

Preventive services advertised to the public by private hospitals in Hong Kong

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To evaluate the preventive activities offered to the public by private hospitals in Hong Kong, we obtained information from 11 of the 12 private hospitals about their screening programmes and evaluated them against the standards of the Canadian and United States task forces on preventive health care. We found that not all proven preventive activities are being offered, and many unproven or even possibly harmful actions are provided. The services focus on the application of technology rather than on behaviour change and immunisation, which are the most effective preventive strategies. This focus on testing may give the wrong impression to the public and divert effort from these worthwhile actions. A clear guideline focused on Hong Kong epidemiology and health care would be helpful.

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Introduction

Prevention is clearly the best 'cure' for disease. It is mainly achieved through socio-economic advancement, public health measures, and community health services such as antenatal care, postnatal care, and immunisation programmes. Doctors play their role through encouraging behaviour change and screening to detect diseases early. Much of this preventive medicine is done by doctors in their practices dealing with individual patients, and it is offered to the public commercially through direct advertising by laboratories and hospitals. In Hong Kong, various organisations advertise preventive services in convenient 'packages', which are often called check-up, health maintenance, or physical examination packages. These schemes provide a wide range of components.

The concept of an annual physical examination was first proposed by the American Medical Association in 1922. In recent years, however, concerns about the value of such activities have led to evidence-based appraisal, first done systematically by the Canadian Task Force on the Periodic Health Examination.¹ This

approach was later adopted by the United States (US) Preventive Services Task Force.² These task forces pointed out that performing the same interventions on all patients annually is not an effective approach. They suggested that the 'annual check-up' should be abandoned, and the American Medical Association withdrew support for this policy in 1983. Instead, they recommended that a series of age-specific 'health protection packages' should be offered, usually during the course of medical visits for other reasons and that the content of such packages should be closely scrutinised and demonstrated to be valuable.

These two task forces were among the first to develop the concept of evidence-based critical appraisal. They formulated specific criteria for deciding which conditions should be assessed and then how to go about analysing their value. The target conditions were selected based on the current burden of suffering based on prevalence, incidence, morbidity and mortality; and the potential effectiveness of the preventive intervention in improving outcomes. Consequently, screening for uncommon conditions, or those that do not produce substantial morbidity and mortality, was not considered. Furthermore, conditions that had limited evidence for the value of prevention were omitted.

Such critical appraisal is necessary, because of the waste of resources and the potential harm caused to the individual patient, not only from testing but also

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Grading system used by both Canadian¹ and United States² task forces

- (A) There is good evidence to support the recommendation that the condition be specifically considered in a periodic health examination
- (B) There is fair evidence to support the recommendation that the condition be specifically considered in a periodic health examination
- (C) There is poor evidence regarding the inclusion or exclusion of the condition in a periodic health examination, but recommendation may be made on other grounds
- (D) There is fair evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination
- (E) There is good evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination

from following up positive results. When a particular health problem is relatively rare, as in a normal population, even a slightly oversensitive test will produce large numbers of positive results. For example, a biological false-positive test result for syphilis or a serological cancer marker would both cause emotional upheaval and further investigation—possibly invasive—or even lead to treatment of the non-existent disease. This approach may be worthwhile if the risk of disease is high, but not when it is very small. The other critical criterion is whether there is an effective treatment available for the early stage of the disease, which produces outcomes better than waiting until the disease would present clinically in the normal course of events. If there is little difference in long-term outcome, regardless of early detection, then the process is not helpful, and it may even be harmful because the patients are aware of the disease for longer time. For screening tests, initially criteria recommended by the World Health Organization³ were mainly used, but because of the difficulty in assessing effectiveness from non-experimental evidence, the emphasis has recently moved much more towards requiring a randomised control trial.⁴ The task forces used a five-point Likert-type scale to grade their recommendations (Box). Level A and B ratings indicated good-to-fair evidence for the efficiency of the intervention; level C recommendations often reflected lack of high-quality evidence; while D and E ratings imply that the intervention may cause net harm.

Given the possible harm caused by certain excess preventive activities, we assessed the preventive services offered to the Hong Kong public by comparing them against evidence-based standards.

Methods

All private hospitals and as many laboratories in Hong Kong as could be identified were contacted by telephone to find out what preventive services they offered. Leaflets and price lists were received by fax or mail. The content of these preventive service

packages and their prices were listed in a spreadsheet, and compared with current recommendations regarding their value. Table 1 shows the tests offered by the hospitals and assessments of their value. These assessments came from the Canadian¹ and US task forces² and were supplemented by evidence-based updates mainly from the Cochrane reviews,⁵ and adapted to the Hong Kong situation and disease risks. To give the most optimistic view; a higher rating was taken when there was disagreement between the sources.

Special considerations or changed recommendations for Hong Kong and the reasons for them are as follows:

- (1) All hospitals offered a 'medical history and physical examination'. We assumed that a blood pressure measurement was included. However, the two task forces recommended that a physical examination be performed as part of the screening procedure for some cancers (eg oral cancer [intervention level C], skin cancer [C], and testicular cancer [C]). Because pamphlets did not describe the physical examination in detail, these were not included in our comparisons and calculations;
- (2) Hepatitis B screening is recommended by the US Preventive Services Task Force for areas of high prevalence, with a C rating.² In Hong Kong, the prevalence of hepatitis B is much higher, at approximately 10%.⁶ Hence, an A rating to hepatitis B screening was assigned, on the grounds that non-immune people could be offered a vaccine;
- (3) Hepatitis A has a high incidence in Hong Kong, so immunisation might be worthwhile, although most adults have already acquired immunity.⁶ Thus, few adults would benefit from a programme that comprises screening to detect immunity and immunisation of those who are susceptible. We assigned a C rating to serological testing for hepatitis A;

- (4) The urinary dipstick/culture is potentially a screening procedure for many conditions, which include progressive renal failure, bladder cancer, and asymptomatic infection, although its value has not been clearly demonstrated. The Canadian Task Force on the Periodic Health Examination gave a C rating for screening for asymptomatic bacteriuria in ambulatory elderly women, a D rating for elderly men, and a D rating for progressive renal failure and bladder cancer.¹ The US task force gave a C rating for bacteriuria in elderly women and an E rating for elderly men; a D rating for asymptomatic bacteriuria in children, adolescents, and all other adults; and a D rating for screening for bladder cancer.² Instead of assigning ratings for screening each of these conditions, urine dipstick/culture was given an overall D rating, because few elderly women are in the target groups for these packages, and we used it only once in the calculations;
- (5) Screening for coronary artery disease risk factors by checking lipid profiles has changed rapidly in recent years. As the tests seldom described which lipids were tested, we assigned a single B rating using recent evidence-based recommendations⁷;
- (6) Southern China and Hong Kong have the highest incidence in the world for nasopharyngeal cancer, but it is still a rare disease and tests are still being evaluated. Hence, we gave no rating⁸;
- (7) Although liver cancer is the third most common cancer in Hong Kong, screening for this disease was given a C rating based on current expert opinion that treatment is not yet sufficiently effective to make screening clearly worthwhile⁹;
- (8) Diabetes mellitus is becoming increasingly common in Hong Kong,¹⁰ and it has recently been proven that vigorous treatment of maturity-onset diabetes improves many of the outcomes.¹¹ Hence, blood glucose screening was assigned an A rating;
- (9) Screening for colorectal cancer by occult faecal blood testing reduces the mortality rate by 13% to 28%,⁵ so this was given an A rating. Any of the detection methods, including flexible sigmoidoscopy, colonoscopy, and barium enema, were given the same rating;
- (10) Screening for hearing impairment has a B rating for elderly people. We assumed that it would be used in a relevant group;
- (11) Screening for certain sexually transmitted diseases (STDs) such as infection with human immunodeficiency virus (HIV), gonorrhoea, chlamydia, and syphilis has a high rating for high-risk populations such as commercial sex-workers, those with other STDs, and those who have sexual contacts with active STD carriers. Considering the target group for the packages, we incorporated recommendations only for the general population; and
- (12) The task force studies examined blood grouping only for pregnant women and not the general adult population. Since this test has little use for those not facing an operation we regarded it as a 'non-recommendation'²;

Thus, three recommendations were upgraded because of recent evidence, and one because of the unique epidemiology of Hong Kong.

Results

Responses were obtained from 11 of the 12 private hospitals in Hong Kong (response rate, 92%) and four laboratories, of which there are more than 20 (response rate, <20%). Laboratories operated mainly on a physician referral system. They generally had packages from which physicians chose by selecting the tests specific for each patient. Due to our inability to determine exactly which packages and tests that physicians selected and the low response rate, data from the laboratories were not analysed further, although leaflets obtained were basically similar to those offered by the hospitals. Most laboratories provided biochemical, haematological, and serological tests, and some also provide imaging and electrocardiography, either directly or through associated entities.

All 11 of the private hospitals had general packages that targeted the adult population and which ranged from the 'basic' package, through the 'standard' package, to the so-called 'executive', 'advanced', 'supreme', or 'premier' package. The difference was an increasing array of tests and cost to the customer. Some hospitals provided other packages, which targeted different groups and life stages such as pre-employment, domestic workers, students, premarital, marital, and preconception. Some hospitals also offered cardiac risk assessment. This study analysed only the packages that targeted the general adult population. Not all hospitals had a standard package, so comparisons were made between basic and advanced packages. One hospital had a package for the 15- to 39-year age-group, and one for those aged

Table 1. Preventive services provided in private hospital packages compared with recommendations by the Canadian¹ and United States² task forces

	Packages with this test		Task force recommendations		Our rating
	Basic, n=11 No. (%)	Advanced, n=9 No. (%)	Canadian	United States	
<i>Circulatory disorders</i>					
Blood pressure measurement (age >21 years)	11 (100)	9 (100)	B	A	A
Electrocardiography, middle-aged men and women	10 (91)	6 (67)	C	C	
Treadmill, middle-aged men and women	0	6 (67)		C	C
Lipid screening*	10 (91)	9 (100)	C‡	B-C‡	B
Carotid artery stenosis screening (physical examination and carotid USG†)	0	0	D	C	C
Peripheral arterial disease	0	0		D	D
Abdominal aortic aneurysm (physical examination or USG)	0	3 (33)	C	C	C
Cardiac enzymes	0	1 (11)			
<i>Metabolic, nutritional, or other disorders</i>					
Diabetes mellitus	11 (100)	9 (100)	D	C	A
Thyroid disease (thyroid-stimulating hormone level)	4 (36)	6 (67)	C	D	C
Thyroxine level	4 (36)	7 (78)			
Osteoporosis (bone mineral density)	0	0 D	C	C	
Iron deficiency anaemia	11 (100)	9 (100)	C	C	
Blood grouping	7 (64)	8 (89)			
Haemoglobin electrophoresis	0	1 (11)			
Glucose-6-phosphate dehydrogenase level	1 (9)	1 (11)			
Erythrocyte sedimentation rate	5 (45)	6 (67)			
Chemistry panel	4 (36)	5 (56)			
Protein	0	2 (22)			
Liver function tests	11 (100)	9 (100)			
Gout screening	9 (82)	8 (89)			
Arthritis (rheumatoid arthritis factor, antinuclear factor)	0	1 (11)			
Colour blindness	1 (9)	1 (11)			
<i>Genito-urinary tract disorders</i>					
Renal function tests	11 (100)	8 (89)			
Urine dipstick to detect progressive renal failure*	11 (100)	8 (89)	D		
Asymptomatic bacteriuria: dipstick and culture*	11 (100)	8 (89)	C-D‡	C-E‡	
Urine flow	0	2 (22)			
Kidney, ureter, and bladder	3 (27)	6 (67)			
<i>Respiratory tract disorders</i>					
Pulmonary function testing	2 (18)	3 (33)			
<i>Infectious diseases</i>					
AIDS screening: low risk/general population	0	3 (33)	C	C	C*
Gonorrhoea screening with culture of cervical or urethral smear: general population	0	0	D	D	D*
Chlamydia screening: low risk/general population	0	0	D	D	D*
Genital herpes simplex: general population	0	0	D		D*
Syphilis: general population	6 (55)	6 (67)			
TB screening					
general population	0	0	E		
high risk			A	A	
Hepatitis B serology					
general population	9 (82)	9 (100)	D		A*
high risk			C		
Hepatitis A screening	1 (9)	2 (22)			C*

(Continued on page 419)

≥40 years. We considered the package for 40 years and above as the basic package. Another hospital had only one ‘maintenance’ package; which was also considered as a basic package. Thus, there were 11 basic packages and nine advanced packages.

Table 1 lists the tests offered by one or more of the private hospital packages or by one of the task forces. It shows how many of the basic or advanced packages offered each test. The preventive task forces divided services into immunisations and chemoprophylaxis,

(Continued from page 418)

	Packages with this test		Task force recommendations		Our rating
	Basic, n=11 No. (%)	Advanced, n=9 No. (%)	Canadian	United States	
Neoplasms					
Breast cancer					
mammography, 50-69 years } mammography, 40-49 years }	0	1 (11)	A D	A C	A C
Cervical cancer: Papanicolaou smear	4 (36)	5 (56)	B	A	A*
Colorectal cancer, >50 years					
occult blood	10 (91)	9 (100)	C	B	A*
sigmoidoscopy	0	0	C	B	
colonoscopy	0	0	C	C	A*
barium enema	0	1 (11)		C	A*
Prostate cancer					
prostate-specific antigen	0	4 (44)	D	D	D
transrectal USG	0	2 (22)	D	D	D
Lung cancer					
chest X-ray	10 (91)	9 (100)	D	D	D
sputum cytology	0	0	E	D	D-
Ovarian cancer					
pelvic USG	1 (9)	6 (67)	D	D	D
serological marker CA 125	0	1 (11)	D	D	D
Pancreatic cancer					
USG	1 (9)	2 (22)	D	D	D
serological marker CA 19.9	0	3 (33)	D	D	D
Bladder cancer					
urine microscopy, dipstick, or cytology*	11 (100)	8 (89)	D	D	D
Thyroid cancer: neck palpation or USG	0	0	D	D	
Liver cancer: α -foetoprotein level and USG	1 (9)	4 (44)			C
USG of whole abdomen	0	2 (22)			
USG of upper abdomen	0	1 (11)			
USG of gall bladder	1 (9)	4 (44)			
USG of kidneys	1 (9)	2 (22)			
USG of breasts	0	2 (22)			
Barium meal	0	3 (33)			
CEA (colon cancer)	0	1 (11)			
Antibodies to Epstein Barr virus (nasopharyngeal cancer)	0	3 (33)			
Serological marker Ca72.4 (stomach cancer)	0	1 (11)			
Conditions affecting primarily elderly					
Vision screening	2 (18)	2 (22)	B	B	B
Hearing screening	0	2 (22)	B	B	B
Glaucoma screening	0	0	C	C	C

* See methods for rationale/discussion

† USG ultrasonography

‡ Multiple recommendations for different groups, see Methods section

screening tests, and counselling interventions. The services provided by these private hospitals were almost exclusively screening tests. None advertised that they offered immunisations, and only one stated that counselling for risk reduction/behavioural modification was provided as part of the package. Table 2 summarises Table 1 and compares the basic and advanced packages provided by the hospitals. Table 3 shows the services most frequently offered in basic and advanced packages, grouped according to the ratings. Basic packages offered an average of 16 tests for HK\$2670 and advanced packages an average of 26 tests for HK\$6244. In general, basic-package tests examined the blood with an array of laboratory tests and some basic procedures

(electrocardiography, urine dipstick test, chest X-ray, and occult blood test). Advanced packages built on the basic packages. The additional 10 tests were mostly imaging (ultrasonography of various organs) and tests for tumour markers.

Table 2 shows that one third of the tests in basic packages had proven benefit, 17% were of uncertain benefit, and approximately 13% were possibly harmful. About one third were not rated by the task forces, presumably largely because there are insufficient reasons to include them in preventive services. In general, the extra HK\$3574 cost of the advanced packages obtained only one more proven useful test, two to three

Table 2. Ratings for preventive services contained in private hospital basic and advanced packages

Rating	No. of preventive services (%)		Difference between basic and advanced packages
	Basic packages (n=11)	Advanced packages (n=9)	
A to B-	59 (33.5)	56 (24.3)	-10
C to C-	30 (17.0)	49 (21.3)	+5
D to E	23 (13.1)	37 (16.1)	+3
No recommendation	64 (36.4)	88 (38.3)	+2
Total No. of services	176	230	
Mean No. of services	176/11=16	230/9=26	+10
Mean cost (range) [HK\$]	\$29 371/11 = \$2670 (\$768-\$4950)	\$56 193/9 = \$6244 (\$3645-\$9570)	+\$3574

more tests of uncertain value, two more tests that are no value or may be harmful, and four tests for which no recommendations have been made.

Table 3 shows that nine tests were clearly valuable, having A or B ratings. Basic packages mostly provided five of these and advanced packages provided six. There were 10 tests rated C (of uncertain value), and basic packages provided three of these, whereas advanced packages provide five to six. Only two tests in basic packages were graded D or E, or potentially harmful, but advanced packages contained four or more such tests. Several other tests, which were not evaluated by the task forces, were provided in the packages: nearly 40% of the tests that were offered in both basic and advanced packages lacked a recommendation.

Some valuable tests were omitted. Mammography was recommended in only one advanced package, whereas four basic packages and five advanced packages offered Papanicolaou smear tests to women. Vision screening was offered by only two basic and two advanced packages, and auditory screening by two advanced packages. The task forces, however, recommend targeting these tests at elderly people.^{1,2}

Discussion

In this study, we were deliberately generous and took an optimistic view of the potential for benefit. Many experts would be more pessimistic.⁴ Even with this view, more than one third of the preventive services provided by the private hospitals have not been considered by either the Canadian or US task forces, and 15% of the services have been recommended for exclusion from periodic health examinations.^{1,2} Thus, these packages may cause damage—either physical or psychological—to some of those who buy them.

Furthermore, the packages omit some of the most effective preventive services. Although immunisation for children is provided by the Hong Kong

Department of Public Health, it is worthwhile to provide booster immunisations for tetanus and diphtheria. Influenza and pneumococcal immunisations are also worthwhile, particularly for older people or those with chronic illness.

Behaviour change is very important. In 1990, approximately 50% of deaths in the US could be attributed to behaviour such as tobacco use, alcohol consumption, poor diet, low activity levels, use of motor vehicles, and sexual behaviour.¹² Whereas the possession of firearms is a risk behaviour in the US that is irrelevant to all but a few in Hong Kong, all the other risk behaviours listed are relevant, although the balance may be different. Nearly half of the deaths in Hong Kong are likely to be due to preventable cancers, heart disease, cerebrovascular disease, chronic obstructive pulmonary disease, injury, and poisoning. All of these could be changed to some degree by behaviour modification. Smoking is still the greatest killer of all, and quitting is the most important health-improvement action that smokers can take.¹³ In Hong Kong, it is now clear that even mild obesity, limited exercise, and a relatively high-fat and low fruit-and-vegetable diet are major risk factors for disease. True preventive services should focus on these factors more than on technology; yet, only one hospital described counselling for risk reduction or behaviour modification as part of their package.

Life expectancy in Hong Kong is currently high, although the elderly population do not usually undergo the types of preventive activity described here. The current elderly population of Hong Kong began life with many natural hazards, when the occurrence of infectious diseases was high. However, regular physical activity was a normal part of life, and the diet was generally far more healthy. Now that infectious diseases are less common and better controlled, the current middle-aged cohort is more at risk for chronic illnesses, which can be detected early and treated in some cases. Thus, there is a role for preventive

Table 3. Services contained in more than 30% of basic and advanced packages compared with recommendations

Included services	Basic package (Mean, 16 tests) % of packages	Advanced package (Mean, 26 tests) % of packages
<i>Tests with A or B rating</i>		
Blood pressure measurement	100	100
Diabetes mellitus screening	100	100
Occult blood/colon examination	91	100
Lipid screening	91	100
Hepatitis B screening	82	100
Papanicolaou smear	36	56
<i>Tests with C rating</i>		
Test for iron-deficiency anaemia	100	100
Electrocardiography	91	67
Thyroid disease screening (thyroid-stimulating hormone level)	36	67
Treadmill test		67
Liver cancer screening		44
Abdominal aortic aneurysm screen		33
AIDS screening		33
<i>Tests with D or E rating</i>		
Tuberculosis screening, general population (chest X-ray)	91	100
Urine dipstick/culture	100	89
Ovarian cancer: pelvic ultrasonography		67
Prostate-specific antigen level		44
Pancreatic cancer screening: CA 19.9		33
<i>Tests with no recommendation</i>		
Liver function tests	100	100
Kidney function tests	100	89
Gout screening	82	89
Blood grouping	64	89
Thyroxine level	36	78
Syphilis screening	55	67
Erythrocyte sedimentation rate	45	67
Chemistry panel	36	56
Kidney urinary bladder X-ray		67
Ultrasound of gall bladder		44
Barium meal		33
Colon cancer tumour marker level (carcinoembryonic antigen)		33
Antibodies to Epstein Barr virus (nasopharyngeal cancer)		33

examination and screening, but this is limited and must be carefully selected. The health packages that we surveyed reflect a naive view of prevention, which is widespread among those who have not understood the evidence-based approach to screening activities.

On the subject of prevention, there is a conflict between the evangelists who want to try anything that might help, and those who will not do anything until there is strong proof. Decisions are difficult when there is inadequate evidence, especially for new tests. Yet, the history of prevention is littered with abandoned procedures that were once used in hope. Although informed patients are entitled to spend their money on experimental programmes that may eventually prove useful, this practice must be properly explained; otherwise, patients might have grounds for legal action if harm is caused. It could be argued that people who request preventive activities should provide formal informed consent, as is currently required

for HIV testing, and in some countries for prostate cancer screening,¹⁴ because of the uncertain value of the process.

In conclusion, hospitals and laboratories offer preventive medicine services through direct advertising to the public. These services are largely technological, and they focus only to a limited extent on other effective activities. The packages of services that are offered appear to be based more on what is convenient to provide than on a scientific assessment on what is worth doing. While some basic valuable screening activities are done, some are omitted or only provided on special request. Many provide services that appear valuable, although critical appraisal suggests that they may even be potentially harmful—not necessarily in themselves, but by way of the extra follow-up investigations due to a false-positive result, as well as the limited potential for benefit, especially for diseases that have no effective cure.

It appears that institutions offering these services consider that 'more is better'. The widespread advertising of these packages may wrongly educate the population that these are effective preventive services and that better preventive services are a function of willingness to spend. There is no formal guidance from any authoritative body in Hong Kong with recommendations on what is worth doing, as there is no local authority to which either the public or medical professionals can turn to obtain information. Clearly, a set of guidelines that are applicable to local needs should be developed, for the information of all concerned.

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