/2 bowl of cooked beans (e.g. snow peas, red kidney beans).

(Remark: 1 bowl = 240 ml)

- Minimize the consumption of pickled or salted vegetables.

(b). Meat, Fish and Dairy Products

Evidence

- Red meat consumption is associated with increased risk of colorectal cancer, breast cancer and probably prostate cancer. For colorectal cancer, stronger association is found for processed meat.
- Experts also opine that intake of dairy products, red meat or animal protein is probably associated with a higher risk for prostate cancer.
- Poultry and fish have not been found to be associated with increased cancer risk.
- Chinese-style salted fish increases the risk of nasopharyngeal cancer and probably gastric cancer.

Recommendations

- Decrease consumption of red meat (for examples, beef, lamb and pork), especially processed meat (for examples, ham, sausages and bacon).
- Minimize consumption of Chinese-style salted fish, particularly in infancy and childhood.

(c). Nutrition Supplements

Evidence

- The use of micronutrients such as β-carotene and α-tocopherol (vitamin E) in prevention against cancer is not sufficiently proven.
- Some studies suggested that β-carotene had preventive effects against cancers of the lung, oral cavity and pharynx. Other studies found that β-carotene use significantly increased the risk for lung cancer among smokers and/or asbestos-exposed workers.
- A reduction in the incidence and deaths from prostate cancer was recorded among the smokers who took α-tocopherol (vitamin E). However, there was an increase in the occurrence of cerebral haemorrhage in this subject group.

Recommendations

- Maintain a well-balanced diet which means: choose a variety of food; consume whole grains as the major component of each meal; eat plenty of fruits and vegetables; eat adequate amount of lean meat (including poultry, fish, seafood and eggs) or beans and low fat dairy products; avoid processed or preserved food and food that is rich in fat, cholesterol, salt and sugar; and drink adequate amounts of fluids.

(d). Breastfeeding

Evidence

- Reduction in risk of developing breast cancer is associated with longer cumulative duration of breastfeeding.

Recommendations

- Breastfeed each child for longer duration.

2. Smoking

Evidence

- Tobacco is recognized as the largest avoidable cause of premature death and the most important known carcinogen.
- There is carcinogenic effect of cigarette smoking on cancers of the lung, oral cavity, pharynx, larynx, oesophagus, pancreas, urinary bladder, nasal cavities and nasal sinuses, stomach, liver, kidney and cervix, and myeloid leukaemia.
- Dose-response relationship between number of cigarettes smoked and risk of developing these cancers has also been found consistently.
- In the developed countries, it is estimated that between 80% and 90% of lung cancer in men and between 55% and 80% of lung cancer in women are

attributable to cigarette smoking; between 75% and 90% of cancers arising in the oesophagus, larynx and oral cavity are related to the effect of tobacco.

- There is convincing evidence of excess risk of lung cancer caused by environmental tobacco smoking or second-hand smoking. The excess risk in spouses of smokers who are exposed to second-hand smoking is 20% for women and 30% for men, and the excess risk increases with increasing exposure.

Recommendations

- Do not smoke.
- Minimize exposure to environmental tobacco smoke or second-hand smoking.

3. Alcoholic Beverages

Evidence

- Prolonged heavy alcohol drinking causes cancer of the oral cavity, larynx, pharynx, oesophagus and liver, and may increase the risk of breast and colorectal cancer.
- The risk relationship between alcohol and cancer of the breast and upper gastrointestinal tract is nearly a linear dose-response relationship between the level of alcohol and risk.
- The carcinogenic effect of alcohol is exacerbated by tobacco use and malnutrition, particularly with low intake of fruit and vegetables.
- The possible carcinogenic effect of alcohol on other organs such as the lung, colon and rectum has also been suggested, yet the evidence is still inconclusive.

Recommendations

- Abstain from alcoholic beverages.
- For drinkers, practise ‘low-risk drinking’.

  For healthy men, ‘low-risk drinking’ is no more than three to four standard drinks per day, less than 21 standard drinks a week and at least 2 alcohol-free days per week. For non-pregnant women, ‘low-risk drinking’ is no more than one to two standard drinks a day, less than 14 standard drinks a week and at least 2 alcohol-free days a week. Examples of a standard drink are:

  - two-third of a can/small bottle (370 ml) of beer at 5% ABV
  - 1 serve (100 ml) of table wine at 12% ABV

- 1 small glass (35 ml) of Chinese wine at 30% ABV (for example double-evaporated rice water)
- 1 pub measure (30 ml) of spirits at 40% ABV (for examples, brandy, whisky, gin or vodka)

The term 'ABV' means 'alcohol by volume' which is the percentage of alcohol in the total liquid.

4. Physical Activity and Weight Control

Evidence

- Overweight and obesity are associated with an increased risk of cancer of the endometrium, breast in post-menopausal women, kidney and colon. Obesity is associated with increased risk of oesophageal cancer.
- Physical activity is associated with lower risk of breast cancer, colorectal cancer and endometrial cancer, and it may protect against prostate cancer.
- The magnitude of decrease in risk of colorectal cancer is around 40% and decrease in risk of breast cancer is around 20-40%.

Recommendations

- Control body weight.
- Have moderate physical activity for at least 30 minutes every day.

5. Vaccine

(a). Hepatitis B Virus (HBV)

Evidence

- Hepatitis B infection is an important causal factor of liver cancer.
- Hepatitis B vaccination effectively prevents liver cancer by decreasing the chance of becoming carriers of hepatitis B virus.

Recommendations

- Newborn babies should receive three doses of hepatitis B vaccine at recommended intervals of 0, 1, 6 months.
- Babies born to mothers of hepatitis B carrier status should receive an additional dose of hepatitis B immunoglobulin within 24 hours of birth.

(b). Hepatitis C Virus (HCV)

Evidence

- HCV is one of the causes of liver cancer.
- Although a prototype vaccine that induces antibodies to HCV envelope protein has been developed, hepatitis C vaccination is not feasible practically because of viral heterogeneity and rapid mutation of this virus.

Recommendations

- No effective HCV vaccine is available currently.

(d). Human papillomavirus (HPV)

Evidence

- 'High-risk' or 'oncogenic' types of HPV are the principal cause of cervical cancer and are also associated with other cancers of the anogenital region, and possibly with cancers of the upper aerodigestive tract and of the skin.
- Three main types of HPV vaccine are being developed: prophylactic vaccines, therapeutic vaccines and a combination of both. There are still many technical and practical problems to be resolved before safe and effective HPV vaccines can be produced for use in the general population.

Recommendations

- Safe and effective HPV vaccine is not yet available currently.

(d). Epstein-Barr Virus (EBV)

Evidence

- A causal relationship has been observed between EBV and nasopharyngeal carcinoma (NPC), Hodgkin lymphoma and Burkitt lymphoma.
- Vaccines are being developed to prevent and/or treat these conditions. Further study is required before a rational vaccine strategy can be formulated.

Recommendations

- No EBV vaccine is available currently.

6. Ultraviolet Radiation

Evidence

- Excess exposure to solar radiation, and specifically its ultra-violet (UV) component, is an established cause of skin cancer. The major source of UV radiation exposure is from sunlight.
- Excess exposure to solar radiation is an established cause of all forms of skin cancer and may account for 80%-90% of such disease.
- Sun exposure during childhood and adolescence contributes markedly to

lifelong risk of skin cancer.

- The use of sunlamps and sunbeds probably also causes skin cancer, particularly if the dose of exposure is high and if it causes sunburn.

Recommendations

- Do not expose to direct sunlight, especially between 11:00 and 15:00 of the day and during sunny seasons.
- Take precaution whenever UV radiation level is high (UV index 6 or above, as measured by the Hong Kong Observatory), for examples, wear long-sleeved clothing, wear broad-brim hat, wear UV blocking sun glasses and use an umbrella.
- Use sunscreen products with a high sun protection factor (SPF greater than 15) on usually exposed skin when having outdoor work or recreation. (The Sun Protection Factor indicates the effectiveness of the sunscreen products on protecting the skin from sunburn. The higher the SPF, the greater the protection. For example, a sunscreen lotion with SPF 4 means that the exposure to ultraviolet (UV) radiation received after a given time is one-quarter that received in the absence of any protection.).
- Protect children and adolescents against excessive sun exposure.
- Do not use sunlamps and sunbeds inappropriately.

7. Sexual Behaviour

Evidence

- Women who become sexually active at an early age, have high lifetime number of sexual partners or have male partner having multiple sexual partners, have a significantly increased risk of cervical cancer.
- Human papillomavirus infection is an important factor in causing cervical cancer.
- Some sexually transmitted factors, including herpes simplex virus 2 (HSV 2), may play a co-causative role. Other sexually transmitted diseases (STD) such as hepatitis B, hepatitis C and human immunodeficiency virus (HIV) infection, may also increase the risk of developing cancers such as hepatocellular carcinoma (by HBV or HCV), lymphoma, Kaposi sarcoma, cervical and anal cancer (by HIV).

Recommendations

- Have long-term, mutually monogamous relationship with an uninfected partner.

- Practise safer sex by using barrier contraception (for example, condom) and spermicides (for examples, contraceptive foam or jelly). (Note that condom does not cover all exposed areas. It is more effective in preventing infections transmitted by fluids from mucosal surfaces (e.g. gonorrhoea, chlamydia and HIV infections) than those transmitted by skin-to-skin contact (e.g. HPV and HSV infections)).

8. Occupational and Environmental Exposure to Carcinogen

Evidence

- At present, 25 chemicals, groups of chemicals or mixtures for which exposures are mostly occupational or environmental, have been established as human carcinogens.
- About 5% of all cancers in the developed world are attributable to occupational exposures and about 1% to environmental pollution.
- Radon gas, coming from radium content in building materials, is one of the carcinogenic indoor air pollutants and excess exposure to radon gas is associated with increased risk of lung cancer.
- Environmental tobacco smoke (passive or second-hand smoke) also imposes cancer hazard.
- Exhaust emissions from motor vehicles are also a source of carcinogenic environmental pollution.

Recommendations

- Reduce the occupational and environmental exposure to potentially carcinogenic matters by reducing emissions, replacing the carcinogen with alternative chemicals, re-engineering of manufacturing processes, improving ventilation, and ensuring proper use of protective equipment or clothing in occupational settings.
- Do not smoke and minimize exposure to environmental tobacco smoke or second-hand smoking.
- Maintain adequate ventilation to reduce residential exposure to radon gas.
- Minimize exposure to exhaust emissions from motor vehicles.

IV. Selected Cancers

Evidence and recommendations on screening and early diagnosis of the seven selected cancers are detailed below. Healthcare professionals could make reference from the information and give advice on risk factors and preventive measures to clients as appropriate. Information on the benefits and potential harm of screening tests should be given to any individual considering the test so that an informed choice can be made before proceeding with the test.

1. Lung Cancer

Facts and Figures

- Lung cancer was the most common cancer in Hong Kong in 2002. There were 3 941 new cases, accounting for 22% of new cancer cases in males and 13% of new cases in females. The median age at diagnosis was 70 for males and 73 for females. The chance of developing lung cancer in the lifetime was 1 in 16 for males and 1 in 39 for females.
- Lung cancer was the leading cause of cancer deaths in Hong Kong. In 2003, a total of 3 403 persons died of lung cancer which accounted for one-third of cancer deaths in males and a quarter of cancer deaths in females.

Risk Factors

- Smoking is the single most important preventable cause of lung cancer.
- Asbestos is a well-established occupational carcinogen of lung cancer.
- Occupational exposure to radon is a significant cause of lung cancer, particularly in miners.
- Diet lacking in vegetables and fruits increases the risk of lung cancer.

Primary Prevention

- Do not smoke and minimize exposure to environmental tobacco smoke or second-hand smoking.
- Minimize exposure to radon and asbestos in occupational setting by wearing protective equipment and following recommended work practices and safety procedures.
- Have diet rich in vegetables and fruits.

Screening

Tests used for lung cancer screening

- Chest X-ray
- Sputum cytology
- Spiral computed tomography (CT) scan

Evidence for screening

- Standard chest radiography can only detect malignant nodules of at least 1 cm in diameter, by which time micro-metastatic dissemination has often occurred. Frequent screening with chest X-ray is associated with increased risk of mortality in lung cancer compared with less frequent screening. Sputum cytology is an even less effective screening test, largely due to its low sensitivity. Studies on screening using chest X-ray and sputum cytology failed to demonstrate any reduction in mortality from lung cancer in screened individuals.
- Spiral CT scan is a relatively new technology with the ability to continuously acquire data resulting in a shorter scanning time, a lower radiation exposure, and improved diagnostic accuracy compared with those of plain radiography. At present, there is no sufficient evidence showing the effectiveness of spiral CT in reducing mortality from lung cancer.
- There are direct adverse effects of screening, such as radiation exposure, which may increase risk of lung cancer and over-diagnosis that leads to unnecessary and invasive interventions.

Recommendations

General public

- Routine screening for lung cancer with chest X-ray or sputum cytology in asymptomatic persons or among smokers is not recommended.
- There is insufficient evidence to recommend for or against the inclusion of spiral CT scan as part of periodic health examination in asymptomatic persons.

Early Diagnosis

General symptoms of cancer include loss of appetite, weight loss, general malaise and general weakness. Signs and symptoms of lung cancer include chronic cough dyspnoea, heamoptysis, recurrent lower respiratory tract infections, pain on the chest during coughing or deep breathing, pleural effusion, hoarseness of voice etc. Symptoms of lung cancer usually appear late. Nonetheless, patients with chronic

cough and suspicious symptoms should have investigations done to detect lung cancer.

2. Colorectal Cancer

Facts and Figures

- Colorectal cancer was the second most common cancer in 2002. There were 3519 new cases, accounting for 16% of all new cancer cases. The median age at diagnosis was 70 for males and 72 for females. The chance of developing colorectal cancer in the lifetime was 1 in 21 for males and 1 in 31 for females. On average, the number of new cases of colorectal cancer increased by 5% per year in the past decade.
- Colorectal cancer was the second most common cause of cancer deaths in Hong Kong. There were 1 537 deaths, accounting for 13% of all cancer deaths in 2003
- About 10-20% of colon cancers are related to heredity.

Risk Factors

- Individuals with close relatives (parents, siblings or children) who have a history of colorectal cancer are at higher risk, and such risk increases with the number of affected close relatives.
- The risk of colorectal cancer is elevated in siblings of patients with adenomatous polyps before the age of 60.
- Nearly all individuals with familial adenomatous polyposis (FAP) will develop colorectal cancer during their lifetime.
- Individuals who carry the genetic mutation for hereditary non-polyposis colorectal cancer (HNPCC) have high risk of developing colorectal cancer in their forties.
- High consumption of red meat or processed meat increases the risk of colorectal cancer.
- High consumption of vegetables and fruits is found to be protective against colorectal cancer.
- Being overweight or obese as indicated by high body mass index (BMI) and/or high waist to hip circumference ratio is associated with an increased risk for colon cancer.
- There is an inverse association between leisure-time physical activity and incidence of colon cancer.
- Smoking is associated with increased risk of colorectal cancer.

- It has been estimated that 66-75% of colorectal cancer can be prevented by dietary and lifestyle modifications.

Primary Prevention

- Avoid high consumption of red meat and processed meat.
- Increase consumption of vegetables and fruits.
- Control body weight by reducing caloric intake and having regular physical activity.
- Do not smoke and minimize exposure to environmental tobacco smoke or second-hand smoking.

Screening

Tests used for colorectal cancer screening

- Faecal occult blood test (FOBT)
- Flexible sigmoidoscopy (FS)
- Colonoscopy
- Virtual colonoscopy

Evidence for screening

- The FOBT detects hemoglobin and its derivatives in faecal samples containing blood. False positive results may result from consumption of various food items, so dietary restrictions may be required for an accurate test result. Moreover, many cancers and polyps bleed intermittently, blood may be unevenly distributed in faeces and become undetectable. Sensitivity may be increased by taking multiple stool samples but compliance can be a problem.
- FOBT is the only screening test with effectiveness in reducing mortality supported by well-designed randomized controlled trials conducted in Western populations. However, sufficient evidence is lacking over the effectiveness of FOBT screening in reducing colorectal cancer mortality among asymptomatic Asian or Chinese populations.
- FS alone or FS combined with FOBT has been used to detect colorectal lesions. Adverse effects of FS include bleeding and bowel perforation. No sufficient evidence has shown the effectiveness of FS alone or in combination with FOBT in reducing mortality.
- Colonoscopy is the most accurate test for detecting colorectal cancer, but it carries a higher risk of adverse events than FOBT and FS. Serious

complications during or immediately after colonoscopy include gastrointestinal bleeding that requires hospitalization and blood transfusion, heart attack, stroke and other vascular hazards and transmission of infection. There is no sufficient evidence about the effectiveness of colonoscopy as a mass screening tool in asymptomatic individuals.

- Virtual colonoscopy refers to the examination of computer-generated images of the colon constructed from data obtained from an abdominal computed tomography (CT) examination. The sensitivity of virtual colonoscopy is comparable to that of colonoscopy but is less invasive. Technical improvements of virtual colonoscopy involving both the interpretative methodology and bowel preparation are under study.

Recommendations

General public

- There is insufficient evidence to recommend FOBT, FS, colonoscopy or virtual colonoscopy for routine screening for colorectal cancer among asymptomatic persons.

High-risk groups

- Mutated gene carriers of FAP are recommended to have screening by FS every two years from age 12 onwards.
- Mutated gene carriers of HNPCC are recommended to have colonoscopy 1-2 yearly from age 25 onwards.
- Regular monitoring of the large bowel with colonoscopy or barium enema together with endoscopy is recommended for people with one first degree relative affected by colorectal cancer aged <45 years or with two affected first degree relatives.

Early Diagnosis

General symptoms of cancer include loss of appetite, weight loss, general malaise and general weakness. Signs and symptoms of colorectal cancer include rectal bleeding, recent and persistent changes in bowel habit, unexplained anaemia, signs of obstruction and a palpable rectal or abdominal mass etc. Individuals with these signs and symptoms should be investigated to detect colorectal cancer.

3. Liver Cancer

Facts and Figures

- Liver cancer was the fourth most common cancer in 2002. There were 1 576 new cases, accounting for 7% of all new cancer cases. The median age at diagnosis was 63 for males and 72 for females. The chance of developing liver cancer in the lifetime was 1 in 32 for males and 1 in 131 for females.
- Liver cancer was the third most common cause of cancer deaths in Hong Kong. There were 1 412 deaths, accounting for 12% of all cancer deaths.
- Approximately 8-10% of the Hong Kong population are hepatitis B carriers, a group at greater risk of developing liver cancer.

Risk Factors

- The most significant risk factor is infection with hepatitis B or hepatitis C virus. The main modes of infection with hepatitis B virus are perinatal transmission, child-to-child transmission, unsafe injections and transfusions, and sexual contact. Hepatitis C virus is spread primarily by direct contact with blood or body fluids, for example, through blood transfusion, re-use of contaminated needles or medical equipment.
- The earlier in life an individual becomes a hepatitis B carrier, the higher is the risk of liver cancer.
- Cirrhosis is a risk factor for liver cancer irrespective of the cause of cirrhosis.
- Haemochromatosis, glycogen storage disease and Wilson's disease can be risk factors.
- Excessive consumption of alcohol is the main dietary-related risk factor for liver cancer.
- Ingestion of foods contaminated with aflatoxin (a toxin found in some food such as mouldy peanuts and cereals) is an important risk factor.
- Liver fluke (Clonorchis sinensis) infection can cause liver cancer.

Primary Prevention

- Newborn babies should receive hepatitis B vaccination through mass vaccination programme.
- Babies born to mothers of hepatitis B carrier status should receive hepatitis B immunoglobulin within 24 hours of birth.
- Practise safety measures against the spread of hepatitis B and hepatitis C virus through blood transfusions, contaminated needles of intravenous drug users and unprotected sex.
- Abstain from alcohol or practise 'low-risk drinking'.
- Avoid food items contaminated with aflatoxin.
- Avoid raw or under-cooked freshwater fish.

Screening

Tests used for liver cancer screening

- Alpha-fetoprotein (AFP) test
- Ultrasonography (USG)

Evidence

- Early detection of hepatocellular carcinoma (HCC) at a stage when it is less than 5 cm is important because surgical resection may be possible in more than 60% of these patients whereas only around 3% of the symptomatic group is resectable.
- In the early stage of HCC, serum AFP level is frequently normal and thus determination of serum AFP levels is not a reliable indicator for the early detection of human HCC. AFP is often elevated in acute exacerbation of chronic hepatitis.
- USG is very much operator dependent and USG screening is expensive and labour intensive. USG detects hepatic lesions down to 1-2 cm, but often cannot distinguish HCC from haemangioma and cirrhotic nodules. More studies are needed to determine the usefulness of USG in HCC screening.
- There is no evidence to establish that screening by AFP and USG would result in decrease in mortality from liver cancer.
- The consequence of over-diagnosis is detection of a large number of nodules of uncertain malignant potential, which leads to unnecessary invasive interventions that may cause harmful effects.
- Abnormal screening results of AFP or USG may require liver biopsy for diagnosis. Complications of liver biopsy include haemorrhage, peritonitis, penetration of viscera and pneumothorax.
- While mass screening for HCC has not been shown to be cost-effective in countries with a lower incidence of HCC, screening of high risk groups may be justified in places with endemicity of hepatitis B infection. However, in Hong Kong, the usefulness of monitoring programme for liver cancer in high-risk persons has been questioned as cost-effectiveness of screening is uncertain and early tumour diagnosis does not generally result in improvement of prognosis. Moreover, there is no consensus screening protocol at present and further research to evaluate the effectiveness of periodic screening for high-risk group is required.

Recommendations

General public

- Routine screening with AFP or USG for asymptomatic persons is not recommended.

High-risk group

- Selected high-risk group, such as hepatitis B carriers, may undertake periodic screening with AFP and USG in consultation with health care professionals.

Early Diagnosis

General symptoms of cancer include loss of appetite, weight loss, general malaise and general weakness. Signs and symptoms of liver cancer include jaundice, unusual discomfort in the upper abdomen, persistent abdominal swelling, dark colour urine and pale stools etc. Although it is difficult to detect liver cancer in its early stages, individuals with these signs and symptoms should be investigated to detect liver cancer.

4. Nasopharyngeal Cancer

Facts and Figures

- Nasopharyngeal cancer (NPC) is frequently seen among Chinese in South-east Asia, Southern China and Hong Kong.
- NPC ranked sixth among the most common cancers in 2002. There were 963 new cases, accounting for 4% of new cancer cases. NPC is affecting relatively young adults with the median age at diagnosis being 50 for males and 48 for females. The chance of developing NPC in the lifetime was 1 in 63 for males and 1 in 170 for females.
- In 2003, NPC was the sixth most common cause of cancer deaths. There were 366 deaths, accounting for 3% of all cancer deaths.

Risk Factors

- Family history of NPC.
- Epstein-Barr virus (EBV) infection is strongly associated with the development of NPC.
- Consumption of Chinese-style salted fish, in particular in infancy and childhood has been established as causes of NPC.
- Smoking has been established as cause of NPC.

Primary Prevention

- Minimize consumption of Chinese-style salted fish, in particular in infancy and childhood.
- Do not smoke and minimize exposure to environmental tobacco smoke or second-hand smoking.

Screening

Tests used for NPC screening

- IgA against specific EBV viral antigen test
- EBV DNA test

Evidence

- There is lack of evidence on the effectiveness of screening test using EBV DNA and using IgA against specific EBV viral antigens in reducing NPC mortality.

Recommendations

General public

- There is insufficient evidence to recommend a population-based NPC screening programme using IgA against specific EBV viral antigens and EBV DNA.

Early Diagnosis

General symptoms of cancer include loss of appetite, weight loss, general malaise and general weakness. Signs and symptoms of NPC include recurrent nasal stiffness, nasal obstruction, frequent epistaxis, earache, unilateral hearing impairment, tinnitus, suspicious lymph nodes in the upper neck etc. Individuals with these signs and symptoms should be investigated to detect NPC.

5. Breast Cancer (for females)

Facts and Figures

- Breast cancer was the most common cancer among females in Hong Kong in 2002. There were 2 059 new cases, accounting for 21% of all new cancer cases in females. The chance of developing breast cancer in the lifetime was 1 in 23. Breast cancer is diagnosed in relatively young women. The median age

at diagnosis was 51 in 2002.

- Breast cancer was the third most common cause of female cancer deaths in 2003. There were 431 deaths, accounting for 10% of all female cancer deaths.

Risk Factors

- Demographic risk factors for breast cancer include advancing age, nulliparity, early menarche, late age at first childbirth and late menopause.
- Women who have a family history of breast cancer, particularly with first degree relatives who developed the disease before the age of 50, have higher risk of developing breast cancer.
- History of cancer in the other breast, previous benign breast disease and previous exposure to radiation increases the risk of breast cancer.
- Obesity is associated with higher risk of breast cancer among postmenopausal women.
- There is also convincing evidence of an inverse relationship between physical activity and risk of breast cancer.
- High alcohol consumption increases the risk of developing breast cancer.
- High fat diet can be a risk factor.
- Use of hormonal replacement therapy among post-menopausal women with combined oestrogen plus progestin for an average of five years is associated with excess risk of breast cancer.
- High intake of vegetables and fruits, particularly green vegetables can likely decrease the risk of breast cancer.
- The risk of breast cancer in women who have their first child after the age of 30 is about twice that in women who have their first child before the age of 20. Studies have shown that the relative risk of breast cancer is reduced by 4.3% for each year that a woman breastfeeds in addition to a reduction of 7% for each birth.

Primary Prevention

- Control body weight and have regular physical activity.
- Abstain from alcohol or practise ‘low-risk drinking’.
- Avoid too much fat in diet.
- Have high intake of fruits and vegetables.
- Have childbirth at an earlier age and breastfeed each child for longer duration.

Screening

Tests used for breast cancer screening

- Breast self examination (BSE)
- Clinical breast examination (CBE)
- Mammography.

Evidence

- Some large randomized controlled trials have not demonstrated the benefit of BSE in lowering the mortality of breast cancer and there may be possibility of harm through unnecessary medical interventions.
- Although screening by mammography has been found to reduce mortality from breast cancer in Western population, there is insufficient evidence regarding the effectiveness of CBE alone and in combination with mammography in reducing mortality of breast cancer.
- Evidence from randomized controlled trials is lacking over the effectiveness of mammography screening in reducing breast cancer mortality among Asian or Chinese populations.
- Adverse effects of mammography include physical harm and anxiety of unnecessary breast biopsies as a result of false-positive screening results. Complications for fine needle aspiration and open biopsy include prolonged bleeding, haematoma formation, abscess and wound adhesion problem.

Recommendations

General public

- Mass education programme on BSE is not recommended.
- All women are encouraged to be breast aware, that is, to be familiar with the texture of their normal breast tissue and to seek professional advice if they suspect breast abnormality, so that early investigation or treatment can be possible.
- There is currently insufficient evidence in Hong Kong to recommend CBE or routine mammography screening to asymptomatic women in the population.
- Any woman considering mammography screening should seek detailed information from medical professionals for an informed choice about whether or not to proceed with the test.

High-risk group

- In individuals with higher risk of developing breast cancer, such as those

with a previous history of breast cancer, family history of breast cancer and those on hormonal replacement therapy, mammography screening may be justified. These individuals may be assessed by medical professionals to determine the appropriateness of regular surveillance for breast cancer through CBE and/or mammography in accordance with internationally accepted protocols.

Early Diagnosis

- General symptoms of cancer include loss of appetite, weight loss, general malaise and general weakness. Signs and symptoms of breast cancer include lump in the breast, discharge from the nipple, enlarged lymph nodes in the axilla, changes in appearance and shape of nipple or breast etc. Individuals with these signs and symptoms should be investigated to detect breast cancer.

6. Cervical Cancer (for females)

Facts and Figures

- Cervical cancer was the fourth most common cancer among females in Hong Kong in 2002. There were 442 new cases, accounting for 5% of all new cancer cases in females. The median age at diagnosis was 52. The chance of developing cervical cancer in the lifetime was 1 in 104.
- Cervical cancer was the tenth most common cause of female cancer deaths in 2003. There were 106 deaths, accounting for 2% of all cancer deaths in females.

Risk Factors

- Human papillomavirus (HPV) infection has been established as a cause of cervical cancer and its precursor lesions.
- The lifetime number of sexual partners has been found to be associated with increased risk of cervical cancer The risk associated with 10 or more partners has been reported to be nearly three times higher than that associated with one or a few partners. Having sexual intercourse with a male partner who has had multiple sexual partners is also a risk factor.
- Women having sexual intercourse at early age are at higher risk of cervical cancer than women who have sexual experience later in life. Several case-control studies have shown that women with first sexual experience before the age of 16 have about twice the risk compared to women who started sexual intercourse after the age of 20.

- Multiple sexually-transmitted diseases have been found to be a risk factor for cervical cancer even after adjustment for HPV infection.
- Smoking is an independent risk factor for development of cervical cancer even after adjusting for the effect of HPV infection. The excess risk of smokers in having cervical cancer is around 2 times that of non-smokers.
- Diet high in tomatoes, green vegetables and fruits may decrease the risk of cervical cancer.

Primary Prevention

- Have long-term, mutually monogamous relationship with an uninfected partner.
- Practise safer sex by using barrier and spermicidal contraceptives.
- Do not smoke and minimize exposure to environmental tobacco smoke or second-hand smoking.
- Have diets rich in vegetables and fruits.

Screening

Tests used for cervical cancer screening

- Cervical smear test
- HPV DNA test

Evidence

- According to overseas experience, organized population-based screening with cervical smear has been found effective in reducing cervical cancer incidence and mortality.
- A study on assessing the cost-effectiveness of alternative cervical cancer screening strategies in Hong Kong found that compared to no screening, opportunistic screening using cervical cytology produced a nearly 40% reduction in the lifetime risk of cervical cancer. With organized screening every 3 years, reduction of risk with conventional and liquid-based cytology was 90.4% and 92.9% respectively compared to no screening.
- According to a major study by the International Agency for Research on Cancer (IARC), the percentage reduction in cumulative incidence in women aged 35-64, who have been screened before age 35, is 93.5% when the interval between cervical smear is 1 year, 92.5% at 2 years, 90.8% at 3 years, 83.6% at 5 years and 64.1% at 10 years, assuming 100% compliance. Screening every one to two years provides little additional protection

compared with screening every three years.

- The number of women needed to screen to prevent a case of cervical cancer is considerably higher in women below age 25. Moreover, there is a comparatively higher incidence of cervical dysplasia that would spontaneously regress among women below age 25. Screening before this age on a population-wide basis therefore could cause undue anxiety and result in a considerable number of unnecessary interventions.
- The HPV DNA test was found to have comparable accuracy with cervical smear test but was more costly.
- It was reported that low rates of low-grade squamous intraepithelial lesion (LSIL) and high-grade squamous intraepithelial lesion (HSIL) were observed in women aged 65 and over and had at least one previous normal cytology result within the last three years. The United States Preventive Services Task Force recommends against routinely screening women above age 64 for cervical cancer if they have had adequate recent screening with normal smear results. The yield of screening is low in previously screened women older than 64 and there is fair evidence of increased risk for potential harms including false-positive results and invasive procedures during follow-up.
- Women, who have cytology results of 'atypical squamous cells of undetermined significance' (ASCUS) or LSIL, and who are positive for high-risk HPV types, are more likely to carry high-grade lesions or invasive cancer. Since around half of ASCUS has high-risk HPV types, HPV typing in triaging women with ASCUS is an alternative to repeat cytology at 6 months in decision for colposcopy referral. On the other hand, HPV typing has limited advantage in triaging patients with LSIL for colposcopy because over 80% of patients with LSIL has high-risk HPV types.
- There is insufficient evidence to show that using HPV DNA test as an adjunct to cervical smear test or using the test in primary screening for cervical cancer is cost-effective in reducing mortality from cervical cancer.

Recommendations

General public

- All women aged 25-64 years who have ever had sexual intercourse are recommended to have smears every 3 years after two normal consecutive annual smears.
- Screening may be discontinued in women aged 65 or above if three

previous consecutive smears within 10 years are normal.

- Women at or over 65 years of age who have never had a cervical smear should have the test.
- Women who have never had sexual intercourse or who have had total hysterectomy need not have cervical screening.

High risk group

- Women aged below 25 years and with risk factors (for example, immuno-compromised women) may be screened, depending on assessment by medical professionals.
- Women at high risk of developing cervical cancer may require more frequent screening interval based on assessment by medical professionals.
- HPV DNA test could be performed for women with cervical smear test result showing ASCUS, as an alternative to repeat cervical smear after 6 months, in decision for referral for further investigation by colposcopy.

Early Diagnosis

Symptoms common to cancer include loss of appetite, weight loss, general malaise and general weakness. Signs and symptoms of cervical cancer include abnormal vaginal bleeding (for example, after sexual intercourse or after menopause), abnormal vaginal discharge and pain during urination. Individuals with these signs and symptoms should be investigated to detect cervical cancer.

7. Prostate Cancer (for males)

Facts and Figures

- The number of new cases of prostate cancer has increased from 206 in 1990 to 912 in 2002.
- Prostate cancer was the fourth most common cancer in men in 2002. There were 912 new cases, accounting for 8% of all new cancer cases in males. The chance of developing prostate cancer in the lifetime was 1 in 48. Prostate cancer is rare in men under 50 years old. The median age at diagnosis was 73 in 2002.
- Prostate cancer was the seventh most common cause of male cancer deaths in 2003. There were 209 deaths, accounting for 3% of all cancer deaths in men.

Risk Factors

- About half of all prostate cancer cases occur in men of age 75 and above.

- Men with a family history of prostate cancer are at increased risk.
- Diet high in meat and fat, especially saturated fats and fats of animal origin, possibly increases prostate cancer risk.

Primary Prevention

- Have a diet low in meat and other fatty foods of animal origin.

Screening

Tests used for prostate cancer screening

- Digital rectal examination (DRE)
- Serum prostate-specific antigen (PSA) test

Evidence

- The effectiveness of screening for prostate cancer in reducing mortality has not been established. As many prostate cancers will remain silent during a patient's lifetime, the detection of slow growing malignancy through screening, followed by therapeutic interventions that carry significant risks of adverse effects, may offer little clinical benefit.
- DRE is limited by the fact that only the posterior and lateral aspects of the gland can be palpated and it depends much on the skill and experience of the examiners, which affect reproducibility.
- Men with prostate cancer tend to have levels of serum PSA that are higher than normal. However, PSA may also be increased in other conditions such as benign enlargement of the prostate, prostatitis and lower urinary tract infection. Also, PSA cannot distinguish between men who have slow-growing prostate cancer that may never cause any symptom or shortened life-span from those who have more aggressive disease. Approximately 2 out of 3 men with a raised PSA level will not have prostate cancer.
- Adverse effects of treatment with surgery, radiation and androgen ablation include erectile dysfunction, urinary incontinence and bowel dysfunction. Risks associated with biopsy include prostatitis, epididymitis and haematuria.

Recommendations

General public

- There is insufficient evidence to recommend for or against screening by

DRE in asymptomatic men.

- Routine use of PSA for screening prostate cancer in asymptomatic men is not recommended.
- Any men considering screening by PSA test are advised to obtain full information on benefits and potential hazards of having the test for an informed consent.

Early Diagnosis

General symptoms of cancer include loss of appetite, weight loss, general malaise and general weakness. Signs and symptoms of prostate cancer include difficulty in passing urine, pain during urination, heamaturia and enlarged prostate gland. Individuals with these signs and symptoms should be investigated to detect prostate cancer.