Disparities in Cancer Care in Australia and the Pacific

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ABSTRACT

Disparities in cancer care across populations become apparent only when there is a cancer registry to record the cancer incidence and mortality statistics and data capture is comprehensive. In Australia, one of the obvious disparities is geography, with mortality in some cancers being worse with increasing remoteness. The reasons are not just poorer access to screening and treatment but lifestyle and occupational factors which encompass increased cancer risk factors compared with urban counterparts. There are also higher proportions of lower socioeconomic groups and Aboriginal and Torres Strait Islanders, both of which in addition to remoteness have poorer cancer outcomes. Indigenous Australians have a higher exposure to risk factors of smoking and obesity, live remotely, and have lower participation rates in screening and treatment than non-Indigenous Australians. Immigrants to Australia from diverse backgrounds have a lower incidence of the

common cancers and a lower overall mortality. They have a different spectrum of cancers such as more liver cancer because of their exposure to hepatitis B. The Māori in New Zealand are well studied and display disparities in cancer outcomes similar to Indigenous Australians. There is less known of the Pacific Islanders, but they often have worse outcomes than Europeans living in the same environment, a greater exposure to risk factors, and the added problem of often needing to travel from the Pacific Islands to New Zealand for treatment. 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. *The Oncologist* 2011;16:930–934

INTRODUCTION

Identifying disparities in outcomes of cancer care triggers the investigation of causes and allows the identification of solutions. The disparities may arise across the spectrum of the cancer development from ethnic differences in genetic predisposition to cancer, unequal exposure to risk factors,

or difficulty with access to services because of remote location or low socioeconomic status. Even available treatments may not be utilized because of differences in comorbid illness, cultural sensitivities, or expense if they are unsubsidized. Often research is lacking in the cancer epidemiology of smaller populations.

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However, one important underlying issue is that disparities are difficult to identify if there is inadequate recording of the incidence and mortality from cancer. Cancer registries that are well developed in high-income nations are often rudimentary in lower-income countries, or do not exist at all [1]. The completeness of the data may be problematic. Even if a cancer is directly reported by pathologists, if there are too many cases diagnosed without pathology or simply not presenting for diagnosis, then the population sample may become unrepresentative of the whole population.

The disparities in cancer outcomes were identified in the first instance from cancer registry data in the public domain and from the medical literature. Australia, with the largest published literature in the area, was used as the paradigm for identifying disparities and these were compared with what is known from New Zealand and the Pacific nations.

CANCER REGISTRIES

In Australia, cancer registries of the states and territories submit data to the Australia Institute of Health and Welfare to produce national data on cancer incidence and mortality [2]. Similar national data are available for New Zealand and new registries are being developed in the Pacific Islands [1, 3]. These data allow the comparison of populations to compare some disparities. The first disparity arises from the Australia data and that is the impact of living remotely from major cities on cancer incidence and outcomes.

REMOTENESS

Nearly one third of Australians live in rural (29%) and remote (3%) areas. Data on the health of this population are influenced by less access to primary care, greater representation of Indigenous Australians (24% population in remote areas and 45% in very remote areas as compared with 2.5% in the overall population), and overrepresentation of the socially disadvantaged [4]. Some of this may explain the disparities seen in cancer incidence. Considering “all cancers,” the age-standardized incidence rates in inner and outer regional areas in 2001–2003 were higher in major cities but lower for very remote areas. The incidence of cancer was 4% higher in regional areas than in major cities, 3% higher in outer regional areas, and 1% higher in remote areas, but 10% lower in very remote areas. It was the preventable cancers such as melanoma (associated with sun exposure), lung, lip, and head and neck cancers (associated with smoking), and colorectal cancer or cancer of the cervix (detectable in a premalignant stage through screening) that had the higher incidence, suggesting that the prevention campaigns may not be reaching their targets as effectively in rural and remote areas [5].

Cancer survival is lower in rural and remote (57.8%) ar-

reas compared with the survival in metropolitan areas (61.2%). Cancer mortality is lowest in major cities and highest in outer regional areas [6]. Deaths from lung cancer, cervical cancer, and cancer of the uterus, as a proportion of cancer deaths, increase with remoteness, whereas deaths from breast cancer, leukemias, ovarian cancer, and stomach cancer, as a proportion of cancer deaths, decrease with remoteness. The differences in mortality probably relate to the different mix of age, ethnicity, socioeconomic status and diet, lifestyle, and occupation exposures between rural and urban areas.

Issues of poorer access to screening and later treatment services are shared with rural and remote communities in Australia, New Zealand, and the Western Pacific.

ETHNICITY

For Indigenous Australians, the age-standardized rates suggest underreporting, but even so, for the common cancers there is a higher incidence for lung, head and neck, and unknown primary cancer. In women, the rates of cervical cancer are double those for nonindigenous females. For colorectal cancer, prostate cancer, and lymphoma the incidences are lower than those for nonindigenous people [6]. Again the higher incidence of cancer is more pronounced in the preventable cancers.

This increased incidence is partly explained by lifestyle factors that carry a risk of cancer. In 2004–2005, for example, 46% of Indigenous Australians over 18 years smoked compared with 21% of non-Indigenous Australians. Similarly, although alcohol drinking was similar for both populations, of those who drank, Indigenous Australians were 1.5 times more likely to drink for longer terms at high-risk levels. Also, considering an emerging cancer risk factor, obesity, Indigenous Australians were more likely to be overweight than the nonindigenous population (31% versus 36%) and more likely to be obese (34% versus 18%) than non-Indigenous Australians [7].

In the period 2002–2006, the death rate of Indigenous Australians from cancer was 1.3 times that of non-Indigenous Australians. This was largely due to gastrointestinal cancer and lung cancers, but indigenous females died from cancer of the cervix at 6 times the rate of non-Indigenous Australians [7]. A study from the Northern Territory showed that indigenous people were more likely to be diagnosed with advanced cancer with colorectal cancer, breast/cervical cancer, and non-Hodgkin's lymphoma. Although stage at diagnosis may partly explain the survival difference, the survival for most cancers, stage for stage, is inferior to that for other Australians [8, 9].

Aboriginal women are less likely to participate in breast (35.8% versus 55.9%) or cervical cancer screening than

nonaboriginal women [10, 11]. Are there differences in treatment of cancer for Indigenous Australians?

A recent study in Queensland demonstrated that nonindigenous patients had better survival when adjusted for stage at diagnosis, comorbidities, and treatment. In terms of treatment, indigenous patients were 24% less likely to receive surgery and waited longer for surgery (hazard ratio 0.84). They were 20% less likely to receive chemotherapy and 9% less likely to receive radiotherapy [12, 13].

Cultural barriers to the prevention, detection, and treatment of cancer have also been identified. Cancer in indigenous culture was ascribed to nonbiological explanations, including retribution for past behavior, and there was fear that treatment was beyond medical intervention. Embarrassment and shame often prevented participation in screening programs such as those for breast or cervical cancer. The relocation for treatment away from home and community was both a barrier to care and a cause of discontinuity of care [8].

Given that 24% of the Australian population consists of immigrants, other culturally and linguistically diverse (CALD) groups need to be examined for disparities in cancer outcomes. In general, looking at risk factors for cancer, CALD groups report lower levels of smoking and except for the European immigrants are less obese. Screening participation tends to be lower [14]. The incidence of those cancers that are most common in the nonimmigrant population, colon cancer, breast cancer, prostate cancer, and melanoma, is lower in the CALD group. They have a higher proportion of lung, stomach, liver, cervix, thyroid, and bladder cancer [15]. The increased incidence of liver cancer, for example, relates to high rates of hepatitis B and C infections, particularly in Southeast Asia. In general, CALD groups have lower mortality rates from cancer. For example, in Asian adult immigrants under 64 years of age, the death rate was up to two thirds the rate of locally born people. There is a much lower rate of death from melanoma, for example. There are some examples, however, where death rates are higher. For example, the death rate for all cancers in women and lung cancer in males 65 years and over who came from the United Kingdom or Ireland are higher than for those born locally.

Patients from CALD groups have lower participation rates in screening. When English was not identified as the main language at home, there was less participation in breast screening (44.8% versus 59.1%) in the 50- to 69-year-old group in 2005–2006. Similarly, participation in the Australian bowel screening program in 2008 was less (14%) for non-English-speaking CALD groups than for others who spoke English (41%). A large population study in New South Wales of people 45 years old and up showed

that for women from Southeast Asia, East Asia, Western Europe, and North Africa and the Middle East, there were lower rates of bowel cancer testing compared with those for Australian women, whereas women who migrated from East Asia and North Africa or the Middle East had lower rates of breast screening. For men from Asia and Europe, bowel cancer screening was much less than that in Australian men [16]. Little has been studied on treatment disparities in CALD groups.

NEW ZEALAND AND PACIFIC ISLANDS

Similar disparities have been noted for the New Zealand Māori and Polynesians of the Pacific Islands [17]. In New Zealand, the Treaty of Waitangi articulated that the Māori must have culturally appropriate health services, but there has been some underreporting due to difficulty identifying ethnicity and the disparities between Māoris and the majority population are pronounced [18–20]. Again in the Polynesian population there are site-specific disparities, such as the higher incidence of lung and cervical cancer in Māori people, and of liver cancer in Pacific people (such as in Tonga [21]) and yet lower incidences of other cancers such as melanoma, prostate cancer, and colon cancer compared with the non-Māoris and –Pacific population [22]. Patterns change over time, with lung cancer decreasing in Hawaiian men and breast cancer increasing in Hawaiian women [23].

There are disparities in the risk factors in the Maori and Pacific Island populations. More Māori and Pacific Islanders in New Zealand smoke more tobacco than European New Zealanders. Māoris are twice as likely to smoke, 50% more likely to be obese, and 3 times as likely to have both risk factors [24]. Other factors that are different include the incidence of hepatitis B. In New Zealand, 6% of the European population of New Zealand are HbsAg-positive as compared with 76.6% of Māori and 80% Pacific Island patients with hepatocellular cancer [25]. Other factors that need further research are how the greater bone mineral density of Māoris signal higher lifetime estrogen exposure, which may partly explain the higher lifetime risk of breast cancer [26]. There are also possible genetic factors, and although research may be culturally sensitive, one disparity that requires more attention is their lesser opportunity to be involved in research [17].

In New Zealand, there are data that survival across 20 cancers is worse for the Māori, then Pacific Islanders, and then Europeans; however, much of this can be attributed to stage at diagnosis [27]. Data on Pacific Islanders can be problematic because there is travel to other countries such as New Zealand for treatment and some are included on the New Zealand registry. In children, however, in New Zealand no ethnic difference in cancer survival is apparent [28].

In Hawaii, cancer survival is worse for native Hawaiians as compared with Europeans for breast, colorectal, and lung cancers [29–31].

Access to treatment is obviously going to be more problematic for Pacific Islanders such as those from Tonga, Samoa, or the Cook islands where they have to travel to New Zealand for tertiary services.

SOCIOECONOMIC STATUS

In Australia, cancer incidence was highest in the second lowest quintile of socioeconomic status (SES) and a higher percentage of people of low socioeconomic status lived away from major cities [32]. Compared to the least disadvantaged, the lowest socioeconomic group had lifestyles with more cancer risk factors. They were more likely to smoke (28% versus 11%) and were more likely to be obese (66% versus 56%). The 5-year survival of the lowest group as compared with the highest socioeconomic group was 57% versus 66%. The participation in screening programs decreases with lower socioeconomic group, which can be best demonstrated in cervical cancer where in 2005–2006 the difference was 57.3% versus 71.5% [33]. The major impact of SES on treatment in Australia, where there is a sub-

sidized health system, is on accessing treatments such as any high-cost drugs that are not subsidized.

In Māori and Pacific Islanders, who have lower educational levels, employment, and incomes, SES has an adverse effect on the cancer mortality [34].

SUMMARY

There are a number of underlying causes of disparities in cancer outcomes in Australia and the Pacific. The extent of the disparities is better known in the more developed countries with good cancer registries. Geographically, there may be large distances to travel for screening or treatment. The poorer outcomes with Indigenous Australians, Māoris, and Pacific Islanders can be related to their greater exposure to cancer risk factors and to barriers in accessing screening and treatment. Lower socioeconomic status compounds the problem. More research is needed to identify preventable causes of these disparities.

AUTHOR CONTRIBUTIONS

Conception/Design: Ian Olver, Franca Marine, Paul Grogan

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REFERENCES

- Moore MA, Baumann F, Foliaki S et al. Cancer epidemiology in the Pacific islands - past, present and future. *Asian Pac J Cancer Prev* 2010;11(Suppl 2):99–106.
- AIHW (Australian Institute of Health and Welfare) & AACR (Australasian Association of Cancer Registries). Cancer in Australia: an overview, 2008. Cancer Series No. 46. Catalog no. CAN 42. Canberra, ACT: Australian Institute of Health and Welfare, 2008.
- New Zealand Ministry of Health. Cancer in New Zealand: Trends and Projections. Public Health Intelligence Occasional Bulletin No. 15. Wellington, New Zealand: New Zealand Ministry of Health, 2002.
- Cancer Australia and Cancer Council Australia 2010. Review of national cancer control activity in Australia. Canberra: Cancer Australia, 2010. Available at <http://www.canceraustralia.gov.au/publications-resources/cancer-control-plans-and-reports>. Accessed February 2011.
- Australian Institute of Health and Welfare & Australasian Association of Cancer Registries 2007. Cancer in Australia: an overview, 2006. Cancer Series No. 37. Catalog No. CAN 32. Canberra, ACT: Australian Institute of Health and Welfare, 2006.
- Australian Institute of Health and Welfare & Australasian Association of Cancer Registries 2004. Cancer in Australia, 2001. Canberra, ACT: Australian Institute of Health and Welfare, 2004.
- Australian Institute of Health and Welfare. Aboriginal and Torres Strait Islander Health Performance Framework, 2008 report: Detailed analyses. Catalog No. AHW 22. Canberra, ACT: Australian Institute of Health and Welfare, 2008.
- Cunningham J, Rumbold AR, Zhang X et al. Incidence, aetiology, and outcomes of cancer in Indigenous peoples in Australia. *Lancet Oncol* 2008;9: 585–595.
- Condon JR, Barnes A, Armstrong BK et al. Stage at diagnosis and cancer survival of Indigenous and non-Indigenous people in the Northern Territory 1991–2000, NCC Initiative, Editor. Melbourne: Menzies School of Health Research, Cooperative Research Centre for Aboriginal Health, 2005.
- Australian Institute of Health and Welfare. BreastScreen Australia monitoring report 2004–2005. Cancer Series No. 42. Cat. No. CAN 37. Canberra, ACT: Australian Institute of Health Welfare, 2008.
- Binns PL, Condon JR. Participation in cervical screening by Indigenous women in the Northern Territory: a longitudinal study. *Med J Aust* 2006; 185:490–494.
- Valery PC, Coory M, Sterling J et al. Cancer diagnosis, treatment, and survival in Indigenous and non-Indigenous Australians: a matched cohort study. *Lancet* 2006;367:1842–1848.
- Australian Institute of Health and Welfare. Aboriginal and Torres Strait Islander Health Performance Framework, 2008 report: detailed analyses. Cat. no. AHW 22. Canberra, ACT: Australian Institute of Health Welfare, 2008.
- Wain G, Morrell S, Taylor R et al. Variation in cervical cancer screening by region, socio-economic, migrant and indigenous status in women in New South Wales. *Aust N Z J Obstet Gynaecol* 2001;41:320–325.
- Australian Institute of Health and Welfare. Australia's health 2008. Catalog No. AUS 99. Canberra, ACT: Australian Institute of Health Welfare, 2008.
- Weber MF, Banks E, Smith DP et al. Cancer screening among migrants in an Australian cohort; cross-sectional analyses from the 45 and Up Study. *BMC Public Health* 2009;9:144.
- Dachs GU, Currie MG, McKenzie F et al. Cancer disparities in indigenous

- populations: Māori, Native Hawaiians, and Pacific people. *Lancet Oncol* 2008;9:473–484.
- 18 New Zealand Ministry of Health. The New Zealand Cancer Control Strategy. Wellington, New Zealand: Ministry of Health and the New Zealand Cancer Control Trust, 2003.
 - 19 Robson B, Purdie G, Cormack D. Unequal impact: Māori and Non-Māori Cancer Statistics 1996–2001. Wellington, New Zealand: Ministry of Health and the New Zealand Cancer Control Trust. Available at [http://www.moh.govt.nz/moh.nsf/by+unid/D43AB8463C97D9A4CC25716F001354AA?](http://www.moh.govt.nz/moh.nsf/by+unid/D43AB8463C97D9A4CC25716F001354AA?Open) Open. Accessed March 14, 2008.
 - 20 Bramley D, Hebert P, Tuzzio L et al. Disparities in indigenous health: a cross-country comparison between New Zealand and the United States. *Am J Public Health* 2005;95:844–850.
 - 21 Centre for Public Health Research. Tonga's Health 2006. Tonga: Tonga Ministry of Health, 2006.
 - 22 Foliaki S, Jeffreys M, Wright C et al. Cancer in Pacific people in New Zealand: a descriptive study. *Pac Health Dialog* 2004;11:94–100.
 - 23 Johnson DB, Oyama N, Le Marchand L et al. Native Hawaiians mortality, morbidity, and lifestyle: comparing data from 1982, 1990 and 2000. *Pac Health Dialog* 2004;11:120–130.
 - 24 Tobias M, Yeh LC, Jackson G. Co-occurrence and clustering of tobacco use and obesity in New Zealand: cross-sectional analysis. *Aust N Z J Public Health* 2007;31:19–22.
 - 25 Blakely TA, Bates MN, Baker MG et al. Hepatitis B carriage explains the excess rate of hepatocellular carcinoma for Maori, Pacific Island and Asian people compared to Europeans in New Zealand. *Int J Epidemiol* 1999;28:204–210.
 - 26 McCredie M, Paul C, Skegg DC et al. Breast cancer in Maori and non-Maori women. *Int J Epidemiol* 1999;28:189–195.
 - 27 Jeffreys M, Stevanovic V, Tobias M et al. Ethnic inequalities in cancer survival in New Zealand: linkage study. *Am J Public Health* 2005;95:834–837.
 - 28 Douglas NM, Dockerty JD. Survival by ethnicity for children diagnosed with cancer in New Zealand during 1990–1993. *J Paediatr Child Health* 2007;43:173–177.
 - 29 Wegner EL, Kolonel LN, Nomura A et al. Racial and socioeconomic status differences in survival of colorectal cancer patients in Hawaii. *Cancer* 1982;49:2208–2216.
 - 30 Nomura A, Kolonel LN, Rellahan W et al. Racial survival patterns for lung cancer in Hawaii. *Cancer* 1981;48:1265–2271.
 - 31 Meng L, Maskarinec G, Wilkens L. Ethnic differences and factors related to breast cancer survival in Hawaii. *Int J Epidemiol* 1997;26:1151–1158.
 - 32 Australian Institute of Health and Welfare, Cancer Australia & Australasian Association of Cancer Registries 2008. Cancer survival and prevalence in Australia: cancers diagnosed from 1982 to 2004. Cancer Series No. 42. Catalog No. 38. Canberra, ACT: Australian Institute of Health and Welfare, 2008.
 - 33 Australian Institute of Health and Welfare 2008d. Cervical screening in Australia 2005–2006. Cancer Series No. 41 Cat. No. CAN 36. Canberra, ACT: Australian Institute of Health and Welfare, 2008.
 - 34 Blakely T, Fawcett J, Hunt D et al. What is the contribution of smoking and socioeconomic position to ethnic inequalities in mortality in New Zealand? *Lancet* 2006;368:44–52.