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3.1 Background

In 2008, an estimated 12.4 million new cases and 7.6 million deaths were attributed to cancer worldwide. Cancer is currently the largest disease burden in Australia and is growing in incidence, primarily due to an ageing population. With a population of 22.6 million, Australia has one of the highest incidence rates of all cancers globally, with an age standardised incidence rate of 314/100,000 and an age-standardised mortality rate of 103/100,000 for all people of all ages. The high ranking of Australia’s cancer incidence compared to other countries may give the impression that local cancer control programs are failing.

The Australian Institute of Health and Welfare (AIHW) publishes reports on cancer in Australia to allow for comparisons of cancer-related information and indicators. This is an important initiative, which provides annual tabulated figures on incidence and mortality. The AIHW has also recently provided projections of cancer incidence to 2020, and a summary of survival and prevalence statistics for all cancer types up to 2010. Rather than reviewing trends and projections across all ages, aptly done by AIHW, we focus on changes between 2 time periods in those under 75 years of age, as intervention programs need significant time to build coverage and effectiveness, and to show an impact on mortality and incidence. The AIHW’s year-by-year trends illustrate gradual changes in incidence and mortality. In this report, we analyse the change over a 20-year period to provide greater contrast between 2 time periods (1987 and 2007). Assessing change using key indicators aids the planning for cancer control initiatives and future evaluations of effectiveness.

3.2 Aims

The aims of this report are to:

1. Provide simple summary measures of changes in cancer deaths and incident cases for individuals under 75 years in Australia by comparing expected and observed figures for 2007, using 1987 as the baseline.

2. Analyse in greater detail eight specific cancer sites that are important in Australia, either because of their public health programs and/or high or changing incidence or mortality changes, to highlight how policy, programs or other changes may have affected these measures.

3. Provide key information on past and current cancer control programs and approaches, and map the relevant policies and programs in Australia.
Eight specific cancer sites were chosen for more detailed analysis, based a consolidated list of the top five cancer sites for males and females in incidence and mortality according to IARC GLOBOCAN 2008 working estimates and/or the existing public health programs in Australia.5, 6

3.4.1 Breast cancer
Breast cancer is the most common cancer found in females globally. Non-modifiable risk factors for breast cancer include being female, age, hormonal and reproductive circumstances, family history and breast density.7, 18-20 Risk of disease is influenced by body weight and physical activity.18 Proven exogenous causes of breast are restricted to ionising radiation, alcohol consumption and pharmacological steroids through hormone replacement therapy (HRT).21, 22 Our analysis shows that breast cancer mortality has reduced from the expected numbers by 31%, while incidence has risen by 34%. Both were statistically significant changes. The former is largely attributed to the national screening program (BreastScreen), improved management of breast cancer, and reduced population risk through changing behaviour.23-25 BreastScreen is part of the Australian Government’s cancer-prevention strategy and developed nationally but managed at a state/territory level. Its evaluation suggested that improved national policy leadership was required to facilitate the availability of an equitable service across the nation.26

3.4.2 Cervical cancer
Cervical cancer is the third most common cancer in females worldwide5 and is caused by persistent infection of human papillomavirus (HPV), making it preventable. It has high survival rates if diagnosed early.7 Risk factors include parity and low socioeconomic status (SES). Proven exogenous causes include smoking, oral contraceptive use and human immunodeficiency virus 1 (HIV-1)/immune suppression. Co-infection with other sexually transmitted diseases such as Chlamydia trachomatis or herpes simplex virus 2 is highly correlated with HPV infection.7, 20, 21 Our analysis shows that cervical cancer incidence and mortality both decreased by 52% and 62% respectively, both statistically significant. Much of this improvement is attributed to the national screening program. These findings do not include the time period when the National HPV Vaccination Program was in place.
3.4.3 Colorectal cancer

Colorectal cancer is the third most common cancer in males and the second most common in females. The most prominent non-modifiable risk factor for colorectal cancer is age, with over 90% of cases being diagnosed in people over 50 years of age. Another established non-modifiable risk is adult-attained height. A personal or family history of colorectal cancer, polyps and specific inherited genetic conditions (e.g., familial adenomatous polyposis and hereditary nonpolyposis colorectal cancer), or a personal history of inflammatory bowel disease significantly increase the likelihood of colorectal cancer. Consumption of processed meat, and to a lesser extent, red meat, is established as increasing risk of colorectal cancer; and obesity increases risk, whilst physical activity decreases risk. Colorectal cancer had a small overall change in incidence (2%). In contrast, there was a statistically significant overall decline of 47% in mortality, being slightly higher for females (50% decline). Reduced mortality is probably due to improved treatment technology and better adherence to national management and treatment guidelines. Early detection may also have had an impact, although there was no organised screening during the time period analysed, apart from the dissemination of faecal occult blood test (FOBT) kits to a limited age group from late 2006. The greatest future reductions in colorectal cancer mortality across the whole population are expected to be gained from population-wide screening. Attaining sufficient coverage of screening is, however, an ongoing challenge in countries that have tried to implement such programs.

3.4.4 Liver cancer

Liver cancer is the fifth most common cancer in males and the seventh most common in females. Worldwide, 70–80% of all liver cancers are associated with chronic hepatitis viruses B and C infection or liver cirrhosis. Smoking and alcohol consumption increase risk of liver cancer. Survival from liver cancer is low and, as a result, it is the third most common cause of death globally. Liver cancer increased in both incidence and mortality over two decades, both being statistically significant changes. Overall, there has been a 70% rise in mortality, which was slightly higher in males than females. Incidence increased by 132%. The substantial burden of undiagnosed chronic hepatitis B infections in some Asian-born Australians, coupled with the natural history of chronic hepatitis B infection in populations where the infection is acquired early in life, contribute to about half of the increasing mortality and incidence in Australia. From 1988, the Australian Government began integrating the hepatitis B vaccination into the National Immunisation Program. Additionally, public health campaigns to curb excessive alcohol consumption may contribute to disease prevention.

3.4.5 Lung cancer

Lung cancer is the leading cause of cancer-related death worldwide, resulting in 1.38 million deaths in 2008. The predominant cause of lung cancer, worldwide and in Australia, is tobacco smoking. Other causes include passive smoking, certain occupational exposures (including those involving asbestos and coal-based industry), pulmonary tuberculosis and atmospheric pollution. Lung cancer had a higher incidence in males; however, the percentage change showed a statistically significant decrease of 38%. Female incident cases have risen by 26%. Overall mortality has dropped by 34%, an encouraging, statistically significant fall. This is predominantly due to the 46% reduction in male mortality. There was a slight increase in mortality for females (7%), which was not statistically significant (based on linear trends). These changes can be largely explained by changes in long-term tobacco consumption. Despite the high burden associated with lung cancer, specific programs (such as organised screening programs for high-risk groups) are not present. The nature of the disease is such that smoking cessation or avoidance is the most fruitful way of addressing the problem, thus lung cancer is a primary focus in public health initiatives through tobacco control strategies. It is also important to note that lung cancer survival after diagnosis has not improved significantly over past decades.

3.4.6 Melanoma

Of the 160,000 new cases of melanoma each year worldwide, approximately 80% are in individuals from North America, Australia and New Zealand. The incidence of melanoma in Australia, and particularly in Queensland, is the highest recorded globally. The major cause of melanoma is ultraviolet radiation exposure resulting in direct cellular damage and modifications to immunologic function, especially in people who are fair skinned. Mortality associated with melanoma of the skin has decreased 11% from expected to observed deaths. Incidence, on the other hand, has increased by 17%, indicating that melanoma is still an ongoing concern. In the
Cancer related deaths have reduced by 28% from the expected numbers.

3.4.7 Prostate cancer

Prostate cancer is the most common cancer in males in Australia. There are no proven exogenous causes of prostate cancer. The incidence of prostate cancer has risen globally, whereas mortality has seen a lower rate of change overall. The only risk factors clearly associated with prostate cancer are advanced age and family history of the cancer. Our analysis shows that prostate cancer incidence has risen dramatically, by 276%. Mortality has declined by 27%. Both are statistically significant changes. As very few lifestyle or other risk factors have been identified for prostate cancer, it is likely that prostate-specific antigen (PSA) testing is largely responsible for the 276% increase in the number of cases diagnosed from this analysis. Pressure is mounting for governments to address prostate cancer screening more formally.

3.4.8 Stomach cancer

Stomach cancer is the fourth most common cancer globally, with an estimate of new cases just short of 1 million in 2008. Infection with Helicobacter pylori (H. pylori) can cause inflammation of the gastric muscosa and is the main risk factor of stomach cancer; however, only a small proportion of people with H. pylori will develop cancer. Excessive consumption of salted fish, pickled vegetables, cured meats and soy sauce is also associated with increasing risk. Additional lifestyle influences on stomach cancer include the consumption of alcohol and tobacco. Incidence and mortality have decreased in both males and females. There has been a 50% decrease in mortality and a 34% decrease in incidence, both of which are statistically significant. The observed falls in mortality and incidence reflect improvements in living standards from the 1920s, when the prevalence of H. pylori began to fall. Current public health initiatives run by the Australian Government aimed at reducing tobacco and alcohol consumption and promoting healthy eating practices, address many of the environmental factors that can increase the incidence of stomach cancer.

3.4.9 Australian approach to health care and cancer control

Cancer control policy in Australia, predominantly focused on primary and secondary prevention, has evolved over the last few decades. Beginning in the 1980s, cancer control has been incorporated into the national strategic direction as well as in specific public health campaigns. Currently, the range of public health and preventive services in Australia are coordinated and administered by intra- and intergovernmental agencies. The services that relate to cancer control are:

- Immunisation services and other communicable disease control
- Programs to reduce the use and harmful effects of tobacco and alcohol
- Prevention programs to reduce weight gain and to promote physical activity and healthy eating choices
- Programs to promote sun protection
- Environmental monitoring and control, including management of harmful chemicals
- Screening programs for breast, cervical and colorectal cancer.

1990s, broad-spectrum sunscreen, which filtered out both ultraviolet A and B radiation, became widely available and used in Australia. This may result in future reductions in incidence and mortality. Initiatives, especially through awareness programs, have successfully raised awareness and improved behaviours in Australia.
3.5 Discussion
The two decades selected for analysis in this study coincide with the inception and launch of a number of programs and changes in treatment that either directly address the cancer burden or address modifiable risk factors. This analysis has shown that cancer-related deaths have reduced by 28% from the expected numbers, based on 1987 rates, to the observed numbers in 2007. Cancer incidence, however, has increased over the same period by 21%, predominantly due to the rise in incident cases of prostate cancer. The reduction in mortality can be partially explained by improvements in prevention programs, screening, diagnosis and treatment. Cancer control initiatives have played a critical role in reducing the burden of cancer through systematic changes and encouraging individual behavioural change. They will continue to be central to combatting cancer. Having said that, there are factors that are still unknown which would have played a role in mortality reduction.

A large proportion of government investment is on cancer treatment. As the cost of treatment rises, there has been increasing attention on preventive health and screening both to address the disease earlier and reduce costs. Health care systems are challenged by the need to transition from a focus on acute service provision to community-based services. The capacity of the existing system will be placed under pressure through the resource and financial burden of new cancer cases as a result of the ageing population, increased detection, and improved survival requiring increased levels of care. With the majority of guidelines focusing on treatment and management restricted to patients under 75 years, reassessment of current protocols are needed to meet the needs of ageing populations.

Moving forward, further understanding the role of current and emerging potential carcinogens, and the integration of biomarker science to better detect exposures, pre-neoplastic conditions or populations at risk, are all areas of discovery that could pave the way for new prevention strategies or treatment techniques. This requires ongoing investment in sound research to support the evidence base for such initiatives. In order to take full advantage of empirical research, studies of basic science need to have a translational phase which makes them practically applicable to epidemiology, public health and clinical settings. Our findings illustrate that significant progress has been made over two decades. However, there are still a number of cancer types requiring greater focus. For example, cancers with unknown or predominantly unmodifiable risk factors currently have limited scope for prevention. Placing greater emphasis on these cancer sites to improve detection and treatment ought to be a growing priority in research and patient support.

3.6 Conclusion
A number of cancer control measures in Australia have contributed to reducing the number of cancer deaths, despite an overall increase in the number of cases diagnosed. However, cancers that require more emphasis in research, policy support and preventive health action are those with little or no improvement, and these are not always at the forefront of activities by lobby groups or of the cancer control agenda. Cancer control needs to be a collaborative effort in the broader community. Governments, researchers, NGOs and industry need to work together in creating a sound evidence base for cancer control. Local communities can also play an important role in advocating and demonstrating change in their social environments to support the implementation of initiatives. The current level of financial and resource commitment to cancer control needs to be maintained and increased, especially in high-need areas, such as improving screening participation in culturally diverse population groups that are at high risk of cancer. Cancer control will never be finished. It needs to be integrated into long-term health policy to result in long-term benefit for the community, to sustain and build on the improvements that have already been achieved.
3 Executive Summary

References


