CME Article

Ministry of Health Clinical Practice Guidelines: Cancer Screening

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ABSTRACT

The Ministry of Health publishes national clinical practice guidelines to provide doctors and patients in Singapore with evidence-based guidance on managing important medical conditions. This article reproduces the introduction and executive summary (with key recommendations from the guidelines) from the Ministry of Health clinical practice guidelines on cancer screening, for the information of readers of the Singapore Medical Journal. Chapters and page numbers mentioned in the reproduced extract refer to the full text of the guidelines, which are available from the Ministry of Health website (http://www.moh.gov.sg/mohcorp/publications.aspx?id=24018). The recommendations should be used with reference to the full text of the guidelines. Following this article are multiple choice questions based on the full text of the guidelines.

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INTRODUCTION

1.1 Guideline objectives and target group

The cancer screening guidelines are intended to assist medical practitioners, especially those in the primary health care sector, to advise their patients on the screening to be conducted for various diseases based on the patient's age, gender and presence of risk factors.

These guidelines provide current evidence-based clinical practice recommendations on screening for the common cancers in Singapore. The individuals for whom these guidelines are recommended are average-risk asymptomatic adults. High-risk individuals have also been identified.

1.2 Guideline development

The cancer screening guidelines were developed by a workgroup appointed by the Ministry of Health. Its members comprised experts in their areas of specialty, family practitioners and patient representatives. The workgroup formulated these guidelines by reviewing published international screening guidelines and current evidence available in the research literature, and taking into consideration the local population's characteristics. Feedback from relevant professional organisations was also sought in the process.

1.3 Principles for screening

Screening people who are apparently well in order to pick up asymptomatic disease can be beneficial to the individual if early treatment is available to improve the prognosis. It is beneficial to society at large if identification leads to primary and secondary prevention. However, there are other considerations for screening. Wilson and Jungner[1] cited the following principles of screening for early disease detection as a public health programme:

a) The condition sought should be an important health problem
b) The natural history of the disease should be adequately understood
c) There should be a recognisable latent or early preclinical stage
d) There should be a suitable and acceptable screening test or examination
e) There should be an accepted treatment or useful intervention for patients with the disease
f) Facilities for diagnosis and treatment should be available
g) There should be an agreed policy on whom to treat as patients
h) 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
i) Case finding should be a continuing process and not a one-off project.

Whether or not a screening policy results in improved health outcomes depends on a number of factors, viz. the characteristics of the disease, the screening test, and the target population.

Screening may be considered where there is a high prevalence of the disease with potential serious consequences, the disease condition has a natural history with a latent stage during which symptoms of disease are either not present or early; and when detected and managed, is beneficial in improving the likelihood of favourable

health outcomes (viz. reduced disease-specific morbidity or mortality). The screening test should be acceptable to the public, simple, fairly readily applied, and valid. With regard to diagnosis, the condition must be treatable and treatment and care available for those who need it. Early treatment should improve the outcome compared to treating patients when they present with signs and symptoms of the disease.

There is also a need for screening on a continuing basis rather than single-occasion screening. One-off screening is of limited value because only a small proportion, often those at least risk, is likely to be screened, and screening picks up those persons in the population who just happen at that particular time to have that condition being checked for. It therefore does not affect the future incidence of disease. Continuing examinations at stipulated intervals have greater advantage as they cover more of the population at risk including, by re-examination, persons presenting with new disease.

1.4 Screening tests characteristics

Sensitivity and specificity are important characteristics of the validity of a screening test. The validity of a screening test is the ability of the test to separate those who may have the disease condition from those who may not. The result of the screening test is confirmed by an acceptable diagnostic procedure ("gold standard") which distinguishes between "true" or "false" results. Sensitivity is the ability of the test to correctly identify those who truly have the disease. It is the ratio, expressed as a percentage, of the number of individuals with the disease whose screening tests are positive to the total number of individuals with the disease. Specificity is the ability of the test to correctly identify those who do not have the disease. It is the ratio, expressed as a percentage, of the number of individuals without the disease whose screening tests are negative to the total number of individuals without the disease.

A highly sensitive test will have a low proportion of false negative results, that is, there will be few missed cases. Few screened people who have the disease will be told incorrectly that they are free of the disease and have a false sense of security. A highly specific test will have a low proportion of false-positive results, that is, there will be few screened people free of the disease who are incorrectly told that they have the condition. False-positives could generate anxiety and unnecessary additional tests which may have potential adverse effects and cost. Ultimately, the medical practitioner would have to weigh the benefits and disadvantages for screening an individual.

The positive predictive value (PPV) is the screening test's ability to identify those who have the disease (true-positives) among all those whose screening tests are positive. PPV is affected by disease prevalence. For example, PPV increases with increasing prevalence of a disease in a high risk population.

Reliability is the ability of the test when reproduced, to have the same result. A poorly reliable test is likely to have high interobserver variation (e.g. between different laboratories) or intraobserver variation (i.e. between the same observer).

1.5 Assessing the evidence

In assessing the evidence, different study designs were considered including randomised controlled trials, cohort studies, case-control studies and uncontrolled clinical studies. Recommendations to screen average and/or high risk individuals are influenced by multiple factors including scientific evidence of effectiveness, costs and policy decisions.

It is often considered that picking up diseases by screening will be economical for a community as a whole. To diagnose and treat all patients would however, also add considerably to the total screening cost. Hence, only prospective studies which determine if morbidity or mortality has been reduced and life improved when compared to a non-screened population can demonstrate the savings in cost to a community. However, there are often limitations to such studies including the difficulty in practice of randomising people into screened and control groups, ethical issues to conduct randomised trials when using a test that is already regarded as normal practice, and significant losses over time in both the intervention and control groups during the study.

1.6 What's new in the revised guidelines

The Ministry of Health clinical practice guidelines on Health Screening published in July 2003 had included recommendations on cancer screening. The following is a list of major revisions or additions to the guidelines:

(1) New chapter on screening for nasopharyngeal carcinoma (chapter 2) has been added.

(2) Chapter 3: Screening for Colorectal Cancer
- The table on the recommended screening age for colorectal cancer has been updated.
- More discussion on the screening tools and recommendations on the use of the various tools are provided.

(3) Chapter 4: Screening for Liver Cancer
- Recommendation for surveillance of high-risk individuals and additional recommendations on recommended screening tests.

(4) Chapter 6: Screening for Breast Cancer in Women

- Recommendations on the benefits of clinical breast examination and breast self-examination are included.
- For normal risk women aged 40–49 years, the recommendation on mammography has been changed from "screening annually" to "informed choice".
- Listed down the conditions in which women should consider genetic evaluation and testing for hereditary breast cancer syndrome.
- Some discussion on the emerging evidence of the utility of MRI in screening of women who have genetic risk of breast cancer.

(5) Chapter 7: Screening for Cervical Cancer
- Age to stop screening has been revised to age 69 to be in line with the recommendations for cessation of breast cancer screening.
- Included a sub-section discussing on women who have had a hysterectomy, immunocompromised women and women vaccinated with human papillomavirus (HPV) vaccines.

(6) Chapter 9: Screening for Ovarian Cancer
- Further discussed on screening for women with average risk (women with persistent symptoms and use of contraceptive pills).
- Addition of a recommendation for women with family histories suspicious for BRCA mutations to screen, and provided a list of risk factors suspicious for BRCA mutations.

(7) Chapter 10: Screening for Prostate Cancer
- The role of the various screening tests is discussed in greater length.
- Included recommendations on frequency of screening and when (at what age and condition) should screening be stopped.
- The current evidence on whether population screening should be done is discussed in greater length.
- Provided a summary of key points in patient education and counselling for prostate cancer screening.

(8) Chapter 11 provides a list of clinical quality indicators and targets for the national screening programmes. Clinical quality indicators for the general clinic setting are also suggested.

1.7 Review of guidelines

Evidence-based clinical practice guidelines are only as current as the evidence that supports them. Users must keep in mind that new evidence could supersede recommendations in these guidelines. The workgroup advises that these guidelines be scheduled for review five years after publication, or if new evidence appears that requires substantive changes to the recommendations.

EXECUTIVE SUMMARY OF KEY RECOMMENDATIONS

This executive summary contains the key recommendations from the main text of the guidelines. Please refer to the main text for other recommendations. Page numbers refer to where the recommendations appear in the full guidelines. The system of grading recommendations and levels of evidence is described in the full guidelines.

Screening for Nasopharyngeal Carcinoma

B Mass screening of general population at normal risk with Epstein-Barr virus (EBV) serology is **not recommended** (pg 13).

Grade B, Level 2++

Screening for Colorectal Cancer

A For average-risk individuals, screening for colorectal cancer has been shown to improve survival and is recommended (pg 18).

Grade A, Level 1++

B For average-risk individuals, screening for colorectal cancer should begin at age 50 years (pg 18).

Grade B, Level 2++

B **For individuals at increased risk or high risk,** screening by colonoscopy is indicated. (Refer to table 1 for age at which screening should be started) (pg 18).

Grade B, Level 2++

Screening for Liver Cancer

C Patients with chronic hepatitis B infection and liver cirrhosis from other etiologies are at increased risk of developing hepatocellular carcinoma, and surveillance should be offered to these at-risk individuals with the aim of detecting hepatocellular carcinoma that could be more amenable to therapy, and hence potentially translate to better outcomes (pg 31).

Grade C, Level 2+

Screening for Lung Cancer

A The use of serial chest X-rays to screen for lung cancer

is **not recommended** (pg 35).

Grade A Level 1+

A The use of single or serial sputum cytologic evaluation to screen for lung cancer is **not recommended** (pg 35).

Grade A, Level 1+

C The use of low-dose CT scan to screen for lung cancer outside the context of a clinical trial is **not recommended** (pg 35).

Grade C, Level 2+

Screening for Breast Cancer in Women

A All normal risk, asymptomatic women 50–69 years of age should be screened with mammography only, every two years. Ultrasound and clinical breast examination are **not routinely required** (pg 47).

Grade A, Level l++

C Women at normal risk aged 40–49 years should be informed of the benefits, limitations and potential harms associated with screening mammography so that they can make an informed choice. If screening is to be performed, it should be done annually. Ultrasound and clinical breast examination are **not routinely required** (pg 47).

Grade C, Level 2++

A Normal risk, asymptomatic women under 40 years **should not** undergo breast screening with any imaging modality (pg 47).

Grade A, Level l+

A In Western nations, the evidence supports mammographic screening every two years for all normal risk women 70–75 years of age. However, for Singaporean women, the lower incidence of breast cancer in this age group suggests that screening mammography may be less beneficial and should be individualised by considering the potential benefits and risks of mammography in the context of current health status and estimated life expectancy. If individual screening is performed, it should be at two-yearly intervals. Ultrasound and clinical breast examination are **not routinely required** (pg 47).

Grade A, Level l++

C Breast CT, Scintimammography, PET, and other non-conventional techniques such as thermal imaging, optical imaging, electrical impedence imaging and microwave imaging are experimental techniques. They **should not** be used for routine breast screening (pg 45).

Grade C, Level 2++

Screening for Cervical Cancer

C All women who have ever had sexual intercourse should undergo screening for cervical cancer from the age of 25 years (pg 54).

Grade C, Level 2+

B Papanicolaou (Pap) smear screening should be performed at least once every three years (pg 55).

Grade B, Level 2++

B Screening should be performed using the Pap smear (pg 57).

Grade B, Level 2++

Screening for Uterine Cancer

B Screening for endometrial cancer is **not recommended** for women with an average or increased risk for endometrial cancer (pg 60).

Grade B, Level 2++

Screening for Ovarian Cancer

D The use of screening in women at average risk for epithelial ovarian cancer with serum markers and/or ultrasound is **not recommended**. There are currently no effective methods for the routine screening of asymptomatic women at average risk for ovarian cancer. These screening practices are **strongly discouraged** as they invariably lead to unnecessary interventions that ultimately risk the health and well-being of asymptomatic members of the general population (pg 63).

Grade D, Level 2+

Screening for Prostate Cancer

A At the present time, given the lack of data on whether screening improves disease-free survival, there is a **lack of evidence** to support population-based screening for the early detection of prostate cancer in Singapore (pg 69).

Grade A, Level 1+

REFERENCES

1. Wilson MG, Jungner G. Principles and practice of screening for disease. Public Health Paper 34. Geneva: World Health Organization, 1968.

SINGAPORE MEDICAL COUNCIL CATEGORY 3B CME PROGRAMME *
Multiple Choice Questions (Code SMJ 201002B)

The following questions are based on the full text of the guidelines, which can be found at http://www.moh.gov.sg/mohcorp/publications.aspx?id=24018

	True	False
Question 1. The following are important principles for screening:		
(a) Screening is always beneficial and the more tests are done the better.	☐	☐
(b) There should be a recognisable latent or early preclinical stage.	☐	☐
(c) There should be an accepted treatment or useful intervention for patients with the disease.	☐	☐
(d) 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.	☐	☐
Question 2. Population screening with EBV IgA serology:		
(a) Mass population screening detects subclinical nasopharyngeal carcinoma in early stage.	☐	☐
(b) EBV IgA positive individuals on follow-up may develop nasopharyngeal carcinoma; hence, mass screening is cost-effective.	☐	☐
(c) Early antigen (EA) IgA, being highly specific, is a more important index than viral capsid antigen (VCA) IgA.	☐	☐
(d) Negative EA IgA excludes nasopharyngeal carcinoma.	☐	☐
Question 3. Regarding screening for colorectal cancer:		
(a) Screening is recommended for all subjects at average risk at age 50 years and above.	☐	☐
(b) Faecal occult blood test and colonoscopy are recommended screening tests.	☐	☐
(c) Magnetic resonance scan is a recommended screening test.	☐	☐
(d) For a person with a family history of a parent diagnosed to have colorectal cancer at age 50 years, screening would be recommended from the age of 40 years.	☐	☐
Question 4. The following apply to screening for hepatocellular carcinoma:		
(a) There is no data to support general population screening.	☐	☐
(b) Serum alpha feto-protein (∝FP) and ultrasound of the hepatobiliary system (US HBS) are accepted screening methods.	☐	☐
(c) Ideal screening interval is six months.	☐	☐
(d) Liver function test is an important part of hepatocellular carcinoma screening.	☐	☐
Question 5. The following diagnostic modalities have been shown to reduce lung cancer mortality when used for screening in heavy smokers:		
(a) Sputum cytology.	☐	☐
(b) Chest x-ray.	☐	☐
(c) Plasma carcinoembryonic antigen assay.	☐	☐
(d) Autofluorescence bronchoscopy.	☐	☐
Question 6. Mammography is appropriate for		
(a) Screening of asymptomatic women aged 50–69.	☐	☐
(b) Screening of asymptomatic women aged 40–49.	☐	☐
(c) Screening of women who had free silicone breast injection.	☐	☐
(d) Screening of women with breast implant.	☐	☐

*** Category 3B CME points: pending SMC approval.**

Question 7. Use of ancillary imaging modalities:

(a)	Breast ultrasound is helpful in the evaluation of mammographic abnormality.	☐	☐
(b)	Routine use of ultrasound for breast cancer screening increases the number of false positive findings.	☐	☐
(c)	Breast MRI is helpful in the screening of normal risk asymptomatic women.	☐	☐
(d)	Women at high genetic risk for breast cancer will benefit from annual screening with mammography and MRI.	☐	☐

Question 8. With regard to uterine cancer screening:

(a)	The Pap smear is an acceptable tool for screening uterine cancer.	☐	☐
(b)	All women above 45 years should undergo regular screening for uterine cancer.	☐	☐
(c)	Women with or at risk for hereditary non-polyposis colorectal cancer (HNPCC) should be offered annual screening for endometrial cancer with transvaginal ultrasound and endometrial biopsy.	☐	☐
(d)	The incidence of endometrial cancer has shown an increase over time.	☐	☐

Question 9. With regard to ovarian cancer screening:

(a)	Family history of ovarian cancer is one of the most important high risk factor for developing ovarian cancer.	☐	☐
(b)	Oral contraceptives increase the risk of ovarian cancer.	☐	☐
(c)	CA 125 should be done routinely in all women.	☐	☐
(d)	Transvaginal ultraound accompanied with CA 125 estimation may be useful in selected women to detect early ovarian cancer.	☐	☐

Question 10. Screening for prostate cancer revolves around the measurement of serum prostate specific antigen (PSA)

(a)	Although the PSA range 0–4 ng/ml is generally accepted as normal, there is continuum of cancer risk for all values of PSA.	☐	☐
(b)	Screening for prostate cancer improves disease free survival.	☐	☐
(c)	PSA derivatives (Free: Total PSA ratio and PSA velocity) are useful for prostate cancer screening in the primary care setting.	☐	☐
(d)	The combination of digital rectal examination (DRE) and PSA is superior for the detection of prostate cancer than either test alone.	☐	☐

Doctor's particulars:

Name in full: _____

MCR number: _____ Specialty: _____

Email address: _____

SUBMISSION INSTRUCTIONS:
(1) Log on at the SMJ website: http://www.sma.org.sg/cme/smj and select the appropriate set of questions. (2) Select your answers and provide your name, email address and MCR number. Click on "Submit answers" to submit.

RESULTS:
(1) Answers will be published in the SMJ April 2010 issue. (2) Category 3B CME points: pending SMC approval. The MCR numbers of successful candidates will be posted online at www.sma.org.sg/cme/smj upon SMC approval of CME points. (3) All online submissions will receive an automatic email acknowledgment. (4) Passing mark is 60%. No mark will be deducted for incorrect answers. (5) The SMJ editorial office will submit the list of successful candidates to the Singapore Medical Council.

Deadline for submission: (February 2010 SMJ 3B CME programme): 12 noon, 30 April 2010.