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S Jones
University of Wollongong, sandraj@uow.edu.au

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Abstract
Cancer is a leading cause of death in developed countries; 27 per cent of all Australian deaths are due to cancer, with 35,000 people dying annually. Prostate cancer is the most common type of cancer amongst men in most Western countries. Breast cancer is the most common cancer in women aged over 30 years, and causes the highest proportion of cancer deaths in women. At present in Australia there is a debate about the public health value of screening for prostate cancer. This paper examines the issues that must be weighed up in reaching a conclusion to this debate, by comparing the issues in prostate cancer screening to those of screening for breast cancer in women. Unlike breast cancer, there is no clear consensus among experts as to whether prostate cancer screening should be provided on a population basis. Many of these experts have developed recommendations which state, in part, that all the information should be presented to the patient by the physician and that the patient should make the final decision. However, if the experts cannot decide, this leaves the layman in a rather difficult position in making an informed decision. At present, there is insufficient evidence to conclusively determine the value of prostate cancer screening on population basis. Health promotion practitioners are often responsible for educating and advising men as to the necessity for cancer screening. We need to be aware that, at this point in time, there is insufficient evidence to justify prostate cancer screening. Until further research has been undertaken to better understand the natural history of prostate cancer, improved diagnostic procedures have been developed, risk and protective factors have been determined, and treatment for prostate cancer conclusively shown to extend life-expectancy, we should be not be advising men to undergo prostate cancer screening, with the possible exception of individuals who are at a high-risk of developing the disease. Some experts describe screening for prostate cancer, while waiting for (trial) results, as rational, appropriate, economical, and ethical, while other authorities describe screening without better evidence of effectiveness as unconscionable, costly, self-serving, and unethical.

Keywords
comparison, factors, breast, consideration, screening, cancer, prostate

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SCREENING FOR PROSTATE CANCER: A CONSIDERATION OF SCREENING FACTORS IN COMPARISON TO SCREENING FOR BREAST CANCER

S Jones

Research Fellow
Centre for Behavioural Research in Cancer Control
Division of Health Sciences
Curtin University of Technology
Perth, WA

Abstract

Cancer is a leading cause of death in developed countries; 27 per cent of all Australian deaths are due to cancer, with 35,000 people dying annually. Prostate cancer is the most common type of cancer amongst men in most Western countries. Breast cancer is the most common cancer in women aged over 30 years, and causes the highest proportion of cancer deaths in women.

At present in Australia there is a debate about the public health value of screening for prostate cancer. This paper examines the issues that must be weighed up in reaching a conclusion to this debate, by comparing the issues in prostate cancer screening to those of screening for breast cancer in women. Unlike breast cancer, there is no clear consensus among experts as to whether prostate cancer screening should be provided on a population basis. Many of these experts have developed recommendations which state, in part, that all the information should be presented to the patient by the physician and that the patient should make the final decision. However, if the experts cannot decide, this leaves the layman in a rather difficult position in making an "informed" decision.

At present, there is insufficient evidence to conclusively determine the value of prostate cancer screening on population basis. Health promotion practitioners are often responsible for educating and advising men as to the necessity for cancer screening. We need to be aware that, at this point in time, there is insufficient evidence to justify prostate cancer screening. Until further research has been undertaken to better understand the natural history of prostate cancer, improved diagnostic procedures have been developed, risk and protective factors have been determined, and treatment for prostate cancer conclusively shown to extend life-expectancy, we should be not be advising men to undergo prostate cancer screening, with the possible exception of individuals who are at a high-risk of developing the disease.

"Some experts describe screening for prostate cancer, while waiting for (trial) results, as 'rational', 'appropriate', 'economical', and 'ethical', while other authorities describe screening without better evidence of effectiveness as 'unconscionable', 'costly', 'self-serving', and 'unethical'."[1]

Primary prevention – The case for (and against) screening for cancer

There are several generally accepted prerequisites for a screening program[2]. These prerequisites fall into two categories – aspects of the disease and aspects of the test.

Characteristics of the disease:

- the disease should have serious consequences for the total population (ie should cause mortality or severe morbidity, and should affect members of the target population);
- the disease should have a recognisable, detectable, pre-clinical phase (DPCP) which is reasonably prevalent amongst the target population; and
- there should be available a treatment which is more effective if commenced during the screen-detected stage rather than after the appearance of symptoms. For example, both breast cancer and cervical cancer have considerably higher survival rates if detected and treated prior to the appearance of symptoms.

Characteristics of the test:

- suitable for detecting the disease and acceptable to the target population;
- high sensitivity (ie a high proportion of tested persons who have the DPCP should test positive), high specificity (ie a high proportion of tested persons who do not have the DPCP should test negative), and high positive predictive value (ie high probability of cancer when the test is positive);
- the costs of applying the test on a population basis should be economically viable; and
- the test should not itself cause morbidity or mortality.

Gender-specific cancers – breast and prostate

Cancer is a leading cause of death in developed countries. In Australia cancer kills more people than heart disease, cerebrovascular disease, or respiratory disease. Twenty-seven percent of all Australian deaths are due to cancer, with 35,000 people dying annually.

Prostate cancer and prostate cancer screening

Prostate cancer is the most common type of cancer amongst men in most Western countries. Prostate cancer begins in the prostate gland, but may spread to nearby lymph glands, bones, bladder, rectal, and other areas. Generally, early prostate cancer does not cause detectable symptoms; however, the symptoms (such as frequent urination, painful urination and painful ejaculation), when they do occur, are very similar to the symptoms of benign prostatic hyperplasia. Prostate cancer incidence is strongly associated with age, increasingly considerably after the age of 50 years.

As with breast cancer, there are two main methods of screening for prostate cancer. The traditional test, the digital rectal examination, consists of the doctor inserting a finger into the rectum and palpating the prostate gland. The "scientific" screening procedure is a blood test to determine the level of prostate-specific antigen in a blood strain; the level of PSA may rise in men with prostate cancer, benign prostatic hyperplasia, or some other infections.

Photograph courtesy of Curtin University of Technology Perth WA

Breast cancer and breast cancer screening

Breast cancer is the most common cancer in women aged over 30 years**(1)**, and also causes the highest proportion of cancer deaths. Age is the single biggest risk factor for breast cancer[3]. It has long been known that, if detected and treated early enough, breast cancer sufferers have a high survival rate; and that screening and early treatment are effective tools in increasing breast cancer survival rates.

Screening for breast cancer consists of two separate, and quite different, strategies. The first, and most comprehensively investigated, method of screening for breast cancer is by mammography. The second method of screening for breast cancer is clinical breast examination. For the purposes of this paper, clinical breast examination can be likened to DRE, and mammography to prostate-specific antigen screening.

Characteristics of the disease:

- The disease should have serious consequences for the total population (ie should cause mortality or severe morbidity, and should affect members of the total population)

Prostate cancer

Prostate cancer is the most common cancer diagnosed in men in Australia, as in most Western countries, and both incidence and mortality are rising[4]. In the United States, for example, it is estimated that 40,000 men died from prostate cancer in 1995. In the US as in Australia, prostate cancer is now the most commonly diagnosed cancer among menv.

Breast cancer

Breast cancer is the most common cancer in women aged over 30 years. Over the last seven years, incidence rates have increased in Australia, due to an aging population and increases in mammographic screening, whilst mortality rates have been declining at around 3% per year[6]. Age is the single biggest risk factor for breast cancer[4], with incidence rates increasing progressively from the age of 30[6].

Comparison between prostate cancer and breast cancer

In 1996, 9,621 new cases of breast cancer were diagnosed in Australia, and 2,619 women died from the disease, equating to 30,955 person years of life lost (PYLL). In the same year, 10,055 new cases of prostate cancer were diagnosed in Australia, and 2,644 men died from the disease, equating to 6,228 person years of life lost (PYLL).[6]

- The disease should have a recognisable, detectable, pre-clinical phase which is reasonably prevalent amongst the target population

Prostate cancer

Prostate cancer does have a recognisable, detectable, preclinical phase that is prevalent in the population; in fact, some studies show that prevalence of histologic evidence of prostate cancer is as high as 42% at age 50-59, 58% at age 60-69, 66% at age 70-79, and 100% at age 80 and older[7]. However, screening cannot at this time differentiate between aggressive (and thus life-threatening) cancers and less aggressive ones (that will not lead to mortality or morbidity in the individual). Research shows that up to 30% of men over the age of 30 who are autopsied have detectable, if microscopic, prostate cancers. However, the risk of death from prostate cancer under the age of 75 is one in 70[8]. According to available statistics, the US Department of Health and Human Services estimates that millions of American men have prostate cancer, though less than 40,000 will die of the disease annually. This suggests that "only a subset of cancers in the population are clinically significant and that widespread screening is likely to detect a large proportion of cancers whose effect on future morbidity and mortality is uncertain"[9]. They further conclude that it is not yet known whether PSA will identify aggressive cancers at the stage where they are still potentially curable.

Breast cancer

Breast cancer also has a recognisable, detectable, preclinical phase, and studies show that "moderate" reductions in mortality between 20 – 30% can be expected.[9] Breast screening aims to detect small cancers, ideally less than 1cm. Small cancers are less likely than larger tumours to have metastasised and are generally regarded as constituting early-stage disease[10].

However, it is important to note that mammographic screening also detects ductal carcinoma in situ (DCIS). Currently in Australia, approximately 10-20% of breast cancers detected by mammographic screening are DCIS[11,14,13]. DCIS is a non-invasive variant of breast cancer which involves abnormal growth of the cells lining the ducts in the breast which, by definition, has not spread beyond the ducts[12,13,14]. The natural history of DCIS and its link with invasive breast cancer is not well understoodxv. As with prostate cancer, "the most innocuous, low-grade looking forms of DCIS may never cause a clinical problem if left untreated"[13]. However, it has been estimated that 20-25% of DCIS lesions will progress to invasive breast cancer[13,15], and women with DCIS are more likely to develop breast cancer in the future. Invasive cancer recurrence rates are significantly reduced by treatment of the DCIS with mastectomy or conservative surgery with radiotherapy[15].

- There should be available a treatment which is more effective if commenced during the screen-detected stage rather than after the appearance of symptoms

Prostate cancer

There is considerable debate as to whether early detection of prostate cancer has any impact on survival. A large scale trial, commenced in 1992, is being undertaken by the National Cancer Institute (NCI) in the United States; 74,000 men will be randomly allocated to either annual screening for prostate cancer or no screening[16]. This is a long-term study, and conclusive results will not be available for several years[6].

In the meantime, some researchers believe that radical prostatectomy is an effective treatment for screen-detected prostate cancer[5]. A study at the University of Quebec reported: "137 deaths due to prostate cancer occurred in the 38,056 unscreened men, while only five deaths were observed among

(1) Whilst it is acknowledged that men can, and do, develop breast cancer, the incidence in males is extremely low; thus breast cancer is generally (and for the purposes of this paper) considered to be a female disease.

the 8,137 screened men ... or a 69% decrease in the deaths from prostate cancer in the group of men who were screened and received early treatment"[17]. Subsequently, the same author reported on five randomised studies of hormone therapy for screen-detected prostate cancer and concluded that "simple use of the available screening procedures and treatment for localised prostate cancer could cause a dramatic decrease in prostate cancer death"[18].

Other researchers, however, question the efficacy of prostate screening. For example, CCIHF state that "there is no information yet available that can tell us whether screening for prostate cancer makes any difference whatsoever to how long the patient will live after his prostate cancer is discovered"[19]. Gohagan criticised the 1998 Labrie study outlined above, as follows: "Of the entire group of men in Labrie's study, 31,000 were invited to come in for PSA screening, but only 7,100 showed up. Instead of sticking to the "randomisation" part of the process, anyone who didn't show up was put into the "unscreened" pile. And during the first round of screening, men whose test indicated that they already had cancer were also dumped into the unscreened category... Counting men that way skewed the data, making the unscreened group look like cancer magnets"[20].

Despite the earlier quoted figure that as many as 30% of men in their thirties have prostate cancer, the risk of death from the disease under the age of 75 is one in 70[10]. Additionally, autopsies of older men show that up to one-third have undiagnosed prostate cancer (which was not the cause of death) and two-thirds of men who have been diagnosed with prostate cancer will die from other causes[21]. In Chapman's words "there are many men walking about today with the 'sleeping dog' of prostate cancer. For many, this dog will never wake up and deliver a serious or lethal bite"[19].

The US Department of Health and Human Services[9] cautions that, as the extent of lead-time and length biases are currently unknown, and as it is difficult to differentiate between aggressive and indolent prostate cancers, it is not possible to determine whether many patients who have undergone radical prostatectomy would have survived just as long without treatment.

The debate is perhaps best summed up in the following two quotes (from the prostate cancer website – http://www.prostatepointers.org/ww/toscreen.htm):

"Since Prostate Cancer Awareness Week began in 1989, more than 3 million men have been screened. In numerous cases, screening save lives by detecting the disease in its earliest, most critical stages" (Prostate Cancer Education Council).

"It does not seem appropriate that we simply screen men or launch free screening programs, with the implied promise of benefit. This would deviate from the Hippocratic principle of 'first do no harm'." (National Cancer Institute)

The greatest "harm" comes not from the screening test itself, but from the diagnostic and treatment procedures which follow a positive diagnosis. Some of the possible consequences of these procedures include[9]:

- needle biopsy – the confirmatory diagnostic procedure – is relatively safe, although it results in infection, septicemia, and/or significant bleeding in a small percentage of patients (note that this is a similar procedure to the confirmatory diagnostic needle biopsy used to (dis)confirm suspected breast cancers detected by mammography);
- radiation therapy has been estimated to have a risk of death between 0.2-0.5%, gastrointestinal and genitourinary complications in 8-43% of patients, chronic complications in 2 %, impotence in 40-67%, urethral stricture in 3-8%, and incontinence in 1-2%[9];
- hormone therapy – to reduce, or eliminate, the production of male hormones – has side-effects which can include decrease in sexual desire, impotence, hot flushes, nausea, vomiting, tenderness and swelling[22]; and
- radical prostatectomy – the surgical treatment for prostate cancer – has significant side-effects. Estimates of operative mortality range from 0.7-2%, of impotence from 20-85%, incontinence from 2-27%, urethral stricture from 10-18%, thromboembolism 10%, and permanent rectal injuries 3%. In practical terms, some of these effects include 30% of post-operative men wearing pads to control wetting, 6 % undergoing corrective surgery for incontinence, 2% requiring a catheter, 60% reporting partial erections, 15% requiring treatment for sexual dysfunction, and 20% requiring dilatations or surgical procedure for strictures[9].

Breast cancer

The value of mammographic screening in reducing breast cancer mortality and morbidity has been investigated and proven over many years. Population-based screening was introduced in many countries, including Australia, as a result of many long-term studies which demonstrated that many breast cancers detected in the preclinical phase could be successfully treated[23]. It is generally accepted that mammographic screening on a population basis results in a reduction in breast cancer mortality of around 30% [21,24].

The one caveat to this benefit is that it is age-related, with the greatest benefits for women aged over 50 years[4, 11]. There is some benefit in screening women under 50; however, due to the increased number of false positives it is not (as) cost effective and there is considerable psychological impact.

Breast self-examination, on the other hand, can clearly only detect symptomatic cancers (although at an earlier stage than they would otherwise be discovered), and has not been shown to reduce mortality[11].

As with prostate cancer, there are considerable side-effects of treatment for breast cancer. These include:

- surgery – scarring and disfigurement (although this is less so with new surgical techniques, particularly breast-conserving operations), need for further reconstructive surgery in the case of mastectomy, risk of infection, reduced sensitivity due to nerve damage, swelling of the arm (lymphoedema); and
- radiotherapy – general tiredness, some reddening or 'sunburning' of the skin, and the breast may change a little in size or shape or feel different in texture.
- However, it is important to note that, in the case of breast cancer, these negative effects are the result of a procedure which has been conclusively demonstrated to reduce mortality and increase life expectancy[25].

Comparison between prostate cancer screening and breast cancer screening

It is argued by many that prostate cancer is unlike breast cancer in that screening for the latter has long been demonstrated to reduce mortality and increase survival subsequent to the onset of the disease[17]. However, in relation to prostate cancer, it has been estimated that when quality-of-life adjustments are incorporated, "one-time screening of men aged 50-70 would increase life expectancy by 0-0.2 days and 0.6-1.6 days, respectively, but quality-adjusted life would be decreased by

1.8-7.1 days and 2.1-9.5 days, respectively, per patient screened"[26].

Further, it is posited "that using the PSA test for detecting prostate cancer in asymptomatic men is not analogous to mammography for early detection of breast cancer in asymptomatic women. Apart from the unproven benefit, there is a need for universally applied guidelines for the management of men with an abnormal test result, parallel to those built into the mammographic screening program" [27](p 9).

It is also suggested that, unlike breast cancer, the greatest benefits of screening are not for those in older age groups. The American College of Physicians[6] estimates that population screening of men over the age of 69 years will result in increased life expectancy of only a few days, and studies show that the 10-year survival rate for early-stage prostate cancer approaches 90%[9] (p 8). Thus, the recommendations of many expert bodies include not screening men over the age of 70.

Characteristics of the test:

- The test to be suitable for detecting the disease and acceptable to the target population

Prostate cancer screening

The traditional, and most well-known, method of screening for prostate cancer is by digital rectal examination. This test, whilst there is a lack of evidence from controlled studies to demonstrate its effectiveness in reducing cancer mortality, has few disbenefits[6]; it has no significant immediate risks, requires little time, and, as it is usually performed as part of a regular check-up, does not incur extra financial cost.

The newer and more "scientific" screening test is prostate specific antigen (PSA) testing. It is generally accepted that a level greater than 4.0ng/mL is clinically suspicious and worthy of follow-up[6]. However, there is considerable debate as to the use of age-specific PSA thresholds (see, for example, Oesterling, 1996). Anecdotal evidence suggests that, for many men, PSA may be a preferable screening test to DRE as it is a less physically and psychologically invasive procedure.

Breast cancer screening

Breast cancer screening is generally accepted by both the target population and the medical profession as a valuable preventive behaviour. A 1991 population survey[28] found that 78% of Australian women have conducted self-checks of their breasts, although only 23% conduct the recommended monthly self-examination. Similarly, the 1996 Breast Health Survey[29], a survey of 3,000 Australian women aged 30–69 years found that 93% of women reported doing BSE at least once, but only 37% of those surveyed reported practising BSE monthly. Mammographic screening rates in NSW have increased steadily since 1984, with an estimated 72% of women in their 50s and 67% in their 60s having had at least one mammogram[30]. Australia's population breast screening program – Breast Screen – commenced in 1991. Acceptance of the use of mammographic screening as a preventive tool for breast cancer is evidenced in target group surveys which show that women believe the benefits outweigh the risks[31]; high participation rates – approximately 70% of eligible Australian women**(2)**; and high rescreening levels[21]. Several studies have shown that breast cancer mortality could be further reduced by increasing compliance with screening recommendations[32,33].

- The test should have high sensitivity, specificity, and positive predictive value

Prostate cancer screening

In discussing the accuracy of prostate cancer screening tests, it is important to bear in mind the following caveat: "the sensitivity and specificity of screening tests for prostate cancer cannot be determined with certainty, however, because biopsies are generally not performed on patients with negative screening test results"[9]. Thus, the following discussion will rely on widely varying estimates of sensitivity, specificity, and positive predictive value.

Whilst the DRE may have high acceptance, it does not appear to have either high sensitivity or high specificity. The US Department of Health reports, from a review of numerous studies, that DRE has a sensitivity of 55-68 %, although it can be as low as 18-22% using different screening protocols; and limited specificity, which results in a high proportion of false-positive results[9]. The American College of Physicians estimates that the positive predictive value is in the region of 15-30% and concludes that the negative predictive value is considerably lower (ie a negative digital rectal examination does not substantially decrease the odds of a subsequent prostate cancer)[6]. The US Department of Health[9] reports that positive predictive value in asymptomatic men tends to be higher when the test is performed by urologists rather than physicians.

Again, there is considerable debate as to the effectiveness of prostate-specific antigen testing; with some investigators reporting the test to have high sensitivity and high specificity[5]. In fact, Gann, Hennekens & Stamorer go so far as to say, "PSA has the highest validity of any circulating cancer screening marker discovered thus far"[34]. Other researchers, however, report that, whilst PSA may have high sensitivity (over 80%), the specificity is much lower (as low as 29%), depending on the screening protocols[9]. The sensitivity of the test, as would appear intuitively logical, increases as the level of PSA increases; an approximate positive predictive value of 20% for levels between 4-10 increases to 42-64% for levels greater than 10 ng/mL[6]. Conversely, the specificity of PSA testing decreases with increasing age; this is due to the age-related development of benign prostatic hyperplasia[6]. It is estimated that 50% of US men aged between 60 and 70 have benign prostatic hyperplasia (BPH), and as many as 90% of those aged 80 to 90 have this condition[19]. Additionally, the American College of Physicians state that "no published studies of PSA measurement in unselected populations have applied an acceptable reference standard ... the true sensitivity and specificity of PSA measurement are unknown"[6]. As Burton[35] points out, serum PSA is the first proposed population screening test that has a continuous range; all other currently used tests (such as Pap smear, screening mammogram and faecal occult blood test) have dichotomous results – positive vs negative.

Two other methods for detecting prostate cancer, transrectal ultrasonography and transrectal needle biopsy, are not intended as screening tests.

Breast cancer screening

Mammography is able to detect breast cancer in seven out of 10 women in whom disease is present[36]. Around 93% of women without the disease can be excluded from further assessment following the initial screen. These data suggest that the test has reasonable sensitivity and specificity. It is the best available technique for the early detection of breast cancer[12]. Additionally, some indication of the sensitivity of mammographic screening can be found in studies of subsequent interval cancers. For example, a study of the incidence of interval breast cancers in the 12 months following mammographic screening concluded that "screening quality

(2) This figure is lower than that quoted in many other studies (eg Glasziou & Irwig, 1997), but it is noted that many of these studies are based on reported compliance.

was acceptable and should result in a significant mortality reduction in the screened population"[37].

- The costs of applying the test on population basis should be economically viable

Whilst, in an ideal world, economic factors would not be a part of decisions as to whether to screen for potentially fatal diseases, the reality of opportunity cost means that all potential interventions must be considered in the light of the ratio of benefits to costs: "resources are scarce, requiring choices to be made about what health care to provide and what not to provide"[38].

Prostate cancer screening

It has been estimated that, if every eligible man in the US decided to undergo annual prostate cancer screening it would cost several million dollars per year[16]. More specifically, Waldman & Osborne estimate that if all men between the ages of 50 and 70 in the US were screened for prostate cancer the cost would come to in excess of $15 billion (if suspect PSA level were set at 10 ng/mL) or $27.9 billion (if set at 4ng/mL), plus an additional $23.6 billion for confirmatory transrectal ultrasonography[39]. The benefits of screening are not proven, making the benefit:cost ratio for prostate cancer screening prohibitive. An economic evaluation of potential prostate cancer screening program in France concluded that mass screening should not be recommendedxl. The US Department of Health and Human Services concurs that, without significant improvements in diagnosis and treatment, a population screening program would not be cost-effective. Further, given a 10-year survival rate of 90% for early-stage prostatic cancer, they recommend against screening of men aged over 70 on both economic and quality of life grounds[7]. Similarly, the American College of Physicians[5] suggests that the highest comparative benefit from screening would be obtained for men aged 50 to 69 years, although they still recommend against population screening.

Breast cancer screening

The costs of breast cancer screening are also very high; however, these costs are weighed up against the reduction in costs (both financial and social) from detecting and treating a cancer which has been clearly demonstrated to be often curable in its early stages. It is important to note that, on currently available evidence, the public health and economic benefits are gained from population screening of women aged 50-69. The benefit of screening women aged 40-49 on a population basis is currently the subject of considerable debate[33].

- The test should not cause morbidity or mortality

Prostate cancer screening

Although there are no immediate risks from PSA testing, other than those usually incurred from any blood-test, it is posited that there are a number of subsequent risks which are not countered by demonstrable benefits. For example, many false-positive testees will then suffer the discomfort of a subsequent, unnecessary, needle biopsy. The greatest risk, however, is for those false positives who undergo radical treatment for presumed prostate cancer with its subsequent significant negative side-effects. This also applies to true positives whose prostate cancer would not have led to their death before they died of other causes. These negative effects are discussed above.

Breast cancer screening

A mammogram is a form of x-ray which uses a very low dose of radiation. The benefit of screening far outweighs the risk of any harm from the x-ray[41]. Possible disbenefits of screening include: fear and anxiety associated with screening and assessment; false reassurance for women with false negative results; for women with incurable breast cancers, they will spend a longer time with the knowledge that they have the disease; the possibility of unnecessary diagnostic tests and associated morbidity for women with false positive results; lesions which might otherwise have regressed may be detected through screening and treated unnecessarily; and there may be a small radiation risk associated with the test itself[12]. It should be noted that all of these, with the exception of the last (radiation), apply equally to prostate cancer screening. The side-effects of breast cancer treatment are also discussed above.

So what do the experts think?

Prostate cancer screening

As discussed above, there is considerable debate as to the value of population screening for prostate cancer. This debate, and the current balance of opinion against screening – at least until further evidence is available – is reflected in the division between the minority of expert bodies who recommend population screening for prostate cancer, and the majority (including The Cancer Council Australia, American Cancer Society, International Union Against Cancer and World Health Organisation) who recommend against it. The general consensus is that the potential benefits and known harms of screening, diagnosis, and treatment should be explained to the individual patient who would then make their own decision as to whether to undergo screening.

Breast cancer screening

There is no such division in relation to population breast cancer screening, with a consensus view that regular mammographic screening be provided to all women over the age of 50**(3)**.

Conclusions

At present, there is insufficient evidence to conclusively determine the value of prostate cancer screening on a population basis. There are many issues and questions which must be resolved. For example, the natural history of prostate cancer needs to be better understood, and diagnostic procedures refined, in order to differentiate between aggressive (and thus life-threatening) tumours and latent (and thus not life-threatening) tumours. Similarly, it remains to be determined conclusively if, and by how much, current treatment for prostate cancer extends life-expectancy of men with even aggressive forms of this disease. Any analysis of this issue would need to take into account the negative consequences of treatment and subsequent quality of life issues. Related to this, there is the need for specific guidelines for clinicians on PSA reference ranges and velocity (ie the changes in PSA over time), including decisive guidelines on the value and use of age-specific reference ranges[42].

So what should the layman do? Many of the "experts" quoted above have developed recommendations which state, in part, that all the information should be presented to the patient by the physician and that the patient should make the final decision in their own case. Whilst this may have the advantage of removing the burden of responsibility from the physician and/or the advisory body, it transfers this thorny problem to the patient. In the words of Wolfe & Wolfe: "when professional and government organisations cannot agree on the standard for screening for this prodigious disease, how can lay individuals be expected to decide when to be screened or tested?"[43].

It is important to bear in mind that the predominantly negative assessment of prostate cancer screening is based on current techniques (screening, diagnostic and treatment). Advances in any, or all, of these techniques in the future may well lead to a

(3) At the present time, however, there is an unresolved debate as to the value of screening younger women.

shift towards population screening. For example, the American Association for Cancer Research are working on a new approach to detection, based on the testing of urine to detect an early genetic change which occurs in 90% of prostate cancers[44]. □

References

1 M Collins, M Barry. "Controversies in prostate cancer screening" *Journal of the American Medical Association*, 25 December 1996.

2 Western Australian Centre for Public Health, *Foundations of Public Health, Guide*, 2000, 18-5.

3 C Paul, A Barratt, S Redman, J Cockburn, J Lowe. "Knowledge and perceptions about breast cancer incidence, fatality and risk among Australian women" *Australian and New Zealand Journal of Public Health,* 23(4) 1999, 396-400.

4 K Kaye. "Prostate Cancer: Enthusiasm for Screening", *Medical Journal of Australia*, 162, 1995, 540-541.

5 American College of Physicians, *Clinical Guidelines: Part III, Screening for Prostate Cancer*, 1997, http://www.acponline.org/journals/annals/15mar1997.

6 Australian Institute of Health and Welfare, *Australia's Health 2000*, Canberra: AIHW, 2000.

7 US Department of Health and Human Services, *Screening for Prostate Cancer*, 2000, http://my.web.com/content/dmk/dmk_article_ 3460985

8 J Rogers, Overview, Cancer Forum, 19(1), 1995, 6-12.

9 J Cuzick, Screening for Cancer: Future Potential, *European Journal of Cancer*, 35 (14), 1999, 1925-1932.

10 BreastScreen Victoria, *The case for mammography screening: Assisting women to participate in BreastScreen*, 2000.

11 Breastscreen WA, *Breastscreen WA Statistical Report 1996-1997*, Perth: Health Department of WA, 1999.

12 Ductal Carcinoma in Situ (DCIS), *Cancer Monitoring* No 1, November, 2000.

13 National Breast Cancer Centre, *Experience of Diagnosis, Information and Support Needs of Women Diagnosed with Ductal Carcinoma In Situ (DCIS)*, Canberra: National Breast Cancer Centre.

14 A Kricker, V Smoothy, B Armstrong, *Ductal Carcinoma in Situ in New South Wales Women*, Canberra: National Breast Cancer Centre, 2000.

15 D Ghersi, J Simes, *The Prognosis and Management of Women with Ductal Carcinoma in Situ of the Breast: A Review*, Canberra: National Breast Cancer Centre, 1998.

16 J Gohagan, P Prorok, B Kramer, R Hayes, J Cornett, "The Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial of the National Cancer Institute", *Cancer Supplement*, 75 (7), 1995, 1869-1873.

17 F Labrie. press briefing, 17 May 1998, sourced from http://www.prostatepointers.org/ww/toscreen.htm

18 F Labrie, "Screening and early hormone of treatment of prostate cancer is accumulating strong evidence and support", *Prostate*, 43 (3), 2000, 215-222.

19 CCIHF, *Prostate Cancer Screening and Early Detection,* http://www.comed.com/prostate/screening-early detection.html (as at 23/05/OO).

20 J Gohagan, *Is Prostate Test a Life-Saver? National Cancer Institute Calls New Study Flawed*, news release, 18 May 1998 sourced from http://www.prostatepointers.org/ww/toscreen.htm

21 S Chapman, "To Screen or Not to Screen", *MBF Living Well*, Winter, 1995 5-6.

22 National Cancer Institute, *What You Need to Know about Prostate Cancer*, http://cancernet.nci.nih.gov/wyntk_pubs/prostate.htm (as at 23/05/OO).

23 A Forrest, E Anderson, "Breast cancer screening and management", *Medical Journal of Australia*, 171, 1999, 479-484.

24 A Rodger, A Kavanagh, "Outcome measures of an Australian breast-screening program", *Medical Journal of Australia*, 169, 1998, 179-180.

25 Anti-Cancer Council of Victoria, *How is breast cancer diagnosed?*, 2000, http://www.accv.org.au/cancer/patients/fs_caninfo.htm

26 M Krahn, J Mahoney, M Eckman, J Trachtenberg, S Pauker, A Detsky, "Screening for prostate cancer: a decision analytical view" *Journal of the American Medical Association*, 272, 1994, 773-780.

27 M McCredie, B Cox, "Prostate-specific antigen testing for prostate cancer: The case for informed consent", *Medical Journal of Australia*, 169, 1998, 9-10.

28 D Hill, V White, R Borland, J Cockburn, "Cancer related beliefs and behaviours in Australia" *Australian Journal of Public Health*, 15(1), 1991, 14-23.

29 NBCC, *Report on the 1996 Breast Health Survey*, National Breast Cancer Council, 1997.

30 A Kricker, K Farac, D Smith, A Sweeney, M McCredie, B Armstrong, "Breast cancer in New South Wales in 1972-1995: tumour size and the impact of mammographic screening" *International Journal of Cancer*, 81, 1999, 877-880.

31 P Glasziou, L Irwig, "Mammographic screening in Australia", *Medical Journal of Australia*, 167, 1997, 516-517.

32 J Cockburn, S Pit, "Perceptions of screening mammography amongst women aged 40-49" *National Breast Cancer Centre*, 1998, http://www.nbcc.org.au/pages/ info/resource/nbccpubs/perc 4049.

33 NHMRC National Breast Cancer Centre, "Screening women aged 40-49 years: A summary of evidence for health professionals" *National Breast Cancer Centre*, 1998, http://www.nbcc.org.au/pages/ info/resource/nbccpubs/sum4049.

34 P Gann, C Hennekens, M Stamorer, "A prospective evaluation of plasma prostate-specific antigen or detection of prostate cancer, *Journal of the American Medical Association*, 273, 1995, 289-294.

35 R Burton, "Prostate cancer screening should not be introduced for all men over 50 years", *Cancer Forum*, 24(1), 2000, 5-6.

36 G Giles, H Farrugia, B Silver, M Staples, *Victorian Cancer Registry 1989 Statistical Report*, Anti-Cancer Council of Victoria, 1992.

37 M Rickard, R Taylor, M Fazli, N El Hassan, "Interval breast cancers in an Australian mammographic screening program" *Medical Journal of Australia*, 169, 1998, 184-187.

38 C Donaldson, "Using economics to assess the place of screening" *Journal of Medical Screening*, 1, 1994,124-129.

39 A Waldman, D Osborne, "Screening for prostate cancer" *Oncology Nursing Forum*, 21(9), 1994, 1512-1516.

40 K Perez-Niddam, F Thoral, S Charvet-Protat, "Economic evaluation of a prostate cancer screening program in France: A decision model" *Critical Reviews in Oncology/Hematology*, 32, 1999, 167-173.

41 BreastScreen Victoria, Is BreastScreen for you?, 2000.

42 J Oesterling, "Prostate-specific antigen: making an excellent tumour marker even better", *US TOO Prostate Cancer Communicator*, 1999, http://www.ustoo.com/articles/5a.html

43 E Wolfe, W Wolfe, "Discussion of the controversies associated with prostate cancer screening", *Journal of the Royal Society of Health*, June, 1997, 151-155.

44 S Stock, "Urine test detects prostate killer" *The Weekend Australian*, 8-9 April 2000, 7.