Prostate cancer, the PSA test and academic detailing in Australian general practice: an economic evaluation

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Abstract

Objectives: To evaluate whether introduction of a national education program for GPs to improve decision making relating to the use of prostate specific antigen (PSA) testing for screening represents 'value-for-money' from the perspective of the Australian Government.
Methods: The annual equivalent costs and consequences of a proposed national program in steady state operation are estimated for Australia using 1996 as the reference year. Because of the controversy about the efficacy of screening using PSA testing, two scenarios are modelled. Uncertainty in the model is examined using Monte Carlo simulation methods.
Results: In scenario one, our model predicts that the national program would cost $12.5 million (gross) or $6.6 million (net), would reduce the burden of disease by 4.7% of total DALYs due to prostate cancer in those aged 70 and over, with no loss of life and an incremental cost effectiveness ratio (ICER) of $16,000/DALY (gross) and $8,500/DALY (net). In scenario two, the proposed program would cost $12.5 million (gross) or $7.1 million (net), would reduce the burden of disease by 3.1% of total, increase by 44 the prostate cancer deaths at an ICER of $24,000/DALY (gross) and $14,000/DALY (net).
Conclusions: These findings, with an overall health benefit at moderate cost and acceptable ICER, support the case for consideration of a national education program on the assumption that prostate cancer screening over age 70 does not reduce mortality. A larger Australian study currently being conducted should provide stronger evidence on the value of implementing a full national program.

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Prostate cancer is a major men's health issue. In 1997, it was the most common cancer diagnosed in Australian males, with 9,700 new cases, and the third most common cause of cancer deaths at 2,400.[1] It represents 32,000 disability adjusted life years (DALYs) or 7% of the total burden of disease due to all cancers.[2] The total health system costs for prostate cancer in 1993/94 were $101 million.[3]

Screening for prostate cancer using the prostate specific antigen (PSA) test is controversial. Theoretically, screening using PSA testing could lead to early detection and possibly decreased prostate cancer mortality. In Australia, Medicare funds PSA as a screening test and, starting around 1990 and peaking in 1994, there was a dramatic rise in the incidence of prostate cancer,[1] which has been shown to parallel the increase in PSA testing.[4] Furthermore, consultations in which prostate cancer screening is either discussed or provided are common and rising, and occur predominantly in general practice.[5] There are significant medicolegal issues involved in prostate cancer screening.[5] Other factors driving screening include the perception that "something must be done" for men's health; the media; pharmaceutical industry promotion; and sections of the medical profession.[5]

On the other hand, routine screening of asymptomatic men is not recommended by the National Health and Medical Research Council (NHMRC) because of lack of evidence from randomised controlled trials for decreased mortality from such screening.[6] More importantly, cancer-related activities carry with them considerable anxiety for both patients and GPs, and poor decisions have profound implications in terms of health costs, potential adverse sequelae of downstream investigations and treatments.[5]

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The importance of "Promoting informed choice by men about prostate-specific antigen (PSA) testing and the early detection of prostate cancer through education for general practitioners and the community" has been recognised by the Australian Government as one of 13 actions in its Priority Actions in Cancer Control 2001-2003.[7] Seven of the 13 priority actions identified have been evaluated using a novel economic protocol developed for priority setting.[8,9] When the results of a pilot study of academic detailing promoting better use of the PSA test in general practice[10] became available, it was possible then to apply the same protocol to estimate the hypothetical benefits and costs of such a program and compare the results with the other interventions.

This paper describes an economic evaluation undertaken to assess the economic credentials of introducing a national education program for achieving better outcomes from the use of the PSA test as a screening modality.

Figure 1: Promoting better use of the PSA test in general practice: randomised controlled trial of educational strategies based on outreach visits and mailout (pilot study).[10]

This RCT was designed to compare the effectiveness of educational outreach visits and mailout strategies with current practice as a means to improve general practitioners' levels of essential knowledge about prostate cancer and the PSA test. Without this knowledge, shared patient/GP decision-making would be less likely to occur when opportunistic testing was under consideration.

A skilled academic detailer undertook two consecutive visits on this topic approximately 4-6 weeks apart.[10] During these visits it was affirmed that screening of men for prostate cancer using the PSA test was generally less justifiable in men younger than 50 or older than 70 years unless risk factors were present.

Prostate cancer screening is less likely to be effective in men with under 10 years of life expectancy[14] because the slow development of the cancer means that benefits of treatment for early disease only become apparent 8-10 years after treatment,[10] and definitive treatment is not normally offered for men with a shorter life expectancy.[15]

Men over 70 years of age are less likely to benefit from screening than younger men, and men over 75 years least likely to benefit. Patient education materials were provided to visited GPs, which facilitated shared and informed decision making.[16] Outcomes measured were PSA testing and GP knowledge in key areas relating to prostate cancer and PSA testing.

Academic detailing is an effective technique employed to obtain changes in the practice of health professionals.[17] It involves use of social marketing in brief, one-to-one encounters between skilled communicators and target individual health professionals in their own practice settings.

Maximal effects from this educational and behaviour-changing technique are generally achieved through repeated visits from a visitor clearly independent of commercial or other biases, but having expert knowledge of the topic under discussion and an unambiguous orientation for supporting clinicians to achieve the best possible outcomes for their patients.[18]

Methods

The evaluation

The evaluation assumes a hypothetical nationally co-ordinated education program delivered to all Australian general practitioners, using 1996 as the reference year. The perspective used is that of the Australian Government as third party funder of such a program. The economic protocol followed was originally developed for a large priority-setting study to assist decisions concerning cancer control in Australia[8,9] that was commissioned by the Cancer Strategies Group, an advisory body of the Australian Government. Using the same methodology, applied to the same population and the same reference year, enables direct comparison of this intervention with those evaluated in that study.

The model

The annual equivalent benefits, costs and incremental cost-effectiveness of the proposed national education program are modelled and compared with the status quo (no program) using a cost-effectiveness analysis (see footnote). The model assumes the major components of a program as outlined in Table 1. Briefly, the education program is delivered to GPs or not; asymptomatic patient visits GP and discusses PSA test (either patient or GP initiated); a shared decision is made whether to perform a PSA test; all positive tests are followed up by the GP; and patients are then referred on for diagnosis and treatment.

Footnote: The generic term of cost-effectiveness analysis is used to include the cost-utility analysis ($/DALY) and cost-effectiveness ($/YLL), as adopted by the Washington Panel.[11]

Table 1: Comparison of status quo and proposed national education program.

Components evaluated	Status quo (1996)	National program
Academic detailing program	No formal program	A national program targeting all GPs
GP visit with PSA test discussion	Current rate	Current rate
PSA tests used for screening in the GP sector	Current rate estimated from Medicare data and the literature[4,12]	Alteration in test numbers based on results of pilot study[10]
GP visit follow-up	Current rate	Expected reduction in visits based on predicted reduction in cancers observed
Total health service costs minus palliation and terminal care (THS minus costs)	Australian Prostate Cancer Health Service costs[3]	Costs are assumed to reduce proportional to the reduction in cancer incidence
Palliation and terminal care in hospital costs (P&T costs)	Proportion of cancer costs that are palliation and terminal care based on Canadian model[13]	Scenario 1. No change Scenario 2. Slight increase in palliation and terminal care costs

Estimation of the effect of academic detailing at a national level

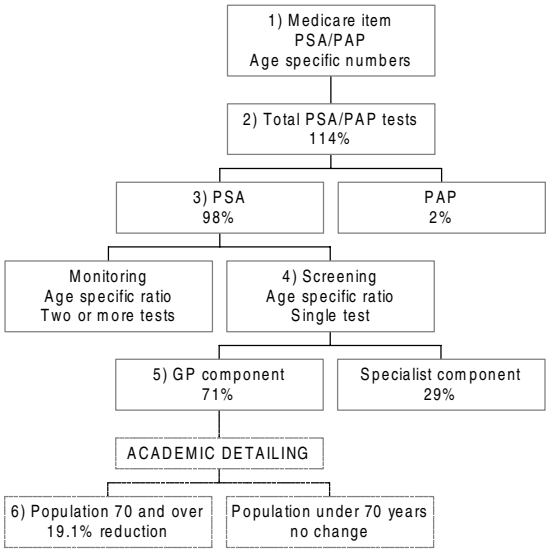
The evidence of efficacy of the academic detailing was based on an Australian pilot randomised controlled trial,[10] which is briefly described in Figure 1. The raw data from the pilot were made available to the authors of this paper. While the intervention was directed at all age groups, the advice was different across three main age groups: under 50 years; 50 to 69 years; and 70 years and over. Aggregation of the results for the full 12 months showed a 19.1% decrease in PSA testing for men 70 years and over in the GP clinics that were visited by an academic detailer as compared with the control clinics. There was no change for the other age groups.

Estimation of the number of PSA screening tests

The status quo number of PSA screening tests requested nationally per annum by GPs is not directly known. Prostate specific antigen and prostatic acid phosphatase (PSA/PAP) tests at the time of the controlled trial were recorded under the same Medicare number. Tests were not identified as screening or monitoring tests, or as GP- or specialist-requested tests or how they differed across age groups. However, they can be estimated by combining information from previous Australian studies.[4,12] Figure 2 demonstrates the rationale for the estimation of the number of GP-requested PSA screening tests in the current situation, and for the change in the number of PSA tests.

As the number of PSA tests has been shown to be highly correlated with the number of new cases of prostate cancer diagnosed,[4] we assume that the incidence of prostate cancer would decrease proportionally to the decrease in PSA screening tests. Therefore, in this case as the number of tests in men 70 years and older requested by GPs decreased by 19.1% then incidence in this group would decrease by 19.1%. However, some (29%) are tested by specialists so the total reduction in the over 70s would be 13% and in the population, 8%.

Figure 2: Flow chart demonstrating rationale for estimating number of PSA tests with and without the intervention.



1. *The average annual number of prostate-specific antigen and prostatic acid phosphatase tests (PSA/PAP) tests for 1995 and 1996 reimbursed by Medicare by age group are outlined in Table 3.*[4]
2. *The Medicare data underestimates the total test numbers by 14%.*[4]
3. *About 2% of the Medicare tests under this schedule number are PAP, not PSA.*[4]
4. *The proportion of Australian males having only one test in the two-year study period as compared with two or more tests is a measure of the proportion of the screening tests for that age group.*[4]
5. *The proportion of the screening tests that are ordered by general practitioners and not specialists is 71%.*[12]
6. *The screening tests averted in each age group was calculated from data supplied by the authors of the pilot study*[10] *i.e. 19.1% in those 70 and older and no change in other age groups.*

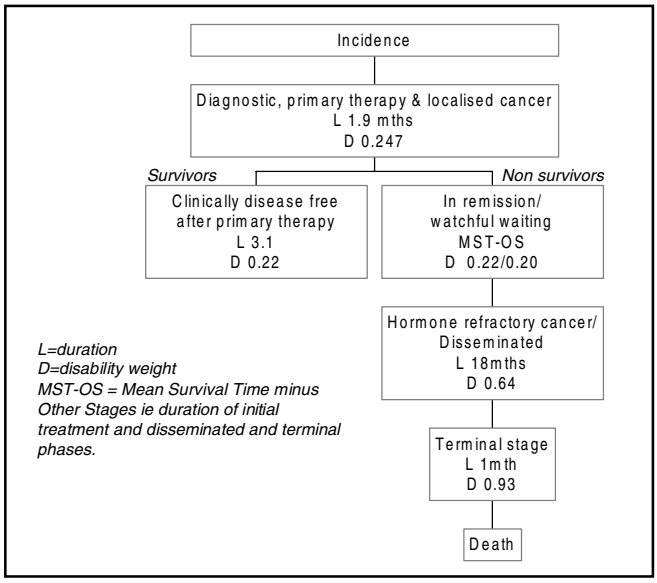
Health benefits

The health benefit is estimated in disability adjusted life years (DALYs), which combines measures of mortality, years of life lost (YLLs) and morbidity, years lived with disability (YLDs). The estimated change in DALYs (DALYs avoided), in the presence of the hypothetical national program, equals the sum of the estimated change in the YLLs and the YLDs associated with prostate cancer. The burden of disease (BOD) methodology[2,19,20] has been adapted for economic studies of this type.[8,9] Consistent with previous BOD studies, all future health benefits and costs were discounted at 3% to indicate a time preference for delaying costs and having health benefits now rather than in the future.

As the efficacy of screening using PSA in reducing mortality from prostate cancer is still controversial, two scenarios are modelled and compared with the status quo:

- Scenario one, the most likely scenario according to current evidence, assumes the test is ineffective in those aged over 70 years. Therefore, a reduction in screening PSA tests would result in a decrease in incidence of observed prostate cancer with no change in the number of deaths.
- Scenario two, highly unlikely but presents the worst possible

Figure 3: Disease model for prostate cancer.



scenario, assumes the test is effective in those aged over 70 years. Therefore a reduction in screening PSA tests would result in a decrease in incidence of observed prostate cancer and an increase in the number of deaths. If we assume that the efficacy would be between FOBT for colorectal cancer and mammography for breast cancer then the mortality reduction (MR) due to screening would be about 20% (expert opinion). Then the change in mortality (MI), in this case an increase, would be dependent on the change in the amount of screening tests. For example, if 10% of the screening tests were averted then the mortality would increase by 10% of 20% or 2%.

The YLDs estimations

Figure 3 shows the disease model used with disability weights (D) and duration (L) associated with each phase for survivors and non-survivors.[2] The disability weights, originally from a Dutch disability weight study,[21] have been modified for use in the Australian context.[2,20] The major difference is an additional average disability weight of 0.02 (equivalent to an additional D of 0.2 in 10% of cases) is added to the *clinically disease free after primary therapy* and the *in remission* phases of the disease to account for the incontinence and impotence associated with the treatment for this condition. Similar to the BOD studies, YLDs are calculated as the product of incidence and average duration of the health state weighted for severity expressed in disability weights (D) as a proportion between 0 (full health) and 1 (worst possible health state).

National Cancer Statistics Clearing House data are used for cancer incidence, mortality, and age of onset for prostate cancer (ICD-9 codes 185), and for the derivation of mean five-year survival time for each age group and duration associated with each phase of the model for survivors and non-survivors.[2,22]

The YLLs estimations (used only in scenario two)

In our study the number of deaths and hence YLLs, in the status quo situation, are modelled from predicted mortality based on the five-year survival rate rather than use observed mortality. The same model is used to predict the mortality increase (or increase in non-survivors) for scenario two. The Australian 1996 Cohort Life Expectancy is used as a standard against which YLLs are calculated.[2]

Health service utilisation and costs

The major health service utilisation components that are expected to change with the introduction of the intervention are outlined in Table 1. The gross cost would be the cost associated with the academic detailing program itself. These are based on an annual cost of $550 for two visits to 90% of the estimated 25,000 GPs in Australia and an administration cost of $125,000.[18] (Service-oriented academic detailing programs as described in Figure 1 have regularly demonstrated 90% uptake and retention of Australian GPs.[23]) The net costs would include the gross cost plus the cost offsets resulting from a reduction in the number of screening tests (PSA) requested at $20/test[24] and the consequent follow-up visits to GPs at $20.85/visit[24] and a reduction in 'total health service costs minus the palliative and terminal care in hospital costs' (THS-costs).

A reduction in screening tests would result in a reduction in observed cancers and ultimately a reduction in THS-costs. These costs are assumed to reduce proportional to the estimated reduction in prostate cancer. Under scenario one, the numbers of deaths will not change and therefore the costs of palliation and terminal care in hospital (P&T costs) will remain constant. Under scenario two, while THS-costs will reduce at a similar rate as in scenario one, the P&T costs will increase in proportion to the predicted increase in deaths.

Sensitivity analysis

A multiway probabilistic sensitivity analysis is performed using @RISK software.[25] The input uncertainty distributions are based on a combination of the reported confidence intervals for that variable, the range of reported values in the literature and expert opinion on the range of likely values under Australian conditions (see Table 2). The output distributions reported are the 2.5th (lower limit) and 97.5th (upper limit) percentiles of the 2000 Monte Carlo simulations because of the skewed distribution. In addition, the @RISK software identifies major influential factors that have the greatest impact on the uncertainty of results by regression and

Table 2: Variables and distribution used in sensitivity analysis of academic detailing.

Variable	Primary analysis	Sensitivity analysis	Rationale for distribution
Scenario one and two			
Proportion of tests screening in over 70s	62-64%	Triangular distribution starting at 45%, peaking at 63% and finishing at 75%	Expert opinion
Test reduction	19.05%	Normal distribution (mean of 19.05% and SD 4.88%)	Based on pilot study results[10]
Cost of academic detailing	$12.5m	Uniform distribution from $8m to $12.5m	Expert opinion
Costs	1[a]	Uniform distribution of plus or minus 10% of estimated costs	Consistent with other cost studies
Scenario two only			
Mortality increase	0%, 2%	Uniform distribution from 0 to 2%	Expert opinion

Note:
(a) The '1' indicates the multiplication factor for all costs. In the primary analysis the costs are multiplied by one to designate no change from the original value. In the sensitivity analysis the costs are assumed to have a possible variation of +/- 10% and therefore the multiplication factor equals +/- 1.01.

Table 3: Estimation of PSA test numbers, observed cancers and reduction due to intervention.

	Age	Average annual no. of tests (Medicare data)[b]	Estimate of screening tests[b]	GP component[b]	Observed cancers[c]
Status quo	0-49	55,191	55,385	39,102	102
	50-69	218,244	177,376	125,227	4,342
	70+	81,329	56,794	40,097	5,611
Academic detailing[a]	70+	73,691	49,156	32,459	4,856
Expected change	70+	-7,638	-7,638	-7,638	-755

Notes:
(a) Academic detailing provided across all age groups however benefit as measured by reduction in testing was observed in those over 70 years of age.
(b) Refer to Figure 1 for explanation of rationale for estimations.
(c) Based on ratio of tests per cancer detected which is age specific.

correlation of inputs and outputs for each of the iterations of the simulation.

Results

Estimation of PSA tests in GP sector at present and with academic detailing

Table 3 provides a summary, in the three age groups, of the PSA test numbers, the estimated number of screening tests and those requested by GPs. An estimated 40,000 PSA screening tests were requested by GPs in 1996 in those aged 70 years and older. Based on data from the pilot study, a 19% reduction, or 7,600 fewer requests by GPs, would be expected with the introduction of the proposed program. Using the current rate of screening test per cancer ratio, the change in incident cancers can be predicted. An estimated 760 (13%) fewer cancers would be identified in those over 70 years of age, equating to an 8% reduction in observed prostate cancers over the total population.

Health resource utilisation, costs and consequences

The predicted health service utilisation and unit costs for status quo, scenario one and scenario two are outlined in Table 4. Based on these estimates, the health benefits, costs and ICER of the proposed intervention were modelled and are summarised in Table 5. The results are expressed as cost (Australian dollars) per YLL avoided, as well as cost per DALY avoided, to enable comparison with published cost-effectiveness studies.

Under scenario one, the health benefit modelled assumes fewer cancers would be observed but the same number of deaths would occur. Therefore, fewer people would undergo the cascade of events for the survivors as outlined in the disease model in Figure 3 (diagnostic procedures, be treated and live with complications and anxiety for five years) before being declared free from prostate cancer. Our model predicts a health gain of 770 YLDs and 0 YLL: a total of 770 DALYs avoided (95% uncertainty interval 380-1200 DALYs).

Under scenario two assumptions, in addition to the health gain estimated in scenario one, there would be a health loss of an increase in deaths due to prostate cancer. Our model predicts an additional 44 deaths (210 YLLs) and a gain of 720 YLDs: a total health gain of 510 DALYs avoided (95% uncertainty interval 230-1100 DALYs).

Health service utilisation and costs

The proposed national program is expected to cost $12.5 million gross. The cost offsets include reductions in PSA screening tests ($150,000), GP follow-up of cancers ($16,000), and treatment of cancers ($5.7 million under scenario one or $5.3 million under scenario two), resulting in net costs of $6.6 million under scenario

Table 4: Health service utilisation and unit costs.

Components evaluated	Status quo	Scenario 1	Scenario 2	Unit	Unit cost $[a]
Academic detailing program (program)	0	1	1	Program	$12.5m[b]
PSA tests used for screening in the GP sector	40,097	32,459	32,459	Test	$20[24]
GP visit follow-up	10,055	9,300	9,300	Visit	$20.85[24]
Total health care costs[c] minus palliation and terminal care per cancer	10,055	9,300	9,300	Cancer observed	$7,628
Palliation and terminal care[d] per prostate cancer death	2,644	2,644	2,688	Predicted death	$11,082

Notes:
(a) All cost are presented in real prices for the 1996 reference year with future costs discounted to present value at 3% per annum.
(b) This is based on an average cost of $275 per visit, two visits a year to each of the 90% of the estimated 25,000 GPs in Australia and an administration cost of $125,000.[18]
(c) The total health system costs for prostate cancer in 1993/94 are $101 million[3] and are inflated by a factor of 1.049 to 1996 values to $106m.[26] Of total health system costs, 72.3% are non palliative and terminal care in hospital costs.
(d) 27.7% will be palliation and terminal care.[13]

one or $7.1 million under scenario two. Sensitivity analysis for scenario one shows this may be as low as $8.1 million (gross) or $0.48 million (net) or as high as $12.4 million (gross) or $8.2 million (net). In scenario two, this may be as low as $8.1 million (gross) or $0.75 million (net) or as high as $12.4 million (gross) or $8.6 million (net).

Incremental Cost Effectiveness Ratio (ICER=ΔC/ΔE)

Under scenario one, the ICER is $16,000/DALY (95% UI 8,200-27,000) and over 98% of the simulation values are below $30,000. The net ICER is $8,500/DALY (95% UI 450-19,000). Under scenario two, the intervention is less cost effective with the gross ICER estimated as $24,000/DALY (95%UI 8,900-45,000) and net ICER as $14,000/DALY (95% UI 590-33,000). Over 98% of the simulation values for gross ICER are under $50,000. The major influential factors in the estimation of the ICER are the efficacy of the academic detailing (i.e. the reduction in PSA screening tests by GPs) and, to a lesser extent, the cost of the academic detailing.

Discussion

Our first and most likely scenario assumes that there is no mortality benefit from screening those aged over 70 years, but there is consequent morbidity. This is consistent with the detailed reviews which state that the benefits of screening are unknown, but the detrimental effects of subsequent diagnosis and treatment are well documented.[14] We estimate a benefit of 770 DALYs avoided would result from a reduction in the cascade of events that arises from a decision to test for PSA: 755 fewer men being labelled as having prostate cancer, 755 fewer will undergo diagnostic and treatment procedures and suffer from the resulting side effects, particularly incontinence and impotence. Our second scenario recognises that the RCTs are still in progress and the mortality reduction of the screening program could be similar to that for breast and colorectal cancer screening, i.e. 20%. In this case the model still predicts a net health gain of 510 DALYs avoided from a reduction in PSA testing, made up of 720 YLDs plus a loss of 210 YLLs (increased mortality).

This study is noteworthy in its use of the DALY as an outcome measure. The use of DALYs in evaluation studies, as opposed to burden of disease descriptions, is in its infancy. The DALY, by combining mortality and morbidity in a single measure, has the potential to enable comparisons across a range of interventions. In this study the health gain from the intervention would not have been captured if we had used YLLs only, which are reported to be a standard and more reliably measured health benefit.[11]

Our use of the same methodology applied to the same population using 1996 as the reference year facilitates comparison with other cancer interventions evaluated in a larger priority-setting study.[8,9] The cost of the proposed national program ($12.5 million) is half the estimated costs of funding psychologists to provide psychosocial care to patients with the major cancers ($25.7 million) and one-fifth that of providing the FOBT screening of those aged 55 to 74 years of age for colorectal cancer ($65.6 million).[8,9] While the costs are lower the benefits, from the

Table 5: Summary of point estimates,[a] and sensitivity analysis[b] on the costs and consequences of a proposed national education program.

	Scenario one			Scenario two		
	Point estimate	Lower 95% uncertainty interval	Upper 95% uncertainty interval	Point estimate	Lower 95% uncertainty interval	Upper 95% uncertainty interval
Health benefit						
Incidence reduction[c]	8%	4%	11%	8%	4%	11%
Deaths	0	(0)	(0)	(44)[e]	(42)	(1)
YLLs	0	(0)	(0)	(210)[e]	(200)	(5)
YLDs	770	380	1200	720	360	1100
DALYs	770	380	1200	515	230	1100
Costs						
Gross costs ($m)	12.5	8.1	12.4	12.5	8.1	12.4
Net cost ($m)	6.6	0.48	8.2	7.1	0.75	8.6
Cost effectiveness						
Gross cost/YLL ($)	N/A[d]	N/A	N/A	(61,000)	(2,100,000)	(46,000)
Net cost/YLL ($)	N/A[d]	N/A	N/A	(34,000)	(960,000)	(6,500)
Gross cost/DALY ($)	16,000	8,200	27,000	24,000	8,900	45,000
Net cost/DALY ($)	8,500	450	19,000	14,000	590	33,000

Notes:
(a) Point estimate is derived from a single value input based on highest level of evidence
(b) Sensitivity analysis results are from monte carlo simulation which takes into account the uncertainty around each of the input variables.
(c) Incidence reduction is calculated for the total population not just those aged 70 years and over.
(d) N/A these results are divided by zero in the no mortality change option and produce a nonsense value for costs/YLL so are not applicable.
(e) This value represents the extreme value of 2% and therefore is outside the lower 95% uncertainty interval.
() represent negative values ie an increase in deaths and cost per health benefit lost.

viewpoint adopted in this analysis (which is that of the funding authority), are also lower. However, the gross ICER of $16,000/DALY is similar to that estimated for the colorectal cancer screening program ($17,000/DALY),[27] which is being piloted with a view to the establishment of a national program.

The implementation of an evidence-based policy is often dependent on other factors in addition to the cost effectiveness of the program.[28] These factors are the broader dimensions of benefit that act as a second-stage filter when making resource choices. These factors include consideration of the public health significance, equity implications, level of evidence of efficacy and effectiveness, acceptability to stakeholders and feasibility of implementation.[8,9]

Sensitivity analysis showed that the cost-effectiveness analysis was sensitive to changes in the efficacy of the academic detailing, the efficacy of PSA testing and the cost of the academic detailing. Academic detailing has been shown to be generally efficacious in modifying prescribing patterns.[17,29] Interest is now extending to its use in other areas of medical practice, with mixed results being reported.[30-32] Improving use of the PSA test was chosen specifically because of the perceived difficulty in changing practice.

Major acceptability concerns include medicolegal issues faced by GPs in their handling of patient anxieties related to prostate cancer: vulnerability to litigation is feared when the high prevalence of the condition in older men is considered. Among Australian GPs there is some suspicion that current official recommendations against use of the PSA test for screening purposes are at least partially based on monetary as well as clinical considerations. The acceptability to GPs of the broad application of academic detailing services across Australia through agencies such as the National Prescribing Service has now been demonstrated. However, some uncertainty remains about the acceptability of this kind of initiative to other groups having an interest in improving management of prostate cancer in the community.

The efficacy of screening for prostate cancer using the PSA test is still under debate. The randomised controlled trials, under way in Europe[33,34] and North America,[35] will not provide results for some time. While there has been a decline in prostate cancer mortality that coincides with the test's availability in some countries, it is thought to be associated with changes in disease management and in hormonal treatment of advanced disease.[36,37] Two recent ecological studies have shown that areas with aggressive screening using PSA are not associated with lower cancer-specific mortality.[38,39]

If the trials ultimately demonstrate that PSA screening is ineffective for those aged 50 to 70 years old, then the intervention would prove to be even more cost effective. Table 3 shows that more than 60% of all PSA testing in the GP sector is within this age group. Reductions in testing would not only reduce morbidity associated with the follow-up of a positive PSA test in asymptomatic men, but also save costs from PSA tests averted. In addition, in the presence of a stronger evidence base, the efficacy of the academic detailing will be higher across all age groups. Academic detailing enables an informed decision, which is a valuable outcome irrespective of the value of the screening itself; this is also being evaluated. Of course, if the evidence on PSA testing changes substantially, which may not happen until the randomised trials produce mortality results, the content and consequently the effects of any educational program would change. An ongoing system of academic detailing will involve constant updating with new scientific evidence.

A program of academic detailing could be introduced nationally. In the 1997 overview of academic detailing for the Commonwealth, it was recommended that there be a phased introduction of a national academic detailing service with a small number of units established (perhaps one in each State).[18] Addition of other health messages such as screening for colorectal cancer or reduction of over-screening for cervical cancer within the academic detailing framework provides the potential for costs to be shared across a number of programs and further enhance the cost-effectiveness ratio. The current trial of academic detailing funded by the Commonwealth Department of Health and Ageing will provide not only a stronger level of evidence on its efficacy but also the cost effectiveness of including additional messages.[40]

This study is also noteworthy because it models a full economic analysis based on the efficacy of outreach visits in the Australian context. Two Cochrane Database Systematic Reviews on the effects on professional practice and health care outcomes have supported the value of outreach visits, but have emphasised the lack of full economic analyses.[17,41] Studies reported in these reviews are mainly costing studies that report the cost of the intervention per physician and/or compare the cost with another form of intervention. The primary outcomes in these studies were changes in physician practice rather than the measurement of health outcome. We have used modelling techniques to extrapolate from the change in practice to estimate the health benefit and hence demonstrate the cost effectiveness of outreach visits.

The modelled health gain from reduced testing is probably an underestimate. We have not included the benefits associated with 7,600 fewer tests being done on men aged over 70. The anxiety associated with waiting for the PSA test results and, if the PSA is elevated, undergoing and waiting for diagnostic test results was not included but, considering the number involved, would not be negligible.

A limitation of studies of this type is that the same average value (the disability weight) for each health state is used pre- and post-intervention. This assumes that the disability weight for each health state is homogeneous across the target population. However, this may not be true. Individuals vary in their preferences. The willingness to trade-off an intact sexual function for long-term survival has been shown to vary considerably among men in the normal population.[42] While many have some degree of sexual, urinary and bowel dysfunction, the degree of bother patients experience does not always correlate with the objective symptoms that are present,[43] reflecting their markedly different preferences for treatment outcomes.[44] Therefore, as stated by the Scandinavian

Prostatic Cancer Group, "These alternatives are associated with complex and incommensurable outcomes, and each man must judge for himself which treatment is preferable".[45] The challenge for evaluators in the future is to incorporate some measures of informed choice into health utility measures so they can better capture the effects of improved decision making that would result from such a proposed national education program.

Conclusion

The findings of this study, with an overall health benefit at moderate cost and acceptable cost-effectiveness ratio, support the case for consideration of a national education program for general practitioners using academic detailing, on the assumption that prostate cancer screening at over age 70 does not reduce mortality. This program would target all age groups. While the health benefit modelled is only for those 70 years and over, we recognise there would be benefits from an informed choice in the largest age group (50 to 69 year olds) being tested. The pilot studies being conducted in three Australian States should provide a higher level of evidence of the potential for improved decision making relating to the use of PSA testing for screening purposes to assist decisions on implementing a full national program.

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