THE SOCIAL HEALTH ATLAS: A POLICY TOOL TO DESCRIBE AND MONITOR SOCIAL INEQUALITY AND HEALTH INEQUALITY IN AUSTRALIA

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RESUMEN

En 1988, como respuesta a la toma de conciencia del papel que las desigualdades sociales juegan en las desigualdades relacionadas con la salud, la Oficina para la Salud Social de la Comisión de Salud de Australia Meridional propuso la adopción de una estrategia en salud social. La estrategia en salud social adoptó una visión, para mejorar la salud de los habitantes de Australia Meridional, basada en el reconocimiento de políticas externas al sector sanitario que pueden tener un impacto importante sobre la salud de la comunidad en general y de los grupos más desfavorecidos en particular. Entre estas políticas externas a la salud destacan la vivienda, la educación y el transporte. En su conjunto, esta visión se conoce como "aproximación social a la salud".

Como parte de esta estrategia, la información se percibe como una componente importante al facilitar la descripción de perfiles socioeconómicos y de salud en la población. Los mapas fueron elegidos como el mejor instrumento para presentar y transmitir este tipo de información. Los mapas presentan la información de tal forma que ésta se hace accesible a audiencias heterogéneas, no sólo para aquellas encargadas de establecer políticas e implementar estrategias sino también a los consumidores y a otros actores sociales que podrían tener limitaciones a la hora de manejar información estadística presentada de forma más tradicional. Los mapas del atlas que se presenta describen la distribución geográfica de la población a través de un amplio rango de indicadores socioeconómicos, su estado de salud y el uso que hace de los servicios sanitarios, subrayando, por tanto, las relaciones existentes entre los indicadores de desigualdad social y las condiciones de desigualdad en salud. Ésta es la razón por la el atlas recibe el nombre de "Atlas Socio-sanitario".

Nota del Coordinador:
El Atlas Social y de Salud de Asutraluia se encuentra disponible online en la URL:
http://www.publichealth.gov.au/atlas.html

Durante los catorce años que han transcurrido desde que el primer atlas socio-sanitario fue publicado, la variedad y calidad de las bases de datos existentes a nuestra disposición ha mejorado considerablemente, lo que permite una mejorada comprensión del impacto que las condiciones socioeconómicas ejercen sobre la salud. Esta mejora ha permito, asimismo, analizar tendencias temporales y patrones de distribución espacial. Los atlas representan una iniciativa de gran calado en los esfuerzos por reforzar la información sobre las infraestructuras de salud pública en Australia y constituyen una herramienta de importancia mayor en las políticas dirigidas a problemas relacionados con desigualdades sanitarias cuyo origen se encuentra en la desigualdad social.

Palabras Clave:

Atlas, Indicadores Socioeconómicos, Desigualdad Social, Desigualdad Sanitaria, Australia

ABSTRACT

In 1988, in response to an increasing awareness in Australia of the role of social inequality as a key to health inequality, the Social Health Office within the South Australian Health Commission proposed the adoption of a social health strategy. The social health strategy outlined an approach to improving health for all South Australians through a recognition that policies in areas outside of the health sector, such as housing, education, transport etc. can have substantial impact on the health of the general community, and in particular on disadvantaged groups. This is often referred to as a 'social view of health'.

Information was seen as having an important part in this strategy, by describing the socioeconomic and health status profiles of the population. The approach chosen to presenting information was through mapping. Maps present data in a way that is accessible to a wide audience, not only those charged with setting policy and undertaking strategic planning, but to consumers and other community advocates who may have limited skills in handling statistical information presented in more traditional ways. The maps describe the geographic distribution of the population by a range of socioeconomic indicators, together with maps showing their health status and use of health services, thereby highlighting the relationships between the indicators of socioeconomic inequality and inequality in health status. These reports have been titled 'social health atlases'.

Over the fourteen years since the first social health atlas was released, the range and quality of datasets has improved, allowing for a better understanding of the impact of socioeconomic influences on health. It has also been possible to address changes in the overall levels, and patterns in the distribution, of socioeconomic status and health status and to assess the extent to which the health divide has been addressed. The atlases represent a major initiative in strengthening the public health information infrastructure in Australia and are a major policy tool with which to address health inequality arising from social inequality.

Keywords:

Atlas, Socio-economic Indicators, Social Inequality, Health Inequality, Australia

TITLE	YEAR	COMMENT
A Social Health Atlas of South Australia SAHC 1990	1990	78 maps for Adelaide and SA (329 pages): supporting data in both hard copy & electronic form
A Social Health Atlas of Australia: Volume 1 and 2 etc	1992	One volume of administrative data (90 maps, 319 pages); second volume of data estimated from household surveys, including supporting data from both volumes (74 maps; 305 pages)
A Social Health Atlas of South Australia, Second Edition	1996	163 maps for Adelaide and SA (440 pages): supporting data in hard copy & electronic form
A Social Health Atlas of Young South Australians	1998	90 maps for Adelaide and SA (222 pages): supporting data in hard copy & electronic form
A Social Health Atlas of Australia, Second Edition Volumes 1-9	1999	Separate volumes for the six states, two territories and Australia as a whole: addition of data by a remoteness classification, by socioeconomic status of area & comparison with data from first edition; supporting data in hard copy & electronic form; PDFs of atlas & data files on web
A Social Health Atlas of Young South Australians, Second edition	2003	132 maps for Adelaide and SA (400 pages): supporting data in hard copy & electronic form; comparison with data from first edition; PDFs of atlas & data files on web
Inequality in South Australia: Key Determinants of Wellbeing	2004	34 maps for Adelaide and SA (97 pages): supporting data in hard copy & electronic form; PDFs of report & data files on web
A Social Health Atlas of South Australia, Third Edition	2004 (In press)	Emphasis on preventive approaches (cervical & breast cancer screening, potentially avoidable mortality & hospitalisations; comparison with data from first & second editions (maps and graphs); PDFs of atlas & data files on web
An Atlas of Potentially Avoidable Mortality in Australia and New Zealand	2004 (forthcoming)	Potentially avoidable mortality in Australia (maps for capital cities and Australia) & New Zealand (maps of District Health Boards); PDFs of atlas & data files on web
An Atlas of Potentially Avoidable Hospitalisations in Australia	2005 (forthcoming)	Potentially avoidable hospitalisations in Australia (maps for capital cities and Australia) & New Zealand (maps of District Health Boards); PDFs of atlas & data files on web

Table 1.- Social health atlases and associated publications, 1990 to 2005.

1. INTRODUCTION

Since 1990, the authors have been involved in the publication of a number of social health atlases and related publications (Table 1). The atlases describe, at a local (or 'small') area level, the distribution of socioeconomically disadvantaged groups, in South Australia and Australia, and the link between socioeconomic disadvantage and health status.

The aims of the first, South Australian, edition were for the atlas 'to be a source of information for health providers (eg specialist clinicians, community health service workers, general medical practitioners), managers of

health and welfare agencies, community groups, researchers, educators and students' (SAHC 1990).

The first edition of the national (Australian) atlas provided information on the distribution of key population groups, illnesses, causes of death and risk factors, and presented them in a way that highlighted the role of social and economic factors in relation to health and illness (Glover and Woollacott 1992). In keeping with a public policy approach, it sought to integrate information on health, education, welfare and housing, in a way that could enable more informed debates on resource allocation and policy and program directions, both within and beyond the health system. The second edition of the national atlas continued the theme of providing information with which to identify and address 'the linkages which exist between socioeconomic disadvantage and health status; the implications of these patterns and linkages for the provision of appropriate health services, in particular health services which address inequalities in health outcomes; and to broaden the use and understanding of data on health status and health outcomes beyond the health system into areas where decisions are made which impact on the health of the population' (Glover et al. 1999). This second edition also drew attention to variations in the patterns of distribution of the socioeconomic and health status profiles of the population over the period between the two editions. This theme of monitoring the health divide has been a major focus of later versions.

The importance of socioeconomic factors in driving health outcomes and health service use was further highlighted in an analysis, by

the South Australian Centre for Economic Studies, of data collected for Adelaide in the first edition of the atlas (CSAES 1993). The findings of this work: 'suggest that socio-economic status is a clearly definable and highly significant cause of the variation in the health status of geographic areas. Second, they suggest that this general status information flows through to actual services demanded. Third, they illustrate that, when it comes to demand for services, broader socio-economic variables are even more significant than when looking at specific health outcomes' (CSAES 1993). In particular, they found that socioeconomic disadvantage explains 34% of the variation in male deaths (deaths at ages 0 to 64 years) between geographic areas, and at least 14% for female deaths; and the link between socioeconomic disadvantage and hospital admissions was even stronger, with almost half (47%) of the variation in admissions between geographic areas explained by socioeconomic disadvantage. These results provide powerful evidence for addressing social inequality.

2. BACKGROUND

The immediate impetus for the production of the social health atlas came from publication of A Social Health Strategy for South Australia (SAHC 1988). The report outlined two main elements of the social health strategy: a 'public policy approach' to health, through 'the deliberate use of public resources, across all government agencies, to maximise good health in the community'; and a strengthening and coordinating of primary health care services in South Australia. This (public policy) approach recognises the need to coordinate

the development and implementation of a wide range of public policies on housing, education, technology, agriculture etc. (not just health policy) for the maximum positive effect on the health of the South Australian public, particularly disadvantaged groups such as the unemployed and Aboriginal people.

Information was seen as having an important part in this strategy: 'Improving policy decision-making, shifting the emphasis from treatment services to illness prevention and health promotion and effective planning for services ... all require information regarding the socioeconomic and health status profile of the population and how these are likely to change over time'. P. 31

The particular approach chosen to providing information was through mapping the indicators, in reports described as 'social health atlases'. As the proverb 'Every picture tells a story' attests, visual images can convey information in a powerful way: this has been our experience with the atlases. Care was taken to write the supporting text in a way that would make the description of the map as accessible as possible to a wide audience, while maintaining appropriate technical standards.

The first, South Australian, atlas was generally well received, not the least because it was launched in a setting where there was a good understanding of a primary health care approach which the atlas, with its local level data, was able to inform. This is not to say that it was universally accepted, with the 'social view of health' concept not accepted by many in the bureaucracy: Raftery (forth-

coming) contends that this is still the case. In discussing the view that 'the population health approach may be of increasing significance to health researchers and practitioners, but the window of opportunity to translate it into a major policy change has not even begun to open in Australia' (Lewis and Leeder 2001, p.47; and cited in Raftery forthcoming), she cites the example of the Generational Health Review, a review of the South Australian health system commissioned by the South Australian government in 2002 and reporting in 2003. Of the Review, Raftery says:

Despite the fact that its aim was to deliver "a plan . . . that provides effective strategies for health system reform, which ensures that all South Australians enjoy the best possible health and have access to high standards of health care", the Generational Health Review failed to take seriously the social determinants and health inequalities research, the Acheson Report, or even, except in a token fashion, the information yielded by the social health atlas. (Raftery forthcoming)

As the data have been compiled over several years, it has been possible to track change, at different levels of socioeconomic status, in death rates, in the use of health services and in the incidence of major health risk factors. While the atlases do not provide the answer to addressing inequalities, they do allow for monitoring the gap in social inequality and health inequality, the health divide, between population groups, and to ascertain whether it is growing or shrinking.

3. METHODS
Data issues faced and their resolution

The majority of work in Australia describing the association between the health status, use of health services and socioeconomic status of the population uses an area-based measure of socioeconomic status. It is necessary to use a proxy measure (the socioeconomic status of the population in the area) because there is no specific measure in the major administrative health record collections (deaths, hospital admissions, cancer registries) of the socioeconomic status of the individual about whom the event is recorded. Such records almost always include an address of usual residence: in administrative collections undertaken by (or under the authority of) the Australian Bureau of Statistics (ABS), the area recorded is the Statistical Local Area (SLA). The SLA, which is largely based on local government areas[1], has been adopted by the ABS as one level in the statistical geography hierarchy under the Australian Standard Geographic Classification (ASGC: ABS 1998).

Coding data to SLA's often requires access to a full street address: administrative and survey collections by other agencies (including State and Territory health, welfare and education agencies) generally record the postcode[2], which is part of the address and does not require such additional coding. Both of these area levels have problems, as discussed below. The smallest area level in the ASGC, the Census Collection District (CD), is not used for health data collections.

The adoption of an area-based measure of socioeconomic status requires a number of assumptions, including that people who move do so between, or within, geographic areas of similar socioeconomic status; and that the (often relatively large) areas used in these analyses provide a reliable indication of the socioeconomic status and health service utilisation of the individuals in the area about whom the event is recorded. Glover et al. (2004) addressed both of these concerns in an analysis of admissions to hospitals in Western Australia over five years of residents of the State's capital city, Perth[3]. They found that postcode level and SLA level data provide a reliable indication of socioeconomic disadvantage of area. That is, the association between rates of total admissions and socioeconomic disadvantage of area evident at the smallest area level is also evident, albeit less strongly, in the higher level[4] area aggregates of postcode and SLA. The finding was similar for individuals admitted. They concluded that, given the widespread use in Australia of area based analyses at the pos-

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1   Areas not incorporated into a local government area are allocated an SLA code, ensuring all of Australia is covered by SLAs. As SLAs in the Australian Capital Territory and, in some cases in Queensland and the Northern Territory, are based on suburbs, an area too small for most analysis of this kind, suburbs have been aggregated to larger areal units.

2   Postcodes are Australia Post postal delivery areas.

3   The Western Australian hospital admissions database is the only one in Australia to include details for individuals.

4   Data for admissions and individuals admitted were coded to census enumeration districts, comprising approximately 200 dwellings and 700 persons.

tcode and SLA level, it is important to know that such analyses can provide a reliable indication of the direction and underlying strength of association of socioeconomic disadvantage at the local area level.

The particular composite measure of disadvantage used in these analyses, the Index or Relative Socio-Economic Disadvantage (IRSD), is one of the Socio-Economic Indexes for Areas calculated by the ABS following each Population Census since 1986. The IRSD is produced using principal component analysis, with the index measuring what is common to the component variables. The 2001 IRSD includes all variables from the Census that either reflect or measure disadvantage. It was produced at the CD level and was then calculated for SLAs by weighting the CD scores by their population. To enable easy recognition of high and low scores, the CD index scores have been standardised to have a mean of 1000 and a standard deviation of 100 across all CDs in Australia. In practice, this means that around 95% of index scores are between 800 and 1,200 (ABS 2003).

The areas for which socioeconomic status and health status data are most frequently available in Australia are the SLA and Australia Post postcode areas. A fundamental problem with the use of the SLA as a unit for presentation of data is that as local government authorities change boundaries (for example, as a result of amalgamation with another authority), so the area changes and the ABS adjusts its classification. These changes can be complex, with sections of a new SLA being spread across two or more preceding SLAs, often making it difficult to produce historical data for the new area, or to aggregate data over time to increase the number of events, as described below.

Postcode areas are not collected by ABS at the Census, despite their almost universal use as an area identifier by non-ABS agencies and individuals who collect data. As the ABS regard the postcode as an 'impure' area, and not part of the hierarchy of Australia's statistical geography, they estimate postcode populations at the Census by allocating whole CDs to a single postcode, where that postcode appears, from maps, to contain most of the population of the CD. The ABS describe this area as a 'Postal Area', to differentiate it from Australia Post postcode areas. There are a number of issues, including that in rural and peri-urban areas some CDs are larger than postcodes, resulting in there being fewer census Postal Areas than postcodes. This is not to deny that postcode areas are not without problems. For example, postcode areas do not conform well to other administrative boundaries. The postcode area given in a hospital admission record may not be the postcode of usual residence: this is particularly likely in peri-urban or rural areas, where the postal address may be a post box in a nearby town. And in rural areas, postcodes may not cover contiguous areas, with the mail delivered along a route that by-passes larger towns with their own postcode.

Thus, there is no standard area, at the national level, of a size useful for the presentation of data for policy and planning purposes, that can be held constant over time (even for relatively short periods). In fact, there are substantial variations between SLAs, both in physical size (area) and population. For

example, areas vary from 1.1 square kilometres in the SLA of Peppermint Grove (in Perth, the capital of Western Australia, with a population of 1,544) to 670,376 square kilometres in Unincorporated Far North (in South Australia, with a population of 5,926, 41.4% of whom are Aboriginal people). There are similar variations in the populations of SLAs, from 143 people in Unincorporated Riverland (in South Australia, with an area of 11,520 square kilometres) to 181,936 in Fairfield (in Sydney, the capital of New South Wales, with an area of 101.6 square kilometres). Our practice has been to map individual areas with sufficient population or events (eg. at least five deaths in the area, at least 100 people resident in the area). This has been achieved by grouping areas to larger area aggregates, or by aggregating datasets over a number of years (eg four or five years for deaths, two or three years for hospital admissions). Despite the remaining variations in size of SLA's, distinct and consistent patterns of socioeconomic status and health status are evident, both visually, in the maps, and statistically, in the correlation analysis[5].

The characteristics of areas can also influence socioeconomic status and health. In addressing the question 'Do individual or area characteristics matter?', Joshi et al. (2001) respond 'Both do'. They conclude their further discussion on this question as follows: 'Our finding that there are spatial dimensions to these disadvantages further suggests that area-based initiatives need not be futile. But they will not be a panacea, if individual inequality is neglected.' This is a neglected area of analysis in Australia: however, the atlases have shown that disadvantaged groups, whether they live in industrial, suburban, country towns or rural areas, have poorer health outcomes than those better off.

Another area-specific issue is that the location in an area of a concentration of an institutionalised population can adversely affect the distribution of events. For example, areas with above average rates of nursing home beds or hostel places for the elderly can impact markedly on the area's death rate: this is particular problem in Australia where nursing homes and hostels have historically been located in areas that have more recently become areas of higher socioeconomic status through gentrification. As the 'place of death' field[6] is rarely completed in death registrations in Australia, the main approach taken to avoid this problem has been to limit deaths to those that are clearly premature, eg. occurring before age 65, when the deaths are more likely to be of people living in their own home, rather than in institutional accommodation which may well be in an area of different socioeconomic status. It is acknowledged, however, that this does not completely eliminate the problem.

Another limitation of the majority of Australian health-related datasets is that they record events (eg., hospital inpatient admissions, services by general medical practitioners),

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5   Variation in population in areas is to some extent ameliorated by presenting the data as percentages or rates (indirectly age standardised, where appropriate). Experience has shown that weighting the correlations by population size has little impact on the results of the correlation analysis.

6   Allows for the separate of identification of deaths in institutions (eg. nursing homes, hostels) as distinct from those in a private dwelling.

rather than individuals[7]. Thus, it is unclear whether a higher rate of, for example, admission to hospital in area A compared with area B reflects that more individuals from area A were admitted, or on average they had more admissions per person, or some combination of these (which is what we have found from the study of the Western Australian data, noted above - see Glover et al. 2004).

Australia's Indigenous population, Aboriginal and Torres Strait Islander people, comprises just 2.2% of the population, but their particular geographic distribution, socioeconomic status and health status means that their influence on many indicators at the area level is substantial. For example, although only 1.1% of Australia's population lives in the most remote areas, 18.9% of the Indigenous population live there. Including the next level of remoteness increases the proportions to 3.0% and 28.0%, respectively. The extent to which any map of rural Australia, by remoteness, is a map of the distribution of the Indigenous population is exacerbated by their under-identification in the five-yearly Population Census, in most administrative collections and in death registrations.

4. STATISTICAL ANALYSIS

Data are presented as proportions or as indirectly age standardised ratios: statistical significance is not shown, but is commented on in the text, and full details are included in the supporting data. A correlation analysis of all variables for which data are mapped is included in each edition and a number of the editions have included a cluster analysis, producing clusters of SLAs for socioeconomic status variables, health status variables and health service use variables.

5. TECHNICAL PRODUCTION

The first atlas was prepared for publication on an Apple Macintosh, with areas infilled manually, film produced (separate film for each colour) and checked, and plates made for printing. The first Australian and second South Australian atlases were produced on PC, and prepared for publication with text in MS Word files and maps in CorelDRAW! files[8] printed to film and combined at the publishing house. Recent issues (since the second edition of the Australian atlas) were set up MS Word (text, tables, graphs and maps[9], with maps inserted, from files, as pictures), PDFs produced and e-mailed to the publisher who edited the PDFs using Encore PitStop Professional plug-in for Adobe, to check that shades of the colour are consistent between the maps and graphs, to change grey shades (indicating area not mapped) to a pattern, to enable these areas to be identified separately from the infill shades when photocopying.

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7   The linkage of health records has only been undertaken for any number of years by one jurisdiction (Western Australia), although others have started doing so in the past few years.

8   Maps were produced in ATLAS*GIS, area infills were converted to shades of a colour in Micrografx Designer and exported to CorelDRAW!, where text was added and output produced for the printer.

9   The maps were produced using an in-house mapping package, HealthMap.

6. MAJOR DEVELOPMENTS BETWEEN EDITIONS

Table 1 includes brief details of each version, with a comment on the major changes between versions and editions. The first South Australian edition comprised separate maps by postcode or SLA for the capital city (Adelaide, a city of 1 million people) and by SLA or region for the non-metropolitan areas (population of 400,000 people). Of interest was a map of the factories, foundries, an oil refinery and other premises in Adelaide being monitored under the State's Clean Air Act. Each of the facilities was located using a hand-held GPS receiver. They were then located on a map and symbols added to show the existence of particulate matter (dust) of nuisance value only; hazardous particulates; hazardous gas; odour; none of the above. The levels of total suspended particulate matter and total suspended lead by monitoring site in Adelaide and Port Pirie, the site of a lead smelter north of Adelaide, were also mapped. While no attempt was made to correlate these data with the other data in the atlas, the publication of the information was seen as important. Unfortunately these data have not been available for subsequent analysis, but recent initiatives could see similar data becoming available in the near future.

The first Australian edition, in two volumes, mapped the cities with populations of 100,000 or more on a single (A3) page, and the whole of Australia on a following page (mapped by large, regional areas). The first volume comprised the Census and administrative health datasets (deaths, hospital admissions, services by general medical practitioners). A second volume included estimates at a regional level, drawn from national household surveys, on chronic illness conditions and associated risk factors (including overweight/obesity, smoking, unhealthy alcohol consumption) and disability and handicap. Estimates for some of these self-reported health conditions and risk factors have been included in subsequent editions, for smaller areas than the regional areas mapped in Volume 1: the estimates were produced by the Australian Bureau of Statistics, from national sample surveys of health and disability, utilising synthetic estimation techniques. An analysis (or modelling) of data for Australia (eg. from the National health Survey (NHS)) was undertaken to identify associations between the variables (ie. prevalence of chronic conditions) that we wished to predict at the small area level (SLA) and a range of variables that are available both from the NHS and at the local area level - socioeconomic status, use of health services, immunisation rates. The model is limited to identifying associations between the area level data (the predictors) and the variables we want to predict. For example, such associations might be between the number of people reporting specified chronic conditions in the NHS and the number of hospital admissions (in total, to public and to private hospitals, by age, sex and diagnosis); or of visits to a general medical practitioner. The results of the modelling exercise are then applied to the SLA counts of the predictors. The prediction is, effectively, the likely value for a typical area with those characteristics. This modelling technique can be considered as a sophisticated pro-rating of Australian level characteristics to SLA's (Glover et al. 1999b).

The second Australian edition comprised separate volumes for each of the six States and two Territories (maps by SLA, or groups of SLAs for very small SLAs), and Australia (mapped at a regional level). This edition saw the introduction of the first remoteness classification developed for Australia (DHAC 2001), the Accessibility/Remoteness Index for Australia (ARIA), based on road distance to service centres (towns) of various sizes. All of the

Topic and indicator	Reference period	
	Current	Previous
Demography		
Age groups: 0 to 4 years; 5 to 14 years; 15 to 24 years; 65 years and over	2001	1991
Total Fertility Rate	2000-02	1990-92
Socioeconomic status		
Families: Single parent, low income, high income and jobless families (2001 only)	2001	1991
Occupations: High status, low status	2001	1991
Labour force: total participation, female participation, unemployment	2001	1991
Education: School participation at age 16; secondary education completion	2001	1991
Aboriginal and Torres Strait Islander people	2001	1991
People born in NESB countries: resident for 5 years+, <5yrs, proficiency in English	2001	1991
Dwellings rented from the State Housing Authority; Dwellings with no motor vehicle	2001	1991
Internet use at home	2001	..
Summary measure of disadvantage: Index of Relative Socio-Economic Disadvantage	2001	1991
Income support payments		
Age, Disability, sole parents; Unemployment; Children in welfare-dependent families	2001	1989
Health status		
Life expectancy	1999-01	..
Burden of disease – HALE, YLL, YLD, DALY	1999-01	..
Self-report: Fair/poor health*; Prevalence of chronic conditions and risk factors*	2001	1995
Infant deaths; Deaths of males, females aged 15 to 64 years	1999-02	1985-89
Potentially avoidable mortality	1997-01	..
Cancer incidence: all cancers, by sex; lung cancer; breast cancer (female); colon/skin	1998-02	1986-93
Perinatal risk analysis; Low birthweight babies, Smoking in pregnancy	2000-02	1981-86
Child abuse and neglect – substantiated cases	2000-02	1996-99
Immunisation	2002	1998
Use of services		
Admissions to hospital – public/ private hospitals; males, females; procedures	2000-01	1990-92
Potentially avoidable hospitalisations	2001-02	..
Booking lists (elective surgery waiting lists in major public hospitals)	2003	1992
Non-admitted patients – Emergency Department services, Outpatient services	2004	..
Services by general medical practitioners – males, females	2001-02	1981
Community health and mental health services; services delivered in the home	2003	1994
Terminations of pregnancy	2002	1990-92

*Synthetic estimates
.. not available
Note: Contents are for printed version. Additional datasets to those listed above will be made available on the Internet, including a wide range of causes of death and of principal diagnoses and principal procedures for hospital admissions.

Table 2.- Contents of Third Edition, A Social Health Atlas of South Australia.

data variables were calculated for the five ARIA classes (Highly Accessible, Accessible. Moderately Accessible, Remote and Very Remote) and presented in a graph. The data were also calculated for socioeconomic groupings of areas (using the IRSD to rank the areas), with each group (quintile) comprising approximately 20% of the population in the applicable age/sex group for the indicator. These charts were produced for all of the health status and health service use variables, and compared data from the first and second editions, with a rate ratio highlighting both the differential in the rates between Quintile 1 areas (the most well-off areas) and Quintile 5 areas (the most disadvantaged areas) and the relative movement in the indicator over time.

The forthcoming, third, edition of the Social Health Atlas of South Australia will incorporate information on population health screening (breast cancer and cervical cancer), as well as maps of the distribution of deaths from causes, and admissions to hospital from conditions, adjudged as 'potentially' avoidable (these concepts will also be the subject of separate publications). This third edition will add to the already extensive coverage, in earlier versions, of community-based services: these include services provided through community health centres (including community mental health), in the home to the elderly and disabled, and in hospital emergency departments and outpatient departments. The topics and indicators to be included in the third edition of the South Australian atlas are listed in Table 2.

7. FINDINGS

The following maps, charts and Table 3 are included as examples of the approach and type of data presented in the atlases, and the insights they offer into the geographc distribution of social inequality and health inequality.

The map of the summary measure of disadvantage, the IRSD (Figure 1), paints a picture of Adelaide that is common to almost all maps of socioeconomic status across this city, as well as to the majority of indicators of health status and health service use: note that scores below 1000 denote greater relative disadvantage than in the State as a whole and those above 1000 denote greater advantage. Socioeconomic disadvantage, poor health status and high service use are common features in Adelaide's north-western, outer northern and outer southern suburbs. In contrast, low rates apply across the eastern and south-eastern suburbs, and in many beachside suburbs (in the west). The IRSD map for Australia (Figure 2, with the base of 1000 being for Australia) highlights the variation in physical size of SLAs and the relatively greater disadvantage of people in rural and remote areas: the graph of the IRSD by the ASGC remoteness classification gives added emphasis to this view. The lower index scores in the more remote areas in large part reflect the location of the Indigenous population, the most disadvantaged population group in Australia.
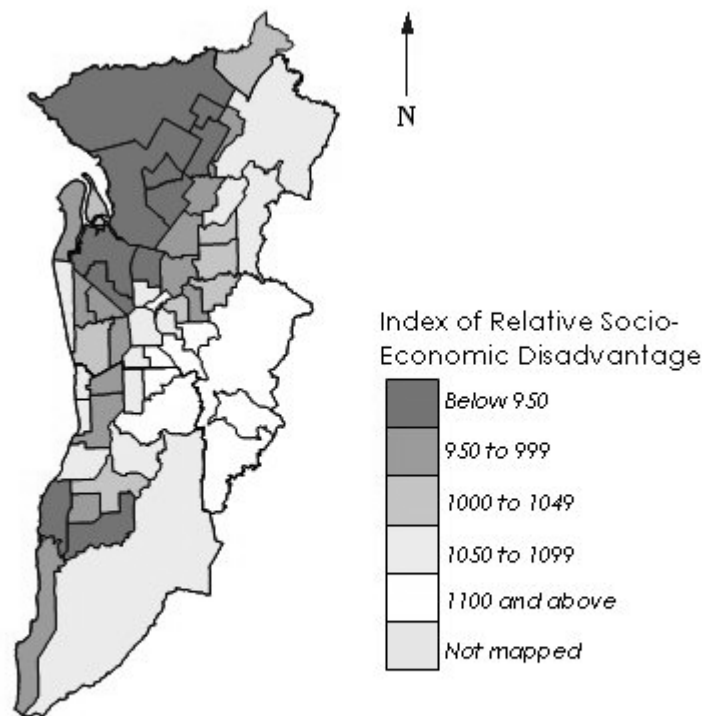
Deaths before age 65 years are, clearly, premature. The geographic pattern of age standardised death rates before age 65 years closely follows the distribution of the socioe-

conomically disadvantaged population (Figure 1). A correlation analysis supports the existence of this association, with a correlation between this variable and the IRSD of -0.63 (an inverse association, because low IRSD scores indicate greater relative disadvantage).

The ABS report that how people rate their health is strongly related to their illness experience (ABS 1997). This is consistent with the finding by McCallum et al. (1994) that people rate their health as poor on the objective basis of illness and disability. The spatial distribution in Adelaide of people who report their health status as 'fair' or 'poor' (rather than 'excellent', 'very good', or 'good')[10] is, therefo-

re an important indicator of health outcomes (Figure 4). As seen for premature male deaths, this distribution also bears striking similarities to the distribution of the socioeconomically disadvantaged population (Figure 1). The correlation coefficient between this variable and the IRSD is -0.95.

The importance of a healthy start to life is recognised as a marker of health and well-being in later life (Keating and Hertzman 1999). In the late 1980s, a measure of pregnancy outcome was developed to describe the spatial distribution of births at risk of adverse pregnancy outcomes (Epidemiology Branch 1988). The 17 factors (a mix of risk factors and adverse outcomes) which had been

Index of Relative Socio-Economic Disadvantage

Below 950
950 to 999
1000 to 1049
1050 to 1099
1100 and above
Not mapped

Note: Adelaide is a city of 1.1 million people: the 53 Statistical Local Areas shown here are repeated in Figures 3 and 4

Figure 1.- Index of Relative Socio-Economic Disadvantage, Adelaide, 2001

10   These data were synthetically estimated from responses to the ABS 1995 National Health Survey.
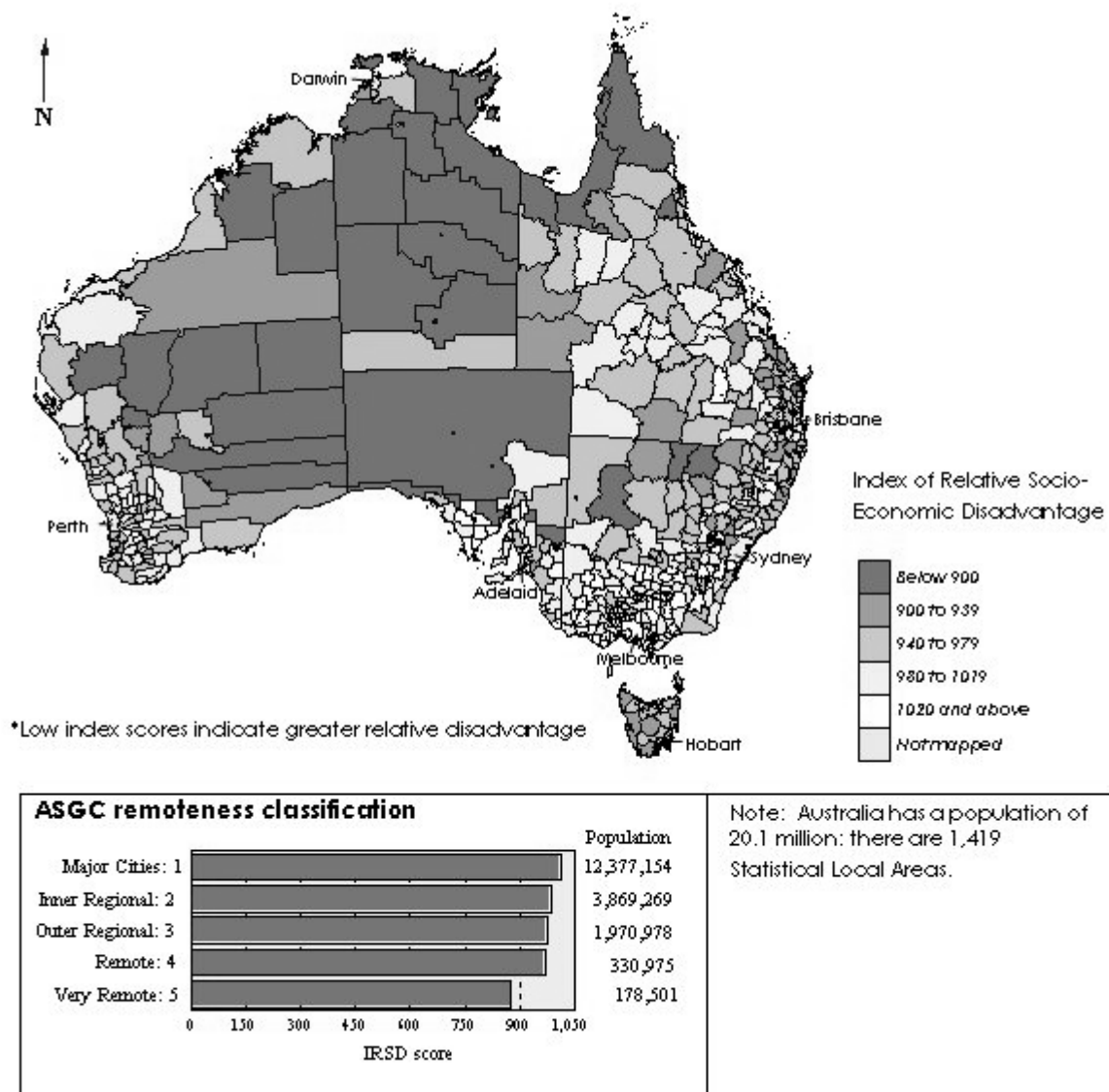
Figure 2.- Index of Relative Socio-Economic Disadvantage, 2001

identified, in earlier studies of births, as those most predictive of adverse perinatal outcomes, included a previous history of perinatal death, low birthweight, few antenatal visits and Aboriginal race. A summary risk score was calculated for each postcode by examining the frequency with which an increase over the South Australian average was recorded on individual factors (eg. percentage of mothers with previous still births). Areas were considered to be most at risk if elevations were recorded in 10 or more of the 17 possible factors: these areas are shown in Figure 5 as 'high risk'. The analysis has been repeated on two occasions, providing a striking example both of the spatial distribution of this important health outcome and of the increasing spatial concentration of poor health outcomes over time. For example, the pattern of distribution in both of the maps is consistent with the overall socioeconomic pattern in Adelaide (Figure 1). While, over time, there is
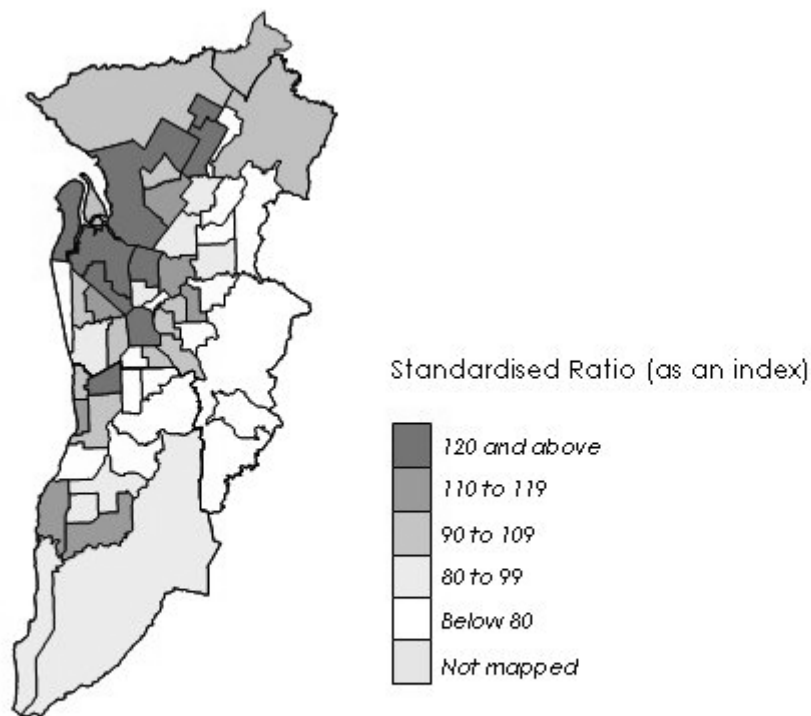
*Deaths of males aged 0 to 64 years: expected numbers were derived by indirect age-sex standardisation, based on South Australian totals

Figure 3.- Premature male deaths*, Adelaide, 1999-2002
Standardised ratio: number of deaths in each area compared with the number expected*

some change in the 'at risk' areas, more notable is the concentration of these poor outcomes into fewer areas.

This change is consistent with the data presented in the chart (Figure 6), which show that while there have been improvements in death rates for women and from injuries and poisonings in Australia, and from lung cancer in Adelaide, the gap between the most disadvantaged 20% and the most well-off 20% of the population has increased. In the case of deaths from lung cancer, the increase was from just over one and a half times higher (1.52 times) in 1985-89, to more than double (2.23 times) in 1997-99; for injuries and poisonings it was from 1.44 to 1.77 and for female deaths it was from 1.29 to 1.51. For infant

deaths, the improvement across all capital cities has been most marked in the most disadvantaged areas, resulting in a reduction in the differential in rates, from 1.54 times higher in the most disadvantaged areas in 1985-89 to 1.43 times higher in 1997-99. This is a notable reduction, although the remaining differential (of 43 per cent) is still substantial.

Underlying much of this growing divide are the substantial changes in the social context in which the Australian population lives, changes which have often exacerbated the social divide in Australia. As in many developed countries, some of the most marked changes have been an increase in the number of sole parent families (especially those where the family head is female), families in which no
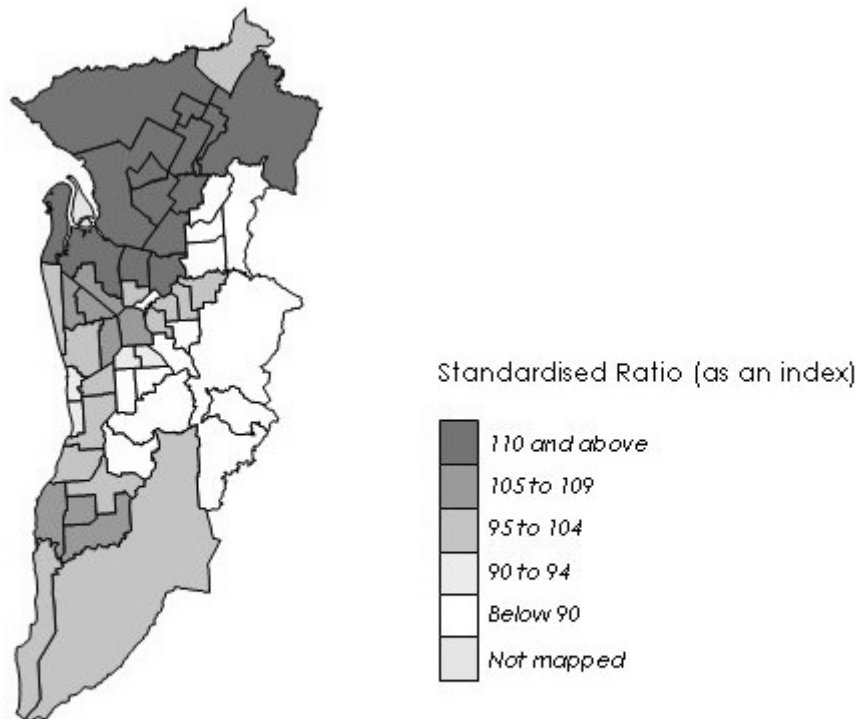
Standardised Ratio (as an index)

- 110 and above
- 105 to 109
- 95 to 104
- 90 to 94
- Below 90
- Not mapped

*Expected numbers were derived by indirect age-sex standardisation, based on South Australian totals

Figure 4.- Health status reported as fair or poor, Adelaide, 1995
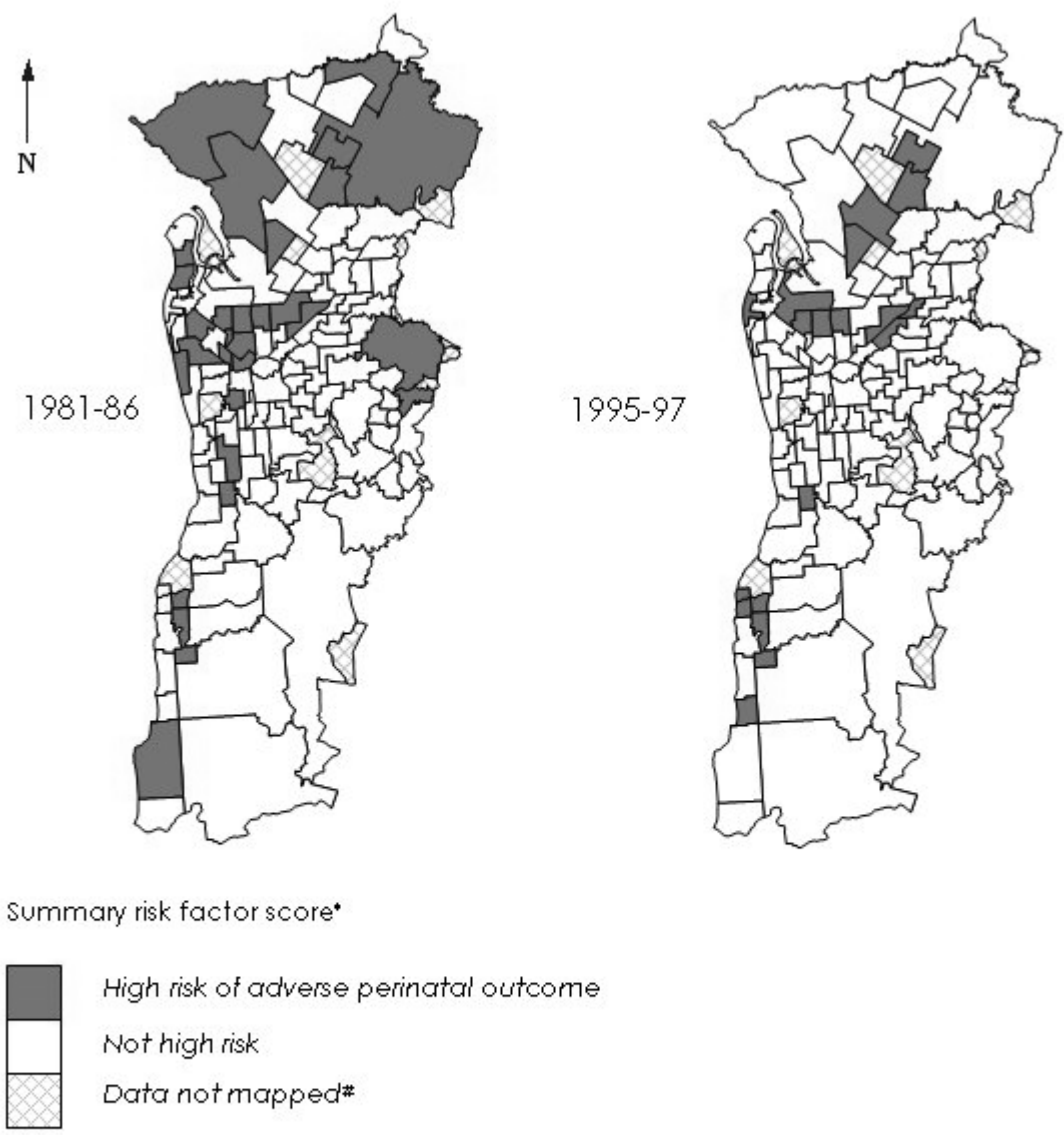*Standardised ratio: number of deaths in each area compared with the number expected**

parent has a job and people on a disability support pension (rather than an unemployment benefit, which would more truly reflect their labour force status); an increase in female labour force participation (with two income families also increasing); and a decline in the proportion of the workforce in the occupational groupings of unskilled and semi-skilled workers, at the same time as there has been a dramatic increase in the occupations of managers and administrators, and professionals.

8. CONCLUSION

The information in the atlases adds to a convincing body of evidence built up over a number of years in Australia as to the striking disparities in health that exist between groups in the population. People of low socioeconomic status (those who are relatively socially or economically deprived) experience worse health than those of higher socioeconomic status for almost every major cause of mortality and morbidity.

In addition, by presenting data for groups of areas of similar socioeconomic status, the atlases demonstrate that significant health inequalities exist not just between the most and least advantaged groups, but are evident at each of the intervening levels of socioeconomic status as well. In other words, a social gradient of health exists in Australia, as it does elsewhere in the world (Raftery forthcoming). Raftery also notes that:
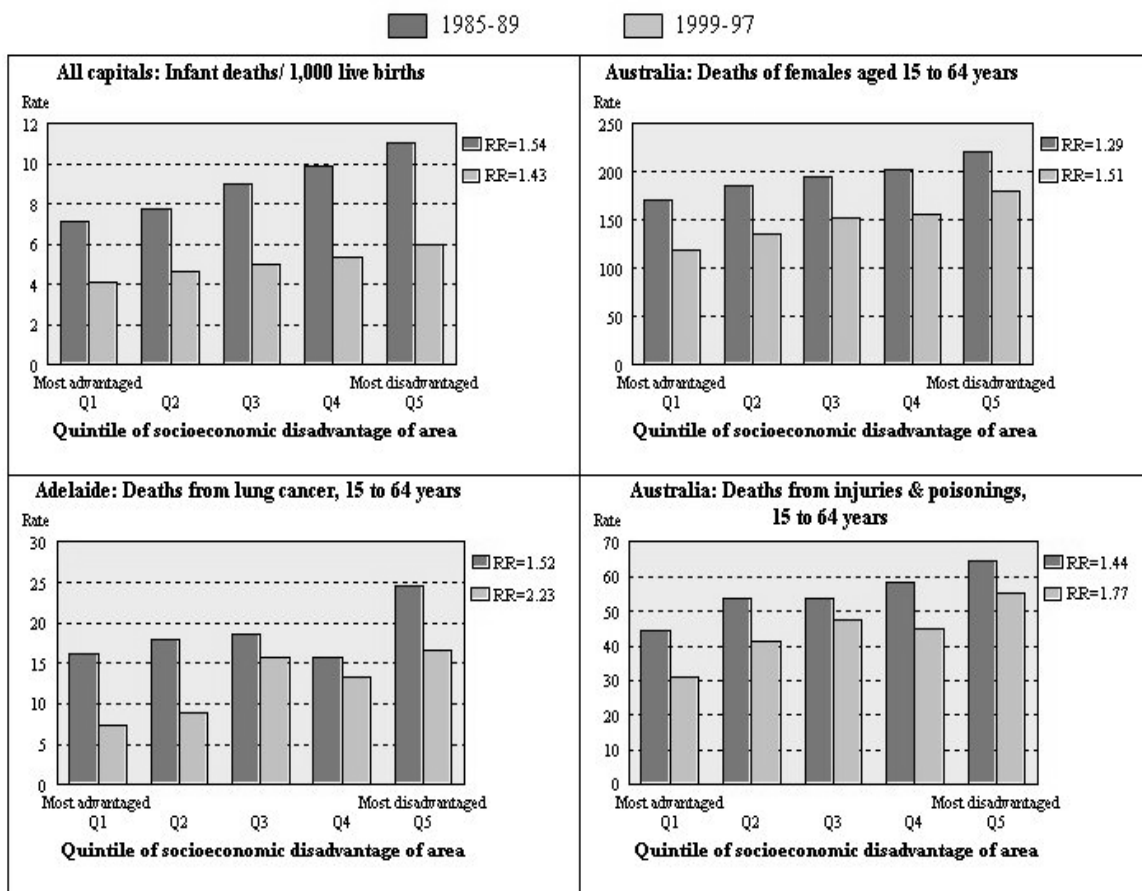
Summary risk factor score*

High risk of adverse perinatal outcome

Not high risk

Data not mapped#

* See text for details of risk factors and calculation of risk factor scores

Data were not mapped because either the population of the postcode is less than 100 or only a small part of the postcode is located in Adelaide.

Figure 5.- Risk of poor perinatal outcome, Adelaide

Figure 6.- Health status by socioeconomic disadvantage of area and change over time.

The unique contribution of A Social Health Atlas of Australia to this understanding is to demonstrate the existence of this gradient graphically, in relation to a large number of socioeconomic status variables and measures of health and illness, and to map it at the local level across the whole nation (Raftery forthcoming).

In an evaluation of the second edition of the national atlas, a number of informants called for the atlas to become a permanent feature of Australia's public health information infrastructure. They argued that Australia has a paucity of time series data for monitoring long term trends in health status and health service use and see that the atlas has a key role to play in this regard. In addition, some informants pointed out that the atlas's analysis of the social determinants of health and the distribution of health and illness is becoming more important in the context of an increased emphasis on whole of government planning. At the federal, state and local government levels, public policy is being driven by an increased understanding that social and health disadvantage is place-related. Some stakeholders saw the Social Health

Atlas as an important analytical tool in supporting this sharper focus on sub-regional or small area ('place') planning and service integration.

The atlases constitute a challenge for policy makers, health practitioners and governments to find ways to address the inequities which they have identified. Hetzel et al. have argued that there is a growing body of knowledge that will help to provide direction for developing policies to reduce these inequities; and further contend that the socioeconomic environment is a powerful and potentially modifiable factor, and public policy is a key instrument to improve this environment (Hetzel et al. 2004). We have much evidence of inequalities, and a range of mechanisms for addressing them: what is needed is action in these areas while research continues to further clarify the pathways from social inequality to health inequality. The atlases have a continuing role, in describing and monitoring the success of these actions.

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