The use of PSA testing in general practice

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The Team
Prostate cancer
The AJCC staging system is based on 3 factors
- T: the size, extent, and penetration of the tumor
- N: the number or location of cancer-involved lymph nodes
- M: the presence of sites of metastases
T4 Prostate Cancer – regional/distant spread

Illustration courtesy of the American Society of Clinical Oncology
Background

- 3000 NZ men each year are diagnosed with prostate cancer
- 76% have localised disease with excellent prognosis
- 560 men will die each year from metastatic prostate cancer
- There are 25,000 men in New Zealand with diagnosed prostate cancer
Age standardised incidence of prostate cancer in NZ 1948 to 2007 per 100,000 men
Age standardised death rates from prostate cancer in NZ 1948 to 2007
To screen or not to screen
Should we screen for prostate cancer?

- Will my patient live longer and be healthier if they take part in a screening program for prostate cancer?
- Will I reduce my risk of dying from prostate cancer if I have a PSA test?
Testing vs screening

- NZ GPs do 350,000 PSA tests per year
- 80% of these are in asymptomatic men and can be considered “opportunistic” testing
- Most NZ GPs think screening is worthwhile (while UK GPs for instance do very little screening)
Midland Study - PSA testing by general practitioners

- Recruited 31 practices (120,000 total pop; approx. 36,000 men over 40yrs) in the Midland Region
- Linked records of men aged 40 plus to community PSA tests in last 4 years
- Excluded men who already had a diagnosis of prostate cancer
- Checked records of all men who had a raised PSA test (lab defined) in 2010
Sample

35,958 men aged 40+ years
1006 (2.7%) diagnosed before 2010 excluded
9344 men (26.0%) had one or more PSA tests in 2010
7936 men (22.1%) were screened in 2010
Estimated 85% of tests were screening

Māori men aged 40+ yrs in Midland: 14.4%
our sample 14%
PSA testing by general practitioners

PSA screening and testing by practice

Proportion of men tested/screened (%)

Practice

Screening  Testing
Who gets tested?

- Men PSA tested in 2010
- Men PSA screened in 2010

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Tested (%)</th>
<th>Screened (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69 years</td>
<td>40%</td>
<td>35%</td>
</tr>
<tr>
<td>70-79 years</td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td>80+ years</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Do Māori get tested/screened as often?

![Graph showing comparison of PSA testing among Māori and Non-Māori populations. The graph compares the percentage of men aged <70 and 70+ years who were tested for PSA in 2010 between Māori and Non-Māori individuals.](image-url)
Does being a rural patient matter?

**PSA testing and screening by settlement size**

- **Proportion of men with PSA test (%):**
  - <10,000
  - 10,000-29,999
  - 30,000+

- **Age groups:**
  - Tested
  - Screened
After a raised PSA

1082 men with elevated PSA in 2010

- 467 (43%) referred to specialist
- 615 not referred

467 men

- 165 (35%) referred to specialist
- 302 (65%) not referred

302 men

- 139 (46%) had negative biopsy
- 165 (54%) had positive biopsy = prostate cancer

22 men referred with normal PSA; 14 had a biopsy, 7 had positive biopsy
## Costs per PCa identified

<table>
<thead>
<tr>
<th>Categories</th>
<th>20% of GP consultation cost included</th>
<th>50% of GP consultation cost included</th>
<th>100% of GP consultation cost included</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>$23,919</td>
<td>$39,892</td>
<td>$66,513</td>
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<tr>
<td>50-59</td>
<td>$29,268</td>
<td>$48,719</td>
<td>$81,138</td>
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<tr>
<td>60-69</td>
<td><strong>$6,023</strong></td>
<td><strong>$8,916</strong></td>
<td><strong>$13,739</strong></td>
</tr>
<tr>
<td>≥70</td>
<td>$10,301</td>
<td>$17,132</td>
<td>$28,516</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Māori</td>
<td><strong>$7,529</strong></td>
<td><strong>$10,673</strong></td>
<td><strong>$15,912</strong></td>
</tr>
<tr>
<td>Non-Māori</td>
<td>$10,859</td>
<td>$17,533</td>
<td>$28,657</td>
</tr>
<tr>
<td><strong>PSA testing history</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No PSA tests in 2007-2009</td>
<td><strong>$8,589</strong></td>
<td><strong>$12,867</strong></td>
<td><strong>$19,996</strong></td>
</tr>
<tr>
<td>Had PSA tests in 2007-2009</td>
<td>$13,361</td>
<td>$22,673</td>
<td>$38,194</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td><strong>$10,399</strong></td>
<td><strong>$16,587</strong></td>
<td><strong>$26,899</strong></td>
</tr>
</tbody>
</table>
What is screening?

- Screening is the practice of investigating apparently healthy individuals with the object of detecting unrecognised disease or its precursors so that measures can be taken to prevent or delay the development of disease or to improve the prognosis.
Criteria for screening for early diagnosis

- Disease characteristics
- Population
- Test characteristics
- Intervention
- Evaluation
Disease characteristics

- Important health problem (i.e. severity and frequency)
- Should be a definable entity
- Natural history should be understood
- Recognised latent phase
Gleason's Pattern Scale

1. Small, uniform glands.

2. More space (stroma) between glands.

3. Distinctly infiltration of cells from glands at margins.

4. Irregular masses of neoplastic cells with few glands.

5. Lack of or occasional glands, sheets of cells.

Well differentiated

Moderately differentiated

Poorly differentiated

Anaplastic
Cumulative Incidence of Death from Any Cause, Death from Prostate Cancer, and Development of Metastases.

A. Death from Any Cause, Total Cohort

B. Death from Prostate Cancer, Total Cohort

C. Metastases, Total Cohort
Prognosis – mortality by Stage from the Midland Prostate Cancer Study
The population

- Identification of risk groups
- Attitudes to screening
Family history

- Prostate cancer seems to run in some families, which suggests that in some cases there may be an inherited or genetic factor.

- Having a father or brother with prostate cancer more than doubles a man’s risk of developing this disease.

- The risk is much higher for men with several affected relatives, particularly if their relatives were young when the cancer was found.
Attitudes

- Gender
- Socio-economic status
- Ethnicity
Test characteristics

- Simple and cheap
- Safe
- Acceptable/ non invasive
- Sensitive and specific
- Valid and reliable
PSA test

- Identifies men who are likely to suffer from symptomatic prostate cancer from men in whom symptomatic prostate cancer is unlikely.
- PSA identifies a significant proportion of men who have no evidence of cancer as well as some men who have evidence of cancer but in whom it is unlikely to become symptomatic and thus have no increased risk (false positives).
- Cut off point of 4 ng/ml will miss some men with cancer including a small number who may have undifferentiated tumours with a high Gleason score (false negatives).
- Lowering the cut off point to 3 ng/ml as was done in the European prostate screening trial increased the sensitivity but also increased the number of false positives.
DRE

- 7/172 (4%) cases identified had a normal PSA
- Most men (73%) said they had received a DRE.
- Māori (71%) and non-Māori men (73%) were just as likely to receive a DRE
- Men aged 60–69 years (86%) were most likely to receive a DRE by their GP.
Treatment

• Is there an effective treatment for the disease?
• Is the treatment acceptable?
• Are there adequate facilities for treatment?
There is an effective and accessible treatment or intervention for the condition

• Options for treatment include radical prostatectomy, radiotherapy (focussed beam, or brachytherapy), or hormonal treatment.

• We have evidence from an RCT of radical prostatectomy versus watchful waiting - fewer men in the radical prostatectomy group died of prostate cancer (Bill-Axelson et al).

• There is little convincing evidence that brachytherapy or focussed bean radiotherapy have different survival outcomes than prostatectomy.

• Treatment options in New Zealand vary from DHB to DHB and differences in outcomes of the various options have not been evaluated in the local setting.
Cumulative Incidence of Death from Any Cause, Death from Prostate Cancer, and Development of Metastases.

PIVOT study

- Trial of watchful waiting vs prostatectomy in localised cancer
### Death from Any Cause

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Observation</th>
<th>Radical Prostatectomy</th>
<th>Hazard Ratio (95% CI)</th>
<th>P Value for Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>183/367</td>
<td>171/364</td>
<td>0.88 (0.71–1.08)</td>
<td>0.85</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;65 yr</td>
<td>50/131</td>
<td>43/122</td>
<td>0.89 (0.59–1.34)</td>
<td></td>
</tr>
<tr>
<td>≥65 yr</td>
<td>133/236</td>
<td>128/242</td>
<td>0.84 (0.63–1.08)</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>119/220</td>
<td>117/232</td>
<td>0.84 (0.65–1.08)</td>
<td>0.81</td>
</tr>
<tr>
<td>Black</td>
<td>53/121</td>
<td>46/111</td>
<td>0.93 (0.62–1.38)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>11/26</td>
<td>8/21</td>
<td>0.85 (0.34–2.11)</td>
<td>0.79</td>
</tr>
<tr>
<td>Charlson score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>86/220</td>
<td>82/224</td>
<td>0.90 (0.66–1.21)</td>
<td>0.66</td>
</tr>
<tr>
<td>≥1</td>
<td>97/147</td>
<td>89/140</td>
<td>0.84 (0.63–1.13)</td>
<td></td>
</tr>
<tr>
<td>Performance score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>146/310</td>
<td>139/312</td>
<td>0.89 (0.71–1.13)</td>
<td>0.04</td>
</tr>
<tr>
<td>1–4</td>
<td>37/57</td>
<td>32/52</td>
<td>0.82 (0.51–1.31)</td>
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</tr>
<tr>
<td>PSA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤10</td>
<td>101/241</td>
<td>110/238</td>
<td>1.03 (0.79–1.35)</td>
<td>0.07</td>
</tr>
<tr>
<td>&gt;10</td>
<td>77/125</td>
<td>61/126</td>
<td>0.67 (0.48–0.94)</td>
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<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>54/148</td>
<td>62/148</td>
<td>1.15 (0.80–1.66)</td>
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<tr>
<td>Intermediate</td>
<td>70/120</td>
<td>59/129</td>
<td>0.69 (0.49–0.98)</td>
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<tr>
<td>High</td>
<td>49/80</td>
<td>42/77</td>
<td>0.74 (0.49–1.13)</td>
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<tr>
<td>Gleason score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;7</td>
<td>125/261</td>
<td>113/254</td>
<td>0.86 (0.67–1.12)</td>
<td>0.87</td>
</tr>
<tr>
<td>≥7</td>
<td>47/86</td>
<td>50/98</td>
<td>0.84 (0.56–1.25)</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Hazard ratio and 95% confidence interval (CI) are provided for each subgroup.
- P values for interaction are also noted.
### Death from Prostate Cancer

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Observation no. of events/total no.</th>
<th>Radical Prostatectomy no.</th>
<th>Hazard Ratio (95% CI)</th>
<th>P Value for Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>31/367</td>
<td>21/364</td>
<td>0.63 (0.36–1.09)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
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<tr>
<td>&lt;65 yr</td>
<td>12/131</td>
<td>6/122</td>
<td>0.52 (0.20–1.39)</td>
<td>0.63</td>
</tr>
<tr>
<td>≥65 yr</td>
<td>19/236</td>
<td>15/242</td>
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<tr>
<td>Race</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>22/220</td>
<td>15/232</td>
<td>0.57 (0.30–1.10)</td>
<td>0.76</td>
</tr>
<tr>
<td>Black</td>
<td>7/121</td>
<td>5/111</td>
<td>0.80 (0.25–2.54)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2/26</td>
<td>1/21</td>
<td>0.56 (0.05–6.17)</td>
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<tr>
<td>Charlson score</td>
<td></td>
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<tr>
<td>0</td>
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<tr>
<td>0</td>
<td>25/310</td>
<td>18/312</td>
<td>0.67 (0.37–1.23)</td>
<td>0.57</td>
</tr>
<tr>
<td>1–4</td>
<td>6/57</td>
<td>3/52</td>
<td>0.41 (0.10–1.71)</td>
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<tr>
<td>PSA</td>
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<td></td>
</tr>
<tr>
<td>≤10</td>
<td>15/241</td>
<td>14/238</td>
<td>0.92 (0.44–1.91)</td>
<td>0.11</td>
</tr>
<tr>
<td>&gt;10</td>
<td>16/125</td>
<td>7/126</td>
<td>0.36 (0.15–0.89)</td>
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</tr>
<tr>
<td>Risk</td>
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<td></td>
</tr>
<tr>
<td>Low</td>
<td>4/148</td>
<td>6/148</td>
<td>1.48 (0.42–5.24)</td>
<td>0.11</td>
</tr>
<tr>
<td>Intermediate</td>
<td>13/120</td>
<td>6/129</td>
<td>0.50 (0.21–1.21)</td>
<td></td>
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<tr>
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<td>14/80</td>
<td>7/77</td>
<td>0.40 (0.16–1.00)</td>
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<td>15/86</td>
<td>10/98</td>
<td>0.51 (0.23–1.14)</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Radical Prostatectomy Better
- Observation Better
Harm of treatment

<table>
<thead>
<tr>
<th>Dysfunction</th>
<th>Radical Prostatectomy</th>
<th>Observation</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary incontinence†</td>
<td>49/287 (17.1)</td>
<td>18/284 (6.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Erectile dysfunction‡</td>
<td>231/285 (81.1)</td>
<td>124/281 (44.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Bowel dysfunction§</td>
<td>35/286 (12.2)</td>
<td>32/282 (11.3)</td>
<td>0.74</td>
</tr>
</tbody>
</table>

Table 2. Patient-Reported Urinary, Erectile, and Bowel Dysfunction at 2 Years, According to Study Group.*
## Harm of treatment

(“Let sleeping dogs lie”)

Table 9: Prevalence of urinary incontinence, bowel problems and sexual impotence, three years after treatment and in untreated controls (percentages). EBRT, external beam radiation therapy; ADT, androgen deprivation therapy.

<table>
<thead>
<tr>
<th></th>
<th>Active surveillance (&quot;watchful waiting&quot;)</th>
<th>RP total</th>
<th>Nerve sparing RP</th>
<th>Non-nerve sparing RP</th>
<th>EBRT</th>
<th>ADT</th>
<th>Combined EBRT/ADT</th>
<th>Low dose brachytherapy</th>
<th>High dose brachytherapy</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urinary incontinence</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Baseline</td>
<td>6.0</td>
<td>1.1</td>
<td>0.6</td>
<td>1.5</td>
<td>0.0</td>
<td>6.6</td>
<td>3.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.0</td>
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<tr>
<td>three years</td>
<td>3.4</td>
<td>12.3</td>
<td>9.4</td>
<td>15.1</td>
<td>2.7</td>
<td>4.3</td>
<td>3.9</td>
<td>5.4</td>
<td>7.0</td>
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<tr>
<td><strong>Moderate to severe bowel problems</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>13.5</td>
<td>4.4</td>
<td>3.6</td>
<td>5.3</td>
<td>10.6</td>
<td>10.0</td>
<td>9.0</td>
<td>0.0</td>
<td>2.1</td>
<td>6.3</td>
</tr>
<tr>
<td>three years</td>
<td>6.3</td>
<td>3.5</td>
<td>4.1</td>
<td>2.7</td>
<td>14.5</td>
<td>6.4</td>
<td>12.5</td>
<td>0.0</td>
<td>9.3</td>
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<tr>
<td><strong>Impotence</strong></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Baseline</td>
<td>27.3</td>
<td>21.5</td>
<td>15.6</td>
<td>27.6</td>
<td>30.2</td>
<td>42.1</td>
<td>39.1</td>
<td>19.0</td>
<td>25.5</td>
<td>22.3</td>
</tr>
<tr>
<td>three years</td>
<td>54.3</td>
<td>77.4</td>
<td>67.9</td>
<td>86.7</td>
<td>67.9</td>
<td>97.8</td>
<td>82.3</td>
<td>36.4</td>
<td>72.1</td>
<td></td>
</tr>
</tbody>
</table>
Evaluation of a screening programme

- Effectiveness – proven by RCT
- Efficiency – cost effective
- Equitable
- Acceptable
- Accessible
- Appropriate
So is there evidence from RCTs that screening is beneficial?

- ERSPC
- PLCO
- Goteborg
European Randomized Study of Screening for Prostate Cancer (ERSPC)

- Included 182,000 men recruited over 10 years from 7 different European countries
- Men aged 55 to 75 years
- Screened men every 4 years
- Considered positive if test greater than 2.4 ng/ml
ERSPC

- The trial *analysed* men from ages 55 to 69 years.
- Absolute risk difference between the screening and control groups of 0.71 prostate cancer deaths per 1000 men.
- 1410 men would have to be screened 1.7 times over 9 years (number needed to screen).
- 48 men would need to be treated (number needed to treat) to prevent one prostate cancer death.
- There was no benefit in all cause mortality.
ERSPC

• 13 years of follow up published Lancet 2014
• Absolute risk difference between the screening and control groups of 1.28 prostate cancer deaths per 1000 men.
• 781 men would have to be screened over 13 years (number needed to screen),
• 27 men would need to be diagnosed (number needed to treat) to prevent one prostate cancer death.
• Despite showing a clear prostate cancer mortality reduction, the findings are not sufficient to justify population-based screening.
# ERSPC

## Table 2. Death from Prostate Cancer, According to the Age at Randomization.

<table>
<thead>
<tr>
<th>Age at Randomization</th>
<th>Screening Group</th>
<th>Control Group</th>
<th>Rate Ratio (95% CI)†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Deaths</td>
<td>Person-Yr (Death Rate per 1000 Person-Yr)</td>
<td>No. of Deaths</td>
</tr>
<tr>
<td>All subjects</td>
<td>261</td>
<td>737,397 (0.35)</td>
<td>363</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50–54 yr</td>
<td>6</td>
<td>55,241 (0.11)</td>
<td>4</td>
</tr>
<tr>
<td>55–59 yr</td>
<td>60</td>
<td>316,389 (0.19)</td>
<td>102</td>
</tr>
<tr>
<td>60–64 yr</td>
<td>76</td>
<td>191,542 (0.40)</td>
<td>95</td>
</tr>
<tr>
<td>65–69 yr</td>
<td>78</td>
<td>135,470 (0.58)</td>
<td>129</td>
</tr>
<tr>
<td>70–74 yr</td>
<td>41</td>
<td>38,755 (1.06)</td>
<td>33</td>
</tr>
</tbody>
</table>
PLCO

- 180,000 men and women recruited in US for a study of prostate, lung, colorectal and ovarian cancer
- 76,693 men randomised
- Aged 55 to 75 years
- Screened men every year
- 2820 cancers in screening group, 2323 in control
- 50 deaths from PC in screening group and 44 in control group
PLCO

- Smaller sample size
- Older patient group
- Significant contamination in control group
Goteborg study (2010)

- 20,000 men aged 50-64 years.
- PSA cut-off 2.4 ng/mL
- Participation rate in at least one screening round was 76% (n=7578) and a total of 29315 PSA tests were performed.
- A total of 4693 positive PSA results were recorded.
- 33% of the participants (n= 2469) received at least one positive result and 93% of these (n=2298) had a biopsy.
Goteborg study (2010)

- After 14 years of follow-up, within a core age group of 50 to 64 years, 44 and 78 prostate cancer deaths were observed in the screening group and control groups respectively. The unadjusted rate ratio for death from prostate cancer in the screening group was 0.56 (95% CI, 0.39-0.82 p=0.002).

- This corresponds with a significant absolute risk difference between groups of four deaths per 1000 men.

- The incidence of prostate cancer was almost 60% greater in the screened group (see table).

- The all cause mortality in the two groups was 1982 in the control group and 1981 in the screened group.
# Goteborg study

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Screened Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number with prostate cancer</td>
<td>718</td>
<td>1138</td>
</tr>
<tr>
<td>Number of prostate cancer</td>
<td>78</td>
<td>44</td>
</tr>
<tr>
<td>Number with prostate cancer</td>
<td>54</td>
<td>109</td>
</tr>
<tr>
<td>who died of unrelated causes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There is consideration of cost-benefit

- Screening large numbers of people is expensive and can divert both human and financial resources from other health services.

- The costs of screening for prostate cancer include:
  - GP time in counselling men about the benefits and risks
  - the cost of the test
  - the cost of diagnosis with prostatic biopsy,
  - the pathology costs needed to make the diagnosis,
  - the cost of counselling for those men who treatment is being suggested,
  - the costs of surgery or radiotherapy (or watchful waiting).

- These costs need to be balanced against the cost of investigating and treating symptomatic patients.

- Ideally, a cost-effectiveness analysis should be undertaken before any screening program is considered
The cost-effectiveness of prostate cancer screening: results from a systematic review [1]

<table>
<thead>
<tr>
<th>Author, year</th>
<th>Country</th>
<th>Perspective</th>
<th>Screening strategy</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Shteynshlyuger [2], 2011</td>
<td>USA</td>
<td>Societal perspective</td>
<td>Screen men aged 55-69 years at an interval of 4 years: ERSPC screening protocol</td>
<td>US$262,758 per life-year saved</td>
</tr>
<tr>
<td>A. J. Martin[3], 2013</td>
<td>Australia</td>
<td>Perspective of the health care system</td>
<td>Screen men aged 50 years at an interval of 4 years</td>
<td>AU$291,817 per QALY for men with average risk; AU$110,726 per QALY for men with two times the average risk; AU$30,572 per QALY for men with five times the average risk</td>
</tr>
<tr>
<td>R. Pataky [4], 2014</td>
<td>Canada</td>
<td>Perspective of health system</td>
<td>The most cost-effective strategy: A single screen at age 60 years, followed by a screen at age 65 years for men with PSA above the median</td>
<td>CAN$340,300 per QALY</td>
</tr>
</tbody>
</table>


Prostate Cancer Management and Referral Guidance
Algorithm for supporting men with prostate-related concerns

Man presents with prostate-related concerns

If aged 50 to 70 years, or over 40 years with a family history of prostate cancer, obtain informed consent before testing by discussing:
• the benefits and risks of PSA testing and/or DRE
• the implications of further testing if the PSA or DRE is abnormal. (See note 1.)
Note. Carefully consider each man’s individual context when discussing benefits and risks.

PSA test and DRE

Normal PSA and DRE

Abnormal DRE (See Note 2)

Abnormal DRE (See Note 3)

Man decides not to be tested
No further action required

Are any of the Red Flags present? (See Note 4.)

NO

YES

Red Flags
- Acute neurological symptoms
- Renal failure
- Bone pain
- Macroscopic haematuria (without LTI)

Treat urinary tract infection (UTI) or prostatitis if present

Repeat PSA test after 6–12 weeks

Is the second PSA result abnormal?

NO

YES

Does the man have a first-degree relative who was diagnosed with prostate cancer under 65 years?

NO

YES

Discuss follow-up options including no further testing (See Note 5.)

Recommend repeat PSA and DRE every 12 months (See Note 5.)

Obtain informed consent and refer to urology service (See Note 6.)
Man presents with prostate-related concerns

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Red Flags

- Acute neurological symptoms
- Renal failure
- Bone pain
- Macroscopic haematuria (without UTI)
Taskforce Recommendations

Diagnostic guidelines

24. Men meeting the following criteria should be considered for prostate biopsy after taking into account clinical considerations, elimination of benign causes of high PSA, age, co-morbidity and patient choice:

- suspicion of malignancy on digital rectal examination
- men up to the age of 70 years with a PSA ≥4 ng/mL
- men between 71–75 years with a PSA ≥10 ng/mL
- men aged ≥76 years with a PSA ≥20 ng/mL
- a significant PSA rise in a man with previously low PSA values.
Summary

- Prostate cancer is a common and important cancer with a long lead time before it becomes symptomatic.

- PSA testing with or without DRE has limitations with regards to its suitability as a test. Over-diagnosis is a concern. Research into other tests may find a test with better sensitivity and specificity.

- Radical prostatectomy has been shown to be of benefit over watchful waiting in younger men. The ERSPC study included a variety of local treatment regimes. Treatment options in New Zealand vary from DHB to DHB and differences in outcomes of the various options have not been evaluated.

- The potential benefits of mass screening for prostate cancer are outweighed by the harms caused by over-diagnosis and unnecessary treatment.

- Cost effectiveness analyses suggests that screening is not cost effective

- Current advice is that men seeking a PSA test should be counselled on the potential benefits and harms of screening before a test is carried out
Question 1

• 67 year old European man attends and says his wife has told him he should have a PSA test. He has no family history of prostate cancer but has had some ED which is causing some marital discord. He has never had a PSA test before.

• What do you tell him?
Question 2

- 58 year old Māori man attends for his CVRA - He has diabetes, BMI 34, smokes 10 cigarettes a day, BP 140/90, total cholesterol of 5.5 mmol/L. He has no family history of prostate cancer and no symptoms. Should you suggest he has a PSA test?
Question 3

- 74 year old man who is generally fit and well – he last had a PSA test 2 years ago which was negative (<1 ng/ml). DRE is normal – what do you advise him?
Question 4

• 42 year old asymptomatic man whose father died of metastatic prostate cancer 30 years ago at the age of 48.

• He would like to be tested for prostate cancer – what do you advise him?