CANCER COUNCIL AUSTRALIA'S STUDENT ESSAY COMPETITION 2010

"Cost and Value of Cancer Care"

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INTRODUCTION

Cancer is the leading contributor to Australia's burden of disease and ranks fifth on the list of the costliest diseases by health expenditure.[1,2] As the Australian population ages, the incidence of cancer is projected to increase by 30% per decade while annual healthcare costs are expected to more than double from $3.8 billion to over $10 billion by 2032.[3,4] Control of the morbidity and mortality of this disease is likely to become increasingly dependent on cost-effective strategies.

Over the past decade, there have emerged new interventions spanning every aspect of cancer care: prevention, screening, diagnosis and treatment, and palliative care.[5] Whilst seeking to improve the quality of life for cancer patients, many of these interventions have substantial economic costs. As resources are limited, the rising cancer-related expenditure has seen a similar increase in the scrutiny of costs relative to the value provided by emerging interventions.[6]

This essay will examine the relevance of health economics in oncology, identify the costs and benefits incurred at different levels of disease control and suggest ways to help maximise the value of cancer care in Australia.

APPLYING HEALTH ECONOMICS TO CANCER CARE

The efficient use of limited resources necessitates the evaluation of the relative costs and benefits of new medical technologies beyond the standard considerations of safety and efficacy.[5] Recently, the economic impact of cancer interventions has received increased attention due to the high costs of many new cancer therapies.[7,8,9] Understanding the potential costs and benefits of these interventions is required to assess their economic viability and to justify resource allocation.

A range of economic evaluation types are available to the health economist, including cost analysis, cost-benefit analysis, cost-effectiveness analysis, cost utility analysis and so on. The

model, criteria for selection and the impact of results are unique to each analysis type and are explained in detail elsewhere.[5] For the purposes of this essay a broad understanding of what constitutes as "cost" and "value" in cancer care and how these perspectives differ between stakeholders is sufficient.

DEFINITIONS IN CANCER CARE

Cost

In New South Wales (NSW), the costs associated with cancer can be grouped into six different categories:[10]

- health system expenditures, which include the costs associated with medical treatment, pharmaceuticals, research and health administration;
- productivity costs, which include losses from both patient and carer due to employment impacts or premature mortality;
- other financial costs, which include supportive and palliation services, home modifications, transport, accommodation, complementary and alternative therapies and funeral costs;
- transfer costs, which include welfare and disability payments; and
- non-financial costs, which include the pain, suffering and premature death that contribute to "burden of disease", often quantified in quality-adjusted life years to provide an assessment of absolute economic cost.[5,11]

In health economics, costs are loosely categorised into direct and indirect costs. Direct costs refer to resources directly consumed by medical interventions, whereas indirect costs refer to resources consumed as a result of disease but not directly by medical care.[5,12] The majority of the direct costs in cancer care are borne by the Federal, State and Territory governments through initiatives such as Medicare and the Pharmaceutical Benefits Scheme, with private sector support through health insurance plans.[13] The patient, however, bears the majority of the indirect costs, largely attributed to burden of disease.[10,12]

Value

When allocating resources, stakeholders provide an assessment of value by looking at how health programs improve and promote health.[11] However, the definition of "value" will vary between stakeholders as each has perspectives and biases that the others lack.[14] For example, the universal health coverage afforded by Medicare may lead to patients consuming more resources than if they had paid for the full cost of the goods and services themselves.[14] Physicians are most likely to know the relative benefits and risks of a given therapy, but the incentives they potentially derive from using certain technologies make them imperfect advocates for their patients' welfare.[14] Health insurers (governments and private health insurance companies) attempt to manage resources in ways that maximise the health of members (taxpayers and clients) and often take the population's perspective. However, fixed budgets inevitably lead to opportunity costs, which often result in insurers being caught between those who demand greater access to interventions regardless of cost (patients and physicians) and those who demand prudence in spending (taxpayers and employers).[14]

Ramsey & Schickedanz (2010) define an intervention as "having value if patients, their families, physicians and health insurers all agree that the benefits afforded by the intervention are sufficient to support the total sum of resources expended for its use"; a definition in which all parties are compelled to agree.[14] The measures selected to help define the "benefits" of an intervention go beyond the baseline measures of safety and efficacy. Survival, quality of life, cost and equity are determined as the concepts of "value" with enough objectivity to enable agreement between stakeholders, similar to other definitions for value in cancer care.[11,14,15]

COST AND VALUE OF CONTROLLING CANCER

Prevention

More than one-third of current cancer cases in Australia can be prevented through lifestyle modifications, while improved early detection methods can prevent or treat many other cases at

a much lowered cost.[16] As 65% of the $3.8 billion in cancer healthcare expenditure is for inpatient services, greater investment in cancer prevention and screening would greatly reduce hospital costs, morbidity and mortality.[2,17]

Among the most important modifiable risk factors for cancer is tobacco use, which contributes to over a fifth of all cancer deaths in Australia.[1] The most effective measure available to governments for reducing the economic costs of smoking is through excise.[18] Cancer Council Australia recommends in its recent pre-budget submission to Treasury that a 21% increase in the price of tobacco products will result in significant reductions in individuals smoking without compromising government revenue intake – a "good value for money" solution:[17,18]

Health promotion campaigns admixed with social marketing strategies are key to effecting behavioural changes that improve health outcomes. The government anti-smoking campaigns conducted between 1975 and 1995 have generated $8.4 billion in healthcare cost-savings, greater than 50 times the amount invested in these campaigns.[19] The $9 million invested in the late 1990s National Tobacco Campaign is expected to return a further $740 million in cost-savings.[20] Skin cancer costs the health system more to treat than any other cancer, yet most cases are preventable through appropriate protection from ultraviolet radiation.[21] Evidence shows that funding social marketing to prevent skin cancer, through a national SunSmart media campaign, is a cost-effective public health investment, with a return of $2.32 in healthcare cost-savings for every $1 invested.[22,23]

In addition to lowering cancer care costs, improved cancer prevention will likely generate better control of other major diseases sharing similar risk factors, including cardiovascular disease, diabetes and stroke.[16] Implementing cancer prevention is therefore recommended in the context of other chronic disease prevention schemes.[24] This is readily seen in an already-established Australian disease prevention strategy, involving Hepatitis B Virus vaccination to protect against both hepatitis and hepatocellular cancer.

Early Detection

The mass screening of healthy individuals allows for the early diagnosis of some cancers, enabling earlier intervention and increased survival. Cancer screening has been a substantial recipient of health expenditure in Australia recently, with 15.3% of all public health expenditure being spent on population screening programs for breast, cervical and colorectal cancer (CRC) in 2006.[25] Whilst screening large numbers of people is a costly undertaking, the goal of screening programs is to decrease overall cost by detecting disease in the community at an earlier stage when treatments are more effective and less expensive.[26] However, the total cost of cancer screening in Australia is likely to be much higher with the inclusion of expenditure on screening that occurs outside population programs (e.g. prostatic specific antigen testing in healthy men, skin cancer checks and screening outside recommended age categories).[27]

Since 1991, the BreastScreen Australia Program has offered biennial mammography to asymptomatic women aged 50-69 years while the National Cervical Screening Program (NCSP) has provided biennial pap testing for women aged 20-69 years.[27] The National Bowel Cancer Screening Program (NBCSP) is the newest population screening program introduced in 2006 and currently offers a once-off faecal occult blood test (FOBT) to individuals turning 50, 55 or 65 years of age.[17] However, the prevention of cancer deaths only occurs in a small proportion of those screened. The majority of screened individuals receive little benefit and may be exposed to additional health risks that arise from:[26]

- complications of the screening procedure;
- false-positive results that lead to unnecessary invasive follow-up procedures; and
- treatment of minimally-invasive cancers that, in the absence of screening, would not have been a cause of morbidity or mortality during the patient's lifetime.

For example, while biennial mammographic screening reduces breast cancer mortality by 15%, it also leads to overdiagnosis. For every 2,000 women screened over 10 years, one will have her life saved, but 10 will be treated unnecessarily.[28] The facts for cervical screening are similar. Despite the implementation of the NCSP having brought cervical cancer mortality down from 4.0 per 100,000 in 1991 to 1.8 per 100,000 in 2004, follow-up testing for an abnormal pap smear may incur substantial loss of quality of life, negative psychological effects and a potentially

increased risk of preterm delivery.[29,30,31,32] In affording population screening, society may be required to trade off the greater value provided to a few against the lesser costs to many.

With regards to FOBT, evidence suggests that biennial screening reduces CRC mortality by approximately 16%.[33] Even in its current form, the NBCSP has been shown to effectively identify early-stage tumours.[34] However, not unexpectedly, FOBT carries a probability of false positives which, in this instance, will lead to an unnecessary colonoscopy. Nevertheless, Cancer Council Australia believes that, at present, extension of the NBCSP has the greatest potential to cost-effectively reduce cancer mortality.[17] Biennial screening of all Australians aged 50 years and over will likely prevent up to 480 deaths annually in NSW.[35] Full implementation of NBCSP will also cost the health system $36,080 for every healthy year of life saved, which renders it a strong immediate investment when measured against the agreed Australian benchmark (where sums of $50,000-$60,000 are considered cost-effective).[36]

While all 3 publicly-funded screening programs in Australia are effective in reducing cancer deaths by 15-20%, screening tests are associated with a controversial level of over-detection of potentially inconsequential disease. Given that lifestyle factors account for 33% of the total cancer burden, a more holistic approach to cancer control is recommended; one that includes primary prevention through lifestyle modification.[27]

Diagnosis and Subsequent Management

A significant proportion of the total economic cost of cancer care lies in the management of cancer patients. When burden of disease is excluded, treatment alone accounts for a third of the total financial cost of cancer in NSW, the bulk of which is borne by individuals and their families. Households affected by cancer face income reductions and additional out-of-pocket expenses, resulting in an average loss of $47,200 per household per cancer diagnosis.[10]

Research and development (R&D) has seen enormous progress in the understanding and treatment of cancer in recent decades, with the identification of cancer-causing genes, the

discovery of new chemotherapeutics and the development of new imaging techniques to enable earlier detection.[37] Despite all this, little progress has been made on cancer survival. This has led to the argument that too much effort has been placed on developing costly treatments at the expense of prevention and early detection.[14] Many have questioned the cost-effectiveness of recent cancer treatments, which are expensive, carry unwanted side effects and only marginally prolong life.[7,8,9] Nevertheless, the value of diagnostic and cancer treatment methods is undisputed. The 5-year relative survival rates for all cancers diagnosed in 1998-2004 in Australia have increased markedly compared to those diagnosed in 1982-1986.[1] Lakdawalla et al. (2010) attribute recent gains in cancer survival among Americans to the result of R&D advancements in cancer therapeutics.[37] Also, the significant value placed on even the smallest survival gains by terminally ill patients can now be addressed by their increasing access to newer biological treatments with the potential to offer increments in longevity at the end life.[38]

ADDING VALUE TO CANCER CARE

Fundamental to improving the value of cancer care is sustained R&D into all its aspects. Advances may lead to the prevention of disease entirely through vaccine development, lifestyle modification and improved screening tests. New screening technologies may result in improved detection of malignant disease at earlier stages, thus improving survival. Even if detection strategies remain unchanged, advances in cancer therapeutics may directly improve survival or, in late-stage disease, maintain quality of life as part of palliative care.[37]

To improve the rates of early detection of disease, strategies need to be implemented at the primary care level to increase participation rates in breast and cervical screening, particularly for under-screened groups. Educational materials for general practitioners may prove valuable in diagnosing early symptoms of cancer and making appropriate referrals. Increased participation by patients in clinical trials is also encouraged for the value assessment of new interventions.[39]

For those undergoing active or palliative treatment, a co-ordinated multidisciplinary model of care is optimum for maximising patient outcomes and delivering cancer care.[39] However,

patient outcomes are often compromised by the inequities in access for Australians living in rural and remote areas, particularly Aboriginal and Torres Strait Islander peoples. One strategy to address this is the improvement of remote travel and accommodation schemes to maximise investments in increased regional cancer facilities.[17]

In the setting of Australia's rising incidence of cancer and cancer-related expenditure, the involvement of the clinician in resource-allocation decisions will likely increase. Clinicians are uniquely positioned to appreciate the value of interventions and to observe the costs from the perspectives of both the patient and health system. Future medical graduates will engage in cancer care teams in a variety of roles, necessitating their understanding of the principles of economic evaluation and its relevance to healthcare. Quality of life, resource costs and the cost-effectiveness of screening and treatment modalities are just some of the concepts that new medical graduates are expected to demonstrate familiarity with.[40] Recommended clinical experiences, such as talking with people affected by cancer and observing shared decision-making between patients and doctors, will further allow students to observe for themselves the different stakeholder perspectives concerning the value of interventions and to better appreciate the human costs of cancer care.[41]

CONCLUSION

With expected increases in health system costs for cancer care over the coming years, economic evaluations of new and existing interventions will become increasingly used to inform resource allocation. Whilst recent advances in cancer therapeutics have resulted in improved survival rates and quality of life, the mainstay of cost-effective cancer control strategies remains with cancer prevention and early detection programs. The efficacy of cancer care programs is currently hampered by resource limitations, technological inadequacies and barriers to utilisation. However, sustained R&D, support and training will enable continued advancements in cancer care to prolong survival, improve quality of life, reduce costs and promote equity.

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