Cancer incidence and socioeconomic status: a brief summary

Findings

Background

Socioeconomic status is a strong predictor of many health outcomes. However, with cancer it is a far more complicated picture.

Equity gap

Overall, cancer incidence shows almost no relationship with the level of socioeconomic disadvantage, and for cancers such as breast, prostate, and melanoma there are higher rates in the least disadvantaged areas than in the most disadvantaged areas.

However, for total cancers and all types of cancers presented in this report, the impact in terms of potential years of life lost is far greater in the most disadvantaged areas than in the least disadvantaged areas. This indicates the impact of

The largest disparity between the most and least disadvantaged areas for both incidence and potential years of life lost is for lung cancer, which in many cases is a preventable disease. For lung cancer, the most disadvantaged quintile has an incidence rate 68% higher than the least disadvantaged quintile, and a rate of PYLL over 2.4 times greater than that in the least disadvantaged quintile.

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Cancer incidence and socioeconomic status: a brief summary

Introduction

In the 2010 to 2014 period there were 623,128 cancers recorded in Australia, excluding all cases of basal cell carcinoma (BCC) of the skin and squamous cell carcinoma (SCC) of the skin. Over half (347,031, 55.7 per cent) of these were for males and 276,097 for females. The highest age-standardised rate of cancer incidence was in Queensland with 589.8 cases per 100,000 people (of which much can be attributed to its extremely high incidence of melanoma compared to the rest of Australia) and the lowest rate was in the Australian Capital Territory, with 502.0 cases per 100,000 people.

Socioeconomic status and cancer incidence

Socioeconomic status is a strong predictor of many health outcomes. However, with cancer it is a far more complicated picture. In the table below, the cancer incidence rates for the five socioeconomic quintiles (with Quintile 1 comprising the least disadvantaged areas and Quintile 5, the most disadvantaged1) are compared to the corresponding national cancer rates, with the darkest two shades being above the national rate and the lightest two shades being below the national rate.

Figure 1. All cancers and most common cancer types by socioeconomic quintile, compared to national rates, 2010 to 2014.

	All cancers (persons)	Colorectal cancer (persons)	Melanoma (persons)	Lung cancer (persons)	Pancreatic cancer (persons)	Prostate cancer (males)	Breast cancer (females)
Quintile 1							
Quintile 2							
Quintile 3							
Quintile 4							
Quintile 5							

Legend

10% or more greater than Australian rate	
5% to less than 10% greater than Australian rate	
Less than 5% different to Australian rate	
5% to less than 10% lower than Australian rate	
10% or more lower than Australian rate	

There is little relationship between socioeconomic status and the overall prevalence of cancer, with all socioeconomic quintiles being within +/- 5% of the national rate, with the most disadvantaged quintile having a rate less than 5% higher than the rate in the least disadvantaged quintile. However, this pattern clearly is not maintained across specific cancer types.

Some cancers are more prevalent in the most disadvantaged areas, e.g., lung cancer, where the rate in the most socioeconomically disadvantaged quintile is 1.7 times as high as in the least disadvantaged quintile.

[1] PHIDU socioeconomic quintiles guide

Breast cancer in females and prostate cancer in males show the opposite pattern, with far greater prevalence in the least disadvantaged quintile. For breast cancer, the higher rate is unlikely to be attributable to variations in rates of testing. For example, in 2017–2018, there was little variation in participation for women aged 50–74 across socioeconomic areas, with all areas having an age-standardised participation rate of between 52.1% and 55.2% (AIHW).

Lung cancer

Nationally, there is a strong relationship between socioeconomic status (as measured by the Index of Relative Socio-economic Disadvantage (IRSD)) and the level of lung cancer incidence. However, the strength of this relationship is not uniform across Australia.

The greatest difference can be seen when comparing the correlation (R value) between the level of socioeconomic disadvantage and lung cancer incidence in Population Health Areas (PHAs) in capital cities to the PHAs in the rest of the state or Northern Territory.

Table 1. R values for correlation of lung cancer incidence (2010 to 2014) and IRSD (2016), by capital cities and rest of states/ territory

Capital city	R value	Rest of State/ NT	R value
Sydney	-0.66	Rest of NSW	-0.55
Melbourne	-0.51	Rest of Vic.	-0.53
Brisbane	-0.72	Rest of Qld	-0.59
Adelaide	-0.88	Rest of SA	-0.44
Perth	-0.74	Rest of WA	-0.32
Hobart	-0.84	Rest of Tas.	-0.51
Darwin	-0.89	Rest of NT	-0.87

Note: The higher an IRSD score, the less disadvantaged an area is, hence the negative R values when correlated with lung cancer incidence.

Not only is there a stronger relationship between SES and lung cancer in most capital cities than outside capital cities, there is also a greater disparity between the least disadvantaged and most disadvantaged quintiles in the capital cities than outside them across all states and territories except the Northern Territory, as shown in Table 2.

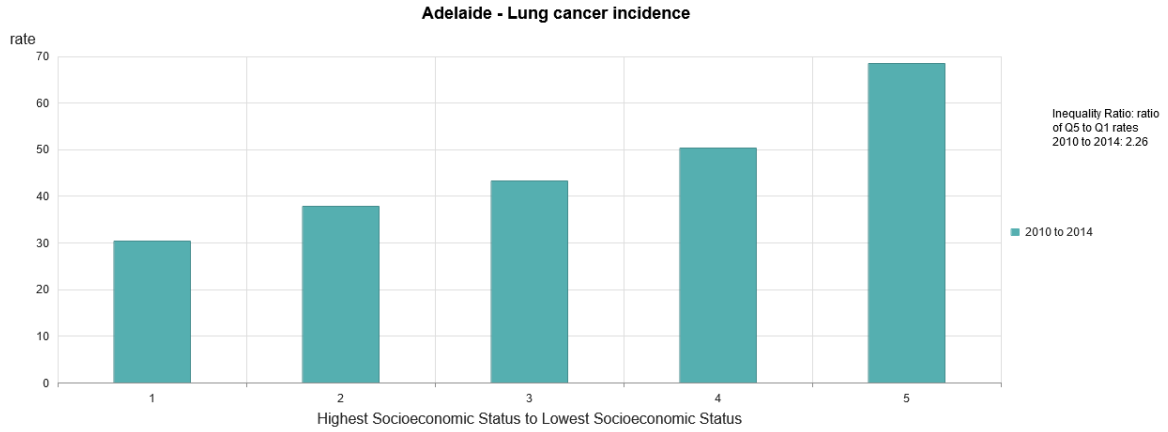
Table 2. Ratio of lung cancer incidence (2010 to 2014) in the most disadvantaged quintile (Q5) compared to the least disadvantaged quintile (Q1) by capital cities and rest of state/ territory.

Capital city	Rate Ratio of Q5:Q1	Rest of state/ territory	Rate Ratio of Q5:Q1
Sydney	1.80	NSW	1.46
Melbourne	1.61	Vic.	1.45
Brisbane	1.75	Qld	1.68
Adelaide	2.26	SA	1.35
Perth	1.89	WA	1.44
Hobart	1.93	Tas.	1.50
Darwin	1.76	NT	2.64

The greatest difference between cancer incidence for the most and least disadvantaged quintiles is in the Northern Territory outside of Darwin, with those living in the most disadvantaged quintile more than 2.5 times as likely to have lung cancer than those in the least disadvantaged quintile.

There is a clear socioeconomic gradient in lung cancer incidence, particularly across capital cities. This is best represented by the data for Adelaide.

Figure 2. Lung cancer incidence (age-standardised rate per 100,000) by socioeconomic quintile in Adelaide, 2010 to 2014



Potential years of life lost

Incidence alone does not give a full account of the impact of cancer diagnosis. Another important measure that needs to be considered is the potential years of life lost (PYLL).

PYLL is calculated as the sum of years of life lost from deaths that occurred before 75 years of age. For example, a person that died at 50 years of age would contribute 25 PYLL; a death at 70 years of age contributes five years. The data are analysed as the age-standardised PYLL per 1,000 population.

Although there is minimal difference (approximately 5%) in the total cancer incidence between the least and most socioeconomically disadvantaged quintiles in Australia, the PYLL per 1,000 population is more than twice as large in the most disadvantaged quintile compared to the least disadvantaged quintile, showing that having cancer disproportionately affects those in the most disadvantaged quintile in terms of years of life lost.

However, this difference is not consistent between cancer types.

Table 3. Rate ratios of most and least disadvantaged quintiles for incidence (2010 to 2014) and PYLL (2014 to 2018) by cancer type.

Type of cancer	Rate ratio for incidence	Rate ratio for PYLL
Total cancers	1.05	2.18
Colorectal	1.18	1.38
Melanoma	0.86	1.28
Lung	1.68	2.41
Pancreatic	1.14	1.59
Prostate	0.83	1.34
Breast	0.84	1.20

All cancer types presented show a greater rate ratio for PYLL than incidence, reflecting a pattern of a disproportionately negative impact, by age of a cancer diagnosis for those in the most disadvantaged quintile compared to the least disadvantaged quintile.

Even though the most disadvantaged quintile has lower incidences of melanoma and breast cancer than the least disadvantaged quintile, the rate of potential years of life lost is at least 20% more in the most disadvantaged quintile. Lung cancer, which has an almost 70% greater incidence rate in the most disadvantaged quintile than the least disadvantaged quintile, shows an even greater disparity between the incidence level and PYLL.

Conclusion

Overall cancer incidence shows almost no relationship with the level of socioeconomic disadvantage, and for cancers such as breast, prostate, and melanoma there are higher rates in the least disadvantaged areas than the most disadvantaged areas. However, for total cancers, and all types of cancers presented in this report, the impact in terms of potential years of life lost is far greater in the most disadvantaged areas than in the least disadvantaged areas.

The largest disparity between the most and least disadvantaged areas for both incidence and potential years of life lost is for lung cancer, which in many cases is a preventable disease. Here the most disadvantaged quintile has an incidence rate 68% higher than the least disadvantaged quintile, and a rate of PYLL over 2.4 times greater than that in the least disadvantaged quintile.

Source

Compiled by PHIDU for the Social Health Atlases of Australia from data analysed by the Australian Institute of Health and Welfare from the Australian Cancer Database (ACD) 2015, and Cause of Death Unit Record Files supplied by the Australian Coordinating Registry and the Victorian Department of Justice, on behalf of the Registries of Births, Deaths and Marriages and the National Coronial Information System.

References

Australian Institute of Health and Welfare 2020. BreastScreen Australia monitoring report 2020. Cancer series no. 129. Cat. no. CAN 135. Canberra: AIHW

Links to data about other types of cancer and socioeconomic status

PHIDU website: cancer by socioeconomic status

PHIDU Social Health Atlas data