

Screening in normal risk adults

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Screening

There are a number of criteria that need to be met for a screening test to be considered good (Table 1). A central aspect of this is that treatment works. Many conditions can be screened for, but often there is no effective intervention, e.g. ultrasound to screen for ovarian cancer. In some cases we do not know if it is the treatment that does not work or if it is the screening test that does not work. This is the situation for prostate cancer screening using a PSA (prostate specific antigen) test. For mammography in women aged 50–69 we know that both the screening test works and the treatment is effective as there is a mortality benefit in the randomised controlled trials. As yet there are no randomised controlled trials that show a benefit in terms of mortality for screening for prostate cancer with PSA testing.

Another issue is the enormous amount of effort that is required to benefit a few. Most screening tests are conducted in situations where the disease is not very prevalent (classically less than 5% of the population has the disease at any one time). In these situations there are many false positive tests for every true positive test. For mammography in women aged 50–69 there are 10 false positive tests for every true positive test.

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Table 1. WHO criteria for a good screening test [Wilson and Jungner 1968¹³]

1. Important health problem
2. Accepted treatment
3. Diagnosis and treatment available
4. Recognisable latent or early stage
5. Suitable test or examination exists (simple, cheap, valid)
6. Test acceptable to the population
7. Natural history should be understood
8. Should be agreed who to treat (treatment works)
9. Cost-beneficial
10. Should be a continuous process

Thus nine women require additional investigation for every one that has breast cancer.

In New Zealand we have a very low rate of breast biopsy to cancer ratios (<2) which is a sign of a good

Table 2. Total deaths prevented in patients <70 yrs over 35 years of screening in general practice in the UK – based on WHO mortality data 1991

Assuming 2 000 patients per GP	
Cervix cancer	1*
Suicide	5
Breast cancer	9*
Colorectal cancer	7 (*?)
Lung cancer	19
Stroke	13*
CHD	55*

* Indicates that screening is recommended for that disease

quality programme. False negative tests are a problem for a screening programme but for general practitioners it is the false positives that create the workload with false negatives being a minor issue.

Table 3. Screening in non pregnant normal risk adults

Activity/topic	Frequency	Age to start-stop	Comments/evidence
Hypertension	? 5 yearly	20 – indefinite	USPSTF, RACGP
Cholesterol level	5 years or more	Start at 20 years – indefinite (?)	RACGP, USPSTF but start 35–64 yrs in men and 45–64 in women
Family history of premature CHD, check lipids	Once unless new cases	Ideally at 20 years of age	RACGP, and National Heart Foundation NZ 1996
Specific risk factors for stroke; atrial fibrillation	Routinely while measuring blood pressure	45 to indefinite	RACGP
Diabetes: fasting glucose + HbA1c	Three yearly thereafter or one yearly if IFG, IGT, gestational diabetes	Europeans at 50 yrs non Europeans from 40 yrs onwards and 10 years earlier if risk factors for vascular disease/diabetes	Specific methods in NZ Med J 2002;115:194–6. CTF, USPSTF, RACGP
Breast cancer (mammography)	2 yearly	Women 50–69	RACGP, USPSTF, NZ Cancer Society
Breast cancer (clinical exam)	2 yearly	Women 50–69	CTF, USPSTF but not RACGP
Cervical cancer	3 yearly	Women: Onset of sexual activity then at one year then 3 yearly (2 yearly in Australia)	CTF, USPSTF, RACGP
Rubella serology or immunisation in women of child bearing age	Once	Women of child bearing age	USPSTF, RACGP
Immunisation for tetanus Immunisation for influenza		Check tetanus and diphtheria status at 45 and 65; influenza yearly from 65 yrs onwards	USPSTF, RACGP
Skin cancer	Yearly/opportunisticly	20 – indefinite	USPSTF, RACGP
Depression		20 – indefinite Any screening instrument	USPSTF
Lifestyle/counselling		Lifestyle/counselling	Lifestyle/counselling
Smoking	History*	Teenage – indefinite	RACGP, USPSTF
Alcohol consumption	History*	Teenage – indefinite	RACGP, USPSTF
Physical activity	History*	Teenage – indefinite	RACGP, USPSTF
Adequate calcium intake	History*	All ages	USPSTF

Key: RACGP = Royal Australian College of General Practitioners⁷

USPSTF = United States preventive services task force⁵

CTF = Canadian task force on preventive health care⁶

The yield from all of this work of screening is not huge. Table 2 shows the number of deaths that screening may possibly prevent in patients under the age of 70 years. There will be many more deaths in the over 70 age group. For example, for a lifetime of screening for cervical cancer only one death can be prevented by a single general practitioner. Dr Tony Keech, who is a clinical trial special-

ist in cardiovascular disease, developed this table to show that there are great gains to be made in the area of screening for coronary heart disease and stroke.

Cardiovascular screening

The New Zealand guidelines for cardiovascular disease¹ suggest that all citizens have their cholesterol measured as a means of detecting familial

dyslipidemia. In addition, a family history of premature cardiovascular disease should be sought and considered. The measurement of hypertension is an activity that should be continued up to at least the age of 85 years.² Management of cardiovascular disease requires the use of absolute risk as the guide for initiating either pharmacological or non-pharmacological treatment.¹ Screening for

diabetes also contributes to preventing cardiovascular disease and a recent New Zealand article has made some suggestions regarding this.³

Breast cancer screening

New Zealand currently has a nationwide breast screening programme that is fully funded for women aged 50–64. Recent controversy over the effectiveness of mammography have been contrasted by a 50% reduction in death from breast cancer in the UK.⁴ Some of this reduction has been attributed to mammography and some to the use of tamoxifen. Clinical breast exam was included in one of the randomised controlled trials of mammography and some countries suggest it be done in conjunction with mammography^{5,6} while others do not.⁷ Breast self examination has not been found to save lives and is not recommended in the USA, Canada or Australia.

Cervical cancer screening

The debate over the effectiveness of screening for cervical cancer has been prolonged by the lack of randomised controlled trials. The evidence for

this form of screening comes from case control and cohort studies.⁶

Skin cancer

The Canadian task force and the Royal Australian College of General Practitioners (RACGP) both recommend screening for skin cancer in spite of the lack of randomised controlled trials. For individuals at significantly increased risk (i.e. family melanoma syndrome [MM] or first degree relative with melanoma) it is prudent to undertake regular examinations (dermatologists may be more accurate assessors).

Depression

The 1996 United States Preventive Services Task Force (USPSTF) recommended against screening for depression. In 2002 they changed their minds and recommended screening for depression in clinical practices which have an integrated programme in place to assure accurate diagnosis, effective treatment and follow-up.⁸ An integrated programme would include feedback, provider or patient education, access to case manage-

ment or mental health care, telephone follow-up and institutional commitment to quality improvement.

Bowel cancer

The USPSTF in 1996 gave a B recommendation that faecal occult blood be offered annually or sigmoidoscopy at an unspecified interval to persons over the age of 50 years as a means of screening for bowel cancer. The RACGP also recommended screening for bowel cancer but limited itself to faecal occult blood testing. The National Health Committee recommended against screening due to the modest benefit, substantial commitment of health resources and the small but real potential for harm.⁹ Assuming a 15% reduction in mortality from faecal occult blood screening, 1 000 persons would need to be screened to prevent one death.

Osteoporosis

The USPSTF recommends that women aged 65 and older be screened routinely for osteoporosis. They also recommend that routine screening begin at age 60 for women at increased

Table 4. Screening in other countries but not in New Zealand

Activity/topic	Frequency	Age to start-stop	Comments/evidence
Bowel cancer: faecal occult blood	2 yearly	Start at 50 years to indefinite	USPSTF, RACGP, CTF but not the NZ National Health Committee
Osteoporosis	Case finding	Women 45–80 men 50–80	RACGP, CTF
Abdominal aortic aneurysm by ultrasound	If aorta <3 cm diameter no further screen; 3.0–4.4 cm annual and 4.5–5.4 cm every three months	Men 65–74	CTF, Recommended by two UK authors ^{11,14} and has been shown to be cost effective. ¹⁰ A screening programme has not yet started in any country
Genetic screening	History for 1° or 2° relative on same side of family or colon cancer before 50 years or multiple colon cancers	Breast cancer and ovarian cancer check for BRCA1 and BRCA2. Hereditary haemochromatosis. Colon cancer for hereditary non-polyposis colon cancer and FAP (familial adenomatous polyposis coli)	RACGP
Pneumococcal vaccine	Once	All institutionalised immunocompetent persons ≥65 yrs	RACGP, CTF, USPSTF

What's New

- Patients should know that screening and treatment for prostate cancer is experimental.
- Rectal exam for either prostate or rectal cancer in asymptomatic patients is not indicated.
- Screening for abdominal aortic aneurysm by ultrasound in men 65–74 is cost effective.
- Consideration should be given to giving pneumococcal vaccine to institutionalised patients over 50 years of age.
- Screening for depression is now recommended in the USA.
- Women 65–69 should have mammography to screen for breast cancer.
- The case is made for screening women over the age of 70 for breast cancer.

risk for osteoporotic fractures. The USPSTF makes no recommendation for or against routine osteoporosis screening in postmenopausal women who are younger than 60 or in women aged 60–64 who are not at increased risk for osteoporotic fractures. In terms of treatment, the only pharmacological treatment now available is a bisphosphonate given the concerns with hormone replacement therapy. The RACGP recommends case finding for osteoporosis rather than screening all women.

Abdominal aortic aneurysm

The Canadian task force states that there is insufficient evidence to recommend for or against ultrasound

screening for abdominal aortic aneurysm. Neither the RACGP nor USPSTF recommend screening, but there have been some interesting developments in the UK. A cost-effectiveness study found that screening men ages 65–74 years was cost-effective¹⁰ and an accompanying editorial recommended a national screening programme.¹¹ The numbers needed to treat from this study were 729 to prevent one death.

Genetic screening

There is no formal screening programme for genetic disorders but screening for these conditions occurs informally in New Zealand.

Pneumococcal vaccine

This is recommended by the RACGP and the USPSTF for patients over 50 years who are immunocompetent. In Australia it is recommended every five years for indigenous Australians from 50 years and for all Australians over 65 years. In the USA it is recommended for immunocompetent institutionalised persons over 50 years and for immunocompetent individuals who have chronic diseases. It seems that this vaccine is less effective in those who are immunocompromised. The Canadians feel that it is only useful in those who have had a splenectomy and those who are institutionalised.

Key Points

- For mammography in women aged 50–69 there are 10 false positive tests for every true positive test. Thus 9 women require additional investigation for every one that has breast cancer.
- Management of cardiovascular disease requires the use of absolute risk as the guide for initiating either pharmacological or non-pharmacological treatment.
- Breast self examination has not been found to save lives and is not recommended in the USA, Canada or Australia.
- Screening for depression is recommended in clinical practices which have an integrated programme in place to assure accurate diagnosis, effective treatment and follow-up.
- Assuming a 15% reduction in mortality from faecal occult blood screening 1 000 persons would need to be screened to prevent one death.

Controversial issues

Prostate screening

This is not recommended by the USPSTF, CTF or RACGP. The reason for this is that to date there is no evidence that screening and treating saves lives. Most groups are awaiting a number of randomised controlled trials to see if screening is effective. A study comparing aggressive versus non aggressive approach to screening in two US states found no difference in terms of the mortality from prostate cancer.¹² While prostate cancer is more likely when the PSA is high there is no evidence yet that we can save lives by intervening.

Table 5. What not to screen for if you wish to save lives

Screening and treating the following diseases does not save lives:

1. Testicular cancer
2. Prostate cancer
3. Rectal exam for either prostate or bowel cancer
4. Lung cancer with chest x-ray
5. Breast cancer in women under the age of 50 with mammography
6. Uterine cancer with bimanual examination
7. Ovarian cancer

Solutions to the issue of screening for prostate cancer

The key issue here is that the treatment for prostate cancer is experimental. The issue would be much clearer if patients had to sign an informed consent form when they are offered treatment for prostate cancer stating that they agreed to this experimental treatment. My approach has been to give patients the National Health Committee form on screening for prostate cancer. This pamphlet does not encourage screening. I also say to the men that if they have the test and accept treatment they are accepting experimental treatment that may or may not turn out to be effective. Another strategy is to put the PSA form into an envelope to be opened if they decide on screening after having read the pamphlet. This is one way of involving patients in the decision-making.

Mammographic screening in women aged 40–49 years and in 70 years and over

This is not recommended by the USPSTF, CTF or RACGP. Again, the reason for this is that to date there is no evidence that screening and treat-

ing saves lives. There does seem to be some benefit for women who started screening in their 40s but the benefit seems to be only for those women who are then in their 50s. While it would not be ethical to mail out a mammography form to all patients age 40–49 it is not unreasonable to order mammography for women who wish to pursue that option and who are fully informed that it is not thought to be life saving in that age group. The risk of breast cancer for a 49-year-old woman with no family history of breast cancer who had her first child at 25 years and her first period at 14 years is 1% over the next five years and 10% over her lifetime. She has to live to 90 years to reach the 10% risk. If that patient had one first degree relative with breast cancer, her five year risk would be 1.7% and her lifetime risk would be 15.7%. There is consideration being given to funding screening for breast cancer in women aged 65–69 as there is evidence that it is effective up to age 69 years. In terms of yield, more patients will have their lives saved if the older group is screened than if the younger groups are screened. While there is no empiric evidence to support the effec-

tiveness of screening in women over the age of 69 years, theory suggests that screening will probably be effective in women aged 70 years and older. My practice has been to encourage women to pay for their own screening and most seem keen to do this up to at least the age of 80. After 80 years they can no longer be bothered and this seems like a reasonable approach.

Screening for bowel cancer

This is not recommended in New Zealand at the moment. However faecal occult blood testing is recommended by the USPSTF, CTF and the RACGP from age 50. The issue here is that about 1 000 patients need to be screened to save one life. At 50 there may be at least 230 false positive tests for every true positive test. Clearly the resources of the public hospital system could not cope with this. However by the age of 65 the rate of false positives to true positives is getting down to about 22. Thus it may be reasonable to screen patients in the 65–74 age group. However we should wait until the National Health Committee guideline group for screening high risk patients produces its report.

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