

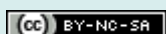
Messages from research:

A review of the research literature concerning differences in cancer outcomes between metropolitan and country residents in South Australia, and factors that might underlie such differences

Public Health Information Development Unit
The University of Adelaide
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- Su Gruszin undertook the literature review, within a framework developed with Diana Hetzel;
and
- Diana Hetzel reviewed and edited the final version.

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Introduction

South Australia's cancer survival rates are high by world standards – and the quality of treatment is very good. However, there are inequalities in cancer survival among people living in rural, regional and remote areas of South Australia. Many factors are associated with cancer risk and poorer survival in rural areas, including:

- varied levels of exposures to a wider range of risk factors;
- greater levels of socioeconomic disadvantage;
- limited access to specialist cancer treatment services;
- lack of coordinated care by health practitioners;
- delays in diagnosis, treatment or care processes; and
- greater proportion of Aboriginal peoples who are often diagnosed at more advanced stages and who may receive poorer treatment.^{1,2}

Treatment for cancer is usually complex, involving different disciplines and therapies, which can make it more difficult for rural South Australians to access the full range of care they require, within their local community. In rural areas, where hospitals and practitioners do not have ready access to professional cancer networks, the challenges of providing quality, evidence-based cancer care can be significant.

There remain opportunities to produce better outcomes and quality of life for people with cancer living in non-metropolitan areas of the State, by improving the organisation and delivery of cancer control activities – across the spectrum of care, including opportunities to engage more effectively with communities and primary care providers.

This report draws on published research literature to determine what is already known about geographic differences in cancer incidence, prevalence, risk factors, screening uptake, survival and outcomes for rural populations. The literature review provides contextual information, and examines the evidence for factors contributing to identified geographic and other inequalities in cancer in South Australia. A better understanding of the patterns of cancer suffered by people living in rural and remote areas of South Australia can assist health planners, cancer screening services, health practitioners and other care providers, and the community, to assess current needs for a range of services and any relative health differences, or inequalities, which need to be addressed.

Overview

A search of the peer reviewed literature was undertaken for material that addressed the scope of the research task: to achieve a better understanding of the existing inequalities in the incidence, secondary prevention and outcomes of cancer, as evident across geographic areas of the State; and to identify where further investment would be productive to improve health outcomes for people in rural and remote South Australia.

Details of the research methodology and search terms, as well as summaries of the articles which were reviewed are included in the appendix; over 400 items were identified, 80 of which were reviewed and are included in Tables 2 and 3 in the appendix. Twenty-two of these were directly related to South Australia and received the most attention. The main emphasis was to identify, for incorporation in this report, usable conclusions, implications and possible policy solutions for future action to reduce inequalities that disadvantage non-metropolitan populations.

Overall, there were not many articles in the peer-reviewed literature that were specific to South Australia. The majority of the urban-rural cancer-related, peer-reviewed research in Australia was from Queensland and New South Wales, followed by Western Australia. About one third of the peer reviewed material that was specifically on South Australia was focused on Aboriginal populations. Some of the material that addressed urban-rural differences was out of scope for the particular

cancer types in this report; nevertheless, some of these studies have been included in the review. It is arguable whether the situations that are described for Queensland, New South Wales and Western Australia are also relevant to South Australia, as there are both similarities and differences with the geographic, demographic and population and infrastructure spreads (roads, towns, distances, impact of wet season, etc.). At the Australian level, these differences are hidden by averages.

Cameron found (reporting in 2008 in a major thesis that included a secondary review of the evidence) that “Australian research was limited and mostly disease-specific” and this review found that the current situation was similar. Moving from Australia to other countries, no major review of urban-rural cancer-related comparisons, that had been made since Monroe and colleagues first reported in 1992, was identified (although their review was frequently cited). In general, there were many articles that made statements of the type that: ‘rural residents’ cancer outcomes might be worse or different due to differences in behavioural risk factors (often erroneously called ‘lifestyle’), ‘rural’ personality and/or attitudes or both, or (maybe) lesser access to services’. No research was identified that was specifically designed to test, or definitively ‘tested’ these propositions, along the lines of the future research program outlined by Monroe and colleagues in 1992, who wrote that “What remains to be established is that access to or use of health care services influences cancer outcomes”. There were, nonetheless, frequent calls for more research to understand this area better.

Broad themes from research and identified barriers to equitable access to cancer-related healthcare services

Overall health differences, or inequalities, between urban and rural populations in Australia have long been observed, as have inequalities in specific health outcomes.^{1,4} One of these is cancer: its screening and early detection, incidence, treatment and follow up, survival and other outcomes, and, inevitably, cancer-related mortality. Geographic inequalities in cancer outcomes have been identified for Australia as a whole, for all states and territories within Australia, and most particularly, between Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians.^{4,13} One of the explanations frequently advanced for geographic inequalities in these cancer-related domains (that is, inequalities between populations in metropolitan and non-metropolitan [regional, rural and/or remote] areas) is that Aboriginal and Torres Strait Islander peoples are more prominent in the populations of non-metropolitan areas, and of remote areas in particular, and are known to have poorer cancer survival rates.^{4,14-16} However, this is unlikely to be the case in South Australia as the Aboriginal population is a very small proportion of the total State population.

Other reasons that are advanced for inequalities relating to cancer-related prevention, health services and outcomes in non-metropolitan areas, include:

- absolute and relative lack of cancer services in rural, regional and remote Australia,^{4,5,7} although South Australia appears better served relative to most jurisdictions;¹⁷
- lack of on-site (including visiting) cancer-specific health care;¹⁵
- poorer quality on-site healthcare services in general (staffing issues such as unavailability at weekends, less well trained/ experienced staff overall, overworked staff, lack of staff training opportunities, infrastructure deficits, out-dated equipment, unstaffed machinery);^{4,17,18}
- culturally inappropriate services, especially in relation to Aboriginal and Torres Strait Islander peoples;^{16,19}
- volume-based service or treatment quality inequalities (that is, lack of expertise due to low volumes of cases seen or treated, and similar skill-related inequalities in the delivery of health care);^{17,18,20-23}
- quality drop off and increasing deviation from standards with increasing remoteness (for example, the difference found in rural and regional areas in the type of healthcare practitioners writing chemotherapy orders, and administering chemotherapy¹⁷); and
- ‘out-dated’ care, care that is not commensurate with ‘best practice’ methods.²⁰

“The pattern of diagnostic and staging procedures used for 1991 rural cases bore more resemblance to that of urban men in 1986 than in 1991.”^{20:727}

These are difficult realities that may not be fully acknowledged in the initial or ongoing training of medical personnel, or in the standards that are set for optimum cancer care delivery.

Additional reasons for observed inequalities which disadvantage non-metropolitan populations include:

- political decisions;¹⁸
- government policies and funding issues;^{24,25}
- differences in risk factor prevalence (especially in regard to Aboriginal and Torres Strait Islander peoples);^{16,26}
- high levels of co-morbidity, especially in Aboriginal and Torres Strait Islander peoples;^{15,16,27:953,28}
- variations in access to screening or early diagnostic services, (for example, breast and cervical screening data indicate much lower levels of participation in screening by Aboriginal and Torres Strait Islander women^{27,29,16,19} and that data are not consistently recorded for these women^{16,24,28});
- rural general practitioners' lack of knowledge;²⁴
- the (later) timing of presentations due to delays in seeking medical advice,^{24,30} leading to more advanced disease at diagnosis,^{26,27:953} especially by Aboriginal and Torres Strait Islander peoples;^{16,19,31,32}
- limited access to specialist diagnostic services, especially for Aboriginal and Torres Strait Islander peoples;¹⁶
- delay in referral for treatment, once cancer has been diagnosed;²⁴
- treatment 'issues',^{24,33} treatment variation (after adjustment for years since diagnosis and stage of cancer at diagnosis²⁸), (possibly) poorer treatment (especially in relation to Aboriginal and Torres Strait Islander peoples²⁶), less complete treatment (especially in relation to Aboriginal and Torres Strait Islander peoples^{19:citing various,27:953}), less treatment compliance, (especially for Aboriginal and Torres Strait Islander peoples);^{14,19,28,31,34-36} poorly coordinated treatment,^{25,37} and suboptimal and/or unsafe care (especially chemotherapy);^{17,38}
- treatment compromised by high levels of co-morbidity (for example, diabetes, cardiovascular, respiratory, and renal diseases: all more prevalent in Aboriginal and Torres Strait Islander peoples^{13,16}), which can predispose to poorer cancer outcomes through increased frailty and reduced physical capacity to cope with cancer and the side-effects of treatment;²⁷
- insufficient access to, and availability of, treatment *per se*, (for example, due to rural healthcare practitioner shortages, as the "supply of health workers typically declines with remoteness"^{4:6});^{17,24,30}
- available treatment technologies that are not staffed and operating to their full capacity (for example, radiotherapy machines in non-metropolitan areas^{17,39});
- lack of, or under-investment in new technology;^{17,40,41}
- lack of specialised, multidisciplinary care teams/ centres;¹⁷
- lack of access to clinical trials and the associated specialist follow up,^{24,42} and to newer, more effective technologies and treatments;³⁸
- large distances from cancer-related health care,^{15,30} such that the "overriding barrier to equitable access to cancer care for all Australians is distance";^{30:2}
- the expense and difficulty of travel to appropriate services (including poor roads, high costs of fuel and regional air travel, absolute and relative lack of transport alternatives), especially burdensome as socioeconomic status and incomes are typically lower in rural and remote than in metropolitan populations;^{4,18,25,30:3,43,44:256} (notes winemaking and mining communities as exceptions to the general statement on SES)
- unavailability of, and inadequate support services (including assistance with patient transport and accommodation^{17,24,25,43-45}), especially burdensome as the majority of cancer patients are elderly;
- difficult decisions and compromises made by some non-metropolitan people because the factors above are a part of the health care equation for the treatment of cancer, once it has been diagnosed (for example, surgeons reported that 25% of women with early breast cancer in 1995 chose non-conservative surgery for various reasons including non-metropolitan residence^{20:727} citing 46);

- under-ascertainment in data collections (i.e., as in under-ascertainment of Aboriginal and Torres Strait Islander peoples in the primary data sources that are used to calculate cancer incidence, outcomes, survival and mortality; under-ascertainment of cancers in this, and possibly in other populations);^{16,47:11,48}
- lower rates of autopsy (specifically of Aboriginal and Torres Strait Islander peoples – related to under-ascertainment^{47:11}); and
- other factors.^{26,38,43,44}

Many of the factors, which apply generally to various non-metropolitan areas in Australia, may also apply to South Australia specifically, although there is a relative lack of information in the peer-reviewed literature. The research information which is specific, however, indicates a similar situation for South Australians resident in non-metropolitan areas.

“The accessibility of a person's residence had the most consistent association with the risk of cancer diagnosis across the specific cancers.”^{49:1st page}

The reasons listed above which apply to Aboriginal and Torres Strait Islander peoples are inequitable, as are the evident inequities for other segments of the South Australian population. However, those that pertain to Aboriginal peoples reinforce the fact that these populations have been significantly disadvantaged across many aspects of their lives over the generations since colonisation; and the inequities that relate to cancers are mainly preventable, given current knowledge and screening, diagnostic and treatment regimes.^{16,27} Furthermore, this situation appears not to have improved appreciably since detailed analyses comparing Aboriginal and non-Aboriginal South Australians with cancer were first undertaken.^{27,50-52}

“Addressing the cancer disparities in Aboriginal South Australians is not only essential, it is overdue.”^{16:500}

“It is too often assumed that Indigenous people do not wish to travel long distances to access care and be away from their families, or that they have different priorities in life and do not value treatment for illnesses that are likely to be terminal. While poorer compliance or higher refusal rates for treatment may be pertinent factors in some cases, it is important not to assume these types of explanations when there are obvious systemic barriers to accessing care in the current health system. Once these barriers have been addressed, any remaining barriers, if they actually exist, can be explored and dealt with separately.”^{53:561}

Overall incidence and mortality in South Australia

Clear patterns of inequality were evident when the South Australian Cancer Registry (SACR) mapped the geography of cancer incidence and mortality in South Australia for 11 major cancers: breast, prostate, lung, colon, rectum, melanoma, leukaemia, lymphoma, stomach, pancreas and cervix (data for 1991-2000, age and sex standardised to world population).⁵⁴

1. Cancers that are screened for, or detected by a medical practitioner (for example, breast, melanoma and prostate cancers), almost always had higher incidence rates in high socioeconomic status areas, such as eastern and inner southern Adelaide.
2. Cancers that have a well-documented association with low socioeconomic status (for example, lung and stomach cancers) had higher incidence and death rates in low socioeconomic status areas, such as northern and western Adelaide, and rural areas such as the Iron Triangle and the Riverland.
3. The majority of cancers showed no overall differences in incidence and mortality between metropolitan and non-metropolitan areas, with the exception of prostate cancer, which had a higher mortality in non-metropolitan than in metropolitan areas.⁵⁴

These patterns remain evident today⁴⁷ and are not limited to South Australia, but occur across the nation, and also apply in other comparable countries.^{5,7,49,55-73}

“Poorer socioeconomic status is the other major factor associated with poorer outcomes in cancer treatment. Often, low socioeconomic status groups have lifestyles with higher levels of smoking and obesity, do not participate in screening as readily, and may not be able to afford unsubsidized treatments such as high-cost drugs.”^{64:930}

A study that undertook a secondary analysis and synthesis of published SACR data (1977-1999) and South Australian population health surveys (SERCIS, Health Omnibus and Health Monitor surveys; 1991-2000) to determine the extent of evidence for a rural-urban health differential in cancer risk and cancer incidence, survival and early detection in South Australia, found that the mean annual age-standardised incidence of all forms of cancer combined (1977-1996) was about 4% lower for rural than for urban residents (265.2 per 100,000 compared to 274.9 per 100,000).³⁶ Of the 31 types of cancer studied, the incidences of three cancers were significantly higher among rural residents (buccal cavity, lip, and pharynx); eight were significantly higher among urban residents (stomach, colon, liver, lung, bladder, kidney, thyroid, and non-Hodgkin’s lymphoma); and there was no significant difference for the remaining 20 cancers (statistically significant difference equal to no overlap in 95% confidence intervals).³⁶

The SACR and other analyses point to various ways in which cancer-related, public health interventions can be applied. Where there is evidence of no difference in rates (e.g., between non-metropolitan and metropolitan areas, areas of high and low socioeconomic status, or between males and females), intervention programs designed for whole-of-population impact are appropriate. However, where there are clear inequalities, more targeted approaches are needed, and are likely to return better value for investment. For instance, in relation to the patterns emergent from the SACR’s work – and potentially this – analysis, the following recommendations could be considered.

1. Increase cancer screening/ detection opportunities to low socioeconomic status groups to the equivalent level experienced by those in high socioeconomic status areas.
2. Target behavioural change programs related to risk factors for lung and stomach cancers to residents of low socioeconomic status areas.
3. Target programs to prevent, detect and treat prostate cancer to non-metropolitan males.

“... primary prevention of chronic diseases among the socially deprived might be one way to reduce social differences in prognosis”^{60:1107}

“Targeted interventions to increase breast cancer screening and treatment coverage in patients with lower SES could reduce much of socioeconomic disparity.”^{71:1st page}

“Despite a universal health care system in Australia, socioeconomic inequalities in survival from colorectal cancer exist, and an enduring challenge is to ensure that improvements in colorectal cancer survival are shared equally across the population.”^{61:290}

Screening participation and coverage rates

In general, screening rates for women for breast and cervical cancer in non-metropolitan areas appeared to be equal to, or higher than those among women in metropolitan areas (with the exception of Aboriginal and Torres Strait Islander women).^{74,75} Wilkinson and Cameron found no substantial differences in “early detection experiences” for Pap smear, and mammogram in self-reported data from a range of South Australian population health surveys (1991-2000).³⁶ Bowman, Sanson-Fisher and Redman, however, caution against relying on such self-reported data, as their attempt to verify these findings with results from pathology laboratories found consistent over-reporting of Pap smear histories.⁷⁶ They suggested:

- use of means other than unverified self-report may be preferable to assess screening prevalence;
- methods to improve the accuracy of self-reported data should be employed in surveys; and
- care should be taken when comparing screening rates that have been obtained using different methods.⁷⁶

Siahpush and Singh used data for Australia from the ABS 1995 National Health Survey to explore socio-demographic predictors of Pap test knowledge, receipt and currency (“being up-to-date for”), finding that women at greater risk of having no knowledge of or not receiving Pap tests, were more likely to be:

- in certain age groups: 18-29, and 50-69 years of age;
- not presently married;
- with lower levels of education (marked gradients were evident); and
- those born in the Middle East or Asia (compared with Australian-/ New Zealand-born women).⁷⁷

No difference was found in the likelihood of screening and knowledge between metropolitan and non-metropolitan regions, or by the SES of areas. The authors concluded that a comprehensive cancer screening strategy should ensure that women who were least likely to receive Pap smears would benefit from targeted interventions to improve adherence to cervical cancer screening recommendations.⁷⁷

A similar study by the same authors using the ABS 1995 National Health Survey to explore breast cancer screening procedures and practices (mammography, clinical, and breast self-examination, women aged 18 years and over, $n= 10,179$) found that a lower likelihood of screening was significantly associated with:

- being in the oldest age group;
- having never been, or having previously been married;
- living in rural regions (except for breast self-examination);
- living in more disadvantaged areas (except for breast self-examination);
- having lower levels of education; and
- ethnicity.⁷⁸

The authors concluded that strategies to promote breast cancer screening practices should target these under-served population groups, and be part of a more comprehensive policy that ensures their access to regular health care.⁷⁸

Although not noted by the authors, these results are also subject to the limitations of unverified self-report data, as discussed above.⁷⁶ When data from screening agencies were examined, different patterns emerged, which in general showed that women living in lower SES areas (in both metropolitan and non-metropolitan areas) were less likely to receive screening services and more likely to have poorer cancer outcomes.⁷⁹

A study comparing the characteristics of people who use colorectal cancer screening tests with those who do not, found that both Faecal Occult Blood Testing (FOBT) and any testing (FOBT, sigmoidoscopy or colonoscopy) were significantly reduced in population groups with the following characteristics:⁸¹

- aged 50-59 and 80 years and over;
- female;
- no family history of colorectal cancer;
- lower levels of education;
- lower income;
- not speaking English at home;
- lack of private health insurance;
- not being retired;
- not living with a partner; and
- not having other screening tests.

A total of 36.2% of participants reported colorectal cancer testing while 17.9% reported having a FOBT (study analysed self-reported questionnaire data from the 45 and Up Study, 2006 cohort [$n=15,900$ women, 14,953 men, aged 50 years or over who had never had colorectal cancer]).⁸¹

In relation to risk factors, test uptake was especially low in:

- current smokers;
- sedentary participants;
- those without fruit or vegetables in their daily diet; and
- those living with a disability.⁸¹

In a Queensland study exploring the use of three cancer screening types by men aged 50 years and over, nearly 52% of men reported ever having at least one PSA (Prostate-Specific Antigen) test for any reason, compared with 15.5% reporting a FOBT and 45.4% reporting a whole-body skin examination (data from the Queensland Cancer Risk Study [QCRS] population-based telephone survey conducted in 2004, of men aged 50-75 years [$n=2336$], overall participation rate of 46%).⁸² Excluding those men whose most recent test was for diagnostic or monitoring purposes, 36.0% of men reported never having been screened for prostate, colorectal, or skin cancers. In those who had been screened, the odds of reported PSA testing were more than two times greater than the odds of whole-body skin examination, and the odds of reporting an FOBT were even lower.

Inequalities were evident in reported screening prevalence between the three specific tests (PSA testing, FOBT and whole-body skin examination), and across certain population subgroups.⁸² Men participating in cancer screening tended to be:

- older;
- reported their skin colour as white;
- lived with a partner; and
- had private health insurance.⁸²

Men who reported smoking were less likely to be screened with any of the three tests that were the focus of this study.⁸² Any differences or lack of differences related to the men's residential location were not reported; and Aboriginal and Torres Strait Islander men, those with lower educational attainment, unmarried men, and those without a history of cancer were under-represented in the study.⁸²

Although the FOBT has the best evidence for reducing mortality, it was the least frequently used by Queensland men; and, conversely, there appeared to be relative over-use of PSA testing, which the authors surmised was due to increasing awareness of prostate cancer as a men's health issue, high prevalence of urinary symptoms in men aged over 50 years, the test's low cost and ease of application, as well as medico-legal concerns that could be an incentive for general practitioners to screen rather than not to screen.⁸² This was similar to the findings from a recent study of the cancer screening activities of the Greek population (Greece is a country with opportunistic rather than programmatic screening practices) that while colorectal cancer screening was rarely performed (12%), non-evidence-based tests were much more regularly performed (for example, urinalysis, 50%).⁸³ The authors noted that opportunistic cancer screening in a primary health care system without national guidelines may cause "ambiguous results".^{83:164} Evaluation of the factors influencing cancer screening behaviours and effective interventions to improve adherence with public health recommendations have been suggested as areas for future research.⁸²

Suggestions for increasing FOBT screening in the meantime included:

- using the prostate cancer screening encounter as an opportunity to promote FOBT for early detection of colorectal cancer; and
- given the associations of being married and older age with cancer screening, promotional programs could also seek to involve men's partners to increase participation in cancer screening by FOBT.⁸²

Although the benefits of FOBT screening are relatively clear, barriers include the inconvenience and unpleasantness of the procedure, lack of perceived benefit from screening, anxiety over possible results, cost, and cultural beliefs and attitudes.⁸² Previous participation in a cancer screening test was also associated with further propensity to continue participating in screening.^{82: citing 84}

Screening of Aboriginal and Torres Strait Islander Australians

Various reviews have called for screening programs to be implemented more effectively, and for established cancer risk factors to be addressed in Aboriginal and Torres Strait Islander peoples.^{14,16,27,85,86} Persistently lower levels of screening participation and higher prevalence of cancer risk behaviours (for example, smoking, excessive alcohol consumption, poor diet) have all been cited as evidence of the lack of effectiveness of current interventions.⁸⁶

Higher than expected numbers of cancers, which are amenable to prevention and early detection through screening programs, have been persistently recorded for South Australian Aboriginal populations (as for other states and territories) as well as poorer than expected survival, at both five and ten years after diagnosis.^{16,47,50}

A range of small scale initiatives have attempted to improve the participation in breast and cervical cancer screening of Aboriginal and Torres Strait Islander women, who have higher incidences of cervical cancer and poorer outcomes for breast and cervical cancer than non-Indigenous women.⁸⁷⁻⁸⁹ Garvey and colleagues suggest that “the time is right to make substantial gains through a coordinated, priority-driven research effort [which] should involve a collaborative partnership of researchers, policymakers, service providers and consumers, with substantial Indigenous input and leadership.”^{90:531} Other related recommendations are contained in the *Opportunities* section below.

Of significance is the call for “a move away from state- or territory-based approaches or specific cancer-based approaches towards more integrated, coordinated, systems-based approaches to improve the quality of care.”^{90:531} While this suggestion was made in relation to cancer in Aboriginal and Torres Strait Islander peoples, it may apply equally well to cancer in all Australians.

Studies of population screening for cancers over lengthy periods of time in the United States (for example, as assessed in the 1987, 1992, 1998, and 2000 National Health Interview Surveys) have shown that there the greatest inequalities in screening were correlated with access to health care, and, the strongest predictors of non-use or under-use of preventive screening were not having a “usual source of health care”, not having health insurance, and not using other preventive health services (for Pap testing at least, non-urban residential location was not associated with less utilisation).^{91:1113,92-94} Recent immigrants were also less likely to have had recent screening.⁹³ Population groups with lower rates of screening use in 1987 showed a widening gap over the period to 2000.⁹³ Patterns of disparities in 2005 remained the same as those in previous years.⁹⁵ Although screening rates had changed, only colorectal endoscopy had increased, PSA testing and mammography had decreased and Pap testing was stable. Factors related to individual interaction with the healthcare system led to the most significant inequalities. For instance, even when test rates increased (colorectal endoscopy), those without health insurance or doctor contact were not screened.⁹⁵ Similar patterns have been seen in Australia, as the reports detailed above indicate.^{81,82}

The impact of population screening programs on detection or ‘incidence’ rates is noted in the following section where appropriate.

Detection rates for cancers

It has been estimated that one in three South Australians will be diagnosed with cancer at some time during their lives, with 60% of cancers detected in people aged 65 years and over (0.5% of cancers detected in people aged 0-14 years, 7% in those aged 15-44 years, and 32.5% in those aged 45-64 years).⁴⁷

The secondary analysis of SACR data (1977-1999), and the South Australian population health surveys (1991-2000) referred to above, found that there were no significant differences in early detection rates for breast cancer or bladder cancer, between metropolitan and non-metropolitan

areas.³⁶ Melanomas were, however, diagnosed *in situ* more often in residents of non-metropolitan areas, and invasive cases tended to be thicker. There were also no substantial reported differences in major cancer risk factors and early detection experiences (self-reported smoking, alcohol risk, sun exposure, Pap smear, mammogram) apart from higher rates of smoking in rural South Australia.³⁶ The findings for cancer risk factors and early detection experiences relied on self-reported data from population surveys, and the traditional limitations apply (for example, self-reporting of 'socially desirable', rather than actual behaviours).

Evidence from the Australian Longitudinal Study on Women's Health (limitations of self-reported data apply) also found that there was almost no difference among women in metropolitan and non-metropolitan areas in relation to either 'current smoking' or smoking history.⁹⁶ The prevalence of overweight and obesity was only slightly higher among women in remote areas, and levels of physical activity slightly lower than among urban women. The authors concluded that there was little evidence that the observed inequalities in mortality were due to the various risk factors considered (mortality was higher for women in rural areas overall, for most major causes of death, and substantially higher for lung cancer compared to urban women; $n=12,400$ women aged 70-75 years in 1996). They suggested that "alternative explanations, such as inequities in health services and environmental hazards, should be considered."^{96:624}

People in rural areas may suffer from a double disadvantage of poorer health services and exposure to health hazards that are less common in urban areas.^{96:624}

In its latest annual report, the SACR reported that the trend towards stable incidence rates for both males and females (1977-2003) had changed in 2004-2007, with an increase in prostate cancer incidence which had caused the all-cancer incidence rate for males to rise; and that incidence generally was rising rapidly of cancers for which population-based (and/or private) screening services were available: colorectal cancer, breast cancer, melanoma and prostate cancer; as well as of some cancers for which improved diagnostic methods had become available (for example, kidney cancer and ovarian cancer).⁴⁷

The latest SACR data confirmed the inequalities evident in previous mapping of the incidence and mortality of major cancers in South Australia (1991-2000): cancers that required screening or a medical check to be detected (such as, breast, melanoma and prostate cancer) had higher incidence rates in people living in high socioeconomic status areas; while cancers associated with lower socioeconomic status (such as lung and stomach cancers) had higher incidence and death rates in people living in low socioeconomic status areas. Most cancers, however, showed no overall differences in incidence and mortality between metropolitan and non-metropolitan areas (with the exception of prostate cancer mortality).^{47,54} Overall, both the incidence and mortality rates did not vary significantly from national averages for all cancers.

The SACR reporting on incidence, and mortality of specific cancers (2001-2007 and 1977-2007) included some observations on further inequalities, which follow.³⁶

Prostate cancer became the most commonly diagnosed cancer overall, and for males (prostate cancer accounted for 30% of all male cancers in 2007). The rise in incidence is attributed to the wide-spread use of prostate specific antigen (PSA) testing; and longitudinal studies are being undertaken to determine whether such testing leads to reductions in prostate cancer-specific mortality.³⁶

Melanoma incidence, which had increased for both sexes over the previous three decades, appeared to have levelled off in recent years. Increases were larger in males, in older age groups, and among those with sun-exposed occupations (for example, farmers and labourers). Melanoma is more common generally among Australian-born than migrant populations in South Australia, and is rarely diagnosed in Aboriginal South Australians or in immigrants from Asia and other populations who have pigmented skins.³⁶

For breast cancer in females, the incidence increased after the introduction of mammographic screening (especially in the 50-69 year old target group), with screening participation having a demonstrable impact on mortality, which has decreased since 1990 despite the rising incidence (a

review of mammography trial data by the International Association of Cancer Registries in 2002 concluded that a 25% reduction in breast cancer mortality was achieved in women provided with mammographic screening, compared with those who were not⁹⁷).³⁶

Lung cancer incidence had fallen by about 25% in males since 1977, with an equivalent reduction in mortality, mostly in the younger age groups. Lung cancer incidence in females, however, had shown a 65% increase in incidence over the same period, which had continued into this century. Higher incidence rates continued to be found in those living in the lower socioeconomic areas of Adelaide.^{36,40} Aboriginal women had particularly high rates of lung cancer. Overseas-born males had a higher incidence than Australian-born males; immigrants from the UK and Southern Europe had an elevated risk and Asian-born males a lower risk of lung cancer.³⁶ Reductions in tobacco smoking in the 1970s have been confirmed as the cause for the decreased incidence in lung cancer, as the result of the decreasing ratio of small-cell or squamous-cell to adenocarcinoma lesions in males over the past 30 years.³⁶

Colon cancer had increased in incidence by around 40% in males and 6% in females over the last 30 years, although mortality rates had decreased over the same period (by about 40% in females and 15% in males leading to improved five-year survival for this cause). Incidence rates were thought to have been raised artificially by the increased use of faecal occult blood testing and colonoscopy leading to improved detection.³⁶ A greater incidence was evident in people living in higher socioeconomic status areas. Aboriginal South Australians had a comparatively low incidence of diagnosed colon cancer. Australian-born people appeared to have a higher risk than the overseas-born population, with migrants from Southern Europe having particularly low incidence.³⁶

Rectal cancer increased in incidence through to the 1990s, but had since levelled out, while mortality rates also peaked in the 1990s in both sexes, with slight declines subsequently. As with colon cancers, cancers of the rectum had a higher incidence in Adelaide than in non-metropolitan areas, with elevated rates in people living in higher socioeconomic status areas.³⁶ Australian-born residents had a higher incidence of cancers of the rectum than did those who were born overseas.

Cervical cancer had been widely reduced with more than 70% of cervical cancers in Australia now detected early and at a curable stage, as a result of population screening programs.³⁶ In South Australia, incidence had fallen by around 40% over the past 30 years, and mortality rates reduced by about 70% over the same period. Overall, the reduction in mortality was greater than the decline in incidence and is attributed to earlier intervention following detection through Pap smear screening, as well as to disease prevention initiatives. However, increased cervical cancer incidence was found in women living in the lower socioeconomic status areas of Adelaide; and Aboriginal women had incidence rates that were five to six times higher than other South Australians: there is an urgent need to address this inequality. Antiviral strategies, such as the vaccination of young people against HPV have potential to reduce incidence further.³⁶

Other studies

Aboriginal and non-Indigenous incidence data analysed from cancer registries in a three state, five-year study (2002-2006; SA, WA, NT) showed that South Australia had the lowest age-standardised rates of cancer for both Aboriginal and non-Indigenous people (age-specific rates calculated using direct standardisation and 2001 ERP for Indigenous and non-Indigenous populations).⁴⁷ There were, nevertheless, large inequalities between Aboriginal and non-Indigenous residents of South Australia.

Deaths from cancer of Aboriginal and Torres Strait Islander Australians occur at about 1.6 times the rate of the Australian population,¹³ but cancer survival is lower than for non-Indigenous people. Cancer is the third most common cause of death among Aboriginal and Torres Strait Islander peoples, and accounts for a greater number of deaths each year than diabetes and kidney disease.¹³ Aboriginal and Torres Strait Islander Australians experience a higher incidence of high-fatality cancers, their cancers tend to have reached more advanced stages at diagnosis, and they have greater levels of comorbid illness, poorer access to care and less comprehensive treatment.^{85,86} Many potentially preventable or screen-detectable cancers are also commoner among these populations.^{85,86}

The burden of cancer among Aboriginal and Torres Strait Islander Australians continues to be underestimated, because of identification deficits in basic data sources.

A series of ecological studies using 'descriptive' (or administrative data) over a long period (1982 to 2008-2009) to analyse trends for prostate-specific antigen (PSA) testing, prostate cancer incidence, radical prostatectomy and prostate cancer mortality, in order to assess whether men in non-metropolitan areas of Australia had equitable access to prostate cancer services and improved outcomes, found that they did not.^{98,99} Their use of diagnostic and treatment services remained lower than that of their metropolitan counterparts, and their survival and mortality outcomes were poorer, as previously observed inequalities continued. The study authors called for an urgent exploration of the reasons for these differences and for the implementation of strategies to address them.^{98,99}

Coastal and riverine areas showed a significant excess of melanoma incidence when the SACR incident cases (1985-2004) were geo-coded and mapped for Adelaide and 11 regional centres (83% of the state's population, listed below).¹⁰⁰ The age-adjusted increased risk of melanoma incidence associated with living near the coast or the Murray River (compared with living inland) was 19% and 25%, respectively (an increase in crude incidence rates of 41% and 19%). The significantly increased risk of being diagnosed with melanoma remained significant after adjusting for age, remoteness and SES, confirming the existence of a real geographical effect (and suggesting - in the absence of lifetime address data - that those who lived near coast or the river may have a lifetime preference for these places). The regional centres included in the analysis, with 2001 ABS census populations close to, or above 10,000, (and their ARIA categories) were: Port Lincoln, remote; outer regional: Renmark/ Paringa/ Berri, Port Augusta-Stirling North, Whyalla, Port Pirie, Wallaroo/ Moonta/ Kadina; and inner regional: Nuriootpa/ Angaston/ Tanunda, Murray Bridge, Mount Gambier, Mt Barker/ Nairne, and Victor Harbor/ Middleton/ Port Elliot.

Follow-up and service delivery for cancer detection-positive individuals, referrals and treatment types and rates, after-care and monitoring of treated individuals

A retrospective survey of Medicare records found substantial geographical inequalities in patterns of surgical management for breast cancer (all Australian women who underwent surgery for breast cancer in 1993 for which Medicare benefits were paid, $n=4,683$).¹⁰¹ The frequency of breast conservation varied significantly between states and region of residence, ranging from 34% in rural women to 42% in urban women; and from 34% in WA to 49% in SA and the NT (the difference between the states could not be explained).¹⁰¹ Breast conservation also decreased significantly with age; and the study authors posited that the tendency for rural women to submit to mastectomy rather than breast-conserving surgery might reflect their relative lack of access to local postoperative radiotherapy.¹⁰¹

A survey of a sample of women aged 34-80 years in rural NSW and SA who travelled for breast cancer treatment ($n=80$, 63% response rate) revealed that more than 90% of participants needed to travel for treatment because of the lack of treatment centres near their homes.⁴⁵ On average, they spent 6.79 weeks away from home and family. More than 80% of participants travelled for radiotherapy, with 55% travelling more than 200 km for treatment.⁴⁵ Although the majority of women had been provided with some type of social support, only 39% received financial assistance but 19% of these had had trouble claiming from the fund. Nearly a third (29%) of the 48 women who did not receive financial assistance, stated that they were unaware it was available, and 13% found the process too complicated.⁴⁵

A similar Australia-wide survey of rural women diagnosed with early breast cancer ($n=204$, 63% response rate) found that over half of the participants undergoing radiotherapy and a third of those having chemotherapy, travelled more than 100 km for their treatment.⁴³ The length of time away from home varied up to about three months, with an average of 43 days for radiotherapy and 20 days for chemotherapy. Less than a third of the women surveyed had been provided with information on available financial support or accommodation while away from home.⁴³

Although the majority of the women surveyed were satisfied with the provision of information overall, less than a third of participants had been provided with specific information on assistance for rural women.⁴³ While every jurisdiction provides financial assistance for rural patients travelling for medical treatment, only 47% of the women who had to travel for treatment, received financial assistance, and 13% of these had difficulty organising or claiming such assistance. Primary sources of psychosocial support were clinicians (for example, surgeons, general practitioners); less than 10% of women and 5% of their families received support from a social worker, counsellor, psychologist, or psychiatrist.⁴³

“Cancer treatment for rural residents is currently provided through either taking the specialist care to the patient or by taking the patient to the care. The further the patient lives from the tertiary health care centre the more problematic both options become.”^{25:235}

Clinical oncology services across regional and rural Australia were mapped in a major study by Underhill and colleagues using a self-administered survey (June-December 2005) of 161 regional hospitals administering chemotherapy (RHAC), with a 98% survey completion rate achieved.¹⁷ RHAC were categorised by state, Hospital Peer Group and the Australian Standard Geographical Classification (ASGC) Remoteness Areas (RA) classification (0=major cities, 1=inner regional, 2=outer regional, 3=remote, and 4=very remote). Overall, significant service provision inequities were identified. For instance, only 21% of RHAC reported a resident medical oncology service, only 41% reported access to a visiting service (visit frequency ranged from weekly to six monthly), and the remaining 38% reported no medical oncology service, despite administering chemotherapy.¹⁷ Medical oncologist availability decreased with increasing remoteness (RA1=56%; RA2=22%; RA3=11%) with no medical oncologists (either resident or visiting) reported in RA4. While 59% of RHAC overall reported that the majority of chemotherapy orders were written by a medical oncologist (this ranged from 24% in SA to 96% in NSW), and, as with medical oncologist availability, the number of RHAC that reported chemotherapy orders written by a medical oncologist decreased with increasing remoteness and the number reporting orders written by general physicians, general practitioners and ‘other’ doctors increased with increasing remoteness.

South Australia (and the NT) were the most likely to report chemotherapy administered by general practitioners (68% and 66%, respectively) or ‘other’ trained nurses (50% and 100%, respectively). Overall, only 7% of RHAC had a radiation oncology unit and only 11 radiation units were reported for all 157 RHAC reporting (with none in the NT, as these patients were flown to Adelaide for treatment). Of the total 26 available radiation therapy machines, however, less than half (46%) were reported as fully staffed. When a unit *was* staffed and available, the average wait for radiation treatment was three weeks (ranging from 0 to 6 weeks).¹⁷

Across South Australia, the number of RHAC in the different remoteness areas was: none in RA0, (as there are no major regional centres as classified by the ASGC in the state), seven in RH1, 18 in RH2, eight in RH3, and none in RH4 (with one RHAC unspecified). The total of 34 identified RHAC (100% responding) was substantially more than the 25 (100%) identified in New South Wales, but fewer than the 45 (96%) identified across Queensland; and South Australia had more in the RH2 outer regional areas than either of these states, but fewer in the RH1 inner regional areas.¹⁷

A study that was specific to South Australia examined and clarified issues of concern to patients resident in rural and remote areas but undergoing cancer treatment in Adelaide.²⁵ Secondary analyses of data from cancer registries and government reports showed that the incidence of cancer was 4% lower in rural residents, and survival was significantly lower, when compared with metropolitan residents for ten cancer types, although risk factor prevalence appeared to favour the rural population (for example, higher Pap screening participation and greater use of precautions against sun exposure).²⁵

The majority of the rural and remote residents who underwent cancer treatment in Adelaide and were surveyed for this study ($n=96$) were satisfied with their treatment; however, expectations were low, and there was a tendency to understate treatment-related problems.²⁵ Many participants

attended treatment with their spouse/ partner and the lack of routine financial support for this was problematic.

Issues of concern included:

- a lack of coordination of their treatment;
- no reimbursement for psychosocial support (i.e. partner escort to treatment);
- inadequate provision of information; and
- a lack of practical support with accommodation and transport.²⁵

Healthcare practitioners confirmed these findings in separate interviews and endorsed strategies to improve psychosocial support. The overall findings demonstrated that participant expectations of treatment were largely met, but that their needs for practical and psychosocial support were not. There was minimal use of shared healthcare arrangements, and few strategies were in place to limit the number of metropolitan visits required by rural residents with cancer. Significant opportunities exist to improve the management of care through care coordination and the use of technologies, such as telemedicine and electronic forms of communication.²⁵

While cancer registry data were assessed as excellent, the same quality of data was not available on the care delivery aspects of cancer, including treatment and psychosocial and financial support. Information on cancer service provision in South Australia was not gathered in a systematic way. Difficulties assessing the total treatment and support provided included the number of government-funded organisations and NGOs involved. Supportive care needs were likely to remain invisible as the responsibility for these did not belong to a single agency.²⁵ Recommendations from this study are detailed in the *Opportunities* section below.

"It is difficult to see how appropriate service planning and policy development can take place in the absence of centrally-available and assessed data on current service provision. ... Policy development and implementation should be underpinned by data which more accurately and appropriately progresses the outcomes for rural residents with cancer including issues of practical support."^{25:234}

While not specific to South Australia, an evaluation of a novel Royal Flying Doctor Service (RFDS) dedicated fly-in/ fly-out remote area skin cancer clinic found that treatment outcomes were similar to those in metropolitan skin cancer clinics.¹⁰² The rate of skin cancer detection was 15/1000 adults per year in the study population of adult, non-Indigenous residents of six distinct communities in a remote region of outback Queensland. Males aged 50 years and over were most likely to have a lesion removed, with a statistically significant increase in the proportion of excised lesions which were melanomas, corresponding to a four-fold rise in melanoma detection (from 0.2/1000 people per year pre-intervention to 2/1000 people per year post-intervention).¹⁰² Scrace and Margolis recommended further studies to develop models for skin cancer clinics in remote areas, noting that both the geography and logistics presented unique challenges in addressing the rise in skin cancer incidence.¹⁰²

Butow and colleagues, on behalf of the Clinical Oncological Society of Australia, systematically reviewed the literature including Australian studies, on the experience and needs of people with cancer living in rural areas and their informal caregivers.¹⁰³ The majority of controlled studies reported poorer outcomes for rural patients, who appeared to have higher needs in the domains of physical/ daily living. The authors speculated that this might reflect more limited access to resources, and/or more self-sufficient lifestyles and personal characteristics (for example, stoical types being less likely to ask for help).¹⁰³

The need to travel for treatment caused practical, emotional and financial problems for patients and burdened them with additional anxieties concerning family and work commitments. An Australian study on travel issues reported that the greatest unmet practical need of rural patients and their families was for comprehensive information provided before travelling, and for someone (for example, a nurse or social worker) who could help them interpret it.¹⁰⁴ Summing up this topic,

Butow and colleagues reported: "Some patients reported benefits in sharing experiences with others also forced to stay away from home, but most agreed that staying at home was preferable."^{103:1st page}

Where people with terminal cancer want to die

After weighting to the age-sex distribution of all SA cancer deaths (2000-2002), 58% of respondents to a Health Omnibus population survey ($n=2,652$ aged 15+ years) reported that their preferred place of death, if they were dying of 'a terminal illness such as cancer or emphysema' was their home; this was the majority of respondents across all socio-demographic categories, with the greatest proportions in the younger age groups.¹⁰⁵ This percentage (58%) was much higher than the proportion of cancer deaths actually occurring at home (14%) in SA in 2000-2002. Other reported preferences for place of death were: hospital 28%, hospice 12%, and nursing home 1.8%; versus actual place of cancer deaths: 56% in hospitals, 18% in hospices, and 12% in nursing homes. Preferences were similar across geographic areas, although residents of the Lincoln Statistical Sub-division ($n=39$) were less likely than others to state a preference for dying at home (the only notable urban-rural difference).

Older people (independent of health status) were less likely than younger people to want to die at home; these results were consistent with other studies showing that older people with cancer *are* less likely to die at home. Those elderly people (80+ years), who did not want to die at home, preferred hospitals (33.0%) and hospices (10.8%) over nursing homes (2%); yet around one in four cancer deaths of people of these ages actually occurred in nursing homes.¹⁰⁵ Similarities between preference patterns and actual locations of cancer deaths confirmed that a person's preference was a determinant of place of death. The discrepancy between the preference for, and the relatively low proportion of cancer deaths that actually occurred at home may reflect:¹⁰⁵

- changes in preferences as illness progresses;
- medical complications;
- changes in care needs;
- altered care-giver capacity; and/or
- a lack of services which support people to die where they want.^{105: citing,106,107}

Survival rates

Survival data for South Australia have shown that non-metropolitan residents are worse off than metropolitan residents for a range of cancers, when comparing Metropolitan Adelaide to the non-metropolitan areas in aggregate.¹⁰⁸ A more detailed SACR analysis, which compared cancer survival for four Adelaide and four non-metropolitan areas, found no marked area variation in survival from the primary cancer for all cancer sites combined: area-based five-year survivals ranged from 50% to 55%.¹⁰⁸ Older cases, however, had lower survival rates generally, and males had worse outcomes than females for all sites combined, and for cancers of the skin (melanoma), rectum and lung (as has been previously reported). Females had lower survival rates than males for cancer of the bladder (also as previously reported).¹⁰⁸

Prior analyses had suggested that there were higher case fatalities among non-metropolitan residents for cancers of the stomach, large bowel (colon/rectum), female breast, and bladder, multiple myeloma and related cancers, and these results were confirmed. As an example, non-metropolitan women with breast cancer had five-year survivals that ranged from 68% to 79% by area. After adjusting for age, there were significantly elevated case fatalities in most country areas, especially in the Lower South East.¹⁰⁸ However, previously recorded increases in case survival from female breast cancer, together with reductions in the diameter of tumours at diagnosis, (gains most marked in 50-69 year old women, the main target age range for population screening) and reductions in socio-demographic differences in tumour diameter, should reduce area inequalities in case survival.^{98,100,108}

Inequalities in case fatalities were reported also across areas, for cancers of the larynx, lung, soft tissue, prostate, and skin (melanoma).¹⁰⁸ As an example, five-year survivals for prostate cancer varied by area from 62% to 74%, and, after adjustment for age, there were significantly higher fatality

rates in the Lower South East, and Whyalla, Pirie and Flinders Ranges combined. However, these findings were noted as being difficult to interpret, as numbers of diagnosed prostate cancers have risen in South Australia (as elsewhere) with increased awareness of the disease, and use of tests. Since prevalence of latent disease is high (affecting at least half of older men), increased testing leading to increased numbers of detected cancers, can also result in apparent increases in case survival. In the Lower South East, and Whyalla, Pirie and Flinders Ranges combined, the age-standardised detection rate of these cancers in 1977-1997 was significantly lower (13% lower) than for the rest of South Australia, and apparent reductions in case survival may have been due to these fewer numbers of detected cases.¹⁰⁸ The authors noted the need for evidence of an association between prostate-cancer screening and death rates from this cancer, as without this information, the effects of early detection on case outcomes could not be quantified (see below, the *Research program for the future* outlined by Monroe and colleagues¹⁰⁹).¹⁰⁸

Although this SACR study is frequently cited as evidence of poorer survival outcomes in non-metropolitan compared to metropolitan residents, the authors themselves downplayed the observed difference, describing some findings as “difficult to interpret” and others as likely data artefacts.^{108:42} Other researchers have noted the potential confounder of patient residential moves from non-metropolitan to metropolitan areas to be closer to treatment centres. Luke and colleagues used a cohort design to overcome this difficulty, in examining the use of radiotherapy by cancer patients in lower SES, and in non-metropolitan areas (using SACR data on patients diagnosed 1990-1994, followed to 31 December 1999; $n=31,586$).¹¹⁰ Their study confirmed earlier cross-sectional studies which found lower use of radiotherapy treatment services by country residents, but judged the observed difference as comparatively small. No similar variations by SES of residential area were observed.¹¹⁰

In another study, which explored trends in laryngeal cancer (using cancer registry data, age-standardised incidence, mortality and disease-specific survival, 1977-2005), poorer five-year survival outcomes were found for non-metropolitan residents (among others).¹¹¹ Possible reasons advanced for lower survival in non-metropolitan patients included poorer access to radiation oncology and other specialist services, and delays in diagnosis for other reasons. Laryngeal cancers are associated with tobacco smoking and alcohol consumption, and were more often presented in people aged 50-79 years; males, particularly those born in Southern Europe; UK/ Irish migrants; and residents of lower socioeconomic areas.¹¹¹

On the other hand, SES was not predictive of either survival or treatment modality for colorectal cancers in patients at South Australian teaching hospitals (thought to cover about 40% of patients with colorectal cancers in SA; data from hospital registries 1980-2002, three diagnostic periods, $n=4,387$ colon cancer + 2,581 rectal cancer cases).¹¹² This was described as “a reassuring finding from an equity perspective”, although the authors also observed that it did not exclude the possibility of socioeconomic differences at a population level.^{112:380-381} In terms of treatment differences, older patients were less likely than younger patients to receive surgery, chemotherapy or radiotherapy. Overall, gains in survivals were evident over time, after adjusting for stage, grade and other prognostic indicators, and trends in the use of chemotherapy and radiotherapy, accorded with evidence-based treatment guidelines.¹¹²

A study to determine the extent to which increases in survival for melanoma over 20 years could be explained by characteristics including SES and region of residence, found a small difference in survival by SES, although the direction was inconsistent across the SES scale (SACR data, 9,519 melanoma cases, 1980-2000).¹¹³ Region of residence also predicted survival: five-year survivals varied by region from 83.4% to 92.5% (SEIFA Index, 20 statistical subdivisions); however, there was no difference when classified as either Adelaide or country South Australia. A comparatively low five-year survival was observed for people born in Southern Europe.¹¹³ Overall, five-year survivals increased from 87% (1977-1983) to 93% (1991-1998), probably due to earlier diagnosis as a result of promoting early detection (especially in high-risk groups), as survival varies with lesion thickness at diagnosis and the percentage of diagnosed thicker invasive lesions rose from 40% (1980-1983) to 57% (1996-2000).^{113,114}

For breast cancer in women, Luke and colleagues in another teaching hospital study, found that the risk of death was higher in patients who were aged 80 years and over at diagnosis, and potentially in non-metropolitan residents, although the difference by residential area achieved only a marginal statistical significance.¹¹⁵ A small difference also was observed in this study, with 52.3% of country compared with 47.7% of metropolitan surgical patients undergoing a mastectomy. Women living in rural areas have been found in other studies to be more inclined to submit to a mastectomy, as opposed to more conservative surgery [32], which would reduce the need for travel to metropolitan areas for radiotherapy and other adjuvant therapy. Nonetheless, country residents were not found to have had less exposure to radiotherapy or to adjuvant treatments in general ($P > 0.750$).¹¹⁵

Participation in breast cancer screening in South Australian women has been found to be associated with breast-cancer mortality reductions of between 30 and 41% (range depending on assumptions about screening self-selection bias). A downward mortality risk by recency of last screen prior to cancer diagnosis, and frequency of recent screening, was considered to be consistent with a screening effect. This was a case-control evaluation of the South Australian breast screening service undertaken to confirm the results of randomised trials, as the authors noted that “efficacy of breast screening may differ in practice” from the results of such trials (study based on 491 breast-cancer deaths in 45-80 year old SA females, 2002-2005, i.e., diagnosed after BreastScreen commencement; and 1,473 live controls [three per death] randomly selected from the electoral roll matched by birth date).^{116:409} Women aged 50 to 69 who had primary breast tumours and were screened by BreastScreen SA (24-month screening interval), were estimated to have achieved an additional survival advantage of 2.6 years.¹¹⁷

The secondary analysis of SACR data (1977-1999) and South Australian population health surveys (1991-2000) referred to above, found that the five-year case survival for all cancers combined was 52% for both urban and rural residents.³⁶ Significant survival differences were identified for ten cancers and survival rates for each of these were higher among metropolitan than in non-metropolitan residents.³⁶ In general, evidence from research that is not restricted to South Australia or Australia, has found that cancer outcomes deteriorate with increasing distance from specialist cancer healthcare services.^{30,58,110,118-129}

Aboriginal patients had poorer than expected five- and ten-year survival rates compared with South Australian non-Aboriginal patients, and even poorer actual five- and ten-year survival rates than expected, in an analysis of SACR data for 1977-2003.¹⁶ Differences between expected and actual cancer site distributions were seen as reflecting inequalities in risk factor prevalence for largely preventable cancers, and the survival results reflecting the many obstacles confronting Aboriginal patients with cancer, when compared with non-Aboriginal cancer patients.¹⁶

Jong and colleagues, in a study of cancer survival by geographic remoteness in NSW, found that there were statistically significant differences in the relative excess risk (RER) of death across remoteness categories ($P < 0.001$) for cancers of the cervix, prostate, and all cancers combined; and significant variations in RER of death by remoteness for head and neck, lung and colon cancers and cutaneous melanoma.^{15,28} Substantial reductions in RERs of prostate and cervical cancers for remote areas (when spread of disease at diagnosis was accounted for) suggests that screening, diagnosis and treatment deficiencies all contributed to the excess risks of death for these cancers in remote areas (although interpretive issues exist). High RERs for several cancers in less accessible areas (with the possible exception of prostate cancer) probably reflected variations in the nature of care received after diagnosis. The study used the Accessibility/Remoteness Index of Australia (ARIA¹³⁰) to classify New South Wales Local Government Areas (LGAs) into four discrete categories (highly accessible, accessible, moderately accessible, and remote) and assessed all patients (aged less than 90 years) with cancers diagnosed in NSW between 1992-1996, with survival determined to 31 December 1999 by weighted probabilistic matching to death indexes, and accounted for SES differences; it was also one of few studies to factor in stage at diagnosis.²⁸

Kelsall and colleagues, in a study of colorectal cancer cases ($n=526$) from the Melbourne Collaborative Cohort Study (MCCS) found significant socioeconomic inequalities in survival rates

(SES at diagnosis was assigned through the use of both an area-based measure and an individual level of educational attainment).⁶¹ Previous research from the Study identified associations between poorer colorectal cancer-specific (and overall) survival with:

- lack of regular exercise prior to diagnosis with cancer;
- increasing body fat; and
- increasing waist circumference.¹³¹

Lower SES was determined to be the most robust, and independent, predictor of delayed diagnosis for colorectal cancer in a large study ($n=66,806$ colorectal cancer cases from the California Cancer Registry, 2004-2008) which sought to establish the relative roles of demographic and other factors in delayed versus early stage diagnosis.¹³² Similar findings favouring higher SES populations in terms of survival from colorectal cancer have also been made in other Western countries (e.g., Denmark⁶⁰) and for Europe, where the previously observed low/ high SES gradients for both the treatment chosen, and outcomes, remained.⁵⁵ The context for the European review was the introduction of population screening; the authors concluded that a screening program would need to achieve high participation rates of low SES people to ensure its success and to address increasing inequalities in survival and mortality from colorectal cancer.⁵⁵ The socioeconomic inequalities evidenced in these studies present “an enduring challenge” if improvements in colorectal cancer survival are to be shared equally across the population.^{61:290}

Opportunities to reduce differences between populations through equity-focused measures

There are opportunities to reduce differences between various South Australian populations through equity-focused measures, to increase the level and distribution of services and consequent outcomes from cancer. The evidence outlined earlier attests to the existence of important inequalities in cancer prevention and diagnostic activities, detection rates and stage at diagnosis, most aspects of service delivery, and ultimately patient outcomes, and survival and mortality rates, both within and between metropolitan, and non-metropolitan (regional, rural and remote) populations. The starkest inequalities exist for South Australian Aboriginal peoples, especially those who live in remote areas.

Case survivals are lower for Aboriginal... patients, partly due to an excess of cancer types with a high case fatality, relatively low numbers with a low case fatality, and due to more advanced cancer stages at diagnosis. After accounting for these factors, Aboriginal... Australians still fare worse, probably due to elevated comorbidity and less complete care resulting from geographic remoteness, limited access to transport and accommodation services, and... cultural disconnect with mainstream services.”^{52:729}

More generally, inequalities are evident between different socioeconomic areas, with people living in areas of lower socioeconomic status having poorer cancer outcomes across a number of domains.

Although there is little evidence for substantial or systematic differences in cancer risk factors between metropolitan and non-metropolitan South Australian residents, consistent inequalities in survival to the detriment of non-metropolitan residents have been described as warranting further study.³⁶ Suggested causes for these inequalities include environmental exposures in rural/remote areas, and “inequities in health services” between metropolitan and non-metropolitan areas.^{96:624} Non-metropolitan populations in general, have access to fewer general practitioners and medical specialists per population unit.¹⁰⁹ A growing amount of research into inequalities in cancer outcomes has found that outcomes deteriorate with increasing distance from specialist cancer healthcare services (findings not limited to South Australia or Australia).^{30,58,110,118-129}

While centralisation of cancer treatment services has merit, our study provides evidence of a shorter survival for people with rectal cancer who live relatively far from radiotherapy facilities. It remains a priority to develop and implement policy, cultural and clinical measures to reduce the burden faced by rural and remote patients with rectal cancer.”^{119:350}

The most detailed mapping study of clinical oncology services across non-metropolitan areas in Australia showed the availability of specialist medical, radiation and surgical oncology service

diminished with increasing geographic isolation, noting that similar issues had been reported overseas.¹⁷ Suboptimal service levels were identified for regional hospitals administering chemotherapy (RHAC) in all areas of cancer service provision, including nursing, allied health and multidisciplinary care, as well as shortages of medical and radiation oncologists nationwide.¹⁷

Underhill and colleagues speculated that these deficiencies contributed to the poorer outcomes (including poorer patient survival and reduced quality of life) for cancer patients in non-metropolitan areas.¹⁷ They advised that both short- and long-term measures were needed to improve access to best-practice cancer services. Patient preferences for treatment close to home and their family ought not to compromise access to high-quality care. Suggested measures to improve equity of access without compromising quality of care included:

- providing better services in larger regional centres;
- greater use of new technologies, such as tele-oncology;
- introducing radiotherapy facilities in areas of identified need; and
- expediting the building of multidisciplinary cancer clinics in large regional centres as a long-term investment in equity of cancer care.¹⁷

Regional cancer centres should provide training and support for smaller regional centres and be mentored themselves by metropolitan centres to:

- improve treatment of low-volume cancers;
- provide professional support; and
- provide a platform for research and the introduction of new technologies to improve equity of access and reduce variations in care.¹⁷

Improved cancer outcomes in non-metropolitan areas are likely to result from these investments in multidisciplinary care, care coordination, and patient and carer support.

The 'gap' in radiotherapy services across Australia in 2009 estimated by Morgan and colleagues, on the basis of the number of linear accelerators needed to achieve the recommended 52.3% treatment rate, was 50 linear accelerators.¹³³ The calculated 'actual' maximum treatment capacity was 38%, the same as in 1999,¹³⁴ while the number of new patients each year had increased from 7,419 in 1999 to 16,550 in 2009. A review of health department radiotherapy plans showed that new and replacement machines were being installed in all jurisdictions, but that South Australia, along with most other jurisdictions, did not have a Radiotherapy Plan beyond 2010 (only Victoria and Queensland had such a plan, and both underestimated the projected cancer incidence).¹³³

The 2009-2010 Federal Budget provided \$560 million over five years for the creation of a national network of best practice regional cancer centres, to improve access for cancer patients in rural, regional and remote Australia and help close the gap in cancer outcomes between these and metropolitan areas.¹³⁵ However, in a recent editorial comment on the service gap and government initiatives to address it, Morgan noted that, while the multidisciplinary management of cancer promoted by the Radiation Oncology Reform Implementation Committee supported the co-location of surgery, radiotherapy and chemotherapy, the 11 new chemotherapy units in non-metropolitan South Australia approved by the Commonwealth¹³⁶ and South Australian governments, including a new Regional Cancer Centre at Whyalla, still left the nearest radiotherapy centre 395 kilometres away in Adelaide.¹³⁷

Areas for future research

In 1992, Monroe and colleagues set out the parameters of the research program that was needed to establish that access to or use of healthcare services definitively influenced cancer outcomes, as well as the criteria to evaluate such research.¹⁰⁹ To address the access-to-care/ cancer outcome hypothesis, researchers needed to undertake rural-urban comparison studies with the following characteristics.¹⁰⁹

1. Focus on cancer types for which effective screening and/or treatment protocols reduce mortality or improve survival;
2. Measure different components of health care including:
 - community cancer prevention activities;
 - availability of medical specialists (for example, oncologists); and
 - ethnic, cultural, educational, and socioeconomic barriers to healthcare use;
3. Compare outcome measures including:
 - the stage at diagnosis;
 - the proportion of cancers unstaged at diagnosis;
 - the case fatality rate;
 - survival time; and
 - quality of life following diagnosis.
4. Evaluate the impact of the socioeconomic status of individual patients as a potential confounder (given that rural populations are generally of lower socioeconomic status, and less educated than urban populations);
5. Improve and standardise rural-suburban-urban definitions to produce more uniform and reliable classifications of place of residence; and
6. Elucidate the relationship between geographic access to specialised cancer care, including cancer prevention activities, and cancer outcomes, in order to detect emerging differences in health status of rural populations which may be associated with sub-optimal access.¹⁰⁹

Finally, and perhaps most difficult of all, policy-makers needed to be prepared to make decisions about providing complex therapies requiring specialist attention in rural areas, if interventions were found to affect outcomes significantly.¹⁰⁹

Specific measures for South Australian Aboriginal populations

Cottrell, Street, Chong and Roder identified priority areas for interventions to reduce cancer levels in the Aboriginal population and to improve the survival of Aboriginal people diagnosed with cancer as including:¹⁶

- nationally funded and coordinated effective tobacco control programs to reduce tobacco smoking rates, which are evaluated to determine their effectiveness;
- implementing culturally appropriate and well-funded alcohol misuse intervention programs;
- consulting with the Aboriginal community to develop culturally acceptable approaches to cancer control, incorporating their holistic view of health;
- employment of Aboriginal Health Workers to communicate health promotion messages more appropriately at the community level (may also impact rates of other chronic diseases that share the same risk factors: for example, heart disease and diabetes);
- vaccination programs against cancer-related infections (for example, HPV and Hepatitis B);
- increasing participation in cancer screening programs which can be implemented immediately and may benefit from integration into primary care settings (for example, within Aboriginal Community-Controlled Health Services);
- the consistent recording of cervical screening participation by Aboriginal women to provide evidence for the development of policies and resources to increase these women's involvement (data are not collected in SA, nor reliably nationally); and
- undertaking basic research into reasons for poor survival in Aboriginal people.¹⁶

Chong and Roder confirmed that much of the inequality in survival outcomes between Aboriginal and non-Indigenous patients could be addressed through the primary prevention of the more lethal types of cancer suffered by Aboriginal peoples, such as:²⁷

- reductions in tobacco smoking prevalence, which is elevated in Aboriginal people, would lead to reductions in the incidence of cancers of the lung, liver, oesophagus, head and neck;
- reductions in excess alcohol consumption, also common in some Aboriginal communities, would lead to reductions in cancers of the liver, oesophagus, and head and neck;
- dietary improvements (for example, increased fresh fruit and vegetable consumption) may lead to decreases in cancers of the head and neck, oesophagus, and stomach;
- hepatitis B vaccination of all Aboriginal newborns would protect against liver cancer;
- improvements in living conditions, including hygiene, could lead to reductions in *Helicobacter pylori* infection and the risk of stomach cancer.²⁷

Expanding these and other activities with a cancer prevention focus should be a priority, as the potentially large effects of today's preventive initiatives will take decades to become evident because of the long disease latencies.²⁷ Thus, the need to improve cancer-related health services for Aboriginal and Torres Strait Islander Australians is evident; however, Garvey and colleagues suggest that the available evidence is not adequate to direct improvements, and that further information is needed on:²⁸

- the availability of Indigenous-specific cancer support services;
- the models of care which are most effective;
- the needs of Aboriginal and Torres Strait Islander cancer patients;
- actions that health services need to take in order to engage productively with patients' families;¹³⁸
- the potentially modifiable factors related to health services' design and delivery, and practitioner attitudes that are associated with poorer cancer outcomes;
- the effects of existing interventions;
- what works, and how to use that knowledge to influence policy and practice; and
- research to guide priority-setting.²⁸

Substantial gains could be made through a coordinated, priority-driven research effort in a collaborative partnership (researchers, policymakers, service providers and consumers) with Aboriginal leadership and contribution, as there is substantial agreement about what is needed for productive progress:²⁸

- the active involvement and leadership of Aboriginal and Torres Strait Islander peoples are critical;
- collaboration and shared lessons between jurisdictions, institutions, researchers, policymakers, service providers and consumers;
- clearly articulated and agreed research priorities, to measure progress and improve cancer care;
- delivery, emphasising work in:
 - reducing risks (e.g., effective tobacco control);
 - identifying and implementing strategies that work across preventive, diagnostic, therapeutic and palliative services;
 - successfully engaging Aboriginal and Torres Strait Islander peoples and communities;
 - improving cancer health literacy; and
 - improving basic data infrastructure and monitoring capabilities.

A nationally integrated and coordinated approach is required, in which new research builds systematically on what has already been achieved, with audit, feedback and translation into behaviour as integral parts of the process. A research agenda should be led by Aboriginal and Torres Strait Islander peoples, with its direction focusing firstly on those cancers with the largest inequalities in survival compared to the non-Indigenous population.

A move away from state- or territory-based approaches or specific cancer-based approaches towards more integrated, coordinated, systems-based initiatives in order to improve the quality of care needs to be considered. Finally, there is an urgent need to identify the barriers against, and enablers for,

accurate identification of Aboriginal and Torres Strait Islander status to improve the accuracy of data collection.

Melanoma prevention and acute care programs may be usefully targeted at residents of coastal and riverine areas, which have a significant excess of melanoma incidence compared with inland areas.¹⁰⁰ Interventions appropriate for older communities will be required because these target population are older than inland populations.¹⁰⁰ Expansions of 1) the Australian G-NAF (Geo-coded National Address File) files to cover rural areas, and 2) cancer registry data to include pre- and post-diagnosis residential address history (providing information on lifetime geographical mobility) are needed to improve cancer research on the link between geographical location and melanoma incidence.¹⁰⁰

Strategies to further promote breast and cervical cancer screening practices should target identified under-served population groups (Aboriginal South Australians¹³⁹; and those with lower levels of education, living in rural and in more disadvantaged areas; born in particular other countries, such as the Middle East or Asia in relation to cervical screening,⁷⁷ and also women who have experienced partner violence¹⁴⁰) and be part of a more comprehensive policy to ensure the access of these groups to regular health care.^{77,78} Methods that have been used with some success with Aboriginal women accessing cervical screening at Family Planning clinics have included: street walks, attendance at community forums, flexible appointments, drop-in times, travel and assistance with childcare.⁸⁹ Employment of female Indigenous workers and female general practitioners to develop and implement local plans (in consultation with communities), to improve service coordination and access, general practitioner knowledge, reminder and recall systems, and health promotion, have also been shown to improve the participation of Aboriginal women in breast and cervical cancer screening.⁸⁷

Targeting screening for colorectal cancer of identified population groups, which have previously reported lower screening rates, has also been suggested. These groups include: particular age groups (for example, people aged 50-59 and 80+ years), people with no family history of colorectal cancer, people of lower education and/or lower income, those who do not speak English at home, those without private health insurance, and people living in remote areas.⁸¹

Suggestions for increasing screening for cancer in men generally, and specifically for FOBT for colorectal cancer detection, include:

- targeting men who report smoking, in particular, and other cancer risk behaviours (as their screening participation rates have been found to be lower for prostate, colorectal, or skin cancer);^{81,82}
- using prostate cancer screening encounters as an opportunity to promote FOBT for early detection of colorectal cancer; and
- developing promotional programs to involve older men's partners in increasing male participation in cancer screening by FOBT.⁸²

Evaluation of the factors influencing cancer screening behaviours and effective interventions to improve adherence with public health recommendations, have been suggested as other areas for future research.⁸² Also high on the research agenda should be a determination of the association between prostate-cancer screening (generally increasing, but especially in certain groups such as those in higher SES areas) and death rates from this cancer (apparently decreasing, but not in areas such as outer non-metropolitan), as the effects of early detection on case outcomes cannot currently be quantified with any certainty.^{108,141}

Needs of people with cancer in rural areas undergoing treatment

Butow and colleagues reported that, although some insights had been gained through their systematic review of the literature into the needs of people with cancer in rural areas, much remained unknown.¹⁰³ They called for population-based, prospective studies that included people with heterogeneous cancers from rural and urban settings.¹⁰³

A study assessing the needs of rural women (including those in SA) travelling to the city for breast cancer treatment highlighted the social and financial costs that this caused, and set out options for ensuring equity in the treatment of breast cancer, which included:⁴⁵

- providing treatment facilities and multi-disciplinary care centres in rural and remote areas (not seen as viable in the near future, given costs);
- increasing the involvement of rural clinicians in breast cancer care outside their practices (for example through telemedicine) which may contribute to improvements in quality of care for rural women;
- reviewing government assistance programs for equity of access, the amount of funds provided, and the appropriate promotion of programs to those eligible to access them;
- improving support through providing rural or community breast care nurses to give comprehensive information and follow-up care, access to telemedicine links for women and their providers, and services to assist with family and work needs.⁴⁵

“Treating women close to home is often not possible, but it is possible to improve access to treatment by making it easier for women to be absent from their home, family and work during treatment. Equity in health care cannot be obtained until all women with breast cancer have the same treatment options regardless of geographic location.”^{45:527}

Cameron made a number of recommendations arising out of a study that was specific to South Australia which reviewed existing data, and surveyed patients from rural and remote areas undergoing cancer treatment in Adelaide.²⁵ These included the following:

- patient travel subsidies should include supporting escorts for patients based on psychosocial as well as medical needs in order to allow equitable psychosocial support and to avoid treating the patient in isolation from their family;
- patients from rural and remote areas accessing cancer treatment in metropolitan areas should be provided with flexible, patient-oriented support that is informed by evaluation of the outcomes of care and support;
- evaluation of these outcomes should be done collaboratively with healthcare providers and consumers;
- routine processes need to be implemented to ensure information on reimbursement schemes for patient travel and accommodation are provided to all eligible patients;
- case manager or rural liaison positions could be used to coordinate information, and clarity about which body is responsible for information and communication ;
- available technology should be used to facilitate shared-care arrangements to provide better care for rural residents diagnosed with cancer;
- visiting specialists could reduce the numbers of trips to Adelaide that are required;
- reducing the complexity of, and providing clear information on, the reimbursement process would improve the access to, and the equity of patient travel and accommodation financial support schemes;
- greater coordination of care would benefit rural patients with cancer (for instance, to reduce the amount of travelling required);
- data to assess and monitor care delivery aspects of cancer treatment are needed to provide information of outcomes related to psychosocial and practical support; and
- further research: a comparative survey of cancer versus non-cancer patients would be useful to establish gaps in care and ensure that all strategies currently used to enhance patient care are considered for use in the broader health context; and a comparative analysis of treatment support outcomes with metropolitan residents could identify discrepancies in patient outcomes and the reasons for them.²⁵

Terminal cancer

Cohort studies are needed to explore the discrepancy between where people say they want to die and where they actually die from terminal cancer, and the extent to which their preferences change during disease progression, or fail to be fulfilled, as well as the policy and service changes that would better fulfil patients' wishes.¹⁰⁵

Investigating differences between preferred and actual places of death would help healthcare service providers to better meet end-of-life preferences.¹⁰⁵ Deficiencies in the provision of services to enable patients to die where they prefer, need to be addressed by service providers and policy makers.¹⁰⁵ Further research to explore whether the content of advanced directives is more closely aligned with hospice-type care than with terminal care in hospitals should be considered.¹⁰⁵

Summary

Inequalities in cancer screening participation, diagnosed incidence, treatment, and consequent cancer outcomes, survival and mortality continue to exist in South Australia, with certain cancers being more prevalent among people living in low socioeconomic areas, and others more frequently diagnosed among those in higher socioeconomic areas, due to the greater take-up of screening opportunities, and diagnostic tests that cost money (and time).

Inequalities are also evident over and above those related to socioeconomic status, among residents of those areas that are most remote from the metropolitan area of Adelaide, where the full range of cancer-related healthcare services is available and readily accessible.

The largest inequalities were evident in the South Australian Aboriginal population, which to a large extent, resides in both of these categories (non-metropolitan including remote residence, and lower socioeconomic status – with all that entails, for instance, lower levels of education, lower incomes, and so forth) and which experiences some of the most inadequate health care in the developed world and faces unacceptable racism and discrimination.

There were also inequalities in the incidence of some cancer types that relate to the origins of the population – whether South Australian born (higher rates of melanoma, especially in males), born in the UK or southern Europe (higher rates of lung cancer), and so on.

Unfortunately for policy makers, the relatively easy successes in this area have been achieved and the more challenging areas remain to be addressed. These include:

- reducing risk factor prevalence further (smoking, risky alcohol consumption, lack of fruit and vegetables in the daily diet, excess of sedentary and lack of physical activity; obesity and overweight, and other unhealthy behaviours) in ways that are appropriately targeted to the subpopulations, especially the Aboriginal populations, which have so far largely missed out on the gains from the healthy behaviours more readily adopted by the less disadvantaged groups within the population;
- extending population screening programs for breast, cervical and colorectal cancers into the hard-to-reach segments of the population, with a special effort to make these culturally acceptable to Aboriginal South Australians, and to South Australians born in other countries;
- improving the delivery of cancer-related healthcare services across the whole of South Australia; and especially to Aboriginal South Australians and other populations resident in the outer regional and remote areas;
- improving support for the non-metropolitan healthcare sector, including staffing, staff training and rotations through metropolitan specialist cancer services, mentoring, more extensive use of telemedicine and other modern cancer-related technological infrastructure and innovations;
- improving financial and other forms of assistance to remote and outer regional South Australians in particular, to make the journey to Adelaide for specialist diagnosis and treatment, including escorts to provide psychosocial support for cancer patients;

- addressing palliative care services and appropriate pain relief for people with terminal cancer and providing targeted assistance in line with their preferences for where they wish to die;
- improving the basic data systems that are used to monitor and evaluate cancer-related data in the population (for example, cancer registries to include stage at diagnosis, lifetime occupation, and lifetime address data, as well as improving the capture of Aboriginal status; and for treatment data to be centralised so that outcomes can be more fully assessed);
- using more sophisticated analytical methods, which can be applied to understanding the heterogeneity of subpopulations in both the metropolitan and non-metropolitan areas;
- better understanding and reporting of the relationship between reported 'incidence' and the impact of screening programs that lead to apparent increases in diagnosed 'incidence' as an artefact of increased screening (for example, the apparently lower 'incidence' of colorectal cancers in residents of low socioeconomic status areas and Aboriginal and Torres Strait Islander Australians being the result of lower screening rates);
- rigorously evaluating interventions and activities that are undertaken to reduce inequalities in access to cancer-related services and cancer outcomes in order to generate the information with which to improve these interventions; and
- better targeting of research: an extensive program is required and has been mapped out in the previous section.

"Addressing deficiencies in cancer service provision in rural and regional Australia will require a whole-of government response and development of flexible service models that reflect local need and existing services. It is not feasible to expect that specialist facilities such as radiation oncology centres will be established in remote locations. However, there is a case for expediting the commitment to introduce radiotherapy facilities in areas of identified need and to explore options for building multidisciplinary cancer clinics in large regional centres as a long-term investment in equity of cancer care. Regional cancer centres could provide support and training for smaller regional centres while in turn being mentored by metropolitan centres to facilitate treatment of low-volume cancers and professional support. They would provide a platform for research and introduction of new technologies^{80,142,143} as well as improving access and reducing variation in care. These benefits and associated improvements in multidisciplinary care, care coordination and support for patients and carers would, in all probability, improve cancer outcomes in regional and rural Australia."^{17:328}

In conclusion, a final overview of the material discussed above reveals the almost total absence of any general or generic reviews examining geographic inequalities in cancer services and outcomes across the broad range of cancer-related topics. The exception was Monroe and colleagues, writing in 1992, whose research agenda for the future is detailed in the *Opportunities* section above.¹⁰⁹ Although frequently cited in the literature, no published account updating the work and research agenda of Monroe and colleagues was found; and it would appear that there are no researchers currently publishing in the peer-reviewed literature at this general level on 'the state of the art' and where it should be going from here. This is despite the fact that cancer screening and testing interventions are now generating 'confounders' (for example, the impact of ramped up prostate cancer testing on incidence, survival and mortality rates).

A summary of the main messages from the research review follows.

Table 1: Summary table of main messages from the research review

| Observation | Possible action/s |
|--|---|
| <p>Inequalities related to cancer outcomes continue to exist in South Australia, especially for</p> <ul style="list-style-type: none"> ▪ Aboriginal South Australians, many of whom live in the most remote areas; ▪ people living in non-metropolitan areas, especially the outer remote and remote areas (with some exceptions); ▪ people living in lower socioeconomic status areas (overlaps with the above); and ▪ people born in certain other countries (differs for different cancer types). | <p>Concerted action is needed to improve cancer outcomes for Aboriginal South Australians, especially for preventable cancers (e.g., cervical cancer). This should be a priority.</p> <p>More targeted action is needed to improve cancer outcomes for people living in non-metropolitan areas and lower socioeconomic status areas, and those born in certain countries, especially to reduce behavioural risk factors (e.g., smoking, alcohol misuse, poor diet and living conditions, and physical inactivity) and preventable cancers (e.g., lung cancer, cervical cancer).</p> |
| <p>Inequalities in cancer detection, incidence, treatment and survival are often associated with particular health risks including lower levels of education and/or income.</p> | <p>Programs to improve cancer outcomes should be part of overall programs to improve health in identified populations, which have missed out on gains made in the general population.</p> |
| <p>Where there are evident inequalities...</p> | <p>More targeted and culturally-appropriate approaches are required.</p> |
| <p>The influence of screening and testing on changes in apparent cancer outcomes over time is largely undetermined except in the clearest cases (e.g., breast cancer in females).</p> | <p>A future research program needs to address this issue, especially in relation to prostate cancer in the first instance.</p> |
| <p>Use of averages hides inequalities: while area-based averages (for example, metropolitan compared to non-metropolitan areas) show no, or minimal differences in important indicators such as screening take-up and cancer survival rates, finer grained analyses show marked inequalities, both between and within metropolitan and non-metropolitan populations.</p> | <p>Reporting and other uses of averages for important indicators should be augmented with finer grained analyses, to clarify the presence or absence of inequalities within and between metropolitan and non-metropolitan populations.</p> |
| <p>Existing research has identified those population groups, who are least likely to receive an equitable share of the services available, especially improved treatments (for example, access to clinical trials), and the corresponding survival gains. Evaluation of interventions that use such research lags well behind.</p> | <p>Research and evaluation activities need to be directed towards benefitting those in the population who have been identified as receiving the most inequitable shares of services, improved treatments and gains in survival.</p> |

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Sources of information

1. Australian Institute of Health and Welfare (AIHW). Australia's health 2006. AIHW cat. no. AUS 73. Canberra: AIHW, 2006.
2. Australian Institute of Health and Welfare (AIHW). Australia's health 2008. Canberra: AIHW, 2008.
3. Australian Institute of Health and Welfare (AIHW). Australia's health 2010. Australia's health series no. 12. Canberra: AIHW, 2010.
4. Australian Institute of Health and Welfare (AIHW). Rural, regional and remote health: a study on mortality. 2nd ed. Rural health series Vol. no. 8. Canberra: AIHW, 2007.
5. Australian Institute of Health and Welfare (AIHW), Australasian Association of Cancer Registries (AACR). Cancer survival in Australia 1992-1997: geographic categories and socioeconomic status. Canberra: AIHW, 2003.
6. Australian Institute of Health and Welfare (AIHW), Australasian Association of Cancer Registries (AACR). Cancer in Australia: an overview, 2006. AIHW cat. no. CAN 32, Cancer series no. 37. Canberra: AIHW, 2007.
7. Australian Institute of Health and Welfare (AIHW), Australasian Association of Cancer Registries (AACR). Cancer survival and prevalence in Australia: cancers diagnosed from 1982-2004. Canberra: AIHW, 2008.
8. Australian Institute of Health and Welfare (AIHW), Australasian Association of Cancer Registries (AACR). Cancer in Australia 2010: an overview. Cancer series no. 60. Canberra: AIHW, 2010.
9. Australian Institute of Health and Welfare (AIHW), Australian Government Department of Health and Ageing (DoHA). National Bowel Cancer Screening Program monitoring report 2007. AIHW cat. no. CAN 35, Cancer series no. 40. Canberra: AIHW, 2008.
10. Australian Institute of Health and Welfare (AIHW), National Breast and Ovarian Cancer Centre. Breast cancer in Australia : an overview, 2009. Canberra: AIHW, 2009.
11. Australian Bureau of Statistics (ABS), Australian Institute of Health and Welfare (AIHW) (Australian Bureau of Statistics & Australian Institute of Health and Welfare). The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples, 2010. ABS cat no. 4704.0, AIHW cat. no. IHW 30. Canberra: ABS & AIHW, 2010.
12. Australian Bureau of Statistics (ABS), Australian Institute of Health and Welfare (AIHW). The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2005. Canberra: ABS & AIHW, 2005.
13. Australian Bureau of Statistics (ABS), Australian Institute of Health and Welfare (AIHW). The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2008. Canberra: ABS & AIHW, 2008.
14. Condon JR, Armstrong BK, Barnes T, Zhao Y. Cancer incidence and survival for Indigenous Australians in the Northern Territory. *Australian and New Zealand Journal of Public Health* 2005; 29(2): 123-128.
15. Jong KE, Vale PJ, Armstrong BK. Rural inequalities in cancer care and outcome. *Medical Journal of Australia* 2005; 182(1): 13-14.
16. Cottrell J, Street J, Chong A, Roder D. Comparing cancer profiles and survival of Aboriginal and non-Aboriginal patients in South Australia: where are the opportunities for improving Aboriginal health? *Asian Pacific Journal of Cancer Prevention* 2007; 8(4): 495-501.
17. Underhill C, Bartel R, Goldstein D, Snodgrass H, Begbie S, Yates P, et al. Mapping oncology services in regional and rural Australia. *Australian Journal of Rural Health* 2009; 17(6): 321-329.
18. McLaughlin D. Why are death rates higher in rural areas? [PowerPoint presentation on The Australian Longitudinal Study on Women's Health], [2010].
19. Christou A, Katzenellenbogen JM, Thompson SC. Australia's National Bowel Cancer Screening Program: does it work for Indigenous Australians? *BMC Public Health* 2010; 10.
20. McCredie M, Bell J, Lee A, Rogers J. Differences in patterns of care of prostate cancer, New South Wales, 1991. *Australian and New Zealand Journal of Surgery* 1996; 66(11): 727-730.
21. Taylor R, Stubbs JM, Langlands AO, Boyages J. Predictors of mastectomy for women with breast cancer in the greater western region of Sydney. *The Breast* 1999; 5(2): 116-121.
22. Young JM, Leong DC, Armstrong K, O'Connell D, Armstrong BK, Spigelman AD, et al. Concordance with national guidelines for colorectal cancer care in New South Wales: a population-based patterns of care study. *Medical Journal of Australia* 2007; 186(6): 292-295.

23. Mitchell KJ, Fritschi L, Reid A, McEvoy S, Ingram DM, Jamrozik K, et al. Rural-urban differences in the presentation, management and survival of breast cancer in Western Australia. *Breast* 2006; 15(6): 769-776.
24. Sabesan S, Piliouras P. Disparity in cancer survival between urban and rural patients - how can clinicians help reduce it? *Rural and Remote Health* 2009; 9(3).
25. Cameron K. People with cancer from rural areas undergoing treatment in metropolitan hospitals: rural-urban differentials and the impact of cancer treatment. In Faculty of Health Science, Discipline of Nursing. 2008. The University of Adelaide: Adelaide
26. Condon JR, Armstrong BK, Barnes A, Cunningham J. Cancer in Indigenous Australians: a review. *Cancer Causes and Control* 2003; 14: 109-121.
27. Chong A, Roder D. Exploring differences in survival from cancer among Indigenous and non-Indigenous Australians: implications for health service delivery and research. *Asian Pacific Journal of Cancer Prevention* 2010; 11(4): 953-961.
28. Jong KE, Smith DP, Yu XQ, O'Connell DL, Goldstein D, Armstrong BK. Remoteness of residence and survival from cancer in New South Wales. *Medical Journal of Australia* 2004; 180: 618-622.
29. Department of Health and Ageing (DoHA). Breastscreen Australia program. Participation and performance trends. Canberra: Australian Government, 2009.
30. Smith T. A long way from home: Access to cancer care for rural Australians. *Radiography* 2011([in press]).
31. Valery PC, Coory M, Stirling J, Green AC. Cancer diagnosis, treatment, and survival in Indigenous and non-Indigenous Australians: a matched cohort study. *The Lancet* 2006; 367(9525): 1842-1848.
32. Shaw IM, Elston TJ. Retrospective, 5-year surgical audit comparing breast cancer in indigenous and non-indigenous women in Far North Queensland. *ANZ Journal of Surgery* 2003; 73(9): 758-760.
33. Craft PS, Buckingham JM, Dahlstrom JE, Beckmann KR, Zhang Y, Stuart-Harris R, et al. Variation in the management of early breast cancer in rural and metropolitan centres: implications for the organisation of rural cancer services. *The Breast* 2010; 19(5): 396-401.
34. Hall SE, Bulsara CE, Bulsara MK, Leahy TG, Culbong MR, Hendrie D, et al. Treatment patterns for cancer in Western Australia: does being Indigenous make a difference? *Medical Journal of Australia* 2004; 181(4): 191-194.
35. Underhill CR, Goldstein D, Grogan PB. Inequity in rural cancer survival in Australia is not an insurmountable problem. *Medical Journal of Australia* 2006; 185(9):479-480.
36. Wilkinson D, Cameron K. Cancer and cancer risk in South Australia: what evidence for a rural-urban health differential? *Australian Journal of Rural Health* 2004; 12(2):61-6.
37. Drury VB, Inma C. Exploring patient experiences of cancer services in regional Australia. *Cancer Nursing* 2010; 33(1): E25-E31.
38. Gosschalk A, Carozza S. Cancer in rural areas: a literature review. 2003. Southwest Rural Health Research Center: Tamu, TX. At <http://srph.tamhsc.edu/centers/rhp2010/Vol2cancer.htm>
39. Cresswell A. Therapy failures lift cancer toll. In *The Australian* [August 29], 2011.
40. Maserat E. Information communication technology: new approach for rural cancer care omprovement. *Asian Pacific Journal of Cancer Prevention* 2008; 9: 811-814.
41. Olver I. Telemedicine in oncology. *Current Problems in Dermatology* 2003; 32:121-126.
42. Vanderpool RC, Kornfeld J, Mills L, Byrne MM. Rural-urban differences in discussions of cancer treatment clinical trials. *Patient Education and Counseling* 2011; 85(2): e69-e74.
43. Davis C, Williams P, Redman S, White K, King E. Assessing the practical and psychosocial needs of rural women with early breast cancer in Australia. *Social Work in Health Care* 2003; 36(3): 25-36.
44. Dixon J, Welch N. Researching the rural-metropolitan health differential using the 'social determinants of health'. *Australian Journal of Rural Health* 2000; 8(5): 254-260.
45. Davis C, Girgis A, Williams P, Beeney L. Needs assessment of rural and remote women travelling to the city for breast cancer treatment. *Australian and New Zealand Journal of Public Health* 1998; 22(5): 525-527.
46. Hill D, Jamrozik K, White V, Collins J, Boyages J, Shugg D, et al. Surgical management of breast cancer in Australia in 1995. Sydney: NHMRC National Breast Cancer Centre, 1999.
47. South Australian Cancer Registry (SACR). Cancer in South Australia 2007 - with projections to 2010: a report on the incidence and mortality patterns of cancer. Adelaide: SA Department of Health, 2010.
48. Giles GG. How important are estimates of cancer prevalence? *Annals of Oncology* 2002; 13: 815-816.
49. Cramb SM, Mengersen KL, Baade PD. Identification of area-level influences on regions of high cancer incidence in Queensland, Australia: a classification tree approach. *BMC Cancer* 2011; 11.
50. South Australian Cancer Registry (SACR). Cancer incidence, mortality and case survival in the South Australian Aboriginal population. In *Epidemiology of cancer in South Australia 1977 to 1996*. Adelaide: SACR, South Australian Health Commission, 1997.

51. Roder D. Comparative cancer incidence, mortality and survival in Indigenous and non-Indigenous residents of South Australia and the Northern Territory. *Cancer Forum* 2005; 29(1): 7-9.
52. Roder D, Currow D. Cancer in Aboriginal and Torres Strait Islander People of Australia. *Asian Pacific Journal of Cancer Prevention* 2009; 10(5): 729-733.
53. Boffa JD. Cancer care for Indigenous Australians. *Medical Journal of Australia* 2008; 188(10): 560-561.
54. South Australian Cancer Registry (SACR). The geography of cancer in South Australia - 1991 to 2000: cancer Incidence and mortality maps by SLA for 11 major cancers. Adelaide: SACR, n.d. At <http://www.health.sa.gov.au/pehs/cancer-maps/cancer-maps-91-00.htm>
55. Aarts MJ, Lemmens VEPP, Louwman MWJ, Kunst AE, Coebergh JWW. Socioeconomic status and changing inequalities in colorectal cancer? A review of the associations with risk, treatment and outcome. *European Journal of Cancer* 2010; 46(15): 2681-2695.
56. Bouchardey C, Schuler G, Minder C, Hotz P, Bousquet A, Levi F, et al. Cancer risk by occupation and socioeconomic group among men - a study by The Association of Swiss Cancer Registries. *Scandinavian Journal of Work Environment & Health* 2002; 28(suppl. 1): 1-88.
57. Cavalli-Bjorkman N, Lambe M, Eaker S, Sandin F, Glimelius B. Differences according to educational level in the management and survival of colorectal cancer in Sweden. *European Journal of Cancer* 2011; 47(9): 1398-1406.
58. Dejardin O, Remontet L, Bouvier AM, Danzon A, Tretarre B, Delafosse P, et al. Socioeconomic and geographic determinants of survival of patients with digestive cancer in France. *British Journal of Cancer* 2006; 95(7): 944-949.
59. Egeberg R, Hallzjaer J, Rottmann N, Hansen L, Holten I. Social inequality and incidence of and survival from cancers of the colon and rectum in a population-based study in Denmark, 1994-2003. *European Journal of Cancer* 2008; 44(14): 1978-1988.
60. Frederiksen BL, Osler M, Harling H, Ladelund S, Jorgensen T. Do patient characteristics, disease, or treatment explain social inequality in survival from colorectal cancer? *Social Science & Medicine* 2009; 69(7): 1107-1115.
61. Kelsall HL, Baglietto L, Muller D, Haydon AM, English DR, Giles GG. The effect of socioeconomic status on survival from colorectal cancer in the Melbourne Collaborative Cohort Study. *Social Science & Medicine* 2009; 68(2): 290-297.
62. Le H, Ziogas A, Lipkin SM, Zell JA. Effects of socioeconomic status and treatment disparities in colorectal cancer survival. *Cancer Epidemiology Biomarkers & Prevention* 2008; 17(8): 1950-1962.
63. McKenzie F, Ellison-Loschmann L, Jeffreys M. Investigating reasons for socioeconomic inequalities in breast cancer survival in New Zealand. *Cancer Epidemiology* 2010; 34(6): 702-708.
64. Olver I, Marine F, Grogan P. Disparities in cancer care in Australia and the Pacific. *Oncologist* 2011; 16(7): 930-934.
65. Ou SHI, Zell JA, Ziogas A, Anton-Culver H. Low socioeconomic status is a poor prognostic factor for survival in stage I nonsmall cell lung cancer and is independent of surgical treatment, race, and marital status. *Cancer* 2008; 112(9): 2011-2020.
66. Shugarman LR, Sorbero ME, Tian H, Jain AK, Ashwood JS. An exploration of urban and rural differences in lung cancer survival among medicare beneficiaries. *American Journal of Public Health* 2008; 98(7): 1280-1287.
67. Smith D, Taylor R, Coates M. Socioeconomic differentials in cancer incidence and mortality in urban New South Wales, 1987-1991. *Australian and New Zealand Journal of Public Health* 1996; 20(2): 129-137.
68. Woods LM, Rachet B, O'Connell DL, Lawrence G, Tracey E, Willmore A, et al. Differences in breast cancer incidence in Australia and England by age, extent of disease and deprivation status: women diagnosed 1980-2002. *Australian and New Zealand Journal of Public Health* 2010; 34(2): 206-213.
69. Yin D, Morris C, Allen M, Cress R, Bates J, Liu L. Does socioeconomic disparity in cancer incidence vary across racial/ethnic groups? *Cancer Causes & Control* 2010; 21(10): 1721-1730.
70. Youlden DR, Baade PD, Valery PC, Ward LJ, Green AC, Aitken JF. Differentials in survival for childhood cancer in Australia by remoteness of residence and area disadvantage. *Cancer Epidemiology Biomarkers & Prevention* 2011; 20(8): 1649-1656.
71. Yu XQ. Socioeconomic disparities in breast cancer survival: relation to stage at diagnosis, treatment and race. *BMC Cancer* 2009; 9.
72. Glover JD, Hetzel DMS, Tennant SK. The socioeconomic gradient and chronic illness and associated risk factors in Australia. *Australia and New Zealand Health Policy* 2004; 1(8).
73. Lagace C, Desmeules M, Pong RW, Heng D. Non-communicable disease and injury-related mortality on rural and urban place of residence - a comparison between Canada and Australia. *Canadian Journal of Public Health-Revue Canadienne De Sante Publique* 2007; 98: S62-S69.
74. SA Cervix Screening Program (SACSP). Brief statistical report 2002 - 2007: SA Divisions of General Practice analysis South Australia & the Rural General Practice Areas, SACSP: Adelaide. At

75. Australian Institute of Health and Welfare (AIHW). BreastScreen Australia monitoring report 2006-2007 and 2007-2008. Canberra: AIHW, 2010.
76. Bowman JA, Sanson-Fisher R, Redman S. The accuracy of self-reported Pap smear utilisation. *Social Science & Medicine* 1997; 44(7): 969-976.
77. Siahpush M, Singh GK. Sociodemographic predictors of pap test receipt, currency and knowledge among Australian women. *Preventive Medicine* 2002; 35(4): 362-368.
78. Siahpush M, Singh GK. Sociodemographic variations in breast cancer screening behavior among Australian women: results from the 1995 National Health Survey. *Preventive Medicine* 2002; 35(2): 174-180.
79. Public Health Information Development Unit (PHIDU). Social health atlas of South Australia, 2010: monitoring inequality in South Australia, PHIDU, Editor. 2010. Adelaide. At http://www.publichealth.gov.au/interactive_graphics/sa_sha_2010/screening.html
80. Maguire R, McCann L, Miller M, Kearney N. Nurse's perceptions and experiences of using of a mobile-phonebased Advanced Symptom Management System (ASyMS) to monitor and manage chemotherapy-related toxicity. *European Journal of Oncology Nursing* 2008; 12: 380-386.
81. Weber MF, Banks E, Ward R, Sitas F. Population characteristics related to colorectal cancer testing in New South Wales, Australia: results from the 45 and Up Study cohort. *Journal of Medical Screening* 2008; 15(3): 137-142.
82. Carrière P, Baade P, Newman B, Aitken J, Janda M. Cancer screening in Queensland men. *Medical Journal of Australia* 2007; 186(8): 404-407.
83. Karampoiki V, Alevizaki P, Lakiotis V, Loukidou E, Terzoudi A, Gkinosati A, et al. Evaluating the strength of potential misplaced priorities in opportunistic cancer screening practice in Greece. *Journal of Buon* 2010; 15(1): 164-173.
84. Lemon S, Zapka J, Puleo E, Luckmann R, Chasan-Taber L. Colorectal cancer screening participation: comparisons with mammography and prostate-specific antigen screening. *American Journal of Public Health* 2001; 91(8): 1264-1272.
85. Cunningham J, Rumbold AR, Zhang X, Condon JR. Incidence, aetiology, and outcomes of cancer in Indigenous peoples in Australia. *The Lancet Oncology* 2008; 9(6): 585-595.
86. Miller J, Knott V, Wilson C, Cunningham J, Condon J, Roder D et al. Aboriginal and Torres Strait Islander cancer control research project. Canberra: Cancer Australia, 2010.
87. Reath J, Carey M. Breast and cervical cancer in indigenous women: overcoming barriers to early detection. *Australian Family Physician* 2008; 37(3): 178-182.
88. Reath J, Usherwood T. Improving cervical screening in a remote Aboriginal community. *Australian and New Zealand Journal of Public Health* 1998; 22(6): 659-663.
89. Read CM, Bateson DJ. Marrying research, clinical practice and cervical screening in Australian Aboriginal women in western New South Wales, Australia. *Rural and Remote Health* 2009; 9(2).
90. Garvey G, Cunningham J, Valery PC, Condon J, Roder D, Bailie R, et al. Reducing the burden of cancer for Aboriginal and Torres Strait Islander Australians: time for a coordinated, collaborative, priority-driven, Indigenous-led research program. *Medical Journal of Australia* 2011; 194: 530-531.
91. Meissner HL, Smith RA, Rimer BK, Wilson KM, Rakowski W, Vernon SW, et al. Promoting cancer screening: learning from experience. *Cancer* 2004; 101(S5):1107-1117.
92. Breen N, Wagener DK, Brown ML, Davis WW, Ballard-Barbash R. Progress in cancer screening over a decade: results of cancer screening from the 1987, 1992, and 1998 National Health Interview Surveys. *Journal of the National Cancer Institute* 2001; 93: 1704-1713.
93. Swan J, Breen N, Coates RJ, Rimer BK, Lee NC. Progress in cancer screening practices in the United States: results from the 2000 National Health Interview Survey. *Cancer* 2003; 97:1528-1540.
94. Cokkinides VE, Chao A, Smith RA, Vernon SW, Thun MJ. Correlates of underutilization of colorectal cancer screening among US adults, age 50 years and older. *Preventive Medicine* 2003; 36:85-91.
95. Swan J, Breen N, Graubard BI, McNeel TS, Blackman D, Tangka FK, et al. Data and trends in cancer screening in the United States. *Cancer* 2010; 116(20):4872-4881.
96. Dobson A, McLaughlin D, Vagenas D, Wong KY. Why are death rates higher in rural areas? Evidence from the Australian Longitudinal Study on Women's Health. *Australian and New Zealand Journal of Public Health* 2010; 34(6):624-628.
97. International Agency for Research on Cancer. Breast Cancer Screening (IARC). Handbooks of cancer prevention: breast cancer screening. Vol. 7. Lyon: IARC Press, 2002.
98. Baade PD, Youlden DR, Coory MD, Gardiner RA, Chambers SK. Urban-rural differences in prostate cancer outcomes in Australia: what has changed? *Medical Journal of Australia* 2011; 194(6): 293-296.

99. Coory MD, Baade PD. Urban-rural differences in prostate cancer mortality, radical prostatectomy and prostate-specific antigen testing in Australia. *Medical Journal of Australia* 2005; 182(3): 112-115.
100. Heard AR, Coventry BJ, Milanowski B, Taylor D. The geography of melanoma in South Australia. *Australian and New Zealand Journal of Public Health* 2009; 33(2): 105-108.
101. Craft PS, Primrose JG, Lindner JA, McManus PR. Surgical management of breast cancer in Australian women in 1993: Analysis of Medicare statistics. *Medical Journal of Australia* 1997; 166(12): 626-629.
102. Scrace M, Margolis SA. The Royal Flying Doctor Service primary care skin cancer clinic: a pilot program for remote Australia. *Rural and Remote Health* 2009; 9(1).
103. Butow PN, Phillips F, Schweder J, White K, Underhill C, Goldstein D, et al. Psychosocial well-being and supportive care needs of cancer patients living in urban and rural/regional areas: a systematic review. *Supportive Care in Cancer* 2011; [Epub ahead of print].
104. Wilkes LM, White K, Mohan S, Beale B. Accessing metropolitan cancer care services: practical needs of rural families. *Journal of Psychosocial Oncology* 2006; 24(2): 85-101.
105. Foreman LM, Hunt RW, Luke CG, Roder DM. Factors predictive of preferred place of death in the general population of South Australia. *Palliative Medicine* 2006; 20(4): 447-453.
106. Hinton J. Which patients with terminal cancer are admitted from home care? *Palliative Medicine* 1994; 8(3): 197-210.
107. Tiernan E, O'Connor M, O'Siorain L, Kearney M. A prospective study of preferred versus actual place of death among patients referred to a palliative care home-care service. *Irish medical journal* 2002; 95(8): 232-5.
108. South Australian Cancer Registry (SACR). Case survivals by place of residence in Australia. In *Epidemiology of cancer in South Australia 1977-1998. Incidence, mortality and survival 1977 to 1998*. Adelaide: SACR, South Australian Health Commission, 1999.
109. Monroe AC, Ricketts TC, Savitz LA. Cancer in rural versus urban populations: a review. *Journal of Rural Health* 1992; 8(3): 212-220.
110. Luke C, Chapman P, Priest K, Roder D. Use of radiotherapy in the primary treatment of cancer in South Australia. *Australasian Radiology* 2003; 47(2): 161-167.
111. Luke CG, Yeoh E, Roder DM. Exploring trends in laryngeal cancer incidence, mortality and survival: implications for research and cancer control. *Asian Pacific Journal of Cancer Prevention* 2008; 9(3): 397-402.
112. Luke CG, Koczwara B, Moore JE, Olver IN, Penniment MG, Pittman K, et al. Treatment and survival from colorectal cancer: the experience of patients at South Australian teaching hospitals between 1980 and 2002. *Clinical Oncology* 2005; 17(5): 372-381.
113. Luke CG, Coventry BJ, Foster-Smith EJ, Roder DM. A critical analysis of reasons for improved survival from invasive cutaneous melanoma *Cancer Causes and Control* 2003; 14(9): 871-878.
114. Dobbins S, Peipers A, Reading D, Sinclair C. A national approach to skin cancer prevention: the National Sunsmart Schools Program. Encouraging sun protection for all Australian primary school children. *Medical Journal of Australia* 1998; 169: 513-514.
115. Luke C, Gill G, Birrell S, Humeniuk V, Borg M, Karapetis C, et al. Treatment and survival from breast cancer: the experience of patients at South Australian teaching hospitals between 1977 and 2003. *Journal of Evaluation in Clinical Practice* 2007; 13(2): 212-220.
116. Roder D, Houssami N, Farshid G, Gill G, Luke C, Downey P, et al. Population screening and intensity of screening are associated with reduced breast cancer mortality: evidence of efficacy of mammography screening in Australia. *Breast Cancer Research and Treatment* 2008; 108(3): 409-416.
117. Tallis GM, O'Neill TJ. Evaluation of the impact of breast cancer screening in South Australia. *Internal Medicine Journal* 2009; 39(3): 174-178.
118. Baade PD, Aitken JF, Ferguson M, Gardiner RA, Chambers SK. Diagnostic and treatment pathways for men with prostate cancer in Queensland: investigating spatial and demographic inequalities. *BMC Cancer* 2010; 10.
119. Baade PD, Dasgupta P, Aitken JF, Turrell G. Distance to the closest radiotherapy facility and survival after a diagnosis of rectal cancer in Queensland. *Medical Journal of Australia* 2011; 195 (6):350-354.
120. Baade PD, Turrell G, Aitken JF. A multilevel study of the determinants of area-level inequalities in colorectal cancer survival. *BMC Cancer* 2010; 10.
121. Baird G, Flynn R, Baxter G, Donnelly M, Lawrence J. Travel time and cancer care: an example of the inverse care law? *Rural and Remote Health* 2008; 8(4).
122. Baldwin LM, Cai Y, Larson EH, Dobie SA, Wright GE, Goodman DC, et al. Access to cancer services for rural colorectal cancer patients. *Journal of Rural Health* 2008; 24(4): 390-399.
123. Campbell NC, Elliott AM, Sharp L, Ritchie LD, Cassidy J, Little J. Rural factors and survival from cancer: analysis of Scottish cancer registrations. *British Journal of Cancer* 2000; 82(11): 1863-1866.

124. Celaya MO, Berke EM, Onega TL, Gui J, Riddle BL, Cherala SS, et al. Breast cancer stage at diagnosis and geographic access to mammography screening (New Hampshire, 1998-2004). *Rural and Remote Health* 2010; 10(2).
125. Dejardin O, Bouvier AM, Faivre J, Bouteux S, De Pourvoirville G, Launoy G. Access to care, socioeconomic deprivation and colon cancer survival. *Alimentary Pharmacology & Therapeutics* 2008; 27(10): 940-949.
126. Girgis A, Bonevski B, Perkins J, Sanson-Fisher R. Self-reported cervical screening practices and beliefs of women from urban, rural and remote regions. *Journal of Obstetrics and Gynaecology (Abingdon)* 1999; 19(2): 172-179.
127. Hall SE, Holman CDJ, Threlfall T, Sheiner H, Phillips M, Katriss P, et al. Lung cancer: An exploration of patient and general practitioner perspectives on the realities of care in rural Western Australia. *Australian Journal of Rural Health* 2008; 16(6): 355-362.
128. Onega T, Duell EJ, Shi X, Wang DM, Demidenko E, Goodman D. Geographic access to cancer care in the U.S. *Cancer* 2008; 112(4): 909-918.
129. Scoggins JF, Fedorenko CR, Donahue SMA, Buchwald D, Blough DK, Ramsey SD. Is distance to provider a barrier to care for Medicaid patients with breast, colorectal, or lung cancer? *The Journal of Rural Health* 2011: 54-62.
130. Department of Health and Aged Care (DHAC). *Accessibility/ Remoteness Index of Australia (ARIA)*. Canberra: DHAC, 1999.
131. Haydon AMM, MacInnis RJ, English DR, Giles GG. Effect of physical activity and body size on survival after diagnosis with colorectal cancer. *Gut* 2006; 55: 62-67.
132. Morgan JW, Cho MM, Guenzi CD, Jackson C, Mathur A, Natto Z, et al. Predictors of delayed-stage colorectal cancer: are we neglecting critical demographic information? *Annals of Epidemiology* 2011; 21(12): 914-921.
133. Morgan GW, Barton M, Atkinson C, Millar J, Gogna NK, Yeoh E. The 'GAP' in radiotherapy services in Australia and New Zealand in 2009. *Journal of Medical Imaging and Radiation Oncology* 2010; 54(3): 287-297.
134. Wigg DR, Morgan GW. Radiation oncology in Australia: workforce, workloads and equipment 1986-1999. *Australasian Radiology* 2001; 45: 146-169.
135. Department of Health and Ageing (DoHA). Radiation oncology: Lessons learned from previous oncology related capital works programs. Report on a symposium hosted by the Service Planning Forum of the Radiation Oncology Reform Implementation Committee (RORIC). [Web page]. Last updated: 13 October, 2010. Australian Government. Viewed 17 November 2011, at http://www.health.gov.au/internet/main/publishing.nsf/Content/oric_lesson_learned_symposium
136. Roxon N, Minister for Health and Ageing. Eleven new chemotherapy units for country SA (Media release). 2010.
137. Morgan G. Why has radiotherapy utilisation not improved since 1999? *Journal of Medical Imaging and Radiation Oncology* 2011; 55(4): 347-350.
138. Shahid S, Finn L, Bessarab D, Thompson SC. Understanding, beliefs and perspectives of Aboriginal people in Western Australia about cancer and its impact on access to cancer services. *BMC Health Services Research* 2009; 9: 132.
139. Shannon GD, Franco OH, Powles J, Leng Y, Pashayan N. Cervical cancer in Indigenous women: The case of Australia. *Maturitas* 2011; 70(3): 234-245.
140. Loxton D, Powers J, Schofield M, Hussain R, Hosking S. Inadequate cervical cancer screening among mid-aged Australian women who have experienced partner violence. *Preventive Medicine* 2009; 48(2): 184-188.
141. South Australian Cancer Registry (SACR). *Epidemiology of cancer in South Australia. Incidence, mortality and survival, 1977-1997. Incidence and mortality, 1997. Annual Cancer Reports*. Adelaide: Openbook Publishers, 1998.
142. Shepherd L, Goldstein D, Olver I, Parle M. Enhancing psychosocial care for people with cancer in rural communities: what can remote counselling offer? *Australian Health Review* 2008; 32(3): 423-438.
143. Shepherd L, Goldstein D, Whitford H, Thewes B, Brummell V, Hicks MJ. The utility of videoconferencing to provide innovative delivery of psychological treatment for rural cancer patients: results of a pilot study. *Journal of Pain and Symptom Management* ; 2006; 32: 453-461.

Appendix

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Literature search methodology

A search of the peer reviewed literature was undertaken for material that addressed the scope of the research task: to achieve a better understanding of the existing inequalities in the incidence, secondary prevention and outcomes of cancer, as evident across geographic areas of the State; and to identify where further investment would be productive to improve health outcomes for people in rural and remote South Australia.

A preliminary search using the terms : “South Australia” + cancer [+ “secondary prevention”] + urban +/- rural / metropolitan +/- non-metropolitan revealed so few results that the term “secondary prevention” was dropped as it was unnecessary to restrict the number of items found. The terms ‘Australia’, and ‘regional’, were added to the search terms to augment the number of references identified. The final search used the terms: [“South Australia” / Australia] + cancer + [urban +/- rural +/- regional | metropolitan +/- non-metropolitan].

The following indexes were searched using the terms described above: Web of Science, Science Direct, Scopus, and PubMed. The limiter ‘review’ was also used to prioritise any over-arching reviews of the literature. A free text key word search was made using the same terms and the Google Scholar search engine. Finally, snowballing, or searching the reference lists of articles of high relevance was done to identify further pertinent references. Further searches were made without the geographic limiters of ‘South Australia’ and ‘Australia’ to identify contextual material on urban-rural inequalities in relation to cancer in other countries.

Over 400 items were identified, 80 of which were reviewed and are included in Tables 2 and 3. Twenty- two of these were directly related to South Australia and received the most attention. The main emphasis was to identify, for incorporation in this report, usable conclusions, implications and possible policy solutions for future action to reduce inequalities that disadvantage non-metropolitan populations.

Overall, there was little in the peer-reviewed literature that was specific to South Australia. The majority of the urban-rural cancer-related, peer-reviewed research in Australia was from Queensland and New South Wales, followed by Western Australia. About one third of the peer reviewed material that was specifically on South Australia was focused on Aboriginal populations. Some of the material that addressed urban-rural differences was out of scope for the particular cancer types in this report; nevertheless, some of these studies have been included in the review. It is arguable whether the situations that pertain to Queensland, New South Wales and Western Australia also pertain to South Australia, as there are both similarities and differences with the geographic, demographic and population and infrastructure spreads (roads, towns, distances, impact of wet season, etc.). At the Australian level, these differences are elided by averages.

Cameron found (reporting in 2008 in a major thesis that included a secondary review of the evidence) that “Australian research was limited and mostly disease-specific” and this review found that the current situation was similar. Moving from Australia to other countries, no major review of urban-rural cancer-related comparisons, that had been made since Monroe and colleagues first reported in 1992, was identified (although their review was frequently cited). In general, there were many readings that made statements of the type that: rural residents’ cancer outcomes might be worse or different due to differences in behavioural risk factors (often called ‘lifestyle’), ‘rural’ personality and/or attitudes or both, or (maybe) lesser access to services. No research was identified that was specifically designed to test, or definitively ‘tested’ these propositions, along the lines of the future research program outlined by Monroe and colleagues in 1992, who wrote that “What remains to be established is that access to or use of health care services influences cancer outcomes”. There were, nonetheless, frequent calls for more research to understand this area better.

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Literature reviewed for contributions to the key themes

The tables overleaf set out the literature that was reviewed for contributions to the key themes of this report. Summaries are listed in alphabetical order, using the surname of the first author.

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Table 2: Literature summaries; peer reviewed literature, South Australia-specific

| Reference | Geographic focus | Cancer type/s, area of interest | Summary of subject matter or study | Conclusions, implications or possible policy solutions |
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| <p>Birks DM, Gunn IF, Birks RG, Strasser RP. Colorectal surgery in rural Australia: Scars; A surgeon-based audit of workload and standards. Australian and New Zealand Journal of Surgery 2001; 71(3):154-158.</p> | <p>rural Australia: Vic, Albury and SA</p> | <p>colorectal cancer</p> | <p>Study examined the workload and standards of colorectal surgery in rural Australia. Sixty-two (out of 69 invited) rural general surgeons in Vic, Albury and SA completed a questionnaire for each transabdominal colorectal operation (n=877) performed during 12 months from May 1996. Data included comorbidity, operation details, pathology, complications and intention to use adjuvant cancer therapy. Patient average age was 65 yrs.; 60% had pre-existing disease; and one-third of the operations were emergency presentations with bowel obstruction the most common presentation. An anastomosis was performed in 675 patients of whom 22 (3.3%) had a clinical anastomotic leak. For low rectal anastomosis, the leak rate was 8.9%. Two-thirds of patients had colorectal cancer and 42% of these had advanced disease (Australian clinicopathological stage C or D). The perioperative mortality rate was 4.6% rising to 16.4% in the presence of >2 comorbidities. Mortality was higher with emergency presentations (8.3%), especially in patients >80 yrs. of age (15.2%).</p> | <p>Study sampled a high proportion of rural colorectal surgery performed in the audit period. Colorectal surgery clinical indicators were comparable to other Australian studies. Anti-thrombotic and adjuvant therapy were identified as areas in which there was a need for further education. Concluded overall, that major surgery was performed regularly in south-eastern rural Australia at a consistently high standard by surgeons who live and work in their rural communities.</p> |
| <p>Cameron K. People with cancer from rural areas undergoing treatment in metropolitan hospitals: rural-urban differentials and the impact of cancer treatment. PhD thesis In Faculty of Health Science, Discipline of Nursing. 2008. The University of Adelaide: Adelaide.</p> | <p>SA</p> | <p>all cancers risk factors, screening, incidence, treatment, survival</p> | <p>PhD thesis examined and clarified issues of concern to patients from rural and remote areas undergoing cancer treatment in a metropolitan setting. Secondary analysis of data from cancer registries and government reports (e.g. AIHW reports) showed that incidence of cancer was 4% lower in rural residents, and survival was significantly lower, when compared with metropolitan residents for 10 cancer types. Prevalence of risk factors appeared to favour the rural population, which had higher Pap screening participation and greater use of precautions against sun exposure. Literature review identified potential issues for rural residents with cancer including: the need to travel, psychosocial concerns, (lack of) information and communication, financial costs, and accommodation while away from home. Australian research was limited and mostly disease specific. A survey (n=96) was conducted in rural and remote residents who underwent cancer treatment in the metropolitan area (Adelaide). Most were satisfied with their treatment but there was a tendency to understate treatment-related problems. Many participants attended treatment with their spouse/ partner (inconceivable to attend without partner) and the lack of routine financial support for this was problematic. Barriers included: the lack of treatment coordination, lack of reimbursement for psychosocial support, inadequate provision of information, and lack of practical</p> | <p>Findings demonstrated that participant expectations of treatment were largely met, but that their needs for practical and psychosocial support were not. Use of shared health care arrangements was minimal, and few interventions were made to minimise the no. of metropolitan visits required by rural residents with cancer. Significant opportunities exist to improve the management of care through care coordination and use of technology such as telemedicine and electronic forms of communication. Health care policy requires a broader input of data including information on supportive care outcomes as there is little data available on the "silent problem" (use of support systems and related outcomes) for rural residents with cancer, making it difficult to formulate effective and targeted interventions. While cancer registry data is excellent, the</p> |

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| | | <p>support with accommodation and transport. Health care professionals confirmed these findings in interviews and endorsed strategies to improve psychosocial support. Study demonstrated that the lack of financial support for a companion during treatment was an important contributory factor affecting satisfaction with care. Quote: <i>“To ensure an equitable and acceptable degree of quality of care, financial support should be routinely provided to enable rural residents to be accompanied by a support person when travelling to access cancer treatment.”</i> (p. iii) The treatment process also needs to be investigated to ensure that all the supports designed to ensure access for rural residents are appropriate and suited to their needs. Quote: <i>“The main cancer treatments used, radiotherapy, chemotherapy and surgery, are not readily available to all rural residents and there is currently a lack of centralised information on the availability of local cancer services for rural residents. This makes it difficult to comprehensively summarise and assess the adequacy of services.”</i> (p. 5) Strategies employed to assist with the provision of cancer treatment in rural and remote areas include telemedicine (video conferencing) with metropolitan medical specialists, regular visiting medical specialists, and expansion of the role of rural nurses to provide a higher level of care to patients with cancer. These strategies are intended to improve access to treatment but there is little information on patients’ preferences or on whether cancer outcomes are equivalent to treatment provided exclusively in the metropolitan specialist setting. Research on the impact of a cancer diagnosis and the psychosocial implications specific to rural and remote residents is also limited. More information is needed on the experience of rural residents treated for cancer in metropolitan areas to inform strategies developed to improve care. Survey participants rated the need to have a support person with them during treatment (“an extra pair of ears” to hear what health care professionals recommended and able to ask questions etc. on the patient’s behalf) as their highest priority (out of 22 issues in the survey) in contrast to the health professionals interviewed, who emphasised travel and accommodation issues, although they agreed that rural patients should have the option of a subsidised escort for support. Few survey participants used ‘formal’ support (e.g. cancer support groups), which can be difficult to organise and maintain in rural areas. Few psychosocial interventions have been researched specifically in rural populations, however ‘electronic communication’ such as internet cancer support groups have been demonstrated to reduce depression, stress and trauma related to cancer, and may be of interest to rural patients as they do not require travel. Limitations included questions as to the representativeness of the survey</p> | <p>same quality of data is not available on the care delivery aspects of cancer including treatment and support. Information on cancer service provision in SA is not gathered in any systematic way. Difficulties assessing the total treatment and support provided include the no. of organisations involved, including NGOs. <i>“It is difficult to see how appropriate service planning and policy development can take place in the absence of centrally-available and assessed data on current service provision.”</i> (p. 234) Policy development and implementation need to be underpinned by accurate data on the outcomes for non-metropolitan residents with cancer including data on issues of practical support. Supportive care needs are likely to remain invisible as responsibility for them is not ‘owned’ by a single agency. Recommendations included:</p> <ul style="list-style-type: none"> * In order to allow equitable psychosocial support and to avoid treating the patient in isolation from their family, patient travel subsidies should include supporting escorts for patients based on psychosocial as well as medical needs; * Patients from rural and remote areas having cancer treatment in metropolitan areas should be provided with flexible, patient-oriented support that is informed by evaluation of the outcomes of care and support; * Evaluation of these outcomes should be done collaboratively with health care providers and consumers; * Routine processes need to be implemented to ensure information on reimbursement schemes for patient travel and accommodation are provided to all eligible patients; * Case manager or rural liaison positions could be used to coordinate information and clarity over which body is responsible for information |
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| | | | <p>sample and the lack of an urban control group.</p> <p>Study contributes to the research into rural residents with cancer who travel to, and receive treatment in metropolitan settings (existing studies on this topic are few in no. and tend to focus on specific diagnostic groups). This study used a large sample of rural residents and drew information from a range of other sources to explore the issues for rural residents in relation to metropolitan-provided care.</p> | <p>and communication ;</p> <ul style="list-style-type: none"> * Available technology should be used to facilitate shared-care arrangements to better care for rural residents diagnosed with cancer; * Visiting specialists could reduce the no. of times that travel to Adelaide is required; * Reducing the complexity of, and providing clear information on, the reimbursement process would improve the access to, and equity of patient travel and accommodation financial support schemes; * Greater coordination of care would benefit rural patients with cancer; * Data to assess and monitor care delivery aspects of cancer treatment is needed to provide information of outcomes related to psychosocial and practical support; * Further research: a comparative survey of cancer versus non-cancer patients would be useful to establish gaps in care and ensure that all strategies currently used to enhance patient care are considered for use in the broader health context; a comparative analysis of treatment support outcomes with metropolitan residents could identify discrepancies in patient outcomes and possible reasons. |
| <p>Chong A, Roder D. Exploring differences in survival from cancer among Indigenous and non-Indigenous Australians: implications for health service delivery and research. Asian Pacific Journal of Cancer Prevention 2010;</p> | <p>SA Indigenous & non-Indigenous</p> | <p>all cancers, breast, colorectal, cervix, unknown primary site, lung survival</p> | <p>Study compared cancer survivals of Indigenous and non-Indigenous Australians and explored the health-service and research implications. SA Cancer Registry data were used to calculate disease-specific survivals for Indigenous (n=671) and sampled non-Indigenous (n=15,799) patients diagnosed during 1977-2007, using Kaplan-Meier estimates and Cox proportional hazards regression.</p> <p>Cancer-site distributions differed noticeably between Indigenous and non-Indigenous patients. Indigenous patients had higher numbers of the following cancer sites per 100 patients: lung (15.1 vs 10.7); head & neck (8.9 vs 2.7); cervix (5.4 vs 1.2); liver/gallbladder (5.1 vs 1.5); stomach (3.9 vs 2.6); thyroid (2.7 vs 0.9); oesophagus (2.5 vs 1.2); vagina/vulva (1.2 vs 0.4); and unknown primary site (6.6 vs 3.5). Indigenous patients had lower numbers of the following cancer sites per 100 patients: female breast (8.6 Vs 11.7); colon/rectum (8.5 vs 14.5); prostate (4.6 vs 13.0); lip (0.7 vs 2.5); and skin (melanoma) (0.7 vs 7.6). The mean prognostic index was lower at 43.3% for</p> | <p>Relative risks for Indigenous compared with non-Indigenous patients for all cancers combined are elevated in SA, as in the NT and Qld. Despite the uncertain accuracy of recorded Indigenous status, various independent studies show risk elevations and identify the need to:</p> <p>1) prevent cancers, especially those of high lethal potential;</p> <p>Much of the inequality in survival outcomes between Indigenous and non-Indigenous patients could be addressed through primary prevention of the more lethal cancer types found in Indigenous patients:</p> <ul style="list-style-type: none"> - reductions in tobacco smoking prevalence, |

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| 11(4):953-961. | | <p>Indigenous compared with 54.9% for non-Indigenous patients, due to differences in site distribution.</p> <p>Indigenous and non-Indigenous five-year survivals were respectively: 40% and 57% for all cancer sites combined; 61% and 80% for female breast; 34% and 56% for colon/rectum; 63% and 73% for cervix. One-year survivals for cancers of unknown primary site were 5% and 22% respectively. Although not statistically significant ($p=0.262$), lung cancer survival tended to be higher in Indigenous than non-Indigenous patients.</p> <p>For all sites combined, Indigenous patients had lower survivals up to 70-79 yrs., with the most marked difference in 50-59 year olds (five-year survivals of 28.1% and 65.3% respectively). The relative risk of death in Indigenous compared with non-Indigenous patients was 2.0 after adjusting for socio-demographic factors and diagnostic period, reducing to 1.4 when also adjusting for prognosis by primary site.</p> <p>Survivals differed for Indigenous males and females, (five-year survivals of 34.1% and 45.0% respectively), and by place of residence with patients from the Far North Statistical Sub-division and potentially other country areas having lower survivals than those from Adelaide. Relative risks were 3.7 and 2.7 respectively for Indigenous compared with non-Indigenous patients from Far North remote communities.</p> <p>Decreased relative risk was observed for the more recent diagnostic period for non-Indigenous but not for Indigenous patients.</p> <p>Reducing case fatality in more recent diagnostic periods for non-Indigenous patients was not seen in Indigenous patients, so that the survival gap between Indigenous and non-Indigenous patients increased.</p> <p>Earlier studies identified more advanced stages of cancers at diagnosis in Indigenous patients as a contributor to observed survival deficits, however, both cancer site distributions and more advanced cancer stages at diagnosis did not fully account for survival deficits in these studies. Lower levels of treatment, treatment compromised by high levels of co-morbidity (including diabetes and cardiovascular, respiratory, and renal diseases, smoking and obesity, all more prevalent in Indigenous people), which may predispose to poorer cancer outcomes through increased frailty and reduced physical capacity to cope with cancer and treatment side-effects, have also been identified as contributory causes. Poorer access of remote Indigenous populations to specialised cancer treatment services would also predispose towards suboptimal treatment and poorer outcomes.</p> <p>Breast and cervix screening data indicate much lower levels of screening participation by Indigenous than non-Indigenous people (citing Department of Health and Ageing (DoHA). BreastScreen Australia program. Participation and performance trends. Canberra: Australian Government, 2009.)</p> | <p>elevated in Indigenous people, would lead to reductions in incidence of cancers of lung, liver, oesophagus, head and neck;</p> <ul style="list-style-type: none"> - reductions in excess alcohol consumption, also common in some Indigenous communities, would lead to reductions in cancers of the liver, oesophagus, and head and neck; - dietary improvements (e.g. increased fruit & vegetable consumption) may lead to decreases in cancers of the head and neck, oesophagus, and stomach; - hepatitis B vaccination of Indigenous newborn would protect against liver cancer; - improvements in living conditions including hygiene, could lead to reductions in helicobacter pylori infection and risk of stomach cancer. <p>The potentially large effects of preventive initiatives taken now will take decades to show due to long disease latencies.</p> <p>2) detect cancers earlier;</p> <p>3) complete planned treatment;</p> <p>4) increase access to care, including palliative services and effective pain control, both in remote and urban settings.</p> <p>A health-services research program is needed to determine the means to better deliver cancer services of all types (from prevention through to end-of-life care) to Indigenous populations in varying urban and rural settings.</p> <p>A concerted health-service response should address contributing geographic, socio-economic and cultural barriers to cancer prevention, screening and treatment in the Indigenous population.</p> <p>Indigenous researchers should be lead partners in the research effort. Indigenous policy-makers and health administrators should play lead roles in implementing</p> |
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| <p>Cottrell J, Street J, Chong A, Roder D. Comparing cancer profiles and survival of Aboriginal and non-Aboriginal patients in South Australia: where are the opportunities for improving Aboriginal health? <i>Asian Pacific Journal of Cancer Prevention</i> 2007; 8(4):495-501.</p> | <p>SA</p> | <p>all cancers; lung, laryngeal, mouth, oropharyngeal, oesophageal, stomach, hepatobiliary (liver & gall bladder), unknown primary, pancreatic, cervical, melanoma, bowel, breast, prostate, lip</p> <p>incidence, survival</p> | <p>SACR data for 1977-2003 were used to calculate expected and actual distributions of cancer sites in Aboriginal versus non-Aboriginal populations using indirect standardisation and a global Chi-square test (individual cancer site contributions to the Chi-square statistic were examined using a z-test and Bonferroni corrected p-value). Expected figures for each cancer site correspond to the no. of cancers expected in Aboriginal patients if they had the same cancer distribution of site by age as the non-Aboriginal population. Expected five- and ten-year survivals were calculated and compared to expected survivals from statewide survivals adjusted for age at diagnosis. Overall there was a significant difference in expected and actual cancer site distributions for SA Aboriginal male (χ^2 (17df) = 202.94) and female (χ^2 (20df) = 311.93) patients, and all patients collectively (χ^2 (22df) = 485.43). SA Aboriginal patients presented with higher than expected numbers of: lung, laryngeal, mouth, oropharyngeal, oesophageal, stomach, hepatobiliary (liver & gall bladder), and unknown primary cancers. Males presented with higher nos. of pancreatic cancers than expected. Women presented with higher nos. of cancers of the cervix than expected. SA Aboriginal patients of both sexes presented with lower than expected numbers of melanoma, bowel, breast, prostate and lip cancers. SA Aboriginal patients presented with high nos. of cancers with poor prognoses (e.g. oesophageal, liver, pancreatic, lung & unknown primary); lower expected survival is a natural consequence. Aboriginal patients had poorer expected five- and ten-year survival compared with SA non-Aboriginal patients, and even poorer actual five- and ten-year survival than expected. The differences between expected and actual cancer site distributions reflect disparities in risk factor prevalence for largely preventable cancers and the survival results reflect the many more obstacles confronting Aboriginal cancer patients compared with non-Aboriginal cancer patients. Findings were comparable to previous observations on cancer in Indigenous Australians in Qld, the NT and NSW; and consistent with SACR findings ten years ago. Aboriginal people are more likely to be diagnosed with advanced disease and distant metastases (citing Shaw et al., 2003; Valery et al., 2006 among others), and more advanced disease at diagnosis is one explanation for poorer survival; most likely due to delay in seeking medical advice but as yet research into other reasons is limited (e.g. cultural barriers, that have been identified as affecting treatment choices and effectiveness, that include: how the immediate family will cope with illness and treatment, concerns that treatment is not effective or worthwhile, difficulties communicating in culturally appropriate ways, cancer perceived as “payback” for offending a relative. Other issues include: remoteness, deciding against curative treatment,</p> | <p>research.</p> <p>Cancer sites distribution in the Aboriginal community is largely shaped by the array of cancer risk factors, including smoking, alcohol consumption, and infections (especially Hepatitis B and C, and <i>Helicobacter pylori</i>); and cancer-related outcomes by factors such as low cancer screening participation, limited access to specialised diagnostic services, and advanced cancer at diagnosis relative to the majority of the population. Areas of focus for interventions to reduce cancer levels in the Aboriginal population and to improve survival of Aboriginal people diagnosed with cancer include:</p> <ul style="list-style-type: none"> * nationally funded and coordinated effective tobacco control programs to reduce smoking rates, that must be evaluated to determine their effectiveness; * culturally appropriate and well-funded alcohol misuse programs; * consultation with the Aboriginal community to ensure development of culturally acceptable approaches to cancer control, incorporating their holistic view of health; * employment of Aboriginal Health Workers to communicate health promotion messages more appropriately at community level (may also impact rates of other chronic diseases that share the same risk factors, e.g. heart disease & diabetes); * vaccine programs against cancer-related infections (e.g. HPV, Hepatitis B); * increasing participation in cancer screening programs can be implemented immediately and may benefit from integration into primary care settings (e.g. within Aboriginal Community-Controlled Health Services); * consistent recording of cervical screening participation in Aboriginal women to provide evidence for development of policies and resources to increase involvement (data not |
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| | | | <p>incomplete treatment, presence of co-morbidities, and systemic differences (e.g. waiting longer for surgery).</p> <p>Limitations of the study included potential sources of bias: under-identification of Aboriginal status (although effect would be small as incidence was not calculated); reporting bias, as cancers may be under-reported more commonly in Aboriginal people or reported erroneously as primary unknown, affecting the accuracy of results, (effect also likely to be small); and, lower life expectancy of Aboriginal people may mean latent cancers at time of death were not registered with SACR. Study results may not be generalisable due to differences within and between Aboriginal people in remote, rural and urban areas of SA.</p> | <p>collected in SA, nor reliably nationally);</p> <p>* undertake basic research into reasons for poor survival in Aboriginal people.</p> |
| <p>Davis C, Girgis A, Williams P, Beeney L. Needs assessment of rural and remote women travelling to the city for breast cancer treatment. Australian and New Zealand Journal of Public Health 1998; 22(5):525-527.</p> | <p>rural SA and NSW</p> | <p>female breast cancer</p> <p>survivor needs</p> | <p>Study assessed the needs of rural women travelling to the city for breast cancer treatment and recommend appropriate interventions to ensure equity in availability and access to breast cancer treatment. Background context included The House of Representatives Standing Committee on Community Affairs Report on the Management and Treatment of Breast Cancer (1995) which identified that women diagnosed with breast cancer living in rural and remote areas had special needs and might require special support when undergoing treatment for breast cancer.</p> <p>Study participants included women aged 34-80 yrs in rural SA and NSW who travelled for breast cancer treatment (n=80, 63% response rate), drawn from a sample of eligible women of major treatment centres in SA and NSW who were sent a letter from a member of their treatment team describing the study and inviting them to participate in a telephone survey. After completing treatment, participants completed a brief (15 minutes) telephone survey on the needs of rural women travelling for treatment.</p> <p>Findings showed that more than 90% of the participants had to travel for treatment due to the lack of treatment centres near home. On average they spent 6.79 weeks (SD=4.73) away from home and family. More than 80% of participants travelled for radiotherapy, with 55% travelling more than 200 km for treatment.</p> <p>Findings also showed that 89% of participants identified specific problems for rural women, with social and practical support being primary concerns. Although the majority of women had been provided with some type of social support, only 39% of women received financial assistance and 19% of these had trouble claiming money. Nearly a third (29%) of the 48 women who did not receive financial assistance, stated that they were unaware it was available and 13% found the process too complicated.</p> <p>Study limitations included that the information was self-report; involved a small, non-random sample; did not include an urban control group, nor women who were unable/ unwilling to travel for treatment; and the women's disease status was unknown (women with advanced disease are likely to have additional</p> | <p>Study highlighted the social and financial costs experienced by women living in rural or remote areas when travelling for breast cancer treatment. Rural women in the study spent an average of more than six weeks away from home and family while undergoing breast cancer treatment due to the lack of nearby treatment centres. A minority received financial assistance for travel and accommodation, and many had difficulty claiming reimbursements. Options for ensuring equity in the treatment of breast cancer include:</p> <ul style="list-style-type: none"> * providing treatment facilities and multi-disciplinary care centres in rural and remote areas (not seen as viable in the near future, given costs); * increasing the involvement of rural clinicians in breast cancer care outside their practices (e.g. through telemedicine) may contribute to improvements in quality of care for rural women; * reviewing government assistance programs for equity in access to assistance, the amount of assistance provided, and appropriate promotion of programs to those eligible to access them; * improving support through providing rural or community breast care nurses to give comprehensive information and follow-up care, access to telemedicine links for women and their providers, and services to assist with |

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| | | | needs related to palliative care that were not addressed in the survey). Quote: <i>“Treating women close to home is often not possible, but it is possible to improve access to treatment by making it easier for women to be absent from their home, family and work during treatment. Equity in health care cannot be obtained until all women with breast cancer have the same treatment options regardless of geographic location.”</i> (p. 57) | family and work needs. |
| Foreman LM, Hunt RW, Luke CG, Roder DM. Factors predictive of preferred place of death in the general population of South Australia. Palliative Medicine 2006; 20(4):447-453. | SA | all cancers preferred place of death | In an SA Health Omnibus population survey, 2,652 respondents aged 15+ years reported their preferred place of death, if dying of 'a terminal illness such as cancer or emphysema', to be: home (70%), a hospital (19%), hospice (10%), or nursing home (<1%). The majority of respondents in all socio-demographic categories reported a preference for dying at home, with the greatest majorities occurring in younger age groups. After weighting to the age-sex distribution of all SA cancer deaths, 58% declared a preference for death at home, much higher than the 14% of cancer deaths that actually occurred at home in SA in 2000-2002 (other preferences were for: hospital 28%, hospice 12%, and nursing home 1.8%; versus actual cancer deaths: 56% in hospitals, 18% in hospices, and 12% in nursing homes). Older people (independent of health status) were less likely than younger people to prefer to die at home; results consistent with studies showing that older people with cancer are less likely to die at home. Those elderly people (80+ yrs) who did not want to die at home, preferred hospitals (33.0%) and hospices (10.8%) over nursing homes (2%); yet around one in four cancer deaths of people of these ages actually occurs in nursing homes. Multivariable analyses indicated predictors of preferred home death as: younger age, male sex, UK/Ireland or Italy/Greece as birthplaces, better physical health, poorer mental health, and fewer concerns about dying at home. Predictors of preference for death in a hospice rather than hospital included: older age, female sex, single status, metropolitan residence, higher educational and income levels, paid employment, awareness of advanced directives (living wills), and interpretation of 'dying with dignity' as meaning death without pain or suffering. Prospective cohort studies of cancer patients suggest that some patients change their preferences as illness progresses, and concern about being a burden is an important factor that influences choices. After adjusting for age and other factors, people with poorer physical health, and people expressing concerns about terminal care at home, were less likely to report a preference to die at home; people with poor health may understand the realities of home care better than well people, leading to their preference for inpatient care. Although inpatient care can meet the needs of many terminally ill patients, service providers are challenged to overcome the | Study showed that social, cultural, socio-demographic and health factors were associated with preferences for specific sites for end-of-life care, and confirmed similarities with the preferences of cancer patients identified in previous studies. Similarities between preference patterns and actual locations of cancer deaths suggest that preference is an important determinant of place of death, however, a major discrepancy was found between the strong preference to die at home and the relatively low proportion of cancer deaths that actually occur at home. Only 14% of SA cancer deaths in 2000-2002 actually occurred at home, while about 58% of people of similar age and sex stated that they preferred to die at home. This discrepancy could reflect: changes in preferences as illnesses progress, medical complications, changes in care needs, altered care-giver capacity, or a lack of services to enable people to die where they want. Cohort studies are needed to explore this discrepancy, and the extent to which preferences: 1) change during disease progression, 2) fail to be fulfilled, and 3) policy and service changes that would better fulfil patients' wishes. Deficiencies in the provision of services to enable patients to die where they prefer need to be addressed by service providers and policy makers. Investigating differences between preferred and actual places of death would help |

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| | | | <p>obstacles that people with poor health confront when their preference is for home care.</p> <p>Women were less likely than men to prefer death at home, and they were also more likely to prefer death in a hospice; actual location-of-death studies show that women <i>are</i> less likely than men to 1) die at home, and 2) to die in hospice settings.</p> <p>Respondents with living wills were also less likely to want to die at home (may reflect greater familiarity with the realities of terminal care and concerns re burdening family members & carers); and those with living wills who preferred death in an institution were more likely to choose a hospice over a hospital as the preferred location.</p> | <p>healthcare service providers better meet end-of-life wishes.</p> <p>Further research: could be relevant to explore whether the content of advanced directives is more closely aligned with hospice-type care than with terminal care in hospitals.</p> |
| <p>Heard AR, Coventry BJ, Milanowski B, Taylor D. The geography of melanoma in South Australia. Australian and New Zealand Journal of Public Health 2009; 33(2):105-108.</p> | SA | melanoma | <p>Study determined the distribution of melanoma (relative incidence & mortality) in SA coastal/ river versus inland, and metropolitan (metro) versus regional/ remote areas. All melanoma cases and deaths (1985-2004) for Adelaide and 11 regional centres (83% of the SA 2001 ABS census population) were geocoded (n=9,091 cases; 1,049 deaths), allocated to ABS collection districts, and those with centroids within two km of coast/ River Murray identified by mapping software. Data were indirectly age standardised.</p> <p>The regional centres (populations close to, or above, 10,000) were: Port Lincoln, Renmark/ Paringa/ Berri, Port Augusta-Stirling North, Whyalla, Port Pirie, Wallaroo/ Moonta/ Kadina, Nuriootpa/ Angaston/ Tanunda, Murray Bridge, Mount Gambier, Mt Barker/ Nairne, and Victor Harbor/ Middleton/ Pt Elliot.</p> <p>Metro Adelaide population was of a similar average age (38.9 years) but higher SES (SEIFA score 993) than the rural population (average age 38.7 years, SEIFA score 931). Coastal communities (Victor Harbor/ Middleton/ Port Elliot, 47.1 years; Wallaroo/ Moonta/ Kadina, 43.3 years; Glenelg (Metro Adelaide), 46.1 years) had higher average age than inland communities (Mt Barker/Nairne, 33.6 years; Mt Gambier, 36.6 years; Golden Grove (Metro Adelaide) 32.7, years). Elderly populations tended to be clustered along Adelaide's coastal strip and in the tourist based regional centres of Victor Harbor/ Middleton/ Port Elliot and Wallaroo/ Moonta/ Kadina. Regional centres' SES was generally below the rural average (Wallaroo/ Moonta/ Kadina, 885; Victor Harbor/ Middleton/ Port Elliot, 919; Mt Gambier, 925; Port Lincoln, 928); coastal and inland communities had similar SES.</p> <p>Melanoma incidence was higher in coastal SA (OR=1.19) and near the River Murray (OR=1.25) than in inland SA; effect remained after adjustment for age and SES. Incidence was also higher in metro Adelaide than in regional areas (OR=1.10). For melanoma mortality there was no significant effect of living near coast/ river, and no effect of living in regional areas.</p> | <p>The age-adjusted increased risk of melanoma incidence arising from living near the coast or Murray River (cf with living inland) was 19% and 25%, respectively (increase in crude incidence rates of 41% & 19%); this significantly increased risk of being diagnosed with melanoma remained significant after adjustment for age, remoteness and SES, confirming the existence of a genuine geographical effect unexplainable by other factors. This geographical link was noteworthy as Cancer Registry address data is only recorded at time of diagnosis, and does not take into account lifetime geographical mobility (suggests that those who live near coast/ river may have a lifetime preference).</p> <p>Melanoma prevention and acute care programs may be usefully targeted at residents of coastal and riverine areas which have a significant excess of melanoma incidence. As this target population is older than inland populations, interventions appropriate for older communities will be required.</p> <p>Improvements needed for cancer research on the link between geographical location and melanoma incidence area include: 1) expansion of the Australian G-NAF (Geocoded National Address File) files to rural</p> |

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| | | | <p>This was an exploratory use of a new technique; technical limitations of geo-coding included inadequate coverage of parts of SA (e.g. areas outside of towns). Another limitation was the lack of sex standardisation (due to insufficient number) as male sex is well-documented as a risk factor for melanoma diagnosis and mortality.</p> | <p>areas, and 2) cancer registry data that includes pre- and post-diagnosis residential address history.</p> |
| <p>Hoon EA, Newbury JW, Chapman P, Price J. Education to improve cancer care in rural South Australia. Rural and Remote Health 2009; 9(2).</p> | SA | all cancers | <p>Cancer prevention and management have been identified as priorities for health care provision in Australia because cancer management follows the overall pattern of rural health disparities, with higher incidence rates of preventable cancers and lower survival rates in rural areas. The Rural Chemotherapy Mentoring Program (RCMP) was funded by the Department of Health and Ageing as part of the 'Strengthening Cancer Care Initiative' (prior to Cancer Australia's establishment of CanNET) to improve access to chemotherapy for rural cancer sufferers in SA. The RCMP education program was developed to enable rural cancer patients to receive more chemotherapy in local health services, and aimed to enhance a functional connection between rural health services and urban specialist cancer services.</p> <p>The RCMP's key strategy was to provide clinical placements for rural health clinicians at metropolitan oncology units. The RCMP enrolled 43 SA rural clinicians (5 GPs & 38 nurses) in 5-day placements at two primary host sites (each providing very different placement opportunities and experiences). Funding covered participant salary costs and back-filling, travel and accommodation expenses, and a salaried mentor for one day per placement participant.</p> <p>RCMP was evaluated after the initial 18 months (2007 to June 2008) using a mixed method approach which supplemented quantitative & qualitative questionnaire data from participant clinicians, their employers, and education providers from metropolitan cancer units; with qualitative interview data from these sample groups and the RCMP steering committee. Information gained on the key strengths, limitations and potential future development of RCMP was analysed interpretatively.</p> <p>The majority of participants, employers, training providers and steering committee representatives expressed high levels of overall satisfaction with their involvement in RCMP. Before their placements, rural clinical participants expressed clearly identifiable needs for increased knowledge and skills in cancer care, and lacked confidence in technical aspects of the delivery of some chemotherapy protocols and safely preparing patients to receive chemotherapy. Post-placement self-evaluation data identified improvements in participant' understandings and confidence about chemotherapy and cancer care; both participants and their employers reported changes in specific work activities as a result.</p> <p>Limitations included: unmet expectations for hands-on experience, and training certification; difficulties related to integrating education into busy work routines</p> | <p>Knowledge acquisition and transfer of experience between rural and urban based clinicians were key to the success of the RCMP.</p> <p>Generalisable recommendations for further improvement of the RCMP were to:</p> <ol style="list-style-type: none"> (1) clearly define and articulate a precise learning objective for the program (including exactly how much practical experience can be gained); (2) involve those staff who will be mentoring directly in the planning of the program; (3) include the time to resolve complex indemnity issues across workplaces in the planning phase; and (4) fund a dedicated trainer (preferably a unit staff member) to supervise placements in busy urban oncology clinics. <p>The evaluation highlighted the challenges of developing clinical education that is both appropriate for participants, and that fits within the safety and quality policies and procedures of host sites.</p> |

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| | | | (especially felt by nursing staff in the cancer day units); and quality, safety and learning ability issues associated with expected prior knowledge of participants (perceived to have insufficient basic knowledge to gain much from the limited 5-day experience). | |
| Lam L, Logan RM, Luke C, Rees GL. Retrospective study of survival and treatment pattern in a cohort of patients with oral and oropharyngeal tongue cancers from 1987 to 2004. Oral Oncology 2007; 43(2):150-158. | SA | oral & oropharyngeal tongue cancers | <p>Retrospective study of Royal Adelaide Hospital (RAH) patients presenting with oral and oropharyngeal tongue cancers, 1987-2004, to determine socio-demographic and tumour characteristics, treatment patterns, and five-year disease-specific survival. All tongue cancer cases, including untreated and palliative cases, were identified through the RAH Cancer Registry for inclusion in the statistical analysis ($n=212$).</p> <p>Patients <45 yrs. of age made up 15% of cases and tended to present with advanced stage disease (not statistically significant). Squamous cell carcinoma was the most common histological type. Almost 30% of recorded cases were oropharyngeal or base of tongue cancers.</p> <p>Nearly half (46.96%) of the patients had advanced stage (III and IV) disease at presentation, which was significantly associated with rural area of residence (63.77%), base of tongue sub-site and early diagnostic period. Treatment was multidisciplinary. The majority of patients were treated with curative intent. Palliative treatment was more likely for patients with oropharyngeal tongue cancers or advanced stage disease.</p> <p>There was no significant improvement in five-year disease-specific survival over the 18-year period. Poorer survival was significantly associated with age ≥ 45 yrs., oropharyngeal tongue cancers and advanced stage disease. There was no significant association between survival and sex ($p=0.07$), residence ($p=0.22$), or multiple primaries ($p=0.08$).</p> <p>Quote: <i>“The metropolitan Adelaide population is about 1.1-1.2 million; with only 10-15% of the entire South Australia State population originating from rural areas. The RAH also receives a steady flow of cancer patients from the Northern Territory, Broken Hill and Victorian Riverland areas. The importance of this is that, from a tiny non-metropolitan community a disproportionate number of advanced cases of cancer arise. Rural and remote residents suffer from higher incidence of oral disease, including oral cancer, and various factors may explain this disparity, including higher levels of health risk factors (smoking and alcohol intake is approximately 2.5–5 times that of metropolitan levels), higher proportion of indigenous Australians, and the lack of timely access to general dental practitioners. The issue of time lag from diagnosis to treatment, inherent in a huge draining catchment area of patients encourages delay in seeking professional consultation and hence advanced disease presentation.”</i> (p. 155)</p> | Nearly half the cases of tongue cancer in this study presented with advanced stage disease, and survival of tongue cancer had not improved over a 25 year period. As tongue cancer is associated with such poor survival there is a need for greater patient and general public awareness of the disease, its risk factors and the importance of regular professional oral cancer examination. Clinicians need to be aware of the potential for tongue cancer to occur in younger patients who may not have obvious risk factors (e.g. tobacco & alcohol use). Early detection and diagnosis are important to improve the survival rate for this. |
| Luke C, | SA | prostate, | Previous studies suggest lower use of radiotherapy by Australian cancer | Study confirmed earlier cross-sectional |

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| <p>Chapman P, Priest K, Roder D. Use of radiotherapy in the primary treatment of cancer in South Australia. <i>Australasian Radiology</i> 2003; 47(2):161-167.</p> | | <p>female breast, lung, rectum, colon, melanoma treatment: radiotherapy</p> | <p>patients in lower socioeconomic areas and in country regions that are some distance from urban treatment centres. These cross-sectional studies had the potential for error from changes in place of residence. This study used a cohort design to avoid such error. SA patients diagnosed in 1990-1994 were followed until 31 December 1999 using data from the SACR (n=31,586). The percentage found to have had megavoltage therapy in the first 12 months following diagnosis varied by leading primary incidence site from 44% for the prostate to 40% for female breast, 38% for lung, 17% for rectum, 3% for colon and 2% for skin (melanoma). Multivariate analysis indicated that determinants of not receiving megavoltage therapy in the first 12 months were older age, female sex, residence in a country region and country of birth. Melanoma data revealed earlier stages for women than men. This difference by sex, if it also applied to other cancers, might explain the lower exposure of women to radiotherapy. Fewer older patients received radiotherapy, consistent with trends observed in hospital-based cancer-registry data. The influence on this finding of differences in stage and comorbidity requires additional study.</p> | <p>study findings that country residents had lower exposure to radiotherapy treatment, however, the difference was comparatively small. Similar variations by socioeconomic status of residential area were not observed. Additional research is needed to determine the reasons for lower exposure to radiotherapy treatment in women and the higher relative exposures in British-Irish migrants.</p> |
| <p>Luke CG, Coventry BJ, Foster-Smith EJ, Roder DM. A critical analysis of reasons for improved survival from invasive cutaneous melanoma <i>Cancer Causes and Control</i> 2003; 14(9):871-878.</p> | <p>SA</p> | <p>melanoma survival</p> | <p>Study objective was to determine the extent to which increases in survival from melanoma over 20 years could be explained by various characteristics including SES and region of residence (SEIFA Index, 20 Statistical Subdivisions). Changes in survival were analysed in 9,519 melanoma cases reported to the SA population-based cancer registry during the 1980-2000 diagnostic period, using proportional hazards regression to adjust for thickness, level and other characteristics. Lower survivals applied for thicker lesions, deeper Clark levels, lesions on the trunk and scalp/neck, and for older cases and males. After adjusting for these characteristics, the relative risk (95% confidence limits) of case fatality for the period was 0.79 (0.63, 0.99), when compared with the baseline 1980-1986. A secular change for deeper Clark levels within Breslow thickness categories was an unexpected finding. Higher survivals were associated with younger age (p < 0.001), female sex (p < 0.001), and a more recent diagnostic period (p < 0.001). The difference in survival by SES (p=0.005) was small and the direction was not consistent across the SES scale. A difference in survival was also observed by country of birth (p=0.007), with a comparatively low 5-year survival (\pmstandard error) of 74.8 (\pm5.4)% applying for cases born in Southern Europe. Region of residence (20 Statistical Sub-divisions) also was predictive of survival (p=0.001), with 5-year survivals varying by region from a low of 83.4 (\pm3.4)% to a high of 92.5 (\pm2.6)%. There was no difference by place of residence when classified as Adelaide or a country area (p=0.155).</p> | <p>Survivals following a diagnosis of cutaneous melanoma have increased in SA to such an extent that mortality rates have remained stable, despite an increase in incidence. About half the increase in survival remained unexplained, after adjusting for thickness and level of lesions at diagnosis, changes in age and sex distribution, and lesion site; and this unexplained component warrants further investigation. Possible contributors include: * changes in other staging characteristics (e.g. ulceration or involvement of regional nodes or more distant sites; * treatment gains; or * changes in the biology of the disease. Among lesions of similar thickness, those diagnosed more recently show a deeper level of invasion, a finding which should be verified and investigated further in independent studies.</p> |
| <p>Luke CG,</p> | <p>SA</p> | <p>colorect-</p> | <p><i>Luke et al. 2005</i></p> | <p>Secular gains in survival were evident for</p> |

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| <p>Koczwara B, Moore JE, Olver IN, Penniment MG, Pittman K, et al. Treatment and survival from colorectal cancer: the experience of patients at South Australian teaching hospitals between 1980 and 2002. <i>Clinical Oncology</i> 2005; 17(5):372-381.</p> | <p>al cancer survival & treatment</p> | <p>Evaluated trends in colorectal cancer survival and treatment at SA teaching hospitals and the degree of adherence to treatment guidelines recommending adjuvant chemotherapy for Dukes' C colon cancers and combined chemotherapy and radiotherapy for high-risk rectal cancers.</p> <p>Trends in disease specific survival and primary treatment were analysed, and comparisons drawn between diagnostic periods, using cancer registry data from SA teaching hospitals (including supplementary data on stage, grade and other prognostic indicators, primary treatment, & immediate treatment outcomes) ($n=4,387$ colon cancer + 2,581 rectal cancer cases). SEIFA index scores, derived from census data for postcodes of residence to indicate SES (based on income levels, educational status, skilled occupations, & related characteristics) were grouped into four ordinal categories. Statistical methods used included univariate and multivariable disease-specific survival analyses. As the data was from different hospitals, it was tested for confounding and effect modification by hospital; and clustering with no evidence of these effects. For both colon and rectal cancers, age and tumour differentiation were highly predictive of survival, as was age at diagnosis. For colon cancer only, males had marginally lower survivals. SES was not predictive of survival for either colon or rectal cancer.</p> <p>For colorectal cancer (combined) five-year survival increased from 48% in 1980-1986 to 56% in 1995-2002, with the largest gains for stage C, where survivals were higher when chemotherapy was part of the primary treatment. Gains in one-year survival were largest for stage D (distant metastases). Chemotherapy was provided for 4% of patients with colorectal cancers in 1980-1986, increasing to 32% in 1995-2002. Among stage C cases aged 70 years and under at diagnosis, the proportion having chemotherapy increased to 83% in 1995-2002. The most common chemotherapy used fluorouracil (5FU) as a single agent in 1980-1986 and 5FU with leucovorin in 1995-2002 (in line with best-practice guidelines). Radiotherapy was used more frequently for rectal than colon cancers, as was expected, and particularly for stage C cancers. Among stage C rectal cases aged 70 years and under, the proportion receiving radiotherapy increased from 10% in 1980-1986 to 57% in 1995-2002. Approximately 93% of colorectal cancers were treated surgically. Patients who were not treated surgically tended to be aged 80 years or more and presented with distant metastases.</p> <p>Survival gains were considered most likely to be due to advances in adjuvant therapy (e.g. increased use of chemotherapy as part of primary treatment), surgical subspecialisation, improved surgical management through better technique, and probably from improved diagnostic imaging (more routine use of CT scans leading to more accurate staging and appropriate treatment planning).</p> | <p>patients at these hospitals and persisted after adjusting for stage, age at diagnosis and other risk factors. For colon cancer, more pronounced increases in five-year survival occurred for stage C (40-52%) and stage B (69-78%) than other stages; an increase was also evident in stage D survival at one year from diagnosis (30-47%), and two years (13-26%), but not at five years from diagnosis. For rectal cancers, overall survival did not vary by diagnostic period, however, an increase was seen at five years; survival gains were also evident for stages C and D, but not A or B, while a pronounced increase was observed for stage D at one year from diagnosis (41-57%), and at two years.</p> <p>Overall, 95% of cancers were treated by surgery, chemotherapy and/or radiotherapy: for colon cancer most were treated surgically (94%); 18% had chemotherapy and 3% radiotherapy. For rectal cancer most had surgery (92%); 25% had chemotherapy and 21% had radiotherapy.</p> <p>SES was not predictive of survival or treatment modality for patients at these hospitals, a reassuring finding from an equity perspective. Older patients were, however, less likely than younger patients to receive surgery, chemotherapy or radiotherapy. Trends in chemotherapy and radiotherapy were broadly in accordance with evidence-based recommended treatment guidelines (and earlier research results on which they were based). There had been reassuring gains in survivals after adjusting for stage, grade and other prognostic indicators. These data provide useful benchmarks for monitoring trends in survival and treatment and can be used by individual hospitals to evaluate their own clinical experiences.</p> |
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| <p>Luke C, Gill G, Birrell S, Humeniuk V, Borg M, Karapetis C, et al. Treatment and survival from breast cancer: the experience of patients at South Australian teaching hospitals between 1977 and 2003. <i>Journal of Evaluation in Clinical Practice</i> 2007; 13(2):212-220.</p> | <p>SA</p> | <p>female breast cancer survival, treatment</p> | <p>Treatment guidelines recommend a more conservative surgical approach than mastectomy for early stage breast cancer and a stronger emphasis on adjuvant therapy. Study used registry data to: (1) investigate trends in survival and treatment; and (2) compare treatment with guidelines.</p> <p>Registry data from three teaching hospitals were used to analyse trends in primary courses of treatment of breast cancers during 1977-2003 (n=4671), using univariate analyses and multiple logistic regression. Disease-specific survivals were analysed using Kaplan-Meier product limit estimates and multivariable Cox proportional hazards regression.</p> <p>Five-year survival was 79.9%, with a secular increase reaching 83.6% in 1997-2003. The relative risk of death (95% confidence limits) was 0.74 (0.62, 0.88) for 1997-2003, compared with previous diagnoses, after adjusting for tumour node metastasis stage, grade, age and place of residence. Treatment changes included an increase in conservative surgery (as opposed to mastectomy) from 51.7% in 1977-1990 to 76.8% in 1997-2003 for stage I (p<0.001) and from 31.1% to 52.2% across these periods for stage II (p < 0.001). Adjuvant radiotherapy also became more common (p<0.001), with 20.6% of patients receiving this treatment in 1977-1990 compared with 60.7% in 1997-2003. Radiotherapy generally was more prevalent when conservative surgery was provided, although also relatively common in mastectomy patients when tumour diameters exceeded 50 mm or when there were four or more involved nodes. The proportion of patients receiving chemotherapy increased (p<0.001), from 19.6% in 1977-1990 to 36.9% in 1997-2003, and the proportion having hormone therapy also increased (p<0.001), from 34.3% to 59.4% between these periods.</p> <p>Multivariable analysis confirmed that predictors of death from breast cancer included higher stages and less differentiated lesions. After adjusting for these characteristics, risk of death was higher in patients over 80 years of age at diagnosis, and potentially in non-metropolitan residents, although the difference by residential area achieved only a marginal statistical significance (p=0.047). Patients diagnosed in 1997-2003 had a lower risk of death than those diagnosed in previous years, with a relative risk (95% confidence limits) of 0.74 (0.62, 0.88).</p> <p>Gains in case survivals have been apparent from Australian population-based data, but without data on stage, it has not been possible to assess respective contributions of earlier detection and treatment advances. These hospital registry data indicate that recently diagnosed patients had better survivals than previous patients, after adjusting for stage and grade. While residual confounding from imperfect measures (e.g. as may occur from stage shift), or from lead-time and related biases, may have contributed, the lower population-based breast cancer mortality in Australian women in 1997-2003 than in the prior ten-year period suggests real gains in case survival.</p> | <p>Survivals appear to be increasing and treatment trends are broadly consistent with guideline directions.</p> <ul style="list-style-type: none"> * Trends towards conservative surgical management of early stage disease, and more general increases in the use of adjuvant radiotherapy, chemotherapy and hormone therapy, are broadly consistent with guideline recommendations and the earlier research results on which they were based. * Reassuring gains in survivals from breast cancer are evident, after adjusting for stage, grade and other prognostic indicators, which may reflect treatment advances in addition to artificial influences. * Older patients have lower survivals than younger patients of comparable stage and other prognostic indicators, which may reflect compromising effects of greater co-morbidity and frailty on treatment planning. * Country residents are more likely than metropolitan residents to have a mastectomy, as opposed to more conservative surgery, despite treatment at the same clinical centres. * These data provide useful benchmarks for monitoring survival and treatment, which can be used by individual hospitals when evaluating their own experience. * Similar analyses are advocated for other states and territories, in order to test the representativeness of results from this study. |
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| | | | <p>Multivariable analyses pointed to poorer outcomes in country than metropolitan residents, but only a marginal level of statistical significance was achieved (i.e. $p=0.047$). If real, this difference could reflect the referral to these teaching hospitals of the more difficult country cases, including those with greater frailty and co-morbidity.</p> <p>Women living in rural areas have been found to be more inclined to receive a mastectomy as opposed to more conservative surgery, which would reduce the need for travel to metropolitan areas for radiotherapy and other adjuvant therapy. A small difference also was observed in this study, with 52.3% of country compared with 47.7% of metropolitan surgical patients having a mastectomy. Country residents were not found to have had less exposure to radiotherapy or to adjuvant treatments in general ($p>0.750$).</p> <p>Survivals were lower in patients aged 80 years, after adjusting for stage, grade, place of residence, and diagnostic period. This may reflect decisions to restrict the range of treatment exposures, due to greater co-morbidity.</p> | |
| <p>Luke CG, Yeoh E, Roder DM. Exploring trends in laryngeal cancer incidence, mortality and survival: implications for research and cancer control. Asian Pacific Journal of Cancer Prevention 2008; 9(3):397-402.</p> | SA | <p>laryngeal cancer</p> <p>incidence, mortality, survival</p> | <p>Study used SA registry data to explore trends in laryngeal cancer age-standardised incidence, mortality and disease-specific survival from 1977 to 2005.</p> <p>Incidence rates decreased by 32% from 1980-84 to 2000-05, affecting both sexes and ages under 70 years. There were concurrent reductions in mortality, although statistical significance was not achieved with the numbers of deaths examined ($p>0.05$).</p> <p>More than other cancers, laryngeal cancers presented in: the 50-79 year age range; males, particularly those born in Southern Europe; UK/Irish migrants; and residents of lower socio-economic areas.</p> <p>Compared with other cancers, laryngeal cancers were less common in more recent diagnostic periods. The ratio of glottis to other laryngeal cancers was higher in males, older patients, and those born in Southern Europe, UK/Ireland and Western Europe. A secular increase in this ratio was evident.</p> <p>The five-year survival from laryngeal cancer was 68%, with poorer outcomes applying for older patients, non-metropolitan residents, patients with cancers of laryngeal sub-sites other than glottis, and potentially patients born in Southern Europe. Secular changes in survival were not observed.</p> | <p>Reductions in incidence were attributed to decreases in tobacco smoking in males and reductions in per capital alcohol consumption since the 1970s. The higher ratio of glottis to other laryngeal cancer sub-sites in males may indicate a greater contribution made by tobacco, as opposed to alcohol, in males. Lower survival rates observed in non-metropolitan patients may reflect poorer access to radiation oncology and other specialist services. Delays in diagnosis for other reasons may also have contributed.</p> |
| <p>Martini A, Javanparast S, Ward PR, Baratiny G, Gill T, Cole S, et al. Colorectal cancer screening in rural and remote</p> | SA | <p>colorectal cancer</p> <p>screening</p> | <p>Presents an analysis of phase 1 of the National Bowel Cancer Screening Program (NBCSP) data for rural and remote SA, to identify geographical areas and population groups that may benefit from targeting to increase participation rates in colorectal cancer screening.</p> <p>De-identified Medicare Australia data from the NBCSP (2007-2008) were mapped and analysed using ESRI ArcGIS and MapInfo. Participants were SA residents who turned 55 and 65 yrs between 2007 and 2008 who were invited to participate in, and completed, the NBCSP test ($n=34,480$ participants,</p> | <p>Findings <i>suggest lower NBCSP participation rates for people from metropolitan and remote areas, compared with those from rural areas</i>. Bowel cancer screening uptake was lower for older rural and remote residents, men, Indigenous people, lower SES groups and those living in the Far North subdivision of SA.</p> |

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| <p>areas: analysis of the National Bowel Cancer Screening Program data for South Australia. Rural and Remote Health 2011; 11(2):1648.</p> | | | <p>46.1%). Data were aggregated to postcode and postcodes allocated to a remoteness area, using the Accessibility/ Remoteness Index of Australia (ARIA, 3 point scale: metropolitan, rural & remote/very remote). Overall participation rates, sex, age, Indigenous status and the ABS SEIFA (Socio-Economic Indexes for Areas)-Index of Relative Socio-Economic Disadvantage (IRSD) were mapped.</p> <p>Differences in participation were statistically significantly (p<.001) for sex (males 46.7%, females 53.3%), age (55 year olds 45.2%, 65 year olds 52%), SES (from 43% in the ‘most disadvantaged’ quintile to 50% in the ‘least disadvantaged’ quintile) and remoteness (metropolitan and remote areas broadly similar at 45.6% & 46.0% respectively, versus rural areas at 48.6%). The participation rate of Aboriginal people invited to screen was unknown (0.5% of those screened).</p> <p>Mapping showed a pattern of high participation in some areas of Eastern and Southern SA (rates of 60-100% in some postcodes). “There was, however, insufficient data to calculate participation rates in large sections of the state, including the Far North subdivision of SA. These areas also have relatively high Indigenous populations.”</p> | <p>From the conclusion: “findings indicate that <i>residing in rural and remote areas can affect uptake of cancer screening, with sex, age, Indigenous status and SEIFA-IRSD having a particularly negative impact on screening.</i> Older rural and remote residents, men, Aboriginal peoples and those living in Far North SA need specifically targeted preventive screening services.”</p> <p><i>Comment: Analysis comparing the characteristics of participants vs. those of the SA population not described in the methodology; & the invited population was not compared (apparently). A weak Limitations section. Findings from the conclusion were watered down for the abstract; those in italics may well be so but are not convincingly derived from the analysis. A muddled and confusing piece of work.</i></p> |
| <p>Roder D, Houssami N, Farshid G, Gill G, Luke C, Downey P, et al. Population screening and intensity of screening are associated with reduced breast cancer mortality: evidence of efficacy of mammography screening in Australia. Breast Cancer Research and Treatment 2008; 108(3):409-416.</p> | <p>SA</p> | <p>female breast cancer screening, survival</p> | <p>Study reports on one of the largest case-control evaluations of a screening service (as efficacy of breast screening may differ in practice from the results of randomised trials).</p> <p>Subjects included 491 breast-cancer deaths affecting 45-80 year-old SA females (2002-2005) diagnosed after BreastScreen commencement; and 1,473 live controls (three per death) randomly selected from the State Electoral Roll after birth-date matching. Cancer Registry and BreastScreen records provided cancer and screening details. Risk estimates were calculated by BreastScreen participation, using conditional logistic regression. Interpretation was assisted by a population survey of risk factor prevalence by BreastScreen participation in 1,684 females aged >or =40 yrs.</p> <p>The relative odds (OR) (95% confidence limits) of breast-cancer death in BreastScreen participants compared with non-participants were 0.59 (0.47, 0.74). Compared with non-participants, the OR was 0.70 (0.47, 1.05) for women last screened through BreastScreen more than 3 years before diagnosis of the index case, and 0.57 (0.44, 0.72) for women screened more recently. The OR of 0.47 (0.34, 0.65) for women screened more frequently in the pre-diagnosis phase was lower than the 0.64 (0.50, 0.82) for other screened women. The overall OR of 0.59 approximated 0.70 when corrected for the screening self-selection bias observed in five randomised trials. Multivariable analysis of survey data, however, did not indicate a lower prevalence of breast-cancer risk factors among BreastScreen participants, suggesting that this correction may be inappropriate.</p> | <p>Participation in screening was associated with a breast-cancer mortality reduction of between 30 and 41%, depending on assumptions about screening self-selection bias. A downward mortality risk by recency of last screen prior to cancer diagnosis, and frequency of recent screening, is consistent with a screening effect.</p> |

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| <p>South Australian Cancer Registry (SACR). Case survivals by place of residence in Australia. In Epidemiology of cancer in South Australia 1977-1998. Incidence, mortality and survival 1977 to 1998. Adelaide: SACR, South Australian Health Commission, 1999.</p> | <p>SA</p> | <p>all cancers, skin (melanoma), rectum, lung, bladder, stomach, large bowel (colon/rectum), female breast, larynx, lung, soft tissue, prostate, multiple myeloma & related cancers</p> <p>survival, case fatality</p> | <p>Survivals of SA cancer cases have been monitored for years, however, numbers have been insufficient for comparisons by area of residence, except broadly for metropolitan Adelaide, and the aggregate non-metropolitan areas. This chapter reports analyses for four Adelaide, and four non-metropolitan areas.</p> <p>Generally, there was no marked area variation in survival from the primary cancer for all cancer sites combined; area-based five-year survivals ranged from 50% to 55%. Older cases generally had lower survival rates, and males had worse outcomes than females for all sites in aggregate, and for cancers of the skin (melanoma), rectum and lung, as previously reported. Females had lower survival rates than males for cancers of the bladder, as in earlier analyses.</p> <p>Prior analyses suggested higher case fatalities among non-metropolitan than Adelaide residents for cancers of the stomach, large bowel (colon/rectum), female breast, and bladder, multiple myeloma and related cancers. These results were confirmed and the areas identified. For instance, country women with breast cancer were previously found to have lower case survivals than metropolitan-resident women and in this study, five-year survivals ranged by area from 68% to 79%. The Cox model showed an area variation ($p=0.004$), after age adjustment, with elevated case fatalities in most country areas, and especially in the Lower South East. Increases in case survival from female breast cancer in SA have been recorded, together with reductions in the diameter of tumours at diagnosis [citing SACR, 1998; 1996]. Gains have been most marked in 50-69 year olds, the main target age range for population screening. In addition, socio-demographic differences in tumour diameter before the commencement of population screening had been largely eliminated by 1997 after eight years of screening; this should lead to reductions in area differences in case survival [citing SACR, 1998].</p> <p>Variations in case fatalities also were reported across areas, for cancers of the larynx, lung, soft tissue, prostate, and skin (melanoma). For example, five-year survivals for prostate cancer varied by area from 62% to 74%, with higher case fatalities at each end of the age spectrum [citing SACR, 1996]. After adjusting for age, the Cox model showed a differences in area outcomes ($p<0.001$), with high fatality rates in the Lower South East and combined Whyalla, Pirie and Flinders Ranges. Findings were, however, difficult to interpret. Numbers of diagnosed prostate cancers have increased in SA and elsewhere, attributed to increased public awareness of the disease, use of prostate-specific antigen tests and more recently of transrectal ultrasonography [citing SACR, 1998; 1996]. Since prevalence of latent disease is high affecting at least half of aged men, increases in investigations can lead to increases in numbers of detected cancers of uncertain clinical significance, and</p> | <p>Although generally, there was no marked area variation for all cancers combined, larger differences in survival were observed between areas for individual cancer sites, however, this would have been affected by the statistical imprecision associated with small case numbers in specific regions. Possible reasons for these differences in case outcome proposed include variations in tumour stage at diagnosis. Further investigations are required to confirm this and suggest other possible explanations.</p> <p><i>Comment: Frequently cited as evidence for poorer survival rates among non-metropolitan residents, usually without the caveats of the authors (e.g. cited in Jong et al., 2004).</i></p> |
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| | | | <p>artificial increases in case survival. In the Lower South East and the combined Whyalla, Pirie and Flinders Ranges, the age-standardised detection rate of these cancers in 1977-97 was 13% lower than for the rest of SA ($p < 0.001$), and it this could have led to reductions in measured case survival due to reduced numbers of detected cases of uncertain clinical significance. This could have occurred without a change in numbers of deaths. Until there is experimental evidence of an association between prostate-cancer screening and death rates from this cancer, the effects of early detection on case outcomes cannot be quantified with any certainty.</p> | |
| <p>South Australian Cancer Registry (SACR). Cancer in South Australia 2007 – with projections to 2010: a report on the incidence and mortality patterns of cancer. Adelaide: SA Department of Health, 2010.</p> | SA | <p>all cancers, prostate, breast, colorectal, lung, melanoma</p> <p>incidence, mortality, projections</p> | <p>In 2007, there were 8,989 new cases of cancer diagnosed in SA, and 3,466 cancer deaths (397 additional new cases over the previous year; 30 additional deaths).</p> <p>Until 2003 there was a trend towards stable incidence rates for both males and females, but 2004-2007 saw an increase in prostate cancer incidence which caused the all cancers incidence rate for males to rise. Incidence was rising most rapidly in cancers where population-based or private screening services were available: colorectal cancer, breast cancer, melanoma and prostate cancer; and in cancers for which improved diagnostic methods were available (e.g. kidney cancer and ovarian cancer).</p> <p>Recent mortality rates declined in both males and females, mainly due to declines in prostate cancer deaths in males, and breast cancer deaths in females. For most of the major cancer sites there had been a steady decrease in mortality rate, with the exceptions being female lung (increase), kidney (slight increase) and non-Hodgkin's lymphoma and melanoma (stable).</p> <p>The most common cancers in SA were: prostate, colorectal, lung and melanoma in males; and breast, colorectal, lung and melanoma in females. Developments of note included:</p> <ul style="list-style-type: none"> - continued increase in prostate cancer incidence to a level which almost equals the peak rate set in 1993, a result of the corresponding rise in PSA testing; - decreasing mortality rates over the last 10-15 years for prostate cancer and female breast cancer; - a steady increase in male liver cancer (albeit from a low base rate) over the last 5 years; - a steady decrease in male and female lung cancer mortality; and - a steady decrease in female colon cancer mortality. <p>Cancer predominantly affected the older population, with 0-14 year olds accounting for 0.5% of cancers; 15-44 year olds – 7% of cancers; 45-64 year olds – 32.5% of cancers; and 65+ year olds – 60% of cancers.</p> | <p>Cancer remained one of the leading causes of morbidity and mortality in SA and was the second highest cause of death overall, after cardiovascular disease. One in three South Australians will be diagnosed with cancer at some time during their lives.</p> <p><i>Comment: Latest data analyses from SACR; confirms SES-related patterns first reported in 2001. Lung cancer & cervical cancer outcomes in Indigenous females outstandingly poor. Some remarks on other subpopulations.</i></p> |
| <p>South Australian Cancer Registry</p> | SA | <p>cancers of the breast,</p> | <p>Twenty two maps showing incidence and mortality (1991-2000) of 11 major cancers: breast, prostate, lung, colon, rectum, melanoma, leukaemia,</p> | <p>Majority of cancers show no overall differences in incidence and mortality</p> |

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| <p>(SACR). The geography of cancer in South Australia - 1991 to 2000: cancer Incidence and mortality maps by SLA for 11 major cancers. Adelaide: SACR, n.d. <http://www.health.sa.gov.au/pehs/cancer-maps/cancer-maps-91-00.htm></p> | | <p>prostate, lung, colon, rectum, melanoma, leukaemia, lymphoma, stomach, pancreas & cervix</p> <p>incidence, mortality</p> | <p>lymphoma, stomach, pancreas and cervix. Plus two SLA-level data files (incidence, mortality). Data is age and sex standardised to the world population.</p> <p>Patterns that emerge from the mapping include:</p> <ol style="list-style-type: none"> 1. cancers such as breast, melanoma and prostate cancer that require screening or a medical check for detection, almost always have higher incidence rates in high SES areas (e.g. eastern and inner southern Adelaide); 2. some cancers (e.g. lung & stomach cancer) that have well documented links with low SES, have higher incidence and death rates for northern and western Adelaide, and for rural areas like the Iron Triangle and the Riverland; 3. the majority of cancers show no overall differences in incidence and mortality between city and country areas, with the exception of prostate cancer for which there is higher mortality in country areas than city areas. | <p>between city and country areas, except prostate cancer which had higher mortality in country areas.</p> |
| <p>South Australian Cancer Registry (SACR). Epidemiology of cancer in South Australia. Incidence, mortality and survival, 1977-2000. Incidence and mortality, 2000. Annual Cancer Reports. Adelaide: SACR, 2001.</p> | <p>SA</p> | <p>all cancers; cancers in males: lymphomas, testicular cancers, colorectal cancers, melanoma; cancers in females: breast, melanoma, lung, cervical</p> | <p>Males: Cancers with an elevated incidence in males in 2000 included lymphomas and testicular cancers, with evidence of a sustained upward trend (a 35% increase in incidence between 1977-81 and 1997-99. Similar upward trends have been reported for other populations and attributed, in part, to HIV infection. Elevated incidence of testicular cancers in 2000 followed a 44% increase (1977-81 to 1997-99), with similar increases reported for other western populations. Causes are unknown; possible contributors include sedentary behaviour, viral exposures, and foetal or later exposures to oestrogen-like compounds.</p> <p>Incidence of large-bowel (colon/ rectum) cancer increased by ~25% in males (1977-81 to 1997-99), remained high in 2000, and may be due to diet and sedentary lifestyles, although incidence figures have probably been increased through enhanced disease detection (e.g. from occult blood testing & colonoscopy).</p> <p>Relatively stable melanoma incidence rates in males suggest that the 'epidemic' of this cancer has peaked. Females: Increased detection through mammographic screening led to a 55% higher incidence of diagnosed breast cancer in 1997-2000 relative to 1977-86 before screening began. Tumour size has reduced markedly, with positive prognostic implications (13% of tumours were found when small (diameter <15mm) prior to population screening, compared with 36% for 1997-99). As for males, melanoma incidence rates were stabilising, and lung cancer rates appeared to have peaked in females. Cervical cancer incidence reduced by 38% between 1977-81 and 1997-99, with 2000 incidence trending lower - attributed mostly to early detection</p> | <p>Sustained upward trend in elevated incidence of lymphomas and testicular cancers in males warrants further investigation into the possible roles of: other viral infections (in addition to HIV), hair dyes, immunosuppressive states, and exposures to herbicides, non-ionizing radiation, and other environmental agents.</p> |

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| | | | (through screening of precursor lesions) and treatment. | |
| Ward PR, Javanparast S, Matt MA, Martini A, Tsourtos G, Cole S, et al. Equity of colorectal cancer screening: cross-sectional analysis of National Bowel Cancer Screening Program data for South Australia. Australian and New Zealand Journal of Public Health 2011; 35(1):61-65. | SA | colorectal cancers | Study aimed to test unequal participation by different population sub-groups, analyse the equity (horizontal equity) of the National Bowel Cancer Screening Program (NBCSP) for SA, to identify geographical areas and population groups that might benefit from targeted approaches to increase participation rates in colorectal cancer screening. De-identified data from the NBCSP [phase 1] (February 2007 to July 2008), from Medicare Australia were analysed (univariate & multivariate analyses) to identify predictors of participation rates. Postcodes were coded using the ABS Index of Relative Social Disadvantage (IRSD), grouped into quintiles, and converted into a measure of 'remoteness', using the Accessibility/ Remoteness Index of Australia (ARIA) 3-point scale (metropolitan, rural, remote). Overall participation rate in the NBCSP was 46.1%; with statistically significant differences (p<0.001) by sex (42.6% for males & 49.5% for females), SES (40% in most disadvantaged quintile to 48.1% in most advantaged quintile) and remoteness (45.6% for metropolitan, 46% for remote & 48.6% for rural areas); findings confirmed in multivariate analyses. Of the NBCSP participants, 0.24% (CI 95% 0.20-0.30) identified as Indigenous and 8% (CI 95% 7.7-8.3) reported speaking a language other than English at home. | Findings suggest inequities in participation in the NBCSP by sex, geographical location, Indigenous status and language spoken at home . Overall analyses revealed lower NBCSP participation rates for men compared to women, socioeconomically disadvantaged groups compared to more affluent groups, and people from metropolitan and remote areas compared to those from rural areas in SA between 2007 and 2008. Comparison with 2006 Census data indicated that those who reported speaking a language other than English at home and those who reported an Indigenous background were under-represented. Differences in participation rates highlight the likelihood of horizontal inequity for colorectal cancer screening in SA . National monitoring of NBCSP does not provide the lower levels of aggregation needed to inform service planning and address equity issues. More research is needed to develop targeted interventions. <i>Comment: see Martini et al., 2011 above – appears to be the same analysis.</i> |
| Wilkinson D, Cameron K. Cancer and cancer risk in South Australia: what evidence for a rural-urban health differential? Australian Journal of Rural Health 2004; 12(2):61-66. | SA | cancer & cancer risk: 31 types of cancers | Study objective was to determine the extent of evidence for a rural-urban health differential in cancer (incidence, survival and early detection) and cancer risk in SA through secondary analysis and synthesis of data published by the SA Cancer Registry (1977-1999) and population health surveys reported by the Centre for Population Studies in Epidemiology in the SA Department of Human Services (SERCIS, Health Omnibus and Health Monitor surveys, 1991-2000). The mean annual age-standardised incidence of all forms of cancer combined (1977-1996) was ~4% lower for rural residents (265.2 per 100,000 cf. 274.9 per 100,000). Of 31 types of cancer, the incidence of three was significantly higher among rural residents (buccal cavity, lip, pharynx) ; eight were significantly higher among urban residents (stomach, colon, liver, lung, bladder, kidney, thyroid, non-Hodgkin's lymphoma) ; no significant difference for the remaining 20 types. [Statistically significant difference = 95% confidence intervals do not overlap.] Five year case survival for all cancers combined was 52% in both urban and | Little evidence for substantial or systematic differences in risk factors for, and incidence and early detection of, cancers between urban and rural SA residents. The apparent consistently poorer survival among rural residents warrants further study. |

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| | | <p>rural residents. Significant survival differences were identified for 10 cancers and survival for each was higher among urban residents. Melanomas were diagnosed in situ more often in the country, but invasive cases tended to be thicker. There was no rural-urban difference in early detection rates for breast cancer or bladder cancer. There were no substantial reported differences in major risk factors and early detection experiences (self-reported smoking, alcohol risk, sun exposure, Pap smear, mammogram) apart from higher rates of smoking in rural SA.</p> | |
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Table 3: Literature summaries; peer reviewed literature, not SA-specific

| Reference | Geographic focus | Cancer type/s, area of interest | Summary of subject matter or study | Conclusions, implications or possible policy solutions |
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| Baade PD, Turrell G, Aitken JF. Geographic remoteness, area-level socio-economic disadvantage and advanced breast cancer: a cross-sectional, multilevel study. Journal of Epidemiology and Community Health 2011; On-line First:7. | Qld | female breast cancer diagnosis | Analysis into relationships between geographic remoteness, area disadvantage and risk of advanced breast cancer in women. Multilevel models were used to assess area- and individual-level contributions to the risk of advanced breast cancer in Qld women (30-79 yrs.) diagnosed with breast cancer, 1997-2006 (n=18, 658). Women who lived in the most socio-economically disadvantaged areas were significantly more likely (OR 1.21, 95% CI 1.07-1.37) than residents of the most advantaged areas to be diagnosed as having advanced breast cancer after adjustment for individual-level factors. When geographic remoteness and area-disadvantage (and all the individual-level factors) were simultaneously adjusted, the rates of advanced breast cancer were significantly higher for women residing in Outer Regional areas (OR 1.13, 95% CI 1.02 to 1.24) and those who lived in the most disadvantaged areas (OR 1.16, 95% CI 1.02 to 1.32). There was no statistically significant interaction between geographic remoteness and area disadvantage. | A major priority for cancer-control agencies is to reduce disparities in cancer outcomes. This analysis found that a woman's risk of being diagnosed with advanced breast cancer depends on where she lives, separate from the individual characteristics of the woman herself. Both rurality and the socio-economic characteristics of the geographical area in which women lived were important. Socio-economic factors that contribute to advanced breast cancer, in both urban and rural environments, need to be investigated. |
| Baade PD, Youlden DR, Coory MD, Gardiner RA, Chambers SK. Urban-rural differences in prostate cancer outcomes in Australia: what has changed? Medical Journal of Australia 2011; 194(6):293-296. | Australia | prostate cancer incidence, screening, treatment, survival | Study updated previous analysis of trends for prostate-specific antigen (PSA) testing, prostate cancer incidence, radical prostatectomy and prostate cancer mortality in order to assess whether men in rural and regional areas now have more equitable access to prostate cancer services, and improved outcomes. Descriptive study used population-based data for Australian men aged 50-79 years from 1982 to the 2008-2009 financial year (depending on data availability for each outcome measure). [Data sources were essentially the same or similar to those used in Coory & Baade 2005, which see.] Outcome measures included age-standardised rates per 100,000 men and five-year survival rates. Overall, rates of PSA screening and radical prostatectomy increased, accompanied by reductions in mortality and improvements in survival throughout Australia. Incidence rates were similar for men in urban and rural areas. However, in the last year of data collection, for men in rural areas compared with urban areas, rates of PSA screening (21,267/100,000 v 24,606/100,000; p<0.01) and radical prostatectomy (182.2/100,000 v 239.2/100,000; p <0.01) remained lower, mortality remained higher (56.9/100,000 v 45.8/100,000; p<0.01), and survival outcomes continued to be poorer (5-year relative survival, 87.7% v 91.4%; p<0.01). | Use of diagnostic and treatment services among men living in rural areas of Australia remained lower than among their urban counterparts, their survival and mortality outcomes were poorer, and these differentials were continuing. There is an urgent need to explore further the reasons for the observed differences and to implement changes to reduce inequalities. |
| Baade PD, | Qld | rectal | Study investigated the existence of an association between distance from | Mortality risk for rectal cancer increased |

| Reference | Geographic focus | Cancer type/s, area of interest | Summary of subject matter or study | Conclusions, implications or possible policy solutions |
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| Dasgupta P, Aitken JF, Turrell G. Distance to the closest radiotherapy facility and survival after a diagnosis of rectal cancer in Queensland. Medical Journal of Australia 2011; 195 (6):350-354. | | cancer | <p>radiotherapy facilities and the survival outcomes of people diagnosed with rectal cancer in a descriptive population-based study that used Qld Cancer Registry data on all patients aged 20–79 years with invasive rectal cancer (diagnosed 1996-2006, n=6848) with the main outcome measure being cause-specific survival.</p> <p>Five-year cause-specific survival was 62% (95% CI, 61%-64%) and was strongly influenced by stage at diagnosis (American Joint Committee on Cancer, Stages I–IV), ranging from 86% (Stage I) to 9% (Stage IV).</p> <p>Data adjusted for age, sex, and stage at diagnosis revealed that patients living 100-199 km, 200-399 km and 400+ km from a radiotherapy facility were, respectively, 16%, 30%, and 25%, more likely to die from rectal cancer than patients within 50 km of a facility.</p> <p>There was a 6% average increase in mortality risk (95% CI, 3%–8%; p<0.001) per 100 km increment in distance from the nearest radiotherapy facility. Shared frailty models showed that this association persisted after adjusting for the correlation between individual cancer patients living in the same remoteness or area-level SES categories.</p> | <p>with residential distance from the nearest radiotherapy facility.</p> <p>Quote: <i>“While centralisation of cancer treatment services has merit, this study provides evidence of a shorter survival for people with rectal cancer who live relatively far from radiotherapy facilities. It remains a priority to develop and implement policy, cultural and clinical measures to reduce the burden faced by rural and remote patients with rectal cancer.”</i> (p. 350)</p> |
| Befort CA, Klemp J. Sequelae of Breast Cancer and the Influence of Menopausal Status at Diagnosis Among Rural Breast Cancer Survivors. Journal of Women’s Health 2011; 20(9):1307-1313. | US: rural Kansas | female breast cancer survivor quality of life | <p>Study examined the physical and psychosocial effects of breast cancer experienced by rural survivors at the time of treatment, and later, to examine differences in these effects between younger and older rural survivors based on menopausal status at diagnosis.</p> <p>Women treated for breast cancer within the six years previous to the study at one of three rural cancer centers were mailed a survey with a covering letter from their oncology provider.</p> <p>Survey respondents (n=918, 83% response rate) were 67 +/- 13 years of age, 3.2 years from treatment on average; 22% were premenopausal at the time of diagnosis, and 95% were postmenopausal at the time of the survey.</p> <p>Women who were premenopausal at diagnosis were significantly more likely to experience numerous symptoms at the time of treatment, and at the time of the study; these included higher rates of hot flashes, vaginal dryness, loss of sexual desire, and weight gain (p<=0.001).</p> <p>The most common psychosocial concerns were fear of recurrence and change in body image; women who were premenopausal at diagnosis were significantly more likely than postmenopausal women to report experiencing these concerns (68% vs. 47%, and 43% vs. 27%, respectively, p<=0.001).</p> | <p>Negative physical and psychosocial sequelae of breast cancer were common in the rural sample studied, and significantly worse for premenopausal women. Research and resources are needed for delivering targeted survivorship care to rural women, particularly younger rural women.</p> |

| Reference | Geographic focus | Cancer type/s, area of interest | Summary of subject matter or study | Conclusions, implications or possible policy solutions |
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| Bowman JA, Sanson-Fisher R, Redman S. The accuracy of self-reported Pap smear utilisation. <i>Social Science & Medicine</i> 1997; 44(7):969-976. | NSW: Hunter region | cervical cancer screening | <p>Study assessed the accuracy of self-reported Pap smear utilisation over four different time frames, including the magnitude of errors in self-report and socio-demographic predictors of accuracy. Australia did not, at the time this article was written [and now], have a centralised registry recording national screening data, and some states had only just begun state-wide registers. Self-report data on women's cervical screening was collected by interview in a random household survey (Hunter Region, NSW) of women aged 18-70 yrs ($n=5,706/7,027$, an overall interview participation rate of 81.2%). Pathology laboratory data was collected by a search of records within laboratories on the final study sample ($n=224$ women reporting a smear & 231 women reporting no smear in three years). The magnitude of error in self-report was assessed by comparing it against longer intervals in pathology laboratory data. Socio-demographic predictors of accuracy were explored using chi square analyses. Low values for specificity and positive predictive value across all four time frames indicate a considerable degree of inaccuracy in women's reporting of those instances where, in truth, screening has not occurred. Only 61.2% of women reporting a smear within the last three years were verified in pathology laboratory records. Allowing women some 'leeway' in their reporting, comparing self-report to longer intervals of pathology laboratory data did not greatly improve the reporting accuracy, confirming that the magnitude of inaccuracy involved is of real clinical significance.</p> <p>Demographic variables were not related to the accuracy of self-report. While a woman's certainty of her response was predictive, this had little impact on the measures of agreement.</p> <p>Limitations noted included some likely degree of inaccuracy in the 'gold standard' of pathology records.</p> | <p>Self-reporting of Pap smear histories consistently resulted in over-reporting of screening in this study (consistent with results of all previous studies). Women tended to report their last Pap smear as having occurred more recently than was actually the case. Overall, self-report was highly accurate when women had, in fact, had a Pap smear, but far less accurate when they had not.</p> <p>Other means of assessing the prevalence of screening (such as the comprehensive screening registries then being set up) may be preferable to self-report. Where self-report data is collected, techniques to improve accuracy should be employed. This report also contributes a better understanding of the relationship of self-report data to verity: women's report of screening having taken place within three years was substantially more reliable than within one year; and self-report could be used to identify a group of women overdue for screening, as such a group would be accurately identified using self-report of an absence of screening, which was highly accurate for all time frames.</p> <p>Finally, care should be taken in comparing screening rates obtained by different methods.</p> |
| Butow PN, Phillips F, Schweder J, White K, Underhill C, Goldstein D, et al. Psychosocial well-being and supportive care needs of cancer | English speaking world including Australia | various cancers survivor quality of life | <p>Systematic review described existing knowledge on levels of morbidity and the experience and needs of people with cancer, and their informal caregivers, living in rural areas. Online databases for English language papers describing or assessing the prevalence of psychosocial morbidity or needs in a population of rural or regional cancer patients were searched.</p> <p>A total of 37 studies were identified in the review, including 25 quantitative studies (all surveys), 11 of which included a control group of urban patients and 12 qualitative studies. Most studies had methodological shortcomings until recently. Only two prospective studies were identified; most studies focused on</p> | <p>This review highlights that although some insights have been gained into the needs of people with cancer in rural areas, there is much that remains unknown. Population-based, prospective studies that include people with heterogeneous cancers from rural and urban settings are needed.</p> |

| Reference | Geographic focus | Cancer type/s, area of interest | Summary of subject matter or study | Conclusions, implications or possible policy solutions |
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| <p>patients living in urban and rural/regional areas: a systematic review. Supportive Care in Cancer 2011; [Epub ahead of print].</p> | | | <p>breast cancer and few addressed psychological morbidity. The majority were US studies although some were from Canada, the UK, and Australia (e.g. Qld: breast cancer survivors, Qld: gynaecological cancer, NSW: breast cancer among others).</p> <p>The majority of controlled studies reported worse outcomes for rural patients, who appear to have higher needs in the domains of physical/ daily living. This may reflect more limited access to resources, a more self-sufficient lifestyle and personal characteristics (e.g. being more stoical and less likely to ask for help). The need to travel for treatment caused practical, emotional and financial problems for patients and burdened them with additional worry concerning family and work commitments. An Australian study on travel issues reported that the greatest unmet practical need of rural patients and their families was for comprehensive information provided before travelling and for someone, (e.g. a nurse or social worker), who can help them decipher it). Another reported that more than 90% of women surveyed in rural NSW and SA travelled for treatment due to lack of available treatment centres near home, spending 6.79 weeks on average away from home and family; although the majority of women received some sort of social support, only 39% received financial assistance and 19% of these had trouble claiming money to which they were entitled.</p> <p>Some rural patients reported benefits in sharing experiences with others also forced to stay away from home, but most agreed that staying at home was preferable.</p> | |
| <p>Carrière P, Baade P, Newman B, Aitken J, Janda M. Cancer screening in Queensland men. Medical Journal of Australia 2007; 186(8):404-407.</p> | <p>Qld</p> | <p>prostate, colorectal cancer, melanoma screening</p> | <p>Study described self-reported use of prostate specific antigen (PSA) tests, faecal occult blood tests (FOBTs), and whole-body skin examinations among Qld men, reasons for use, and personal characteristics of men undergoing the tests for cancer screening.</p> <p>Data from the Queensland Cancer Risk Study (QCRS), a population-based telephone survey conducted in 2004, using random sampling stratified by age, sex, and geographic location, were analysed (men aged 50-75 yrs [$n = 2336$], overall participation rate of 46%).</p> <p>Main outcome measures included: use of PSA test, FOBT, or whole-body skin examination, specifically as a screening procedure; probability of being screened; associations with socio-demographic factors, risk behaviour, and cancer experience.</p> <p>Nearly 52% of men reported ever having at least one PSA test for any reason, compared with 15.5% reporting an FOBT and 45.4% reporting a whole-body skin</p> | <p>Of the three cancer screening tests, the FOBT has the best evidence for reducing mortality and yet is the least frequently used by Qld men. Disparities were evident in reported screening prevalence between the three specific tests, and across certain population subgroups.</p> <p>Suggestions for the future included:</p> <ul style="list-style-type: none"> * using the prostate cancer screening encounter as an opportunity to promote FOBT for early detection of colorectal cancer; and * given the associations of being married and older age with cancer screening, promotional programs could also seek to involve men's |

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| | | | <p>examination. Over 80% reported that either their most recent PSA test or FOBT was for screening purposes, compared with 57.8% of men reporting a skin examination for screening purposes. The 734 men whose most recent test was for diagnostic or monitoring purposes were excluded from further analysis, leaving a sample of 1,602 men who either had ever been screened by at least one of the three tests, or never received a test for any reason. Within this subset, 36.0% reported never having been screened for prostate, colorectal, or skin cancer. Of those who had been screened, the odds of reported PSA testing were more than two times greater than the odds of whole-body skin examination (adjusted odds ratio [OR], 2.54; 95% CI, 1.49-4.32); the odds of reporting an FOBT were less (adjusted OR, 0.48; 95% CI, 0.22-1.04). Those men who participated in cancer screening tended to be older, white, living with a partner, and to have private health insurance. Men who reported smoking were less likely to be screened with any of the three screening tests. Limitations of the study included: the relatively low overall participation rate of 46% in the survey, and related concerns about the generalisability of results, and the differential non-response bias that may result; under-representation of Indigenous people, and of men with lower educational attainment, unmarried men, and/or those men without a history of cancer; factors that could be associated with participation and the study outcomes. Any differences or lack of differences related to location of residence were not described. Although the benefits of participating in screening by FOBT are relatively clear, barriers described include: the inconvenience and unpleasantness of the procedure, lack of perceived benefit from screening, anxiety over possible results, cost, and cultural beliefs and attitudes. Previous participation in a cancer screening test is associated with further propensity to continue screening.</p> | <p>partners to increase participation in cancer screening by FOBT. Increasing awareness of prostate cancer as a men's health issue, and/or the high prevalence of urinary symptoms in men aged >50 yrs, and the test's low cost and ease of application are possible facilitators of increased use, as well as medico-legal concerns that may act as an incentive for GPs to screen rather than not to screen. Evaluation of the factors influencing cancer screening behaviours and effective interventions to improve adherence with public health recommendations are important directions for future research.</p> |
| Christou A, Katzenellenbogen JM, Thompson SC. Australia's National Bowel Cancer Screening Program: does it work for Indigenous Australians? BMC Public Health | Australia | colorectal cancer screening | <p>Despite overall lower incidence of bowel cancer, Indigenous Australians are more likely to be diagnosed at an advanced stage when prognosis is poor. Bowel cancer screening is effective in reducing bowel cancer mortality through early identification and treatment. Initial program evaluation of the population-based National Bowel Cancer Screening Program (NBCSP) using the Faecal Occult Blood Test, which began in 2006 showed substantial disparities in screening uptake. Indigenous Australians were significantly less likely to participate in screening than non-Indigenous. Program characteristics that may cause screening uptake discrepancy were reviewed and organisational, structural, and socio-cultural barriers analysed. Peer-reviewed journal articles, government reports, and other grey literature were</p> | <p>Findings suggest that the population-based approach to implementing bowel cancer screening unintentionally excludes vulnerable minorities, especially Indigenous and other culturally and linguistically diverse groups, which may exacerbate the already widening disparities in cancer outcomes that exist among Indigenous Australians. Program modifications are recommended to increase access and participation by Indigenous and other minority populations.</p> |

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| 2010; 10. | | | searched using electronic databases and citation snowballing; resulting articles were critically evaluated for relevance to the research questions. Factors contributing to the known sub-optimal participation of Indigenous Australians in the NBCSP included: the manner in which participants were selected, the screening kit was distributed, the nature of the test, comprehensiveness of its contents, cultural perceptions of cancer, and prevailing low levels of knowledge and awareness of bowel cancer and the importance of screening. | Further research is required on the needs, and social and cultural sensitivities, of these groups regarding cancer screening and to inform alternative approaches to bowel cancer screening. |
| Condon JR, Armstrong BK, Barnes A, Cunningham J. Cancer in Indigenous Australians: a review. Cancer Causes and Control 2003; 14:109-121. | Australia | all cancers, lung, liver, cervix, breast, colon, rectum, prostate, melanoma of skin, & lymphoma | Study aim was to summarise for the first time evidence of the impact of cancer on Indigenous Australians. An extensive search of peer review literature was conducted as well reports of government agencies, publications of cancer registries and non-government organisations, and other non-peer-reviewed sources. Indigenous Australians had much higher incidence rates than other Australians of cancers of the lung, liver, and cervix; but much lower rates of cancers of the breast, colon and rectum, prostate, melanoma of skin, and lymphoma. Differences in risk factor prevalence at least partly explain some of these differences. Indigenous Australians also have higher mortality and lower survival from cancer as a whole than other Australians. More advanced disease at diagnosis, and possibly poorer treatment, are partly responsible for these differences, but other factors may also be involved. | Less accessible and less effective health programs are as great a problem for cancer control as for other aspects of Indigenous health in Australia. Major improvements in preventive services, screening, primary care, and specialist treatment services are required to reduce cancer incidence and improve cancer outcomes for Australia's Indigenous people. |
| Condon JR, Armstrong BK, Barnes T, Zhao Y. Cancer incidence and survival for Indigenous Australians in the Northern Territory. Australian and New Zealand Journal of Public Health 2005; 29(2):123-128. | NT Indigenous | all cancers incidence, mortality risk, survival | Study compared cancer incidence and survival in the NT Indigenous population with that of other Australians, and assessed cancer incidence time trends in the NT Indigenous population. Cancer registry data were used to calculate cancer incidence rate ratios (NT Indigenous to total Australian), average annual change in NT Indigenous cancer incidence and relative risk of cancer death after diagnosis of cancer (NT Indigenous to combined WA and Tas cases) for 1991-2001. For NT Indigenous people, incidence rates were high for cancers of the liver, gallbladder, cervix, vulva and thyroid and, in younger people only, for cancers of the oropharynx, oesophagus, pancreas and lung, but low for cancers of the colon and rectum, breast, ovary, prostate, bladder, kidney, melanoma and lymphoma. Incidence rate ratios ranged from 0.1 for melanoma to 7.4 for liver cancer. Incidence increased for breast and pancreatic cancers. Survival was low for almost all specific cancers examined, and for all cancers combined (relative risk of death 1.9, 95% CI 1.7-2.1). | Compared with other Australians, NT Indigenous people have higher, and increasing, incidence for some cancers (especially smoking-related cancers) and lower survival for most. Cancer has a greater impact on NT Indigenous people than other Australians. Well-established cancer risk factors should be more effectively tackled in Indigenous people and known effective screening programs more effectively implemented. Research is urgently required into the reasons why survival from cancer in NT Indigenous people is so much lower than in other Australians. |

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| | | | | <p><i>MJA editorial, 2005 referred to these (among other) findings as demonstrating an additional “axis of disadvantage that may contribute to poorer cancer outcome in remote areas. Indigenous Australians account for 26% of the population in these areas, and have poorer survival from cancer than other Australians”. (Jong 2005, p. 13)</i></p> |
| <p>Coory MD, Baade PD. Urban-rural differences in prostate cancer mortality, radical prostatectomy and prostate-specific antigen testing in Australia. <i>Medical Journal of Australia</i> 2005; 182(3):112-115.</p> | <p>Australia : capital cities vs. regional & rural areas</p> | <p>prostate cancer incidence, screening, treatment, survival</p> | <p>Study assessed differences in trends for prostate cancer mortality, radical prostatectomy and prostate-specific antigen (PSA) testing for Australian men aged 50-79 years living in capital cities compared with regional and rural areas. Descriptive, population-based study based on data from official sources from 1985 to the 2002-2003 financial year (depending on data availability). Data sources included collated ABS & AIHW data from cancer registries, hospital procedures, death registrations and populations including geographic coding; and Medicare Australia data on PSA test MBS claims. Directly age-standardised rates were calculated for each outcome measure using the 2001 population as the standard. Outcome measures included age-standardised rates per 100,000 men aged 50-79 years of mortality from prostate cancer, incidence of prostate cancer, PSA tests and radical prostatectomy. Study found a statistically significant and increasing (age-standardised) mortality excess for prostate cancer in regional and rural areas. In 2000-2002 the excess (compared with capital cities) was 21% (95% CI, 14%-29%). Rates of radical prostatectomy in rural and regional Australia were 29% lower (95% CI, 23% lower to 35% lower) than in capital cities. Although PSA testing was common across Australia, age-standardised rates in 2002-2003 were 16% lower (95% CI, 15% lower to 17% lower) in regional and rural areas than in capital cities.</p> | <p>Study results showed that the probability of a man having a PSA test and the management of his prostate cancer depended on where he lived. Cause/s of the prostate cancer mortality excess in regional/ rural areas could not be established (limitation of a descriptive study), but fewer radical prostatectomies in regional and rural areas, perhaps associated with less PSA screening, remain among several competing hypotheses. Other possibilities relate to other differences in management, perhaps associated with access to urologists. Governments and other budget holders need good evidence about the effectiveness of prostate cancer screening and early treatment, as well as on the best strategies to provide equitable access to cancer services in both urban and rural areas.</p> |
| <p>Coory M, Smithers M, Aitken J, Baade P, Ring I. Urban-rural differences in survival from cutaneous</p> | <p>Qld</p> | <p>melanoma survival</p> | <p>Study assessed how much of the urban-rural disparity in melanoma survival in Qld was due to later diagnosis. Data were obtained from the population-based Qld Cancer Registry using incident cases for six years (1996-2001) with follow-up to the end of 2002, so that all patients were followed for at least 12 months with a median follow-up time of 41 months. Cox regression models were used to compare urban versus rural case-fatality rates, after adjusting for thickness, level, subsite, age and sex.</p> | <p>“Some characteristic of living in an urban area”, other than earlier diagnosis, improved melanoma survival. In the first instance, differences in access to services and variation in management practices deserve investigation and exclusion.</p> |

| Reference | Geographic focus | Cancer type/s, area of interest | Summary of subject matter or study | Conclusions, implications or possible policy solutions |
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| melanoma in Queensland. Australian and New Zealand Journal of Public Health 2006; 30:71-74. | | | The adjusted case-fatality rate was 20% higher in rural versus urban areas (hazard ratio 1.20, 95% CI 1.02-1.43). | |
| Coory MD, Green AC, Stirling J, Valery PC. Survival of Indigenous and non-Indigenous Queenslanders after a diagnosis of lung cancer: a matched cohort study. Medical Journal of Australia 2008; 188(10):562-566. | Qld Indigenous & non-Indigenous patients | lung cancer diagnosis, treatment, survival | Study compared the survival of Indigenous and non-Indigenous lung cancer patients aiming to investigate any corresponding differences in stage, treatment and comorbidities. This was a cohort study of patients frequency-matched on age, sex and rurality who had been diagnosed with lung cancer between 1996 and 2002 and treated in Qld public hospitals (n=158 Indigenous & 152 non-Indigenous patients). Outcome measures included: survival after lung cancer diagnosis; and effects of stage at diagnosis, treatment, comorbidities and histological subtype on lung cancer-specific survival. Survival of Indigenous lung cancer patients was significantly lower than that of non-Indigenous patients (median survival, 4.3 v 10.3 months; hazard ratio, 1.48; 95% CI, 1.14–1.92). Seventy-two of 158 Indigenous patients (46%) received active treatment with chemotherapy, radiotherapy or surgery compared with 109 (72%) of 152 non-Indigenous patients. This treatment disparity remained after adjusting for histological subtype, stage at diagnosis, and comorbidities (adjusted risk ratio, 0.65; 95% CI, 0.53–0.73). Treatment disparity explained most of the survival deficit: the hazard ratio reduced to 1.10 (95% CI, 0.83–1.44) after inclusion of treatment variables in the proportional hazards survival model. Remaining survival deficit was explained by the higher prevalence of comorbidities, mainly diabetes, in Indigenous cancer patients. | Survival after a diagnosis of lung cancer is significantly worse for Indigenous patients than for non-Indigenous patients, and differences in treatment between the two groups are mainly responsible. |
| Craft PS, Buckingham JM, Dahlstrom JE, Beckmann KR, Zhang Y, Stuart-Harris R, et al. Variation in the management of early breast cancer in rural | ACT/NSW Canberra vs. rural hinterland | female breast cancer treatment, outcomes | Study examined the management and outcomes of women with early invasive breast cancer treated in rural and metropolitan centres over a nine-year observation period. A prospective audit of the treatment and outcomes of 2,081 women with early breast cancer who underwent potentially curative surgery 1997-2006 in metropolitan Canberra or the surrounding rural region was completed. Overall, there was good agreement between published guidelines and the treatment received by the women in the study, however, women treated in rural centres were less likely to receive postoperative radiotherapy after breast-conserving surgery, or to undergo axillary lymph node surgery or sentinel | Initiatives supporting rural-based surgeons to adopt new procedures such as sentinel node biopsy may help to optimise rural breast cancer treatment. |

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| and metropolitan centres: implications for the organisation of rural cancer services. The Breast 2010; 19(5):396-401. | | | lymph node biopsy compared with women treated in metropolitan centres. Surgery in a rural centre was associated with increased breast cancer recurrence (HR = 1.54, $p > 0.001$) and increased breast cancer mortality (HR = 1.84, $p > 0.001$), after adjustment for age and tumour characteristics. Non-cancer related mortality was increased in women treated in rural centres compared with women travelling to a metropolitan centre for surgery (HR = 2.08; $p = 0.005$). Differences in both the care provided and treatment outcomes between women treated in rural centres and women treated in metropolitan centres were observed. However, the increased non-cancer related mortality in women treated in rural centres suggests an increased medical comorbidity in this group. | |
| Cunningham J, Rumbold AR, Zhang X, Condon JR. Incidence, aetiology, and outcomes of cancer in Indigenous peoples in Australia. The Lancet Oncology 2008; 9(6):585-595. | Australia : Indigenous population | all cancers diagnosis, treatment | An assessment of recent data on cancer in Indigenous Australians (Aborigines and Torres Strait Islanders) shows that, although they are less likely to have some types of cancer than other Australians, Indigenous people are significantly more likely to have cancers that have a poor prognosis, but are largely preventable , such as lung and liver cancer. Indigenous people with cancer are diagnosed at a later stage, are less likely to receive adequate treatment, and are more likely to die from their cancers than other Australians. Inadequate identification of Indigenous people in cancer registers precludes reporting for some parts of Australia, but sufficient information is available to identify priorities and inform appropriate remedial action. | Health-risk factors, especially smoking, and inadequate health-system performance largely explain the patterns of cancer incidence and mortality in areas with adequate data. Effective tobacco control programmes, improvements across a range of health services, and meaningful Indigenous engagement are all needed to decrease the burden of cancer in Indigenous Australians. |
| Davis C, Williams P, Redman S, White K, King E. Assessing the practical and psychosocial needs of rural women with early breast cancer in Australia. Social Work in Health Care 2003; 36(3):25-36. | Australia except Tas | female breast cancer treatment | Study assessed the practical and psychosocial needs of rural women with early breast cancer across Australia and recommended strategies to ensure equity in availability and access to cancer treatment for all women. A random sample of 204 rural women diagnosed with early breast cancer (in 1997) was recruited to participate in a telephone survey six to 12 months after diagnosis, via cancer registries (and with the agreement of their clinician) in all states and territories except Tasmania (63% overall response rate). Over half of the participants having radiotherapy and a third of those having chemotherapy travelled >100km for treatment. The length of time away from home varied up to about three months with an average of 43 days (SD=21.54) for radiotherapy and 20 days (SD=26.53) for chemotherapy. Less than a third of the women surveyed had been provided with information on available financial support or accommodation information while | Social workers should be playing a key role in ensuring that the needs of women diagnosed with breast cancer and their families are adequately met. Rural social workers as well as medical social workers in the treating hospital could be a valuable resource for rural women and their families, as social workers have the skills to advocate on behalf of the patient and to provide psychosocial support. It is essential that social workers work as part of a multidisciplinary team in collaboration with clinicians, rural physicians, nurses, rural community nurses, community organisations, |

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| | | | <p>away from home. Although the majority of women were satisfied with their provision of information overall, less than a third of participants had been provided with specific information on assistance for rural women. Although every jurisdiction provides financial assistance for rural patients traveling for medical treatment, only 47% of the women who had to travel for treatment received financial assistance, and 13% of these women had difficulty organising or claiming such assistance. The primary sources of support were clinicians (e.g., surgeons, GP); less than 10% of women and 5% of families received support from a social worker, counsellor, psychologist, or psychiatrist.</p> | <p>and other healthcare professionals to develop innovative strategies (e.g., telephone counselling, transportation services, rural information kits) to adequately address the needs of rural women and their families.</p> |
| <p>Dewar AM, Steginga SK, Dunn J, McCarthy A, Yates P, Beadle G. Delivering cancer nursing education to regional, rural and remote area nurses in Queensland. Cancer Forum 2001; 27:27-29.</p> | <p>Qld: rural & regional oncology nurses</p> | <p>cancer nursing</p> | <p>Evaluated nurses' perceptions of an intensive mode post-graduate cancer nursing education program targeting regional and rural registered and enrolled nurses. Cross-sectional design in an urban non-government cancer control agency. Sample: 147 nurses, of whom 95% were female; mean age=45 years; mean years of experience in oncology nursing=13 years; 40% of nurses worked in highly accessible areas, and 57% in accessible-to-very remote areas. Nurses surveyed using self-report measures assessing recalled impact of the education program on nursing practice, effectiveness in meeting educational needs and perceived need for further training in cancer care. Participants rated the cancer-nursing program as highly effective in improving their knowledge about cancer, professional networking, information about support/ referral sources and knowledge of other health facilities. Other benefits described included increased confidence in cancer nursing skills and improved community referral skills. Barriers to implementing new skills were lack of interest, motivation or cooperation from work colleagues, organisational structure or procedural policies and financial or time constraints. Respondents requested further training in pain and symptom management, palliative care, psychosocial aspects of cancer, and communication skills. Brisbane-based Queensland Cancer Fund courses and seminars in their local area were the preferred delivery method.</p> | <p>Results suggested that intensive mode cancer nursing education programs are a preferred and effective learning mode for regional and rural nurses.</p> |
| <p>Dobson A, McLaughlin D, Vagenas D, Wong KY. Why are death rates higher in rural</p> | <p>Australia</p> | <p>lung cancer risk, mortality</p> | <p>Examined causes of death of urban and rural women & potential explanations for higher rural death rates. Participants: community-based random sample of women (n=12,400) aged 70-75 yrs on recruitment in 1996 to the Australian Longitudinal Study on Women's Health. By October 2006: 2,803 deaths, 9,597 survivors. Overall mortality higher for women in rural areas as were most major causes</p> | <p>Little evidence that differences in mortality were due to risk factors examined; alternative explanations (e.g., inequities in health services & environmental hazards) should be considered. Rural people may suffer double disadvantage: poorer health</p> |

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| areas? Evidence from the Australian Longitudinal Study on Women's Health. Australian and New Zealand Journal of Public Health 2010; 34(6):624-628. | | | of death compared to urban women. Death rates were substantially higher for lung cancer & COPD, although there were almost no differences among the groups for current smoking or smoking history. Prevalence of overweight and obesity slightly higher and levels of physical activity lower in remote area women. | services and exposure to health hazards uncommon in urban areas. |
| Duncan MJ, Mummery WK, Kift RL. Geographical location and sunburn in Queensland adults. Australian Journal of Rural Health 2008; 16:181-182. | Qld | melanoma risk, incidence | Study examined differences in the incidence and likelihood of sunburn by geographical location using a metro/ non-metro split derived from the Regional, Remote and Metropolitan Areas (RRMA) classification. Participants were a sample of Qld adults (n=1214) who took part in a computer-assisted telephone-interview survey conducted in July-August 2006 by the Population Research Laboratory at Central Queensland University. Eligible participants were over 18 yrs, and able to be contacted by direct dialled land-based telephone, overall response rate was 44.4%. People living in non-metropolitan areas were significantly more likely to report sunburn than those in metropolitan areas. This finding provides information on acute overexposure to sunlight between geographical locations, however, is unable to provide data on chronic exposure to sunlight which may be useful to understand geographical differences in melanoma survival. The higher incidence of basal cell carcinoma in Qld men compared with women may reflect the increased likelihood of men to experience single and multiple sunburns as observed in the current study. These patterns of sun exposure reflect the acknowledged need to improve sun protection behaviours in men as a health priority in Qld, with a particular emphasis on men in non-metropolitan locations. | Objective measures of sunlight exposure are needed to clarify observed associations. An individual's propensity for sunburn appears to be associated with geographical location, and may suggest the need for additional preventive efforts and resources in non-metropolitan areas. |
| Hall SE, Holman CDJ, Threlfall T, Sheiner H, Phillips M, Katriss P, et al. Lung cancer: An exploration of | WA | lung cancer diagnosis, treatment | Investigated whether the patterns of diagnostic testing for suspected lung cancer, stage at diagnosis, patterns of specialist referral and treatment options offered to people in rural WA were similar to those in the metropolitan area; & explored barriers to quality care in rural areas as perceived by GPs and patients. GP records were reviewed to obtain clinical and referral information and in-depth interviews with patients and GPs elicited their perspectives on the quality of care. Rural (22) and metropolitan (21) patient samples were age and sex-matched. | Rural patients received a different care pattern from metropolitan patients and they and their GPs raised concerns about the equity and quality of lung cancer care. <i>Comment: a nicely designed study, could be repeated in other areas</i> |

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| patient and general practitioner perspectives on the realities of care in rural Western Australia. Australian Journal of Rural Health 2008; 16(6):355-362. | | | Rural patients had more symptoms, took longer to consult their GPs, resulting in later diagnosis and fewer treatment options. They had longer waits for specialist consultation and less diagnostic testing. GPs always referred lung cancer patients to a specialist, usually a respiratory physician; preferring teaching hospitals because of their comprehensive facilities and multidisciplinary teams. Rural GPs reported distance, time and availability of appointments as barriers; and raised concerns about late confirmation of diagnosis. Rural and metropolitan patients were equally satisfied with their quality of care, but rural patients wanted more information and better communication between hospital and GPs. Facilities for rural patients at some metropolitan hospitals were criticised. | |
| Harding R, Higginson IJ, Prisma. PRISMA: A pan-European co-ordinating action to advance the science in end-of-life cancer care. European Journal of Cancer 2010; 46(9):1493-1501. | Europe | all cancers palliative care | The epidemiology of progressive cancer and associated mortality in Europe underlines the essential need for high quality palliative and end-of-life care for its citizens. Currently, care of patients at the end-of-life is under-researched and under-funded due to a lack of prioritisation, challenges in defining end-of-life, lack of a common research strategy that identifies and implements best practice and highest scientific principles, and the need for common use of appropriate well-validated tools to measure and improve the end-of-life cancer experience in Europe. PRISMA is a pan-European co-ordinating action funded under Framework Programme 7 of the European Commission. With 12 partners in nine countries, it is delivering a series of eight Work Packages with the common aim of promoting best practice in the measurement of end-of-life care, agenda setting and guidance that reflects European cultural diversity, and is informed by both public and clinical priorities. Guidance in the selection, adaptation and use of core tools will be informed by public health experts and clinical research. PRISMA is producing a series of outputs that will be accessible to the wider community of researchers, policy makers, funders and clinicians. New partnerships are encouraged to build on the work of PRISMA and to lead high quality work informed by PRISMA deliverables. | It is hoped that PRISMA will redress the current lack of co-ordination of cancer end-of-life research across Europe, and catalyse the conduct of evidence-based care to reflect European populations and priorities. |
| Hawley ST, Chang S, Risser D, Zhang Q. Colorectal cancer incidence and mortality in Texas | US: Texas | colorectal cancer incidence, | Cancer incidence and mortality rates are known to be higher in urban populations, however, more unstaged tumours and later staged cancer are diagnosed in rural populations. Dichotomous definitions of urban-rural are used by most researchers studying these populations. It was posited that a more detailed (i.e. non-dichotomous) rural areas categorisation could influence their findings. | Results suggest that a dichotomous definition of rural-urban masks important variation in colorectal cancer incidence and mortality rates within rural areas. |

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| 1990-1992: a comparison of rural classifications. The Journal of Rural Health 2002; 18(4):536-545. | | mortality | <p>Study evaluated colorectal cancer incidence and mortality rates in Texas (1990-1992) using 1) a dichotomous definition (Metropolitan Area vs. Nonmetropolitan Area [MA/non-MA]); and 2) two, more detailed rural classifications (the Rural-Urban Continuum Code [RUCC], & the Urban Influence Code [UIC]). Texas Cancer Registry data were supplemented with data from the Texas State Department of Vital Statistics (mortality), the US Census Bureau (age, sex, race) and the Area Resource File (rural & urban definitions). Incidence and mortality rates, age-adjusted to the 1970 US standard population, were calculated for non-Hispanic White, African American, and Hispanic males and females.</p> <p>Results revealed a nonlinear relationship between rural category and colorectal cancer incidence or mortality for all races. Applying the MA definition yielded rates in the middle of the ranges obtained with using RUCC or UIC classifications and most closely reflected the result for non-Hispanic Whites using the more detailed scales.</p> | |
| Hébert JR, Daguise VG, Hurley DM, Wilkerson RC, Mosley CM, Adams SA, et al. Mapping cancer mortality-to-incidence ratios to illustrate racial and sex disparities in a high-risk population. Cancer 2009 115(11):2539-2552. | US: South Carolina | <p>all cancers; breast, cervical, colorectal, lung, oral, & prostate cancers</p> <p>incidence, mortality</p> | <p>Comparisons of incidence and mortality rates are the metrics used most commonly to define cancer-related racial disparities, which, in the US, especially in South Carolina (SC), largely disfavor African Americans (AAs). The mortality-to-incidence rate ratio (MIR), which can be computed from readily available data sources, provides a population-based indicator of survival. SC Central Cancer Registry incidence data and Vital Registry death data were used to construct MIRs. ArcGIS 9.2 mapping software was used to map cancer MIRs by sex and race for 8 Health Regions within SC for all cancers combined, and for breast, cervical, colorectal, lung, oral, and prostate cancers individually. Racial differences in cancer MIRs were observed for both sexes for all cancers combined, and for most individual sites. The largest racial differences were observed for female breast, prostate, and oral cancers, and AAs had MIRs nearly twice those of European Americans (EAs).</p> | <p>Comparing and mapping race- and sex-specific cancer MIRs is a powerful way to show the scope of the cancer problem. This study was able to demonstrate that AAs had much higher cancer MIRs compared with EAs for most cancer sites in nearly all regions of SC. Future work needs to explain and address the underlying differences in cancer outcomes by region and race. MIR mapping allows researchers to pinpoint areas where future work has the greatest chance to identify the causes of large, persistent, cancer-related disparities. Other regions with access to high-quality data may find it useful to compare MIRs and conduct MIR mapping.</p> |
| Higginson IJ, Evans CJ. What is the evidence that palliative care teams improve outcomes for | Europe | <p>all cancers</p> <p>palliative care</p> | <p>Patients with advanced cancer experience a complex web of interacting problems. Specialist palliative care services have developed to meet these needs, but their effectiveness should be considered. This study aimed to determine whether specialist palliative care teams achieve their aims of improving outcomes for patients with advanced cancer and their caregivers, in terms of improving symptoms and quality of life and/or reducing the emotional</p> | <p>The overall evidence showed that home, hospital, and inpatient specialist palliative care significantly improved patient outcomes in the domains of pain and symptom control, anxiety, and reduced hospital admissions. These results suggest that specialist palliative care</p> |

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| cancer patients and their families? Cancer Journal 2010; 16(5):423-435. | | | concerns of family caregivers. A systematic review was conducted, searching standard databases augmented by reference lists of earlier reviews. The review focused on specialist (i.e., with trained and dedicated professionals) palliative care in the home, hospital, or designated inpatient settings for patients with cancer. Outcome measures included pain, symptoms, quality of life, use of hospital services, and anxiety. Eight randomised controlled trials and 32 observational or quasi-experimental studies were identified. | should be part of care for cancer patients. Although the appraisal of evidence found improvements across domains, there is a need to understand better the effects of different models of palliative care and to use standardised outcome measurement. |
| Jong KE, Smith DP, Yu XQ, O'Connell DL, Goldstein D, Armstrong BK. Remoteness of residence and survival from cancer in New South Wales. Medical Journal of Australia 2004; 180:618-622. | NSW | all cancers, 20 cancer types survival | Study set out to distinguish the relative contribution of variation in screening and diagnosis, and variation in treatment, to variation in cancer survival – using measurements of the stage of cancer at diagnosis, and the Accessibility/Remoteness Index of Australia (ARIA) to assess remoteness. Later stage (and unstaged) tumours have been shown to be more common in rural than urban residents in the US [citing Luff et al. 1991] probably due to differences in access to, use of, and quality of screening and diagnostic services, but this variation probably runs parallel to variation in access to, and quality of, treatment services; and both may contribute to geographic variation in survival. Cancer survival in NSW was analysed by geographic remoteness (using ARIA to classify all NSW LGAs & creating 4 discrete categories: highly accessible, accessible, moderately accessible, & remote) for all patients (<90 yrs.) with cancers diagnosed in NSW between 1 January 1992 and 31 December 1996, with survival determined to 31 December 1999 (weighted probabilistic matching to death indexes). Relative excess risk (RER) of death over 5 years was estimated for each geographic remoteness category relative to the highly accessible category for 20 cancer types (those for which >5 cases were expected in the remote group) adjusted for age, sex, years since diagnosis and, subsequently, stage of cancer at diagnosis. There were 108,159 people diagnosed with cancer in the highly accessible group, 20,471 in the accessible group, 3,143 in the moderately accessible group and 743 in the remote group. People living outside highly accessible areas were more likely to be diagnosed with non-localised cancers of the head and neck, stomach, lung and prostate than those living in these areas (p<0.05 for each cancer type). Overall, people living in remote NSW diagnosed with cancer were about 35% more likely to die as a result of their cancer in the 5 years after diagnosis than are people living in areas with the greatest access to services. This apparent outcome disadvantage is unlikely to be due to chance. | Cancer survival varied by remoteness of residence in NSW for all cancers together as well as for some individual cancers. Access to screening or early diagnosis probably contributes to this variation, but persistence after adjustment for stage suggests that treatment variation is also important. National stakeholder conferences on non-metropolitan cancer service delivery consistently stress the need for specialist oncology nurses, improved educational opportunities for staff, and patient accommodation and transport support facilities to be addressed. Optimal cost effective cancer service delivery to widely separated, small, communities, outside major metropolitan areas raises many complex issues, however, finding ways in which effective consultation, diagnostic support and education can support what services are available in non-metropolitan areas remains important. <i>Comment: SACR 1999 cited as evidence of poorer non-metropolitan cancer survival outcomes, however, without the caveats and expressed misgivings of the authors in relation to their findings.</i> |

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| | | | <p>There were statistically significant differences in the RER of death across remoteness categories (p<0.001) for cancers of the cervix, prostate, and all cancers combined. RERs for the most remote categories (compared with the highly accessible category) before and after adjustment for stage were cervix, 3.22 (95% CI, 1.54–6.75) and 2.25 (95% CI, 1.06-4.77); prostate, 3.38 (95% CI, 2.21-5.16) and 2.53 (95% CI, 1.60-4.01); all cancers, 1.35 (95% CI, 1.20-1.51) and 1.25 (95% CI, 1.11-1.41). There were significant variations in RER of death by remoteness for head and neck, lung and colon cancers and cutaneous melanoma.</p> <p>Limitations noted included: the use of LGA as the unit of aggregation likely to lead to heterogeneity within the remoteness groupings; possible residential area misclassifications (e.g. remote area patients moving to more accessible areas for tests/ treatment having this recorded as their ‘address at diagnosis’); and, the ‘degree of spread of cancer at diagnosis’ measure (local, regional, distant metastasis, and stage unknown) is subject to coding and interpretive uncertainties (degree of spread at diagnosis was unknown for between 26- 51% of lung, prostate, head and neck, and stomach cancers in residents of non-highly-accessible areas which could reflect poorer hospital reporting in these areas or poorer access to specialists and diagnostic testing, as found elsewhere). Five-year relative survival was notably worse in the remote group for people with unstaged cancers (data not shown); the trend for poorer survival with increasing remoteness was greatest for cancers diagnosed with regional spread.</p> <p>Despite significant variation by ARIA group in stage at diagnosis of head and neck, lung, cervical and prostate cancer, control of stage of these cancers reduced the RER appreciably only for cancers of the cervix and prostate in the most remote areas, suggesting that cancer treatment variations may be the main determinant of geographic variation in survival for most of these cancers. Substantial reductions in RERs of prostate and cervical cancer for remote areas when spread of disease at diagnosis was accounted for suggests that screening, diagnosis and treatment deficiencies all contribute to the excess risks of death for these cancers in remote areas (although interpretive issues exist). SES was accounted for by using ARIA-specific life tables to calculate relative survival (lower SES LGAs have higher ‘all-cause mortality’, thus lower expected survival). High RERs for several cancers in less accessible areas (with the possible exception of prostate cancer) probably reflect variations in the nature of care received after diagnosis.</p> | |

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| Karampoiki V, Alevizaki P, Lakiotis V, Loukidou E, Terzoudi A, Gkinosati A, et al. Evaluating the strength of potential misplaced priorities in opportunistic cancer screening practice in Greece. Journal of Buon 2010; 15(1):164-173. | Greece: rural | cancer screening | <p>Study purpose was to determine the cancer screening activities of a large sample of the Greek population, in a country with opportunistic screening practice. A large cancer screening survey was organised and conducted by the Panhellenic Association for Continual Medical Research (PACMeR). Use of evidence-based (EB), non-evidence-based (non ER) and of undefined benefit tests was analysed.</p> <p>A total of 7,001 individuals were surveyed, with 88% of males and 93% of females stating that they were interested in cancer screening practices. Gynaecological cancer screening was performed in the range of 23-38%. Colorectal cancer screening was rarely performed in both sexes (12%), while non-evidence-based tests were regularly performed (urinalysis 50% and chest radiography 15-18%). Full blood count and PSA measurement were widely accepted (over 45% in both sexes and 19.5% in males, respectively). Socio-demographic characteristics did not influence the performance of EB tests in males while females appeared to be highly influenced by such parameters.</p> | Opportunistic cancer screening in a primary health care system where national guidelines are missing may cause ambiguous results. Reconsideration of health policy in such cases is mandatory. |
| Kenny A, Endacott R, Botti M, Watts R. Emotional toil: psychosocial care in rural settings for patients with cancer. Journal of Advanced Nursing 2007; 60(6):663-672. | Vic | all cancers psycho-social support – impact on nursing staff | <p>Study explored experienced rural nurses' perceptions of key issues around the provision of effective psychosocial care for people with cancer in rural settings. A diagnosis of cancer has a major impact on psychological and emotional wellbeing, and psychosocial support provided by nurses is an integral part of ensuring that people with cancer have positive outcomes. Ideally, people with cancer should be managed in specialist settings; however, significant numbers are cared for in rural areas.</p> <p>Using a qualitative descriptive approach, three focus groups were conducted with 19 nurses in three hospitals in rural Victoria in 2005. Nurse participants indicated that a key issue in providing psychosocial care to patients with cancer in the rural setting was their own 'emotional toil'. This Global Theme encapsulated three Organizing Themes - task vs. care, dual relationships and supportive networks - reflective of the unique nature of the rural environment. Nurses in rural Australia are multi-skilled generalists and they provide care to patients with cancer without necessarily having specialist knowledge or skill. The fatigue and emotional exhaustion that nurses described often has a major impact on their own well-being.</p> | In the rural context, it is proposed that clinical supervision may be an important strategy to support clinicians who face emotional exhaustion as part of their cancer nursing role. |
| Khanjani N, English DR, Sim MR. An ecological | Vic | female breast cancer | Various studies have suggested that environmental contamination with organochlorine pesticides may be related to risk of breast cancer. To investigate this association in a rural part of Australia, organochlorine contamination data | Study provides limited support for the role of environmental contamination with organochlorine pesticides in the |

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| <p>study of organochlorine pesticides and breast cancer in rural Victoria, Australia. Archives of Environmental Contamination and Toxicology 2006; 50(3):452-461.</p> | | <p>incidence, environmental exposures</p> | <p>from a breast milk organochlorine study conducted in Victoria in 1993 were used. The state was divided into 11 statistical divisions, and standardised incidence ratios (SIRs) were calculated using breast cancer incidence data (1983-2002; n=47,250 breast cancer cases in Victoria [average population of 2,147,409 women]).</p> <p>The Ovens-Murray region, the region most contaminated with organochlorine pesticides, showed an elevated SIR of 1.10 (95% CI, 1.03-1.17), although two other regions with lower organochlorine contamination levels also had elevated SIRs. The rural part of the Ovens-Murray region, where the main pesticide use occurred, had the highest SIR, 1.15 (95% CI, 1.07-1.23).</p> <p>No significant correlation between organochlorine contamination and the age-standardised rate of breast cancer across all regions was found. However, a positive dose-response relationship using an adjusted negative binomial model was detected for heptachlor epoxide.</p> | <p>development of breast cancer.</p> |
| <p>Kricker A, Haskill J, Armstrong BK. Breast conservation, mastectomy and axillary surgery in New South Wales women in 1992 and 1995. British Journal of Cancer 2001; 85(5):668-673.</p> | <p>NSW</p> | <p>female breast cancer treatment</p> | <p>Measured the increase in uptake of breast-conserving therapy (BCT) in NSW and its determinants, through an examination of the Cancer Registry records of women with breast cancer linked to their surgical treatment records in the NSW Inpatient Statistics Collection (n=2,020 in 1992, n=2,883 in 1995); as well as a parallel review of trends and determinants in axillary surgery for breast cancer. Breast conservation increased from 39% of breast cancer cases in 1992 to 45% in 1995, mainly in women with the smallest cancers. In 1995, mastectomy was still most common in women with larger cancers and cancers that had spread beyond the breast. Rural women were more likely to have mastectomies relative to urban women (as has also been observed in the US) with no change between 1992 and 1995 (OR = 1.3 95% CI 0.9-1.9), and independently of any regional differences in breast cancer size and stage at diagnosis. Hospital caseload was not a strong predictor of BCT, but higher surgeon caseload has been previously associated (1995 national survey) and low surgeon caseload was a predictor of mastectomy in urban NSW in 1992 [citing Taylor R et al., Predictors of mastectomy for women with breast cancer in the greater western region of Sydney. The Breast 1999; 5(2):116-121 1999]. There was little evidence that SES influenced BCT rates.</p> <p>Axillary surgery, common in 1992 (78%) and 1995 (82%), fell steeply with increasing age and more often accompanied mastectomy (93% in 1995) than BCT (67% in 1995). In 1995 the odds for axillary surgery were some two-fold or more higher for all cancers 1 cm or more in diameter compared with those <1.0 cm, and highest for 2.0-2.9 cm cancers. Regional spread of the cancer at</p> | <p>Higher mastectomy rates in rural women were considered unlikely to be due to poorer health (& consequent lower tolerance of adjuvant therapy) as rural women of the time were healthier than urban women. Rural residents, however, generally have low use of medical services and less access to specialist medical care and their higher mastectomy rates may have been due to less specialised care [citing Howe et al., 1992] and less access to recommended radiotherapy.</p> <p>Surgeons reported that 25% of women with early breast cancer in 1995 chose non-conservative surgery for various reasons (e.g. concerns about recurrence or treatment by radiotherapy) that were sometimes age- or residence-related [citing Hill D et al. Surgical management of breast cancer in Australia in 1995. Sydney: NHMRC National Breast Cancer Centre, 1999], suggesting the need for benchmarks on the proportion of women who were (well) informed of the pros and cons of their options, and whether their</p> |

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| | | | diagnosis was not a strong predictor. Defining 'appropriate' (arguably optimal) surgery as 'according to recommendation', then just over 80% of women had optimal surgical treatment of the axilla, however appropriate attention to women's preferences may account for some of the 20% of women who had not, apparently, had optimal treatment of the axilla. | preferences were honoured. As long as treatment data is <i>not</i> collected by cancer registries, linking registry records with hospital inpatient data is a cost effective alternative for monitoring trends in breast cancer treatment. |
| Loxton D, Powers J, Schofield M, Hussain R, Hosking S. Inadequate cervical cancer screening among mid-aged Australian women who have experienced partner violence. Preventive Medicine 2009; 48(2):184-188. | Australia | cervical cancer screening | Partner violence is linked to cervical cancer and other gynaecological conditions, although results of current research into associations between partner violence and cervical cancer screening have been inconclusive. This study investigated the association between partner violence and inadequate cervical cancer screening. Participants were women aged 45-50 yrs responding to the Australian Longitudinal Study on Women's Health population-based surveys in 1996 and 2004 (n=7,312) who self-reported frequency of Pap smears via mailed questionnaires. Women who had experienced partner violence at least eight years earlier, compared with those who had not, were more likely to report current inadequate screening (OR: 1.42, 95% CI: 1.21; 1.66). After adjusting for known barriers to preventive screening (education, income management, marital status, general practitioner visits, chronic conditions) and depression, partner violence was independently associated with inadequate Pap tests (OR: 1.20, 95% CI: 1.01; 1.42). This association was no longer significant once access to a GP of choice was added to the model (OR: 1.18, 95% CI: 0.99; 1.40). | Study claims significant for two reasons: 1. it confirms a negative relationship between cervical cancer screening and partner violence ; 2. it suggests that access to a doctor of choice can significantly decrease this negative relationship. |
| McCredie M, Bell J, Lee A, Rogers J. Differences in patterns of care of prostate cancer, New South Wales, 1991. Australian and New Zealand Journal of Surgery 1996; 66(11):727-730. | NSW | prostate cancer diagnosis, treatment | Study tested the hypothesis that rural people and migrants from non-English-speaking countries were less likely to be offered newer methods of diagnosis and treatment for prostate cancer. Incident cases of prostate cancer in 1991 were identified through the NSW Central Cancer Registry: 73% of eligible cases with sufficient data on: diagnosis, staging and treatment; were abstracted from clinical records of consulting urologists and public hospitals. Diagnosis: transrectal ultrasound and prostatic biopsy were used significantly more often in urban than in rural cases; for transurethral resection of the prostate it was the reverse. Staging: intravenous pyelography, ultrasound (other than transrectal) and bone scans were performed more frequently in urban than in rural cases. Treatment: rural cases were more likely to be treated with anti-androgens than urban cases and less likely to be given luteinizing-hormone releasing hormone (LH-RH) agonists. | Urban-rural differences could be at least partly explained by the fact that some patients in the country would have been treated by general surgeons rather than urologists. <i>Comment: An MJA editorial in 2005 synthesised these (among other) findings as: "[d]ocumented instances of poorer cancer care in rural and remote Australia, though not necessarily all with survival implications, include less "state of the art" diagnosis, staging and treatment of prostate cancer". [Jong, 2005, p. 13]. Article not sighted</i> |

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| | | | <i>Quote: "The pattern of diagnostic and staging procedures used for 1991 rural cases bore more resemblance to that of urban men in 1986 than in 1991."</i> | - full text not available. |
| Maserat E. Information communication technology: new approach for rural cancer care improvement. Asian Pacific Journal of Cancer Prevention 2008; 9:811-814. | world-wide [US, Australia] | all cancers prevention, diagnosis, treatment, palliation | Cancer control aims to reduce the incidence, morbidity, and mortality of cancer and to improve the quality of life of cancer patients. For rural populations this presents particular problems. This article outlines some of the challenges of oncology care in rural areas and solutions, applying information communication technology with specialty telemedicine for overcoming problems in prevention, early diagnosis, treatment, and palliative care. <i>Quote: "Tele-oncology has been defined as delivering clinical oncology services at a distance and has come to encompass the use of electronic devices to aid clinical diagnosis, treatment and follow-up based on the transfer of video, images of clinicians and patients and data including pathology and radiology images, graphics and text."</i> [citing Olver 2003] Telecommunications infrastructures and frameworks for the implementation of telemedicine are also described. | <i>Comment: A useful outline which includes then recent Australian and US developments and acceptability findings.</i> |
| Mitchell KJ, Fritschi L, Reid A, McEvoy S, Ingram DM, Jamrozik K, et al. Rural-urban differences in the presentation, management and survival of breast cancer in Western Australia. Breast 2006; 15(6):769-776. | WA, rural and urban | female breast cancer diagnosis, treatment, survival | Study compared rural and urban women diagnosed with invasive breast cancer in 1999 re: mode of detection, tumour characteristics at presentation, diagnostic investigations, treatment, and survival. Cases were sourced from the WA Cancer Registry (n=899, age at diagnosis: 22-92 yrs.) & matched to mortality records after 5 yrs.; data was extracted from medical records by a trained nurse. Women from rural areas (n=206, 23%) were less likely to have open biopsy with frozen section (P < 0.001), breast-conserving surgery (P < 0.001), adjuvant radiotherapy (P=0.004) and hormonal therapy (P=0.03); also less likely to be treated by a high caseload breast cancer surgeon (P < 0.001). Adjusting for age and tumour characteristics, rural women had an increased likelihood of death within 5 yrs of breast cancer diagnosis (HR 1.62, 95% CI 1.10-2.38); a difference that was not significant after adjustment for treatment factors (HR 1.36, 95% CI 0.90-2.04). The 'rural' classification was not a homogenous group - included a wide range of diverse communities and associated health services: from large regional centres (some with access to specialist surgeons & oncologists) to small remote settlements. Cases were insufficient to divide into further geographical categories, and information on the proportion of rural women travelling to Perth for diagnosis and treatment was lacking but it was estimated that up to 40% of rural cases travelled to Perth at some stage ; tendency would be to improve the outcomes of rural women. | Rural women with breast cancer experienced poorer survival outcomes than urban women, despite similarities in mode of presentation and tumour characteristics. Survival difference appeared to be mostly due to treatment and surgeon caseload variations between rural and urban cases. Information was lacking on whether observed disparities were due to inadequately informed rural patients and practitioners, distance factors, incomplete service availability or accessibility. As many of these potentially explanatory factors can be modified it should be possible to reduce the disadvantage suffered by rural women with breast cancer. |

| Reference | Geographic focus | Cancer type/s, area of interest | Summary of subject matter or study | Conclusions, implications or possible policy solutions |
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| <p>Meissner HI, Smith RA, Rimer BK, Wilson KM, Rakowski W, Vernon SW, et al. Promoting cancer screening: learning from experience. <i>Cancer</i> 2004; 101(S5):1107-1117.</p> | <p>US</p> | <p>screenable cancers screening</p> | <p>An overview of behavioural and social science cancer screening intervention research which introduces the scope of topics addressed in separate articles in this supplement to the journal <i>Cancer</i>. Issues to consider before conducting interventions to promote the uptake of screening tests are identified and addressed (e.g. the benefits and harms associated with screening). Trends in the use of cancer screening tests are discussed in relation to their efficacy and adoption over time. Both the development and breadth of social and behavioural intervention research intended to increase the use of effective tests are reviewed as background for the following articles. <i>Quote: “The greatest disparities in screening appear to be correlated with access to health care. Indeed, the strongest predictors of underutilizing screening are not having a usual source of health care and not having health insurance coverage. Persons who have not used other preventive services (e.g., had not had a health maintenance visit) are more likely to underutilise screening. Recent immigration to the U.S. often is found to be related to access and has been demonstrated to be negatively associated with recent screening. The interpersonal dimensions of health care, such as satisfaction with the quality of the care received, can influence the use of cancer screening services as well...” (p. 1113)</i></p> | <p>Application of the lessons from this extensive knowledge base not only should accelerate the uptake of the effective cancer screening tests currently available, but also guide future directions for research.</p> <p><i>Comment: Figure 1 shows recent use of cancer screening tests by women and men in the US, using data from the 1987, 1992, 1998, and 2000 National Health Interview Surveys.</i></p> |
| <p>Monroe AC, Ricketts TC, Savitz LA. Cancer in rural versus urban populations: a review. <i>Journal of Rural Health</i> 1992; 8(3):212-220.</p> | <p>US:</p> | | <p>Rural-urban comparisons have identified higher age-, race-, and sex-adjusted cancer incidence and mortality rates in urban populations for most anatomic sites, suggesting that rural populations are at lower risk from cancer. Conversely, findings that rural cancer patients are diagnosed at later stages of disease, that higher proportions of rural cancer cases are unstaged at diagnosis, and that rural cancer patients are at a more advanced stage of illness when referred to home health care agencies, suggest that rural cancer patients are disadvantaged when compared to their urban counterparts. This review summarises rural-urban patterns of cancer mortality, incidence, and survivorship since 1950; outlines rural-urban differences in utilisation of health care services; questions the appropriateness of using rural-urban comparisons of cancer mortality and incidence to evaluate access to cancer care; and suggests potential approaches to the question of whether rural residents have access to cancer care comparable to that available to urban residents. Using cancer mortality and incidence to measure health care system performance appears to show rural populations at an advantage compared to urban counterparts, but this is contradicted by evidence that rural populations</p> | <p>To address the access-to-care, or cancer outcome hypothesis, researchers need to do rural-urban comparison studies that:</p> <ol style="list-style-type: none"> 1. focus on cancer types for which effective screening and/or treatment protocols reduce mortality or improve survivorship; 2. measure different components of health care including: community cancer prevention activities; availability of medical specialists (e.g. oncologists); and ethnic, cultural, educational, and socioeconomic barriers to health care use; 3. compare outcome measures including: stage at diagnosis, proportion of cancers unstaged at diagnosis, case fatality rate, survival time, and quality of life following diagnosis; 4. evaluate the impact of the SES of individual patients as a potential confounder (given that rural populations are generally lower SES, less |

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| | | | <p>have fewer physicians and specialists per population unit, and less access to, or use of, early cancer detection programs than urban populations. What remains to be established is that access to or use of health care services influences cancer outcomes.</p> <p>The review sets out a “research program for the future” that includes the criteria by which to evaluate future research.</p> | <p>educated, and poorer than urban populations);</p> <p>5. improve and standardise rural-suburban-urban definitions to produce more uniform and reliable classifications of residence; and</p> <p>6. elucidate the relationship between geographic access to specialised cancer care including cancer prevention activities, and cancer outcome to detect emerging differences in the health status of rural populations that may be associated with inferior access.</p> <p>Policy makers should be prepared to make decisions about providing complex therapies requiring specialist attention in rural areas, if interventions are found to significantly affect outcomes.</p> |
| <p>Morgan GW, Barton M, Atkinson C, Millar J, Gogna NK, Yeoh E. The 'GAP' in radiotherapy services in Australia and New Zealand in 2009. <i>Journal of Medical Imaging and Radiation Oncology</i> 2010; 54(3):287-297.</p> | <p>Australia & NZ</p> | <p>all cancers</p> <p>treatment: radiotherapy</p> | <p>Study estimated (a) the number of linear accelerators required in Australia and NZ to achieve a 52.3% treatment rate; (b) the 'GAP' between the actual and required number of linear accelerators; (c) the no. of persons not treated (PNT), premature deaths (PD) and years of life lost (YLL) as a result of the 'GAP'; and (d) reviewed actions taken by health jurisdictions in Australia and NZ to address the 'GAP' and reach the 52.3% treatment rate.</p> <p>The actual no. of fully staffed and operating linear accelerators (A) in Australian and NZ was obtained from a survey of radiotherapy facilities in 2009; no. of linear accelerators required (R) was calculated from projected cancer incidence figures for 2009 based on 1.6 linear accelerators per 1,000 new cancer patients. The 'GAP' in radiotherapy services (G) was R minus A. The maximum treatment capacity (MTC) was the ratio of A over R multiplied by 52.3%, assuming all linear accelerators operating at 100% capacity. As each linear accelerator can treat 331 new patients each year, the number of new cancer PNT is G x 331. Estimated five-year survival benefit from radiotherapy was 16%, and average survival for all patients receiving radiotherapy (radical and palliative) was 0.76 year. Hence, the number of PD attributed to the 'GAP' is PNT x 16%, and the YLL to cancer is PNT x 0.76.</p> <p>A literature search and local knowledge of health department radiotherapy plans in all jurisdictions provided information on actions being taken to achieve a 52.3% treatment rate.</p> <p>In 2009, the 'GAP' was 50 linear accelerators in Australia and the MTC was 38%,</p> | <p>In conclusion, urgent action is needed by health departments and governments in Australia and NZ to improve access and equity to radiotherapy as an essential cancer treatment. There is merit in the Baume Report [2002] recommendation to establish a national body to oversee radiotherapy services in all jurisdictions in Australia, and a similar central body should also be considered for NZ.</p> |

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| | | | <p>the same as it was in 1999, but there had been an increase in PNT each year from 7,419 in 1999 to 16,550 in 2009; PD each year increased from 1,187 in 1999 to 2,649 in 2009; YLL each year increased from 5,638 in 1999 to 12,585 in 2009. In NZ in 2009, the 'GAP' was nine linear accelerators and the MTC was 38%. An estimated 3,310 persons did not receive radiotherapy in 2009 in NZ (523 PD & 2266 YLL).</p> <p>The review showed that new and replacement machines were being installed in all jurisdictions in Australia and in NZ. Only Victoria and Qld had a Radiotherapy Plan beyond 2010, but both underestimated the projected cancer incidence.</p> | |
| Onega T, Duell EJ, Shi X, Wang DM, Demidenko E, Goodman D. Geographic access to cancer care in the U.S. Cancer 2008; 112(4):909-918. | US | all cancers treat-ment | <p>Study estimated travel time to specialised cancer care settings for the continental US population and calculated per capita oncologist supply. Access to cancer care is known to influence patient outcomes, but little is known on whether and how geographic access to cancer care varies by population characteristics. The closest travel times were estimated using network analysis of road distance weighted by travel speeds from the population/ geographic centroid of every ZIP area in the US to that of the nearest cancer care setting, including: National Cancer Institute (NCI) - designated Cancer Centers, academic medical centers, and oncologists. Population and geographic characteristics including race/ethnicity, income, education, and region were derived from US Census 2000 data and from rural-urban commuting area classifications. Oncologist supply per 100,000 residents in each Hospital Referral Region (pHRR) was estimated. Travel times of <=1 hour were estimated for 45.2% of the population to the nearest NCI Cancer Center, 69.4% to the nearest academic-based care, and 91.8% to any specialised cancer care. Native Americans, nonurban dwellers, and residents in the South had the longest travel times to the nearest NCI Cancer Center compared with the overall US population (median [interquartile range (IQR)] in minutes: 155 [62-308], 173 [111-257], and 164 [70-272], vs 78 [27-1721, respectively). Travel burdens persisted for Native Americans and nonurban populations across all three cancer care settings. Travel times for all population strata increased markedly as the degree of cancer care specialisation increased. The median oncologist supply for pHRRs was 2.83 per 100,000 individuals.</p> | There are population groups with limited access to the most specialised cancer care settings. |
| Read CM, Bateson DJ. Marrying research, clinical | NSW | cervical cancer diagno- | Australian Aboriginal women experience a significantly higher rate of mortality from cervical cancer than non-Aboriginal women. The 'Women, Human papilloma virus prevalence, Indigenous, Non indigenous, Urban, Rural Study' (WHINURS) research project was designed to obtain the HPV status of Aboriginal and non- | Results: 43 Aboriginal women were recruited (7 short of target). Collaborative community-based consultation and the research study itself increased the no. of Aboriginal women |

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| practice and cervical screening in Australian Aboriginal women in western New South Wales, Australia. Rural and Remote Health 2009; 9(2). | | sis | Aboriginal women when presenting for routine cervical screening at. Family Planning NSW (FPNSW), which provided an investigator site in Dubbo, western NSW. Intention: to recruit 50 Aboriginal and 100 non-Aboriginal women. FPNSW Dubbo team devised strategies to maximise recruitment when the Project did not progress to plan, including street walks, attendance at community forums, flexible appointments, drop-in times, travel and babysitting assistance. | accessing cervical screening at the FPA clinic, sustained a year after the study concluded. |
| Reath J, Carey M. Breast and cervical cancer in indigenous women: overcoming barriers to early detection. Australian Family Physician 2008; 37(3):178-182. | Three pilot sites in three States | female breast & cervical cancers | Report on a project that aimed to implement and evaluate strategies to improve GP early detection of breast and cervical cancer in Aboriginal and Torres Strait Islander women, who are known to have a higher incidence of cervical cancer and poorer outcomes for breast and cervical cancer than non-Indigenous women. Partnership between the local Division of General Practice and Aboriginal Community Controlled Health Service (ACCHS) was a key criterion for the selection of the three pilot sites (one regional centre with a substantial Torres Strait Islander community (A), one capital city (B), and one rural centre), 15 month time frame. In all sites, a female Indigenous worker and female GP developed and implemented local plans aimed to improve service coordination and access, GP knowledge, reminder and recall systems, and health promotion. Evaluation included analysis of qualitative and quantitative data from project reports and surveys. Important factors in project success (identified by project officers & partners): collaboration between service providers, community participation in planning and delivery, an Indigenous health worker raising awareness in both women and GPs, and a female GP providing a holistic service. | Increased cervical screening was documented in one site and a trend toward increased breast and cervical screening in another. Partnerships involving community members planning and implementing evidence based strategies may improve participation of Aboriginal and Torres Strait Islander women in breast and cervical cancer screening. <i>Comment: Table 1 usefully summarises barriers to GP improvements in early detection & management of breast and cervical cancer and strategies to overcome them.</i> |
| Roder D, Currow D. Cancer in Aboriginal and Torres Strait Islander People of Australia. Asian Pacific Journal of Cancer Prevention 2009; 10(5):729-733 | Australia | all cancers diagnosis, incidence, treatment, survival, | Aboriginal and Torres Strait Islander Australians have a cancer incidence for all sites combined equivalent to or slightly lower than for other Australians. They have a higher incidence of cancers of the cervix, liver and gallbladder, oesophagus, unknown primary site, mouth and throat, lung and pancreas, but a lower incidence of cancers of the prostate, female breast, colon/rectum and skin (melanoma). Case survivals are lower for Aboriginal and Torres Strait Islander patients, partly due to an excess of cancer types with a high case fatality , relatively low numbers with a low case fatality, and due to more advanced cancer stages at diagnosis. After accounting for these factors, Aboriginal and Torres Strait Islander Australians still fare worse, probably due to | <i>Comment: An excellent summary of the major issues affecting Aboriginal South Australians.</i> |

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| | | mortality | elevated comorbidity and less complete care resulting from geographic remoteness , limited access to transport and accommodation services, and sometimes a cultural disconnect with mainstream services . | |
| Sabesan S, Piliouras P. Disparity in cancer survival between urban and rural patients - how can clinicians help reduce it? Rural and Remote Health 2009; 9(3). | Australia , Qld, NSW | all cancers prevention, screening, diagnosis, treatment, survival | <p>Many reasons for the disparity in survival of 5-7% between rural and urban cancer patients relate to government policies and funding issues. However rural healthcare workers, particularly medical practitioners, can make an impact on reducing this disparity with attention to factors such as reducing referral processing time, using telemedicine, and ensuring ongoing education of rural patients regarding risk factors and screening programs, among other strategies.</p> <p>Evidence of survival disparities between rural and urban cancer patients includes: a 7% difference in five-year age-adjusted relative survival proportions for all cancers between remote centres and larger rural and metropolitan centres Australia-wide (major city, inner regional, outer regional and remote centres reported as 64.7%, 64.9%, 60.8% and 60.1%, respectively); a similar trend in Qld [citing Baade et al., 2005]; and for NSW, summarised as [citing Jong et al. 2004]:</p> <ol style="list-style-type: none"> 1. the more remote the area in which a person lives, the greater their chance of dying from cancer. 2. the worst survival figures are in areas where the proportion of Indigenous persons is highest; with 3. survival rates particularly poor for cervical; prostate; head and neck, and colorectal cancers; and melanoma. <p>Low SES and Indigenous status are associated with poorer survival, and their impact on survival rates is not always separately identified.</p> <p>Similar situations exist in many other developed countries that comprise a significant proportion of rural and remote residents [citing Campbell et al. 2000, Liff et al. 1991]. Few among the possible reasons for the disparity between metropolitan and non-metropolitan health outcomes for cancer are researched, and many remain speculative.</p> <p>Possible reasons include: screening issues (however unpublished Qld Health data suggests broadly similar screening participation between urban and rural areas for Pap tests & mammography), timing of presentation (known to be delayed in US rural residents [citing Liff et al., 1991]), delay in referral (a factor in Scottish rural areas [citing Campbell et al., 2000]), rural healthcare professional shortages (resulting in patients travelling many hours to receive specialist services, potentially discouraging early presentation and timely treatment), treatment issues (no evidence to support or refute the view that rural patients</p> | <p>Most of the barriers to improving non-metropolitan cancer health services are related to government policies and funding issues, beyond the scope of this article, however, healthcare providers can contribute to patient survival in many ways without straining existing or future budgets. These include: patient education on screening programs and prevention initiatives (e.g. 'Quit Smoking' campaigns), and encouraging participation in screening and prevention initiatives; reducing referral processing time - making routine 'confirmation of receipt' calls to specialists' rooms to ensure timely arrival of cancer patients' referral letters; maintaining intensity of treatment - rural patients should not receive less intensive chemotherapy treatment because of their residential location; clinical trials - rural cancer patients should be encouraged to participate despite the potential increase in their GP's workload, and travel time requirements for the patient; teaching - teaching and mentoring medical students in rural settings is essential; telemedicine - using telemedicine facilities, rural patients can have immediate access to specialist services without having to travel, chemotherapy can also be supervised using this technology, and doctors and nurses can receive one-on-one support and education from medical oncologists by telemedicine; knowledge of services - GPs need an in-depth knowledge of available rural patient support services to reduce patients' financial and emotional strains.</p> <p>The situation is not all bleak: cancer survival has improved over time and the 5-7% disparity between non-metropolitan and metropolitan patients can be bridged in the future with ongoing</p> |

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| | | | <p>are treated later than their urban counterparts, however the intensity of treatment may be affected by rural residence; prostate cancer patients in remote NSW had less radical prostatectomies than their urban counterparts and this was associated with poorer survival [citing Coory & Baade, 2005]), availability of clinical trials and specialist follow up (participation in RCTs is associated with improved cancer survival; many require frequent visits and specialist investigations and rural patients could be excluded due to their residential distance: studies should explore the impact of this factor), GPs' knowledge (despite the need for cancer education, cancer knowledge among medical graduates has declined over the last 10 years [citing: Barton M, Bell P, Sabesan S, Koczwara B. What should doctors know about cancer? Undergraduate medical education from a social perspective. The Lancet Oncology 2006; 7(7):596-601], and, the availability of support services (travelling to cancer centres requires money, time and family support, the need to give up work and resulting financial hardship may discourage rural patients from attending regular clinics in major centres, and while patient assistance travel schemes are helpful they generally do not cover all travel-related costs).</p> | <p>commitment from government and healthcare providers. Other potential actions: Clinical trials - research to explore the impact of clinical trials on cancer survival, and whether rural residents have the same access to RCTs etc. as do urban residents, or whether (or the extent to which) distance is a deterrent to participation., and what can be done about it; GP knowledge about cancer – encourage initiatives such as the CCA's 'Ideal oncology curriculum for medical schools' [(CCA) TCCA. Ideal oncology curriculum for medical schools. Sydney: CCA, Clinical Oncological Society of Australia, 2007].</p> |
| <p>Scrace M, Margolis SA. The Royal Flying Doctor Service primary care skin cancer clinic: a pilot program for remote Australia. Rural and Remote Health 2009; 9(1).</p> | <p>remote Australia : Qld</p> | <p>skin cancer detection, treatment</p> | <p>The geography and logistics of living in remote Australia present unique challenges in providing dedicated primary healthcare services to address the rising incidence of skin cancer. This study examined whether a Royal Flying Doctor Service (RFDS) skin cancer clinic could improve skin cancer outcomes for the target population while providing care at a level consistent with metropolitan skin cancer clinics. Study used a retrospective longitudinal design to compare historical controls with an RFDS dedicated fly-in/ fly-out primary care skin cancer outreach clinic. The clinic was run concurrently with the regular primary care medical service; the entire focus of this additional service was on skin cancer diagnosis and management. Rationale for using this model was to minimise the additional costs of providing the service. The study population was adult, non-Indigenous residents living and working in six distinct communities within one remote region in outback Qld (n=1004 adults 18+ yrs identified from the 2006 Census). During the study period a total of 316 people were seen at the RFDS skin cancer clinic (29% of the total non-Indigenous population) with the clinic examining 39% of those aged 50 yrs and over. There was an average of 1.1 consultations per person (343 consultations in total), with a procedure performed in around one-third of consultations. The demographic most likely to have a lesion removed were 50+ year-old males (p<0.0001). The rate of skin cancer detection was</p> | <p>The RFDS dedicated fly-in/ fly-out remote area skin cancer clinic outcomes were similar to those seen in metropolitan skin cancer clinics. The small population and consequently low statistical power mitigated against certainty in concluding that clinical outcomes were enhanced. Further studies would assist in the future development of models for skin cancer clinics in remote areas.</p> |

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| | | | 15/1000 adults/year. The no. of lesions removed per year increased from 37 to 42 after the intervention, with no statistically significant change in the percentage of excised lesions that were malignant (44%). For 50+ year-old males there was a statistically significant increase in the proportion of excised lesions that were melanomas ($\chi^2 = 6.015$; $p = 0.013$), which corresponded to a four-fold rise in melanoma detection from 0.2/1000 people/year pre-intervention to 2/1000 people/year post-intervention. A comparison of the skin clinic's effectiveness with documented results from other Australian non-specialist skin cancer services demonstrated a low number needed to treat for melanoma which is consistent with high diagnostic accuracy, also supported by a relatively high consultation to biopsy ratio. The biopsy treatment ratio and percentage of lesions that were malignant were similar to those seen in other Australian settings. | |
| Shannon GD, Franco OH, Powles J, Leng Y, Pashayan N. Cervical cancer in Indigenous women: The case of Australia. <i>Maturitas</i> 2011; 70(3):234-245. | Australia | cervical cancer incidence, case fatality | Reviews available evidence on the difference in occurrence and case fatality of cervical cancer among Indigenous and non-Indigenous Australian women. Current evidence suggests that Indigenous women have higher age standardised incidence and mortality than non-Indigenous women when adjusted for stage at diagnosis and co-morbidities ; but there is little information re national estimates of cervical cancer in Indigenous women. The ABS, AIHW, and state-/ territory-based cancer registries provided surveillance data, and journal literature was identified through Medline and Embase to corroborate existing data. Papers selected for review were cross-referenced to identify further relevant studies. The most recent national estimate of age-standardised cervical cancer incidence rate was 16.9 and 7.1 per 100,000 women-years in Indigenous and non-Indigenous women respectively (incidence ratio 2.4). The Indigenous age-standardised mortality rate was 9.9 per 100,000 women years (95% CI 7.1–13.3), over 5 times the non-Indigenous rate . Cervical cancer incidence, in both Indigenous and non-Indigenous women, has decreased since 1991 , however, age-standardised incidence among Indigenous women is still higher than non-Indigenous women . | Health inequities between Indigenous and non-Indigenous populations exist globally; in Australia this disparity in health outcomes is typified by cervical cancer. The pattern of cervical cancer incidence and survival corroborates the health inequities that exist in Australia. Indigenous women are more likely than non-Indigenous women to develop cervical cancer and are less likely to survive it. Similar patterns exist in Indigenous populations worldwide, such as New Zealander Maoris and Canadian Aboriginals, suggesting that high rates of cervical cancer incidence and mortality may be a symptom of social and economic inequity. |
| Shugarman LR, Sorbero ME, Tian H, Jain AK, Ashwood JS. An exploration of urban and rural differences in | US | lung cancer survival | Study tested the relationship between urban or rural residence as defined by rural-urban commuting area codes and risk of mortality in a sample of Medicare beneficiaries with lung cancer. Surveillance, Epidemiology, and End Results (SEER) data was linked with Medicare claims to build proportional hazards models to test hypothesised relationships between individual and community characteristics and overall survival for a cohort of Medicare beneficiaries 65 years and older diagnosed with | Although urban versus rural residence did not directly influence survival, rural residents were more likely to live in poorer areas with a smaller supply of health care providers . Therefore, we still need to be aware of rural beneficiaries' potential disadvantage when it comes to receiving needed care in a |

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| lung cancer survival among Medicare beneficiaries. American Journal of Public Health 2008; 98(7):1280-1287. | | | lung cancer (1995-1999, n=26,073). No evidence found that lung cancer patients in rural areas had poorer survival than those in urban areas. Individual (Medicaid coverage) and regional (lower census tract-level median income) socioeconomic factors and a smaller supply of subspecialists per 10000 individuals 65 years and older were positively associated with a higher risk of mortality. | timely fashion. |
| Siahpush M, Singh GK. Socio-demographic predictors of pap test receipt, currency and knowledge among Australian women. Preventive Medicine 2002; 35(4):362-368. | Australia | cervical cancer screening | Study examined socio-demographic predictors of the receipt, currency (being up-to-date for), and knowledge of Pap test, using data from the 1995 National Health Survey. A subsample of women was given self-administered questionnaires that included questions about the Pap test (n=7,572). Multiple logistic regressions were used to examine the associations of age, marital status, region of residence, country of birth, Index of Relative Socioeconomic Disadvantage (IRSD), and education with Pap test receipt, currency, and knowledge. Women <30 and >49 years of age, those not presently married, those with lower levels of education, and those born in the Middle East or Asia (compared with Australian-/ NZ-born women) were at a greater risk of not receiving, and having no knowledge of, Pap tests. | Study results suggest that, as part of a comprehensive cancer screening strategy, women who are unlikely to obtain a Pap smear might benefit from targeted interventions to improve adherence to cervical cancer screening programs. <i>Comment: No area effect was observed. Limitations of self-report data not discussed.</i> |
| Siahpush M, Singh GK. Socio-demographic variations in breast cancer screening behavior among Australian women: results from the 1995 National Health Survey. Preventive Medicine 2002; 35(2):174-180. | Australia | breast cancer screening | Study explored socio-demographic variations in breast cancer screening behaviour among Australian women using a subsample (women 18+ years, n=10,179) from the 1995 National Health Survey to assess the association of socio-demographic variables with mammography, clinical breast examination, and breast self-examination. Being in the oldest age group, never being or previously being married, living in rural regions (except in the case of breast self-examination), residing in more disadvantaged areas (except in the case of breast self-examination), and having lower levels of education were all associated with a smaller likelihood of screening. Ethnicity was also significantly associated with screening (lower levels for certain particular ethnic groups). | Strategies to promote breast cancer screening practices should pay particular attention to the underserved groups and should be part of a more comprehensive policy that ensures the accessibility to regular health care of these population groups. <i>Comment: Some area effects observed. Limitations of self-report data not discussed.</i> |

| Reference | Geographic focus | Cancer type/s, area of interest | Summary of subject matter or study | Conclusions, implications or possible policy solutions |
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| Stamatiou K, Skolarikos A. Rural residence and prostate cancer screening with prostate-specific antigen. Rural & Remote Health 2009; 9(2):1227. | Worldwide | prostate cancer screening, mortality | Prostate cancer mortality worldwide has recently decreased by 6% after peaking in the 1990s. Based on the recently published results of the European Randomised Study for Screening of Prostate Cancer (which showed a relative prostate cancer mortality reduction of at least 20% by PSA-based population screening) it could be assumed that this decrease is in part due to the implementation of prostate-specific antigen (PSA) screening. The existing large rural-urban inequality in prostate cancer mortality rates can be now associated with the different rates of prostate cancer screening between men who live in capital cities and men who live in regional and rural areas. | Given the adverse effects of PSA-based prostate cancer screening in terms of over-diagnosis and over-treatment , research is needed to develop effective methods for cancer prevention and early detection services in rural populations. In the meantime, the introduction of intervention strategies is needed to augment existing prostate cancer screening methods. |
| Smith T. A long way from home: Access to cancer care for rural Australians. Radiography 2011 [in press]. | Australia | all cancers treatment, mortality | In 2002, the Commonwealth Radiation Oncology Inquiry reported that access to cancer care services in Australia was seriously limited. Recommendations included improving access to cancer care in rural areas by increasing the no. of comprehensive oncology facilities outside the cities. Since 2002 a no. of Regional Integrated Cancer Centres have been established; and boosted again in 2011 by further Commonwealth Government funding to build another ten oncology facilities in regional locations. Cancer is primarily a disease of the elderly and, with the ageing population access to cancer care for rural and remote Australians remains a major challenge. It has been reported that the relative risk of dying of cancer within 5 years of diagnosis is 35% higher for those living in remote locations compared with major cities. Overall cancer mortality is significantly higher in rural and remote locations (206 deaths per 100,000) compared with urbanised areas (172 per 100,000). Cancer mortality is higher again for the Aboriginal population (230 per 100,000). [Impact of this population on data for regional and remote areas is noted.] Reasons for the disparity in cancer outcomes for metropolitan versus non-metropolitan Australians are varied. In general, rural and remote residents have to travel long distances and stay away from home, family and work for long periods of time to access the care they need. Hence, distance is the overriding barrier to access, compounded by the financial costs and disruption to family life, not to mention the endemic lack of specialist medical and allied health workforce outside the major cities. Some rural and remote Australians choose to compromise, accessing whatever care they can locally , although this contributes to the need for cancer care services close to where people choose to live and die, to deal with the complex associated morbidities. | Recent government investment in new regional cancer care infrastructure is essential ; however, it is not the entire solution. Staffing the new facilities calls for innovative solutions, including managed care pathways, outreach programs, models of shared care and the use of telemedicine. There is also a need to better address issues of Indigenous cultural safety and risk reduction in the Aboriginal population. |
| Swan J, Breen N, | US | breast, | Understanding differences in cancer screening among population groups in 2000 | No striking improvements were seen for groups |

| Reference | Geographic focus | Cancer type/s, area of interest | Summary of subject matter or study | Conclusions, implications or possible policy solutions |
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| <p>Coates RJ, Rimer BK, Lee NC. Progress in cancer screening practices in the United States: results from the 2000 National Health Interview Survey. Cancer 2003; 97:1528-1540.</p> | | <p>cervical, colorectal, prostate cancers</p> <p>screening</p> | <p>and successes or failures in reducing disparities over time among groups is important for planning a public health strategy to reduce or eliminate health disparities, a major goal of Healthy People 2010 national cancer screening objectives. In 2000, the new cancer control module in the National Health Interview Survey (NHIS) collected more detailed information on cancer screening than previous surveys.</p> <p>Data from the 2000 NHIS and earlier surveys were analysed to discern patterns and trends in cancer screening practices, including Pap tests, mammography, prostate specific antigen (PSA) screening, and colorectal screening. The data are reported for population subgroups that were defined by a number of demographic and socioeconomic characteristics.</p> <p>Women least likely to have had a mammogram within the last two years were those with no usual source of health care (61%), women with no health insurance (67%), and women who immigrated to the US within the last 10 years (61%). Results for Pap tests within the last 3 years were similar. Among both men and women, those least likely to have had a faecal occult blood test or endoscopy within the recommended screening interval had no usual source of care (14% for men, 18% for women), no health insurance (20% for men, 18% for women), or were recent immigrants (20% for men, 18% for women). Analysis of changes in test use since the 1987 survey indicated that disparities were widening among groups with no usual source of care.</p> <p>PAP smear: Women with lower levels of education, women with limited incomes, and women with chronic disabilities had lower levels of use compared with women in the comparison groups, although the levels of use were not as low as those associated with no usual source of care and recent immigration status.</p> <p>Living in a nonurban location was not associated with less utilisation. For women, the use of Pap smear, mammography, and colorectal endoscopy increased; and use of FOBT increased until 1998 and then stabilised. For men, use of colorectal endoscopy and FOBT increased until 1998 but may have fallen off more recently (a change to the endoscopy question in 2000 may account for the decrease).</p> <p>Decreases in disparities have been small with no decline in differences among groups. Groups with some of the lowest rates of screening use in 1987 showed a widening gap.</p> | <p>with the greatest need. Although screening use for most groups increased since 1987, major disparities remained. Some groups, notably individuals with no usual source of care and the uninsured were falling further behind; and recent immigrants also experienced a significant gap in screening utilisation. More attention is needed to overcome screening barriers for these groups if the population benefits of cancer screening are to be achieved.</p> <p>Application of the lessons from this extensive knowledge base should accelerate the uptake of the effective cancer screening tests currently available and guide future directions for research.</p> |

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| Swan J, Breen N, Graubard BI, McNeel TS, Blackman D, Tangka FK, et al. Data and trends in cancer screening in the United States. <i>Cancer</i> 2010; 116(20):4872-4881. | US | breast, cervical, colorectal, prostate cancers screening | <p>Study examined prevalence of cancer screening use as reported in 2005 by US adults, focusing on differences in historically underserved subgroups; and examined trends 1992-2005 to determine whether differences in screening use had increased, stayed the same, or decreased.</p> <p>Data from the National Health Interview Surveys between 1992 and 2005 were analysed to describe patterns and trends in cancer screening practices, including Papanicolaou test, mammography, prostate-specific antigen, and colorectal screening. Logistic regression was used to report 2005 data for population subgroups defined by several demographic and socioeconomic characteristics. Rates of use for cancer tests were rising only for colorectal cancer, due largely to the increase in colorectal endoscopy screening. Use of all screening modalities was strongly influenced by contact with a physician and by having health insurance coverage.</p> <p><i>Quote: “We found that screening rates have changed over time. Between 2003 and 2005, colorectal endoscopy screening rose, Pap testing was stable, PSA testing dropped, and as previously reported, mammography dropped. The lowest screening rates were found for persons without a usual source of care, those who had no physician contact in the past year, and the uninsured. The patterns of disparities...in 2005 were consistent with those found in previous years of the NHIS. A review of other studies shows that factors associated with disparities have remained similar over recent years... after adjustment for the other variables studied, race/ethnicity and immigration status did not yield significant differences in test usage for distinct racial-ethnic groups. It was the factors more directly related to the individual’s interaction with the healthcare system that resulted in significant disparities. The only cancer site for which screening increased in 2005 was colorectal, and this was because of an increase in use of endoscopy. Even when test rates increased, people without insurance or physician contact were not screened.” (p. 4879)</i></p> | Large gaps remain in use for all screening modalities by education, income, usual source of care, health insurance, and recent physician contact. These specific populations would benefit from interventions to overcome these barriers to screening. |
| Underhill C, Bartel R, Goldstein D, Snodgrass H, Begbie S, Yates P, et al. Mapping oncology services | Australia , regional & rural | all cancers treatment | <p>Study mapped clinical oncology services in regional and rural Australia. A self-administered survey was sent (June-December 2005) to 161 regional hospitals administering chemotherapy (RHAC), which were categorised by state, Hospital Peer Group and the Australian Standard Geographical Classification (ASGC) Remoteness Areas (RA) classification (0=major cities, 1=inner regional, 2=outer regional, 3=remote, and 4=very remote). Outcome measures included percentage and aggregate figures on availability of</p> | Study documented and highlighted cancer service deficiencies in rural and regional Australia , with specialist medical, radiation and surgical oncology service availability diminishing with increasing geographic isolation (similar issues have been reported overseas). A suboptimal |

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| <p>in regional and rural Australia. Australian Journal of Rural Health 2009; 17(6):321-329.</p> | | | <p>medical, radiation and surgical oncologists, chemotherapy nurses, breast cancer nurses, palliative care physicians and allied health professionals according to remoteness and state. Chemotherapy prescribing practices, adherence to occupational health and safety guidelines and availability of multidisciplinary clinics were also explored.</p> <p>A 98% survey completion rate was achieved. Significant deficiencies in service provision were identified in RHAC, for instance, only 21% of RHAC reported a resident medical oncology service (and only 41% reported access to a visiting service, with visit frequency ranging from weekly to six monthly; the remaining 38% reported no medical oncology service despite administering chemotherapy).</p> <p>Medical oncologist availability decreased with increasing remoteness (RA1=56%; RA2=22%; RA3=11%) with no medical oncologists (resident or visiting) reported in RA4. Overall, 59% of RHAC reported that the majority of chemotherapy orders were written by a medical oncologist (ranging from 96% in NSW to 24% in SA); the no. of RHAC reporting chemotherapy orders written by a medical oncologist decreased with increasing remoteness, while the no. reporting orders written by general physicians, GPs and 'other' doctors increased. NT and SA were most likely to report chemotherapy administered by GPs (66% and 68%, respectively) or 'other' trained nurses (100% and 50%, respectively). Chemotherapy administration outside a recognised facility was reported by 31 RHAC, with other sites including Hospital-in-the-Home, GP surgeries, carer administration and self-medication (more common in Qld & NSW, & generally occurring in RA1).</p> <p>Only 7% of RHAC had a radiation oncology unit; 11 radiation units were reported for all 157 RHAC (7%; none in NT: Darwin patients flew to Adelaide for treatment). Of the 26 available machines, less than half (46%) were reported as fully staffed; when a unit was available and staffed, the average wait for radiation treatment was three weeks (range 0-6 weeks).</p> <p>Only 6% of RHAC had a resident surgical oncologist (10, in RA1 & RA2 only). General and 'other' surgeons provided the majority of local oncology surgery while 62% of RHAC (98) reported referring the majority of patients to metropolitan units for major surgery. Only 24% reported a dedicated palliative care specialist (58% reported dedicated palliative care nurses) and 39% identified a dedicated oncology counselling service.</p> <p>Most RHAC reported access to limited allied healthcare services (e.g. physiotherapist, occupational therapist & dietician (142, 90%), but many</p> | <p>service level was identified for RHAC in all areas of cancer service provision including nursing and allied health and multidisciplinary care. Deficiencies in cancer service availability were not restricted to regional and rural areas: the Australian Medical Workforce Advisory Committee identified shortages of medical and radiation oncologists nationwide.</p> <p>These deficiencies may be contributing to poorer outcomes (poorer patient survival and reduced quality of life) for cancer patients living in these areas, suggesting the need for both short-term and long-term measures to improve access to best-practice cancer services for patients living in regional, rural and remote areas. There is no reason why patients' preferences to be treated close to home and family should compromise access to high-quality care. As well as providing better services in larger regional centres new technologies such as tele-oncology that allow for improved equity of access without compromising quality of care should be used. The commitment to introduce radiotherapy facilities in areas of identified need and to explore options for building multidisciplinary cancer clinics in large regional centres as a long-term investment in equity of cancer care should be expedited. Regional cancer centres could provide support and training for smaller regional centres while themselves being mentored by metropolitan centres to improve treatment of low-volume cancers and professional support, as well as providing a platform for research and new technology introduction to improve equity of access and reduce variations in care.</p> |

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| | | | <p>reported long waiting times, high out-of-pocket expenses or restricted services to inpatients only.</p> <p>Dedicated oncology counselling services were reported by 61 RHAC (39%, social workers were most common); 61% of RHAC reported requesting urgent access to psychological services and support. Patient transport refunds were criticised in many surveys; 65% of respondents indicated significant problems with travel support for patients and their families.</p> <p>Other issues included administration of chemotherapy by nurses outside a recognised facility or by nurses without recognised oncology training, limited availability of funded breast care nurses and lack of multidisciplinary clinics.</p> <p>Limitations: In the absence of local cancer registries, estimates of cancer care professionals per patient could not be calculated. Quality of service provision was not examined (would have required in-depth on-site reviews, beyond the scope of available project resources), however, several small studies have identified supportive care issues in regional and rural areas, these justify a more comprehensive analysis of the impact of service inequities on quality of life as well as survival.</p> | <p>Investment in multidisciplinary care, care coordination, and patient and carer support, would improve cancer outcomes in regional and rural Australia.</p> |
| Vanderpool RC, Kornfeld J, Mills L, Byrne MM. Rural–urban differences in discussions of cancer treatment clinical trials. Patient Education and Counseling 2011; 85(2):e69–e74. | US | all cancers treatment: clinical trials | <p>Study compared the characteristics of rural and urban callers to the National Cancer Institute (NCI) Cancer Information Service (CIS), exploring associations between geographic location and discussion of cancer clinical trials.</p> <p>CIS call data, 2006-2008, were assigned to a rural or urban caller ZIP code using Rural–Urban Commuting Area Codes ($n=227,579$ calls). Calls which discussed clinical trials were analysed using univariate and multivariate analyses.</p> <p>Overall, 10.3% of calls included a discussion of clinical trials and there were significantly more discussions among urban than rural dwellers (10.5% vs 9.4%). Multivariate regression analyses supported the univariate findings. Compared to other callers, patients (OR 5.58 [95% CI: 4.88, 6.39]) and their family and friends (6.26 [5.48, 71.5]) were significantly more likely to discuss clinical trials.</p> | <p>Urban dwelling callers were more likely than their rural counterparts to discuss cancer treatment trials, placing individuals living in rural areas at a disadvantage in learning about and communicating with their providers about possible participation in clinical trials. The CIS, with its multiple access points serves as an important source of clinical trials information for rural cancer patients, family members, and providers.</p> |
| Weber MF, Banks E, Ward R, Sitas F. Population characteristics related to colorectal cancer testing in New South Wales, | NSW | colorectal cancer screening | <p>Study compared characteristics of people who use colorectal cancer screening tests with those who do not, through analysis of self-reported questionnaire data ($n=15,900$ women & 14,953 men aged 50 or over who had never had colorectal cancer) from the 45 and Up Study cohort in 2006.</p> <p>A cross-sectional analysis of colorectal cancer test behaviour within the last five years by faecal occult blood test (FOBT), or by any test (FOBT, sigmoidoscopy or colonoscopy) was performed.</p> <p>A total of 36.2% of participants reported colorectal cancer testing and 17.9%</p> | <p>Population subgroups require targeted intervention to ensure equity in colorectal cancer screening.</p> |

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| Australia: results from the 45 and Up Study cohort. Journal of Medical Screening 2008; 15(3):137-142. | | | reported having a FOBT. Both FOBT and any testing were reduced significantly in groups with the following attributes compared with the remaining population; ages 50-59 and 80+, female; no family history of colorectal cancer; lower education; lower income; not speaking English at home; lack of private health insurance; not being retired; not living with a partner and not having other screening tests. Compared with other participants, test uptake was particularly low among current smokers (relative risk 0.76, 95% CI 0.71-0.80), sedentary participants (0.71, 95% CI 0.66-0.77), those without fruit (0.77, 95% CI 0.71-0.84) or vegetables (0.79, 95% CI 0.69-0.90) in their daily diet and those with a disability (0.91, 95% CI 0.85-0.97). Compared with participants from major cities, outer regional area participants were significantly more likely to report a FOBT (1.31, 95% CI 1.23-1.39) however participants in remote areas were significantly less likely to have had any colorectal cancer test (0.75, 95% CI 0.67-0.85). | |
| White KJ, Roydhouse JK, D'Abrew NK, Katris P, O'Connor M, Emery L. Unmet psychological and practical needs of patients with cancer in rural and remote areas of Western Australia. Rural Remote Health 2011; 11(3):1784. | WA | all cancers supportive care | Financial and psychological impacts of cancer treatment on patients can be severe. Practical issues, (e.g. childcare, medical supplies, getting in 'home help') impose financial strain on patients and their families, often exacerbated by loss of income if a patient cannot continue employment during treatment, or if family members become full-time carers. Financial difficulties are often more severe for patients from rural regions because cancer services are concentrated in metropolitan areas and require rural patients to relocate or undertake lengthy, frequent commutes in order to access treatment. Rural cancer patients' needs may differ from, and exceed, those of metropolitan cancer patients and it is important to assess the needs of each population to develop appropriate, tailored supportive-care interventions. This article compares the unmet supportive-care needs of rural/ remote with metropolitan cancer patients in WA, as part of a larger program of research assessing the supportive-care needs of WA cancer patients. Eligible participants (those diagnosed with any type of cancer 6 months to 2 years previously) were identified through the WA Cancer Registry (WACR). A random sample of 2,079 potential participants, structured to include all cancer types and geographical areas, with both sexes randomised within these groups was generated, and after confirmation and exclusion of deceased patients and those patients excluded at the treating doctor's request, 1,770 patients were contacted, and asked to complete a demographic questionnaire and the Supportive Care Needs Survey Long Form (SCNS-LF59). The SCNS-LF59 is a self-administered instrument for measuring global needs in cancer patients, with 59 items in 5 domains: psychological; health system and information; physical | The lack of discrepancy between rural, remote and metropolitan cancer patients' unmet needs is a positive message on the state of WA cancer services and the level of support provided to rural and remote WA residents. Future research should assess the unmet needs of rural and remote carers and families in comparison with metropolitan carers and families , to ensure that services are well-equipped to meet the needs of all individuals involved in a patient's cancer journey. |

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| | | | <p>and daily living; patient care and support; and sexuality. Participants were asked to circle their level of need for help over the last month for each item on a scale of 1 to 5 (1 = not applicable, 2 = satisfied, 3 = low need, 4 = moderate need, 5 = high need). 'Some need' was distinguished by combining scores for low, moderate and high need, as opposed to 'no need' (the combination of scores for not applicable & satisfied). Data from participants who completed and returned both questionnaires (n=786: 234 (30%) rural, 169 (22%) remote, & 383 metropolitan) were analysed using descriptive statistics and χ^2-tests; with missing data addressed through imputation. ABS remoteness classes were adapted by grouping to 3 categories: metropolitan (ABS classification 0); rural/ regional (ABS classifications 1 & 2); and remote (ABS classifications 3 & 4).</p> <p>At least 20% of the participant sample identified 15 items where they had 'some needs'. The item with the highest number of participants (41%) reporting 'some needs' was 'fears about the cancer returning'.</p> <p>Participant needs did not vary by geographical location, with no significant differences found for any of the 15 items with the highest frequency for 'some needs' in the survey. The item for which the greatest, albeit non-significant (p = 0.12) difference was seen, was 'concern about financial situation'. Differences among all items were not significant (p-values from 0.28 to 0.96), and the proportion of participants reporting 'moderate to high need' on these items also did not differ significantly across geographical populations (p-values from 0.13 to 0.91).</p> | |
| <p>Wigg DR, Morgan GW. Radiation oncology in Australia: workforce, workloads and equipment 1986-1999. <i>Australasian Radiology</i> 2001; 45:146-169.</p> | <p>Australia : all states</p> | <p>all cancers treatment: radiotherapy</p> | <p>Regular national surveys of all public and private radiation oncology facilities in Australia have been carried out between 1986 and 1999. Workforce data recorded were numbers of radiation oncologists and trainees, radiation therapists, medical physicists and physics technicians, nursing staff, data managers, social workers and clerical staff. Workloads included treatments with megavoltage beams (linear accelerators, cobalt-60), orthovoltage/ superficial X-rays, brachytherapy, total body irradiation and stereotactic radiosurgery. Major equipment recorded included numbers of megavoltage and orthovoltage/ superficial X-ray machines, planning simulators, computerised dosimetry systems and brachytherapy equipment. The use of radiotherapy beds and the public-private mix of treatments were also documented. Data were assembled for Australia based on each individual state. Within Australia the number of public and private treatment facilities increased by 44% from 18 in 1986 to 26 in 1999. The population increased by 16.4%, cancer incidence by 51.8% and megavoltage workloads (fields) by 102%. Overall, numbers of radiation</p> | <p>It was concluded that the low treatment rate with radiation oncology for cancer patients across Australia was due mainly to the lack of resource allocation. The stated commitment of governments and health departments to a 50% treatment rate can only become a reality if there is a concerted effort to increase the numbers of radiation oncologists, radiation therapists, megavoltage machines and support staff. Otherwise at least one in every 10 newly diagnosed cancer patients will continue to be denied adequate and equitable access to radiotherapy – in 1999 that total figure was 9400 persons.</p> |

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| | | | <p>therapists and physicists, and linear accelerators, have increased with growth in workloads. The number of radiation oncologists increased by 60% from 4.5 full-time equivalent (FTE) radiation oncologists per million population in 1986 to 7.2 per million in 1999. There was a deficit of at least 40 radiation oncologists to treat the 50% of newly diagnosed cancer patients requiring radiotherapy, and significant deficiencies in numbers of radiation therapists, nursing staff, data managers, social workers and clerical staff. Demands for medical physicists increased but the data were insufficient to comment on deficiencies. Despite increases in workloads the proportion of patients with cancer receiving radiotherapy remained below 40%. A positive correlation has been shown between the proportion of newly diagnosed cancer patients treated and the numbers of FTE radiation oncologists, megavoltage machines and radiation therapists, for Australia as a whole, for each state and for the years 1986 to 1999 (also the case when total megavoltage fields was used as the dependent variable). Multiple regression analysis using the same independent variables confirmed these positive correlations.</p> | |
| <p>Willis EM, Dwyer J, Owada K, Couzner L, King D, Wainer J. Indigenous women's expectations of clinical care during treatment for a gynaecological cancer: rural and remote differences in expectations. Australian Health Review 2011; 35(1):99-103.</p> | <p>NSW, Vic, SA & NT in 2008</p> | <p>gynaecological cancers treatment</p> | <p>Report differences in Indigenous women's expectations of clinical care during treatment for a gynaecological cancer in rural and remote regions. Qualitative interviews conducted with 37 clinicians and 24 women with a gynaecological cancer. Three participants were Indigenous women living in large rural towns, six clinicians worked with Indigenous women in remote settings. Interviews were analysed for emerging themes, compared with each other and with the research literature for similarities and differences. Considerable variation between clinician observations of expectations of Indigenous women in remote regions, and the views of Aboriginal women in rural settings.</p> | <p>Indigenous women in rural settings have specific views about quality medical care that include expectations of timely and culturally appropriate care, and strong ties to family and kin, but do not accord with other research findings that Aboriginal women must receive care from same sex clinicians or that care is often delayed. Culturally appropriate care will vary from group to group, particularly between remote, rural and urban populations.</p> |

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| Youlden DR, Baade PD, Valery PC, Ward LJ, Green AC, Aitken JF. Differentials in survival for childhood cancer in Australia by remoteness of residence and area disadvantage. <i>Cancer Epidemiology Biomarkers & Prevention</i> 2011; 20(8):1649-1656. | Australia | all cancers in children survival | Study investigated whether improvements in cancer survival in recent decades benefit children from different geographic locations equally, by producing national survival estimates for childhood cancer by remoteness of residence and area-based SES. Population-based data from the Australian Paediatric Cancer Registry was used to identify children diagnosed with cancer from 1996 on who were at risk of mortality 2001-2006 (n = 6,289). Remoteness was coded using Australian Standard Geographical Classification Remoteness Areas, with an index of area disadvantage obtained from census information. Five-year relative survival estimates were produced by the period method for all cancers and the most common diagnostic groups, with corresponding age-sex adjusted mortality hazard ratios calculated using Poisson regression. Overall, children with cancer from remote/ very remote areas had a significantly lower survival rate than their counterparts in major cities (HR = 1.55, 95% CI = 1.08-2.23); and survival was also lower for children with leukaemia living in regional areas (inner regional: HR=1.52, 95% CI=1.11-2.08; outer regional: HR=1.53, 95% CI=1.03-2.28). Less evident was a trend toward poorer survival by greater area disadvantage for all childhood cancers. | Some variation in prognosis by place of residence evident for children with cancer , especially among leukaemia patients. Treatment, clinical or area-related factors that contribute to the observed survival differentials require identification. |
| Young JM, Leong DC, Armstrong K, O'Connell D, Armstrong BK, Spigelman AD, et al. Concordance with national guidelines for colorectal cancer care in New South Wales: a population-based patterns of care study. <i>Medical Journal of Australia</i> 2007; 186(6):292-295 | NSW | colorectal cancers treatment | Study objective was to investigate predictors of evidence-based surgical care in a population-based sample of patients with newly diagnosed colorectal cancer, using a prospective audit of all new patients with colorectal cancer reported to the NSW Central Cancer Registry (2000-2001). As patients were registered, questionnaires were mailed to their surgeon for clinical information and referrals; medical and radiation oncologists were then asked to complete a questionnaire about adjuvant therapy. The main outcome measures were: concordance with NHMRC 1999 guidelines for colorectal cancer (7 guidelines); predictors of guideline concordance; and the mean proportion of relevant guidelines followed for individual patients. Questionnaires were received for 3,095 patients (91.6%). A median of 67% of relevant guidelines were followed for individual patients (ranging from 0 to 100%; considerable variation for individual guidelines). Patient age was an independent predictor of non-concordance with guidelines for adjuvant therapy and preoperative radiotherapy, which they were less likely to be offered or referred to (despite evidence that older patients are as likely to benefit as younger patients). Adjuvant chemotherapy was more likely if a patient with node-positive colon cancer was treated in a | Cancer treatment guidelines are supposed to reduce variations in care and improve clinical outcomes and quality of life – but this can only happen if they are followed. Systematic training of surgeons in new, effective techniques can have a major effect on cancer outcomes (citing Swedish experience). Effective strategies to fully implement national colorectal cancer guidelines are needed. In particular, the development of resources focusing on appropriate care for older patients, and increasing the use of appropriate adjuvant therapy generally, and especially among older people, should be priorities. <i>Comment: Appears to be some predictive effect of patient residence but not consistent across</i> |

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| | | | <p>metropolitan hospital or by a general surgeon. Surgeons with a high caseload or specialty in colorectal cancer were more likely to perform colonic pouch reconstruction, prescribe thromboembolism or antibiotic prophylaxis, and were less likely to refer patients with high-risk rectal cancer for adjuvant radiotherapy. Bowel preparation was less likely among older patients and in high-caseload hospitals.</p> | <p><i>whole & study design did not tease out. Suggests need for proactive clinical retraining programs & active monitoring of implementation of guidelines, as an inherent part of setting guidelines.</i></p> |