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An Internal Research
Project conducted by the
Cancer and Bowel
Research Trust.

Colorectal Cancer in Australia: the desperate need for education, prevention and early detection.

A Collation and Analysis of Cancer Data

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: Summary

Cancer currently costs the Australian community around \$2 billion per year in direct health system costs, 80% of these expenses are attributed to treatment costs. This report demonstrates that increased funding in the area of prevention will result in an overall reduction in the direct public cost of cancer in the long term, particularly for cancers where early detection results in simpler, faster and cheaper treatments. Looking at this trend with particular reference to colorectal cancer, the report outlines the need for an effective screening program in Australia with a corresponding public awareness campaign due to the low level of awareness currently demonstrated in the Australian public. It also looks at the huge benefits that can be produced through primary prevention and discusses this in relation to colorectal cancer prevention through diet modification, specifically fruit and vegetable consumption and exercise.

This report intends to outline the current status of bowel cancer in Australia; looking at bowel cancer from an incidence/mortality perspective, the relative knowledge within the Australian community, possibilities for screening programs and public awareness campaigns and their economic viability. A collaboration of research both in Australia and internationally, its aim is to provide a concise summary of the current situation in Australia, while looking, from a primarily economic perspective at the direction Australia should be going with bowel cancer. Hopefully the nature of the information presented will assist in the analysis of currently available knowledge; and assist in obtaining recognition for the requirement and economic value of increased funding in the area of cancer prevention, particularly colorectal cancer.

: Introduction

In 2003, The Cancer and Bowel Research Trust conducted a survey(1) which indicated that the awareness level of bowel cancer in Australia in no way coincided with its high incidence and mortality. There is currently a 1 in 17 lifetime risk for males of being diagnosed with colorectal cancer by the age of 75 years and a 1 in 26 risk for females. It is also second only to lung cancer as the most common cause of cancer death in Australia.(2) Results indicated that Australians are not well educated about cancer; as part of this survey people were asked to rank five cancer types (breast cancer, bowel cancer, prostate cancer, skin cancer (melanoma), and lung cancer) according to what they believed to be the incidence in Australia. Results indicated that people's knowledge in this area was very low. People tended to rank breast and skin cancers ahead of bowel cancer. In Australia both skin and breast cancers have received a large amount of public attention, directed through the introduction of large campaigns and screening programs. From this point of view, the trend is very positive, displaying that campaigns are getting through to the Australian public. Although the results also demonstrate that Australians are still not aware of their risks in relation to some cancers, notably prostate cancer and colorectal cancer.

The combination of cancers of the colon and rectum, often referred to as bowel or colorectal cancer (CRC), was the most common registrable cancer in 2000 with 12,405 new cases.(2) Colorectal cancer is one of the most curable cancers if detected early. Statistics for Australia show that we are not achieving early detection. In 1999 only about 15% of these cancers in South Australia were diagnosed at stage A.(3) Stage A is defined as where the cancer is confined to the bowel wall. The chance of survival from bowel cancers varies significantly according to when the cancer is diagnosed. Stage A detection allows for about a 90% five-year survival rate, while Stage D (once the cancer metastasises) allows for less than a 10% five-year survival rate.(4) In the majority of cases it takes between five to ten years for bowel cancer to develop from an identifiable precancerous phase (a polyp or adenoma). It is this 5-10 year window, which should be providing Australia with tremendous hope for bowel cancer mortality rates. It is this window that characterises bowel cancer as an ideal candidate for a screening program.

The Australia government is currently spending over \$200 million dollars each year on bowel cancer. This money is being spent primarily (83%) on the hospital costs of treating people with the cancer. Economically this is far from ideal. The cost of treating colorectal cancer in Australia increases dramatically with the stage of the cancer varying from \$1,250 for removal of non-cancerous polyps to over \$23,400 for treatment of later stage colorectal cancer.(5)

The evidence clearly suggests that the introduction of a screening program would save lives, alleviate suffering and reduce the burden of treatment costs. A population based screening program in Australia has been recommended by the National Cancer Control Initiative, the Australian Health Technology Advisory Committee and is supported in clinical guidelines endorsed by the National Health and Medical Research Council. Research has indicated that in the majority of cases colorectal cancer is seen in the "average" risk category. A national screening program would be designed to detect colorectal cancer as it develops from benign adenomatous polyps.

Removal of these precursor lesions is feasible and effective, as is surgery for early cancer. Clinical trials have provided strong evidence for the survival benefit achieved from a screening test known as faecal occult blood testing (FOBT). Flexible Sigmoidoscopy, double contrast barium enema and colonoscopy have also been considered as screening interventions.

It is accepted that there are some lifestyle changes that can dramatically reduce the risk of colorectal cancer. It has been predicted that around 70% of colorectal cancer could be prevented through an appropriate combination of diet and exercise. Primary prevention campaigns that promote good dietary and exercise practises in Australia may see a dramatic decrease in colorectal cancer as well as other cancer types and other lifestyle related disease. Australia has already demonstrated huge success with many public awareness campaigns, both the tobacco and SunSmart campaigns are witness to this. Analysis of a future campaign that promotes fruit and vegetable consumption has been found to be very profitable.

A direct result of this collaborative report is the development of a list of recommendations for the Cancer & Bowel Research Trust and Australia as a whole. With the current level of knowledge, there is no correct method for dealing with the prevention or early detection of colorectal cancer; it is clear, however, that doing nothing is not the best approach. Australia needs to educate its population about this cancer and allow people access to currently available screening methods.

: Cancer & Bowel Research Trust Phone Survey

A random sample of 3760 Australians from South Australia, Victoria and New South Wales were asked to rank the incidence levels of the five most common cancer types; Bowel cancer, breast cancer, prostate cancer, skin (melanoma) cancer and lung cancer. The results were clearly in contrast with the actual incidence levels that prevail in Australia.

Over half of those surveyed believed either breast or skin cancers to have the highest incidence, with 30.22% answering skin cancer as the highest and 27.19% ranking breast cancer as the highest. The lowest two cancer types selected were bowel cancer (14.47%) and prostate cancer (10.03%).

Point values were calculated using a weighted points system according to the ranking each type of cancer was given. On this scale, breast and skin cancers again came out with the highest rankings, whereas bowel cancer was considered to be the lowest overall. The survey responses indicate that very few people are aware that bowel cancer has the highest level of incidence in Australia (except for non-melanoma skin cancer). It appears that public knowledge of cancer incidence in general is very low.

During the same survey participants were asked which type of cancer they considered they knew most about. Overall, skin (25.71%) and breast (24.49%) cancer recorded the most responses; again indicating public awareness for these cancers is comparatively high. The lowest two responses were obtained for bowel (11.94%) and prostate (7.49%) cancers. Especially notable was the fact that only 5.04% claimed they knew most about bowel cancer in New South Wales. Another worrying result was that 17.21% of respondents claimed to have no knowledge of any of these cancers.

People who answered the previous part were then asked why they believed they knew most about the cancer type they had chosen. Over 50% of those who answered bowel or prostate cancer stated that they knew about it because they knew someone who has been affected. It can be said from this that very little knowledge of bowel or prostate cancer types resulted from publicly available information. Only 2.44% (lung cancer) and 1.45% (bowel cancer) knew a lot about these cancer types because they consider themselves potential contractors of the disease. This is surely in contrast to mortality rates in Australia, where lung and bowel cancers are the two biggest cancer killers. This again indicates a lack of community awareness.

When asked the area in which funds for cancer research should be distributed, research funding was favoured slightly (45.87%) compared with public education (22.13%). 32% said both should be treated as a priority. When asked the split of funding which should be applied in each area, the overall response was 64% to research and 36% to public awareness campaigns.

Television campaigns were viewed as the most popular way of delivering information (43.81%). Other popular ways to create public awareness were through the aid of doctors (26.17%) and via print media (17.65%).

The major finding from this survey was that there is little or no correlation between the incidence of a cancer and the level of knowledge the Australian Community has on that cancer. It is highly likely that the people surveyed based their knowledge of incidence on the amount they hear about that particular cancer. Campaigns for skin, breast and cervical cancer in Australia would therefore explain the clear distortion in results. Cancers that can be either prevented by public behaviour or screened through established screening programs require a higher level of publicity. Although, this being the case it is important to ensure that cancers where effective screening methods are available and lifestyle modifications have shown to have significant impacts are embraced and supported in such a way as to receive maximum benefit for both the health and economy of the society.

: Cancer Incidence and Mortality in Australia

The most recent published data relating to cancer incidence and mortality at the completion of the survey was from 1999, as a result this was the basis of most analytical procedures performed on the retrieved data. During 1999, cancer was responsible for 29% of male deaths and 25% of female deaths; it is therefore an issue at some point in many Australians lives. The cancer types focused upon are the 5 most common types statistically, being colorectal cancer, breast cancer, lung cancer, skin cancer (melanoma), and prostate cancer, we have not included non-melanoma skin cancer, although this is by far the most common cancer in Australia.

In Australia in 1999 there were 82,185 new cancer cases and 34,695 deaths caused by cancer in total. It should be noted that a death is only recorded and attributed to cancer where the cancer is deemed to be the underlying cause of death. In addition to those deaths attributed to cancer, there were 11,714 cases where cancer was reported on the death certificate as an associated cause. Review of cancer incidence data shows that colorectal cancer has the highest level of incidence of any cancer type (except non-melanoma skin cancer) in Australia in 1999, affecting 11,637 people. The lowest incidence of the 5 types studied in 1999 is lung cancer, which was suffered by 7,826 Australians. In contrast, the mortality data presented shows lung cancer as the highest, killing 6,768 people in 1999. The second biggest cancer killer is colorectal cancer, which accounts for 4,575 deaths. The lowest of the 5 cancer types with regard to mortality is skin cancer (melanoma), responsible for 1,005 deaths.(6)

The incidence and mortality statistics for all cancer types studied have increased during the period 1989 to 1999. The most notable increase in incidence was seen in prostate cancer, up an alarming 102.33%, whereas the next highest was breast cancer, up 50.79%. The large increases in cancer incidence in this period can partly be attributable to an ever-growing push to educate the public about the deadly illness. As part of this, screening programs have been implemented which have increased the rate of early detection. Although the high increase in incidence appears alarming, those related to early detection show improvements in the practises and precautions taken by the community at large. The aging Australian population is also having a significant impact on statistics, in general cancer risk is seen to increase with age; as the population ages a corresponding increase can be seen in cancer incidence. Mortality rates also increased, but at a far lower rate than incidence. The highest increases occurred in skin cancer (28.52%), prostate cancer (24.05) and colorectal cancer (10.16%) Breast cancer mortality increased only 2.68%, noticeably lower than the 50.79% increase in incidence over the same period.

Table 1 shows the number of deaths shown as a percentage of the number of new cases for each cancer type in 1989 and 1999. Although it is acknowledged that this is not an absolute measure of cancer survival in any one year (the number of deaths is not directly related to the number of new cases per year as different individuals are included in each statistic), it is still viewed as a reasonable manner in which to analyse the behaviour of each type of cancer. Lung cancer has clearly the worst survival rate, with 86.48% of cases resulting in death in 1999. Colorectal cancer caused the second highest number of deaths at 39.31%. Skin cancer has the best survival rate with just 12.19% of deaths occurring.

1999	Lung	Colorectal	Prostate	Breast	Skin - Melanoma
Incidence	7,826	11,637	10,232	10,667	8,243
Mortality	6,768	4,575	2,512	2,533	1,005
Rate	86.48%	39.31%	24.55%	23.75%	12.19%
1989	Lung	Colorectal	Prostate	Breast	Skin - Melanoma
Incidence	6,743	8,737	5,057	7,074	5,643
Mortality	6,308	4,153	2,025	2,467	782
Rate	93.55%	47.53%	40.04%	34.87%	13.86%
% Decrease	7.56%	17.29%	38.69%	31.91%	12.02%

Table 1: Mortality/Incidence Rate in Australia.

Table 1 shows the percentage decrease in the mortality rates between 1989 and 1999. All cancer types showed a decrease. The largest decreases were seen in prostate (38.69%) and breast cancer (31.91%). These were due to a high increase in incidence of prostate cancer during the period and a relatively low increase in breast cancer mortality rates.

Figure 3 shows both the rate of incidence and mortality per 100,000 people in Australia in 1999. The highest incidence rate per 100,000 Australians was colorectal cancer at 61.3, while lung cancer had the highest mortality rate at 35.7. This is highlighted in figure 1 and figure 3.

A review of figures 1 to 4 indicates that some cancer types show higher incidence and mortality rates for those aged above 60. The highest increases in incidence rates are seen in lung cancer (41.2 for all ages up to 206.8 for ages 60+), prostate cancer (53.9 to 287.4), and colorectal cancer (61.3 to 291.7). Breast cancer and skin cancer show smaller variations between age groups. The same pattern is evident in mortality age based data, with lung, prostate and colorectal cancers increasing in numbers at a higher rate above age 60 than breast and skin cancer.

Due to the massive growth in those affected by cancer in higher age groups, those cancers with high rates of incidence and mortality at ages 60 and above are seen as high-risk cancer areas. As stated above, these are primarily colorectal, lung and prostate cancers. The fact that cancer affects the elderly more so than younger Australians is a growing issue in Australia as evidenced by Figures 4 and 5.

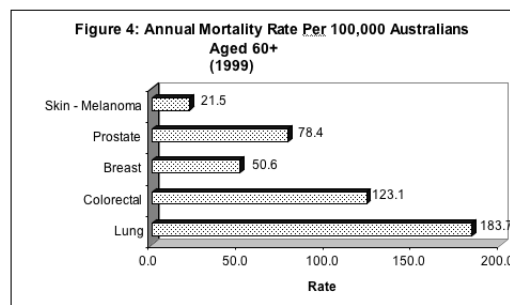
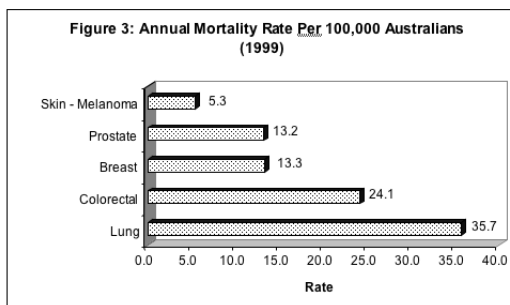
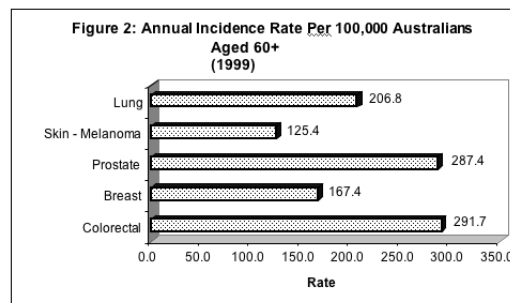
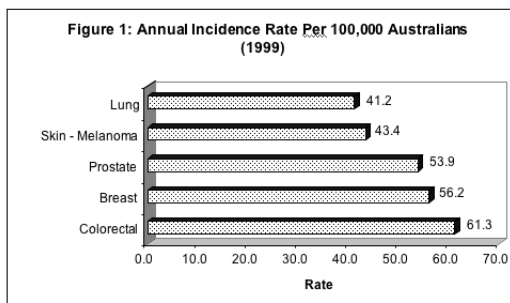
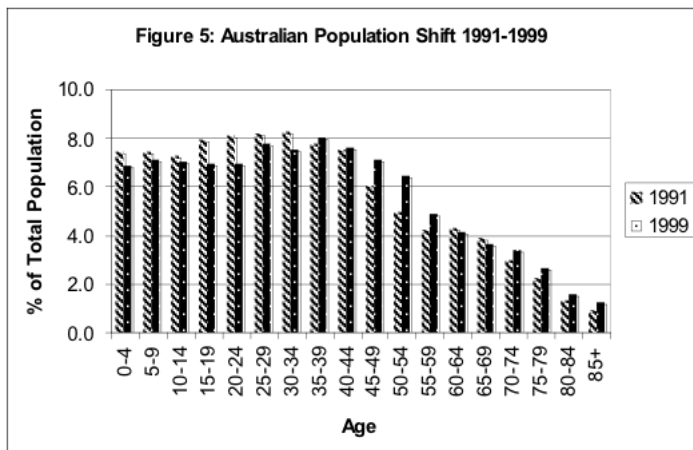
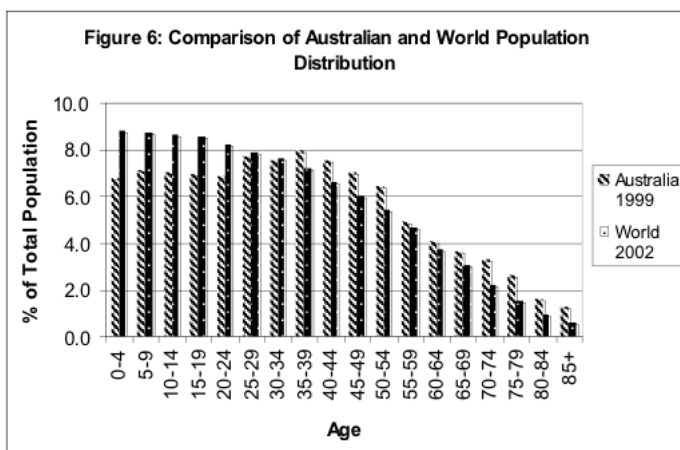


Figure 5 shows the percentage of the Australian population attributable to each age group at two periods in time, 1991 and 1999. This shows that the Australian population is clearly one which is ageing, with most age brackets above the age of 40 increasing in the period examined. This makes cancer an issue of growing importance to the community. The issue is further evident when examining the distribution of the Australian population as compared with the rest of the world.



Source: Australian Bureau of Statistics.(7)

Figure 6 shows the Australian population in 1999 as compared with the distribution of the world population in 2002. It is clear that Australia has a higher portion of its population in elderly age groups, further emphasising the cancer problem in Australia.



Source: Australian Bureau of Statistics.(7)

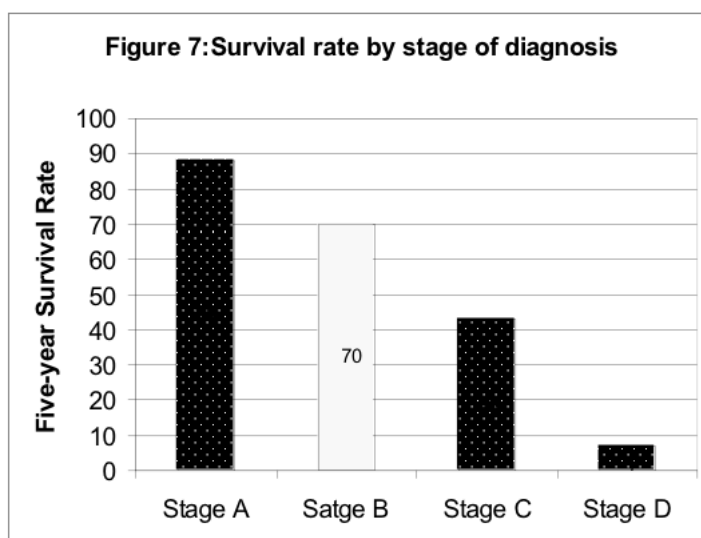
World Health Organisation at <http://www3.who.int>.(8)

: Cancer Cost and Government Funding

Colorectal cancer is currently the second highest cancer contributor to direct health costs (\$205 million) in the period 1993-1994. (Only Non-melanoma skin cancer has a higher direct cost).(9) The treatment cost per case of colorectal cancer was found to be \$15,374 in 1993-94.(9) According to estimates by the Cancer Council the total cost of a case is now more like \$23,000(5)

Early colorectal cancer is one of the most easily treated cancers. In the vast majority of cases it takes five to ten years for bowel cancer to develop from an identifiable precancerous phase, a perfect window of opportunity for a screening program. Due to the nature of this cancer early detection is imperative for successful treatment. When colorectal cancer is diagnosed at an early, localised stage, the five-year survival rate is 91%, decreasing to just 9% for diagnosis involving distant metastases.(4) In Australia we are not catching bowel cancer at an early stage in the majority of cases. Considering that there is such a substantial window of opportunity to find this cancer the high amount of late diagnosis seems unnecessary.

As mentioned earlier the survival rate is dramatically altered by the stage of diagnosis. Hospital based registries for teaching hospitals in South Australia indicate that five-year colorectal cancer survival varies with the Australian clinicopathological stage (ACPS) at diagnosis;



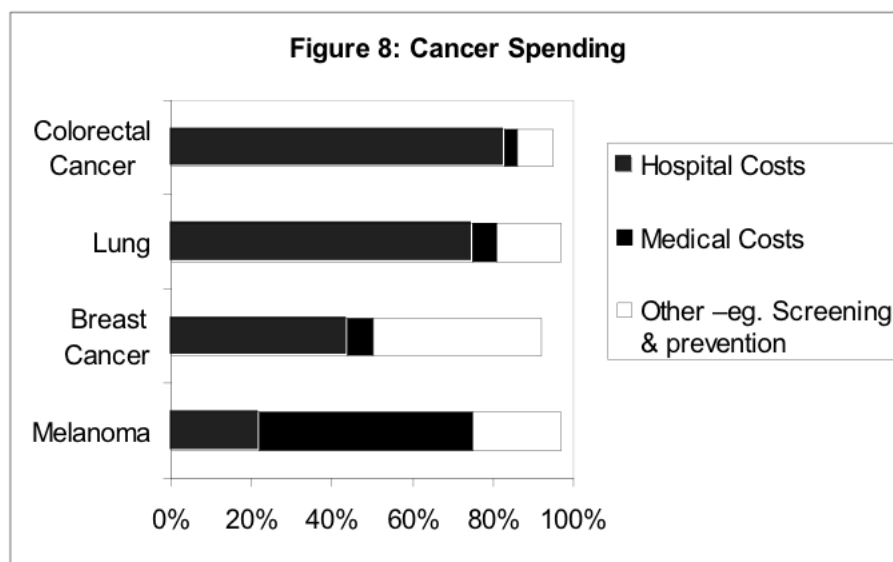
Source: Health and Medical Research Council guidelines for the prevention, early detection and management of colorectal cancer, Canberra: NHMRC, 1999.(10)

In 1999 only about 15% of colorectal cancers in South Australia were diagnosed at stage A.(3) This is possibly similar for all Australian states although data was not obtained. This clearly suggests that there exists the opportunity for earlier diagnosis, treatment and corresponding reductions in mortality in Australia.

A look at the division of Australian government spending by area, displayed in Table 2 and Figure 8, clearly demonstrates an in balance in funding in the area of prevention for different cancer types. For Colorectal cancer hospital costs are clearly the main contributor to the economic resources delivered. This is in stark contrast to the other cancers where early detection is considered greatly beneficial to survival rates (Breast cancer, melanoma and cervical cancer). This finding leads to the question: Could the overall burden of colorectal cancer be reduced through early detection and public awareness campaigns?

Cancer Type	Hospital Costs	Medical Costs	Other –eg. Screening
Cervical Cancer	26%	54%	20%
Melanoma	22%	53%	22%
Breast Cancer	44%	6%	42%
Colorectal Cancer	83%	3%	9%

Table 2: Division of Cancer Spending.



Source: All data has been calculated from "Health System costs of cancer in Australia 1993-94 report". It should be noted that community and general public health programs are not included in the estimates of the cost of disease report. However costs for breast and cervical cancer national screening programs and lung and skin cancer programs have been included. (eg. The national breast screening program represents a contribution of \$50 million).⁽⁹⁾

As well as a decrease in mortality in cases where the cancer has been diagnosed earlier, there is also a huge difference in the cost of treatment. More advanced colorectal cancer cases incur a much greater burden on the health system in terms of resources and funds required. According to the Cancer Council (New South Wales), the cost to remove a small polyp in the bowel of a patient costs around \$1,250. In comparison, treatment for established bowel cancer with surgery, chemotherapy and follow-ups at a public hospital costs over \$23,400.⁽⁵⁾

It is clear that the introduction of a screening program has the potential to save lives, alleviate suffering and reduce the burden of treatment costs. Screening would initially involve a substantial outlay of extra funds, as it would be expected that initially a screening program would detect cancers at all stages that had up until that time gone undetected. Late stage cancers would demand high treatment costs. Over time the benefits of a screening program should see a reduction in costs as less cancerous lesions are allowed to reach the later stages of development.

: A Screening Program for Colorectal Cancer

A population based screening program in Australia has been recommended by the National Cancer Control Initiative(11, 12), the Australian Health Technology Advisory Committee(13) and is supported in clinical guidelines endorsed by the National Health and Medical Research Council(14). The Commonwealth government is currently running a pilot screening program at the cost of approximately 7.2 million dollars over four years. This pilot will be very important in confirming the feasibility and cost effectiveness of a bowel screening campaign in Australia.

The majority of cases of colorectal cancer are seen in people in the category of "average" risk. Research has indicated that 86% of CRC cases occur in those without predisposing factors, and that 93% of the population is at average risk.(15) A large proportion of people present with the advanced disease with a poor prognosis, as measured by the five-year survival rates, compared with those who present with localised disease. The objective of screening is the early detection of pre-symptomatic disease in order to permit more effective treatment. It is recognised that most CRC develops from benign adenomatous polyps. Removal of these precursor lesions is feasible. Surgery for early cancer is also effective.

Clinical trials have provided strong evidence for the survival benefit achieved from a screening test known as faecal occult blood testing (FOBT), Screening programs in the US, UK, Denmark and Sweden achieved reductions in colorectal cancer mortality by 15-30 percent.(5) Flexible sigmoidoscopy, double contrast barium enema and colonoscopy have also been considered as screening interventions.

According to a 1997 report from the American Institute for Cancer Research's Diet and Cancer Project, Food Nutrition and the Prevention of Cancer(16), it is generally accepted that a screening program for colorectal cancer should follow the following lines:

- The program should be available to all individuals aged 50 and older. There should be active recruitment of these individuals.
- The programs should possibly use faecal occult blood testing (FOBT) as its primary modality. Positive FOBTs should be followed up with a complete colon examine, possible through colonoscopy.
- In time programs will hopefully be extended to utilise direct visualisation of the colon through colonoscopy and flexible sigmoidoscopy. Although before this can be achieved there must be sufficient capacity that this does not interfere with the timely assessment of positive FOBT and high risk individuals.
- Screening must be comprehensive, including patient recruitment, follow-up and recall and timely assessment.
- Public and provider education must be a priority.

Many countries are ahead of Australia in considering free screening programs for their citizens. Italy provides screening colonoscopy every 5 years, or annual FOBT, through their National Insurance; Germany has a similar program, but colonoscopy only every 10 years; Germany has used FOBT for screening programs for people aged over 45 since 1977. Japan has a well-established FOBT screening program, which targets people 40 years and older and is now evaluating endoscopic screening. England and Scotland established a two year pilot in 2001 targeting people aged between 50 and 69 years.(5) Reduction in mortality in some of these countries has not been significant. Japan and Germany have seen no reduction in mortality, this has been blamed on the lack of registration of screenees and lack of follow up of positive results. In the US where screened positive individuals were reviewed, they were often not followed up with appropriate investigations.(17)

Many studies have been carried out to determine which method of screening is the most effective and cost-efficient. All studies demonstrate that screening reduced deaths from colorectal cancer in adults older than 50 years. Concerning choice of the optimal screening method, the results are less obvious, with different studies finding either annual FOBT, sigmoidoscopy every five years, or colonoscopy every 10 years to be the most cost-effective technique. If a higher cost is allowed per life-year saved, colonoscopy every 10 years or a combination of annual FOBT with sigmoidoscopy every five years becomes more beneficial. Concerning an appropriate age range for screening, data provide some support for starting at 50 years of age for men and women. The ending date beyond which screening is no longer cost-effective is less clear.

An Australian study, Comparison of community based flexible sigmoidoscopy with fecal occult blood testing and colonoscopy,(18) found that colonoscopy averted the greatest number of colorectal cancers, followed by flexible sigmoidoscopy and annual and biannual faecal occult blood testing. They found that colonoscopy also averted the greatest number of deaths, followed by annual FOBT, Flexible sigmoidoscopy and biennial FOBT. Flexible sigmoidoscopy was found to be the most cost effective in terms of cost per life saved, followed by colonoscopy, biennial and annual FOBT. The researchers also correctly note that the choice of an appropriate screening test must involve looking at the safety and acceptability of the test. These researchers believe that flexible sigmoidoscopy will lead to fewer unnecessary colonoscopies. Also flexible sigmoidoscopy need only be preformed every ten years. It was also claimed that flexible sigmoidoscopy and colonoscopy compared with the cost effectiveness of breast and cervical screening programs.

Other recent studies include the work of Wagner et al, Fraizer et al, Khandker et al and Bolin et al. The results of O'Leary, Olynyk, Neville and Platell(18) agreed with Wagner et al(19) in both results obtained and ranking of alternatives. Frazier et al.(20) found flexible sigmoidoscopy to be more cost effective than either FOBT or colonoscopy. Khandker et al(21) found flexible sigmoidoscopy preformed five-yearly to be the most effective screening strategy, this model assumed that during flexible sigmoidoscopy screening adenomas detected could be removed, instead of referred for colonoscopy. Bolin et al.(22) using accurate Australian data, has placed the cost-effectiveness of 5-10 yearly colonoscopy at about the same level as annual FOBT. They report that although the initial cost would be higher the benefit would be greater.

Population based screening programs using FOBT (currently the method being trialled in the Australian pilot program) has been shown to significantly reduce mortality from bowel cancer. FOBT has the huge advantage of being a less invasive procedure, although it must be performed at least biannually to be effective.

Direct visualisation of the bowel through colonoscopy is almost definitely the most medically effective method for finding polyps and colorectal cancer; this alone does not make it an appropriate mechanism for screening a population. Efficacy (ie sensitivity, adherence and access) is the main clinical challenge. It is of great benefit when a screening method is easy and fast to perform, and generally acceptable to the screening population. When screening for colorectal cancer people who are asymptomatic for a condition are being ask to undergo sometimes uncomfortable and inconvenient tests which result in very much lower compliance rates within the community. It has been found that it is often more effective to offer a highly acceptable test (such as FOBT) which allows for high compliance rates, thereby reducing the percentage of the population that must undergo more invasive investigations to only those that returned positive results; despite the fact that up to 90% of positive FOBT results will not result in the diagnosis of colorectal cancer as bleeding can be caused by many other problems. It is believed that someone who returns a positive FOBT result is 12-40 times more likely to have colorectal cancer.(23)

Screening Method	Advantages	Disadvantages
FOBT	<ul style="list-style-type: none"> - Relatively Inexpensive - Simple to complete - Strong evidence from randomized controlled trials of reduction in mortality with screening 	<ul style="list-style-type: none"> - Requires patient action for completion of test (restricted diet and stool collection) - Patients may find test unpleasant - High false positive rate
Flexible sigmoidoscopy	<ul style="list-style-type: none"> - Moderate cost - Many primary care providers can do the test - 5 year screening interval - Evidence from case-control studies of reduction in mortality with screening 	<ul style="list-style-type: none"> - Requires enema preparation - Patients may find test uncomfortable or embarrassing - Small risk of perforation or bleeding - Screens only about half the colon
Double contrast barium enema	<ul style="list-style-type: none"> - Screens full colon - 5 or 10 year screening interval 	<ul style="list-style-type: none"> - Requires laxative preparation - Patients may find test uncomfortable or embarrassing
Colonoscopy	<ul style="list-style-type: none"> -Screens full colon -10 year screening interval -Evidence for reduction in mortality with screening, from follow-up of patients with adenomatous polyps 	<ul style="list-style-type: none"> -Typically requires 2-days of clear liquids & laxative preparation -Patients may find test uncomfortable or embarrassing -Small risk of perforation or bleeding

Table 3: Brief Advantages and Disadvantages of different screening methods.

In the 2000 Budget the Australian government provided \$7.2 million over four years to improve knowledge about early detection of bowel cancer, the money is being used to establish a Bowel Cancer Screening Pilot program in Australia. This trial will be using FOBT as the primary screening method. The results of this pilot will be interesting primarily from an economic perspective and also to gauge the community response to such a program. It is already well documented that population based screening programs using FOBT results in significant reductions in mortality from bowel cancer.

: The Cost of Screening

All health systems must take into account economic viability as a strong component of decision making. Screening programs must be cost effective to justify their introduction into the competition for health funds. The cost effectiveness of a program is generally determined as a function of the sensitivity and specificity of the available testing, the flow on costs of positive results as well as the risk and costs of the test used.

The cost effectiveness of colorectal cancer screening has been very much in the international spotlight recently, as more countries introduce or consider introducing screening programs. It is said that colorectal cancer screening is at least as effective as screening for breast cancer.(24) Cost-effective studies have also been a major focus, as American states begin encouraging private health insurers to cover the cost of colorectal cancer screening. Medicare, America's largest health insurance program, providing health insurance to nearly 40 million Americans included screening in its policies as of January 1, 1998. This coverage included faecal-occult blood tests, flexible sigmoidoscopy, colonoscopy (for people at high risk of colorectal cancer), and in certain cases, barium enemas.(25) Many of America's HMO's also offer coverage for either annual FOBT, with or without flexible sigmoidoscopy, or colonoscopy every 10 years.

Currently fifteen American States have legislated that health-insurance companies provide for CRC screening,(26) other states are in the process of bringing in legislation. According to the National Conference of State Legislatures colorectal cancer tests are said to increase the cost of premiums by four to eight dollars in the US.(26) There is a clear division in opinion regarding the introduction of mandated insurance cover of colorectal screening tests. Supporters argue that including screening in policies is cost beneficial due to the early detection. Treatment cost for the more advanced disease is expensive and high risk. Opponents argue that requiring companies to cover screening increases overall costs and results in less people being able to afford premiums.(26)

Economic analysis by the Australian Commonwealth Department of Health and Aging found the financial cost of a screening program varies hugely with the design option (\$39 million to over \$180 million). Analysis found that the most effective program would be biennial screening for the 55-74 age group. A baseline program of biennial screening restricted to ages 55-69 would result in savings of 251 deaths and 3,177 DALYs (Disability Adjusted Life Years: The sum of years of potential life lost due to premature mortality and the years of productive life lost due to disability)(27) per year for a net cost of \$38.9 million. Increasing the age range to the 50-74 age group would achieve 419 fewer deaths and a decrease in overall burden of disease by 4,982 DALYs per year; the net cost of such a program was found to be \$62.3 million per year. Despite the higher cost the cost effective ratios were very similar (\$12,244 for the age range 55-69 and \$12,505 for the 50-74 age range). Increasing the frequency of the screening program from biennial to annual for the 55-74 age group would cost an additional \$56.9 million and increase the cost per DALY saved to \$15,092, although it would increase the annual deaths prevented to 601 and DALYs saved to 6,725.(28)

: Need for Public Education

In order to see a successful screening program introduced, the target population must be educated about the requirement for screening, they must understand the screening process, what is required of them and why their participation is imperative. In a country such as Australia which has demonstrated such a low level of knowledge about colorectal cancer, it is impossible to envisage the successful introduction of a screening program without first investing in a comprehensive public education program.

A public awareness campaign should, to allow the most immediate and cost effective results, focus primarily on the 50+ age group, explaining the necessity to participate in screening. Our survey results demonstrated that the Australian people would find education programs with information dispersed through television campaigns and medical professions to be their preferred method of obtaining knowledge and information relating to colorectal cancer.

Germany, Japan and the United States all provide FOBt screening free of charge, but there is no specific screening program. In the US particular attention has been given to publicity and media support, this has resulted in a participation rate of up to 50% in 1998. This is substantially greater than has been achieved in either Japan or Germany where the focus on mass promotion has been lower.(17)

In March 1999 the United States launched a program Screen for Life: A National Colorectal Cancer Action Campaign. This is a multimedia campaign designed to educate men and women aged 50 and older about colorectal cancer and the importance of having regular screening tests. Screen for Life is designed and implemented by Centres of Disease Control & Prevention whose campaign partners include State Departments of Health, the District of Columbia, Tribes/Tribal Organizations, and the Centres for Medicare & Medicaid Services, with technical support from the National Cancer Institute. Campaign messages and materials were developed based upon an extensive review of existing communication and behavioural science literature and formative research, including information gathered from more than 140 focus groups conducted with men and women aged 50 years and older in more than 40 United States cities. This program is still in operation, new research is being conducted and new campaign materials will be produced in 2005 for the use of consumers and health care professionals.(29)

: Requirement for Primary Prevention

It is accepted that there are some lifestyle changes that can dramatically reduce the likelihood of getting bowel cancer, according to the findings of the Ontario Expert Panel in April 1999(30), approximately half of colorectal cancer has been attributed to diet. Research completed by Kune et al.(31) states that "The proportion of colorectal cancer attributed to dietary factors has been estimated to be about 50%". Potter states that observational studies have defined a number of modifiable risk factors for colorectal cancer including diets high in saturated fat, low in vegetables, low in high-fibre grains and physical inactivity.(32) Further, around 66-77% of colorectal cancer could be prevented by appropriate combination of diet and physical activity.(33)

There is convincing evidence that a diet high in calories and rich in animal fats, most often high in red meat, and low in vegetables and fibre is associated with an increased risk of colorectal cancer. Conversely, a low fat, high vegetable and possibly high fibre diet has a protective effect.(34)

Appropriate dietary changes, together with regular physical activity and maintenance of a healthy weight, could, in time, substantially reduce the incidence of colorectal cancer in Australia.(35) The current Australian trends in these dietary and lifestyle risk factors present a mixed picture. The rate of regular physical activity among Australians has decreased significantly in recent years. Average dietary fibre intake among Australian adults has increased, although it still remains well below the recommended level. However, the average total 27 calorie intake has increased, along with the rates of overweight and obesity.(36, 37).

It has been estimated that 10 per cent of all cancers (around 8,000 per year), 10 per cent of all DALYs lost from cancer and 2.8 per cent of the total DALY loss per year are attributable to insufficient fruit and vegetable consumption.(38) The Cancer Strategies Group concluded that national implementation of a campaign to increase vegetable and fruit intake would save \$12.5 million a year over the implementation costs (\$2.5 million a year) and prevent thousands of cancer DALYs, as well as reduce the burden of other disease such as heart disease and diabetes.(38)

The report "Priorities for action in cancer control 2001-2003", by the Commonwealth department of Health and Aging,(28) found a fruit and vegetable campaign to be one of three "dominant" campaign interventions. Dominant programs were reported to have very strong economic credentials for funding. This analysis indicated that a fruit and vegetable campaign would result in a Gross cost (no offsets) of \$2.46 million and a net saving of \$12.15 million. With a cost per DALY recovered estimated at \$677. It is believed that the development of a national 'fruit n veg' campaign is likely to be both acceptable and feasible. This data was determined through analysis of the Victorian campaign.

Currently there is limited evidence supporting behavioural changes resulting from campaigns to promote fruit and vegetable consumption. Although in 1991, the US National Cancer Institute (NCI) launched the '5-a-day' program, a national population based initiative to reduce cancer, results of this program are encouraging indicating that the campaign raised public awareness and increased vegetable consumption.(39) Although not specifically targeted at cancer campaigns to increase the consumption of fruit and vegetables have been run in Australia, although Australia has never seen a national campaign. Results for the state campaigns indicate that an increase in awareness was seen when the campaigns ran for a number of years.(40, 41. 42)

The evidence suggests that it would be economically justifiable to introduce primary awareness campaigns to target the impact of lifestyle and cancer. Such campaigns could encourage Australians to eat low fat, high fruit, vegetable and grain diets, while also pointing out the virtues of exercise. State fruit and vegetable campaigns have allowed for a low level demonstration that such "lifestyle" campaign can be effective, now Australia needs to run such campaigns at an intense and national level.

The message of a national awareness campaign of this nature will not only increase the awareness of colorectal cancer but hopefully assist in the general health of Australians, evidence on the benefits of healthy eating and merits of physical activity are well documented in many health areas.

Australia has already demonstrated huge success in health primary prevention campaigns. The National Tobacco campaign was launched in 1997, total funding has been estimated to be approximately \$22 million, \$13 million of which was allocated by the Federal government since 1996. This campaign was focused at smokers aged 18-40. Television advertising was the main feature of the campaign with the message 'every cigarette is doing you damage'. A reduction in smoking from 23.5% to 22.1% was seen in the first six months of the campaign, approximately 190,000 fewer smokers in Australia.

It is estimated that this would have prevented 922 premature deaths, an additional 3338 person years of life up to the age of 75. In terms of cost this campaign is expected to have averted \$24 million in health expenditure in the first six months of the campaign (from a total of \$9 million spent by the States and Commonwealth on the campaign).

The costs of implementing the National Tobacco Campaign have been more than offset by projected savings to the health system, demonstrating that prevention can be cost saving.(43)

The Tobacco campaign is only one example of a successful health campaign in the area of cancer prevention. Evaluation of the SunSmart campaign has shown a reduction in the crude proportion of sunburn in the Victorian population from 11% to 7% over 3 years (1988-91). Substantial attitude changes were also seen during this time, including increased hat wearing and sunscreen use.(44). It was assumed from these results that a 20% reduction in total lifetime UVR was achieved, possibly resulting in the evasion of 249 deaths per year from melanoma and 59 deaths per annum from NMSC.(45). This campaign was also found to be cost saving.

Physical activity is an area which has been considered related to cancer since research began in the early 1990s, evidence is still somewhat sketchy. Although there is fairly consistent evidence that exercise decreases the risk of colorectal cancer. Studies have indicated that one third to one fifth of colon cancer could be avoided through physical activity. A report by Colditz et al 1997(46) suggests that such a relationship can be explained biologically through reduced intestinal transit time and mediation of prostaglandins. There is also fairly consistent evidence for the link between physical activity and breast cancer risk reduction. There is definitely strong evidence for the prevention of other disease through physical exercise, particularly coronary disease and diabetes. As a result of these strong links there has been a lot of research into the impact of public awareness campaigns in this area.(47, 48, 49, 50,51)

There is almost certainly, according to the scientific research, a strong correlation between colorectal cancer and the consumption of red and processed meats. Unlike recommending people increase their intake of fruit and vegetables, recommendations that people lower their meat intake has the potential to increase other medical conditions, meat is known to be a vital source of iron and other nutrients. There have been many studies released on this subject. The "COMA report (52)" published in 1998 by the committee on Medical Aspects of food supply, UK Department of Health stated that although lowering meat intake would possibly reduce the risk of colorectal cancer, meat was an important source of iron and other nutrients. Although a campaign to reduce the intake of meat may reduce the incidence of colorectal cancer, the overall health of the community may not be improved. Highlighting the risk of meat as a dietary cause of cancer in a public campaign may prove more detrimental to health, although more research would be required before this could be stated with any real confidence.

Over the past decade aspirin has been repeatedly highlighted as a potential means of preventing colorectal cancer. Until the risks and benefits of aspirin are evaluated in controlled studies, and reliable dosage information is determined, a campaign to encourage consumption of aspirin is not yet a safe or viable preventative measure. This is not to say that in the future aspirin will not be a valuable tool in cancer prevention.

: Where Australia Should Be Going

The federal government is currently carrying out a pilot program to determine the viability of a colorectal cancer screening program; it is time put some serious steps in place to allowing the public of Australia to access information and a mechanism for early detection of this cancer.

Australia has one of the highest incident rates of bowel cancer in the world. The International Agency for Research on Cancer (IARC) has compiled comparative incidence and mortality data for colorectal cancer for 173 countries. This study revealed that Australia has the fifth highest colorectal cancer incidence for men (behind the Czech Republic, New Zealand, Hungary and Slovakia) and the second highest for women (behind only New Zealand). Australian death rates are comparatively lower, Australia is ranked fifteenth out of the 173 countries for male death rates and seventeenth for female death rates(53)

It is clear that Australia is currently not doing enough to avoid the impact of colorectal cancer. Of the 12,405 new cases in 2000, it is estimated that only around 50% will be cured (based on estimation that only 53.7% diagnosed in 1997 will be cured)(2). Colorectal cancer should be one of the most curable cancers. If colorectal cancer was being detected earlier this percentage could be substantially reduced. Research and evaluation has clearly demonstrated that a screening program for colorectal cancer is economically viable.

Research by the 'Cancer and Bowel Research Trust' indicated that the level of knowledge about colorectal cancer is sufficiently low that public education is urgently required prior to the introduction of a screening program. There is no reason why such a campaign could not be run over the next couple of years, informing the people of Australia of the risks and the requirement for screening. The federal government needs to commit funds to colorectal cancer prevention.

A national awareness program that ran from now, right through the introduction of a screening program would have the potential to act as both a primary prevention campaign, informing people of the benefits of a high fibre, high fruit and vegetable diet and the need to maintain physically active lives, while at the same time informing people that screening for colorectal cancer is an essential part of insuring their health. There is no excuse for the low awareness of colorectal cancer. It is the second biggest cancer killer in Australia, and yet only 11.94% of Australians feel they know most about this cancer.

Australian colorectal cancer awareness, incidence and mortality could certainly be improved through the introduction of a screening program and awareness campaign. There is evidence to suggest that a screening program would be good value for money in Australia. Likewise public prevention programs have demonstrated that they are excellent value for money. Money spent in prevention and early detection now will equate to money saved in the future. Public health program are never introduced without a large amount of work and substantial commitment by both government and private enterprise. This report is designed to highlight the necessity to begin making changes to the way the health system and the Australian community view colorectal cancer. There is still a large amount of research necessary before the implementation of preventative programs, as institutions committed to the health and well being of Australians we need to make bowel cancer one of our top priorities.

: Recommendations

A screening program in Australia

- A program is required in Australia that allows individuals aged 50 and older to access screening. This should include appropriate corresponding recruitment, follow-up, recall and timely assessment.
- An Australian program should use faecal occult blood testing (FOBT) as its initial and primary modality. Positive FOBTs should be followed up with a complete colon examination through colonoscopy.
- A program should, in time, be extended to include the option of colonoscopy every 10 years as a screening procedure. Although this should only be introduced when it has been confirmed that health system capacity is sufficient to handle demand with no interference to analysis of positive FOBT and high risk individuals.
- It is acknowledged by the Cancer & Bowel Research Trust that further cost and logical analysis may be required before implementation, but it is also necessary to see the urgency in putting a program in place.

Awareness Campaign

- The low level of knowledge that Australians have demonstrated with regard to colorectal cancer needs urgency attention.
- There is a clear requirement for public awareness campaigns directed at all Australians, in the form of television campaigns, pamphlets and knowledge delivered through doctors.

Introduction of primary prevention campaigns directed specifically at lifestyle and colorectal cancer

- It is well documented that there are ways in which colorectal cancer risk can be substantially decreased. Australia needs campaigns that deliver information to Australians regarding lifestyle changes that could be of substantial benefit.
- Campaigns would be looking to increased fibre, fruit and vegetable consumption, lowering fat intake, while also increasing physical activity.

The Cancer & Bowel Research Trust would like to see a three phase national awareness and prevention campaign

- Phase 1: Awareness - Informs people of the high incidence of colorectal cancer, who is at risk, symptoms and where to obtain further information.
- Phase 2: Prevention - Introduce the lifestyle changes that can decrease the risks of developing colorectal cancer.
- Phase 3: Screening - Informing the public about the requirement of screening, with the focus being the significance of early detection for survival. (Hopefully by this time a screening program can be in place, in which case this phase would inform people of details regarding the screening program).
- Further research would be required to determine the most effective means and methods for carrying out a campaign of this nature.

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