8 Statistical analysis

Introduction

Two sets of analyses have been undertaken to illustrate the extent of association between areas with low socioeconomic status and poor health. Correlation coefficients have been produced to indicate interdependence between the measures of socioeconomic status, health status and use of health services. Cluster analysis has been undertaken to indicate the extent to which areas display significantly similar characteristics from among the chosen measures of socioeconomic status, health status and use of health services.

Inequalities in health have traditionally been indicated by an approximation to social class, frequently based on a categorisation of occupations. The other major indicators traditionally used have included income, education, ethnicity and employment status (which allows for the inclusion of unemployed people and those not in the labour force). The measures of socioeconomic status included in this analysis include income, education, occupation, labour force status and Aboriginality.

Correlation analysis

Description

Correlation is the degree to which one variable is statistically associated with another. The correlation coefficient is a measure of the strength of this association. When high values for one variable are matched by high values for the other (or when low values are matched by low values), then they are positively correlated. Where the interdependence is inverse (ie. high values for one are matched by low values for the other), the two variables are negatively correlated.

Methods

The Pearson product-moment correlation (r) has been used in this analysis to indicate the degree of correlation between pairs of variables. Pearson correlation coefficients range from +1 (complete positive correlation) through 0 (complete lack of correlation) to –1 (complete negative correlation). As a general rule, correlations of plus or minus 0.5 or above are considered to be of meaningful statistical significance. Correlations of plus or minus 0.71 or above are of substantial statistical significance, because this higher value represents at least 50 per cent shared variation (r^2 greater than or equal to 0.5).

Correlation coefficients were calculated by comparing the value (expressed as a percentage, or as a standardised ratio) for each variable in each SLA with the value of each of the other variables. Correlation coefficients are generally referred to as being, for example, 'a correlation of low income families with the *paired* variable of hospital admissions of females'. However, to promote ease of reading where many correlation coefficients are quoted in the text, the word 'paired' has been omitted. For similar reasons the symbol used to indicate a correlation coefficient (r) has been omitted.

Two measures of socioeconomic status included in the analysis in this section have not been mapped. They are families receiving an income of $52,000 or more per annum and people in occupations classified as 'Managers and administrators' and 'Professionals'. These two measures were included as they indicate high socioeconomic status, in contrast to most other measures, which were chosen because they indicate low socioeconomic status.

The results of the correlation analysis, which was undertaken separately for **Brisbane** and the rest of the State, are shown in the following tables: coefficients of from 0.5 to 0.7 and from 0.71 to 1 (both positive and negative) are highlighted in the tables, and are referred to in the individual map commentaries, as appropriate. The analysis was not undertaken for **Gold Coast-Tweed Heads** or **Townsville-Thuringowa**, as both of these major urban centres had too few SLAs for the analysis to be valid.

When discussing the results of the correlation analysis in the text, mention is often made of 'the indicators of socioeconomic disadvantage'. This reference is to variables such as those for single parent families, unemployed people, Indigenous people and housing authority rented dwellings. References to 'high socioeconomic status' reflect the variables for high income families, female labour force participation and managers and administrators, and professionals.

The associations discussed in the text are, in general, limited to associations between the variable under discussion and the indicators of socioeconomic status from Chapter 3. This approach is largely a response to the limited space available for comment. The extent of any association with the other variables analysed can be ascertained from an examination of the correlation matrices (**Table 8.1** and **8.2**).

Results

Brisbane

There were correlations of significance at the small area level between the measures of socioeconomic disadvantage and a number of the health status variables. The strongest of these were with the variables for people reporting their health as fair or poor (as opposed to those reporting their health as being excellent, very good, or good) and the PCS (the physical component score, a measure of physical health) (**Table 8.1**). Similarly, strong associations were also evident in the correlation analysis with the health service use variables of GP services to females and admissions to a public hospital.

Non-metropolitan areas

SLAs in the non-metropolitan areas range in size from an estimated 6 square kilometres in Mooloolaba to 116,658 in Cook. They also range from sparsely populated rural and remote areas to large country towns. Despite these wide variations, the correlation analysis has been produced: the results are presented in **Table 8.2**.

It is clear from the matrix of correlation coefficients that there are fewer correlations of significance at the SLA level in the non-metropolitan areas of Queensland than was the case in **Brisbane**. This is, in part, a result of the number of areas with relatively small numbers of cases (population, deaths, hospital admissions, etc.) which reduces the strength of the analysis.

However a number of variables are highly correlated with each other: these are the variables for unemployed people, single parent families, Indigenous Australians, people born in non-English speaking countries, people with poor proficiency in English and dwellings without a motor vehicle.

Various sub-sets of these are correlated with measures of health status and use of health services. The strongest correlations with the measures of socioeconomic disadvantage were with the variables for people reporting their health as fair or poor, and the PCS. Although generally weaker, there was a consistent pattern between socioeconomic disadvantage and the variables for hospital admissions of males and females; and hospital admissions from circulatory and respiratory system diseases.

For the Indigenous population, there were correlations of substantial significance at the SLA level with the variable for years of potential life lost (a summary measure of premature death), single parent families, dwellings without a motor vehicle and admissions for respiratory system diseases.

Table 8.1: Correlation matrix for small areas in Brisbane

Refer to file: ch8 correlation matrices

Table 8.1: Correlation matrix for small areas in Brisbane ...*cont*

Refer to file: ch8 correlation matrices

Table 8.2: Correlation matrix for SLAs in non-metropolitan areas of Queensland

Refer to file: ch8 correlation matrices

Table 8.2: Correlation matrix for SLAs in non-metropolitan areas of Queensland ...*cont*

Refer to file: ch8 correlation matrices

Cluster analysis

Description

The intention of the cluster analysis is to produce summary measures of socioeconomic status, health status and health service use at the SLA or other small area level. It is useful to have this information, as the SLA is an important administrative and planning unit for much of the State. However, the production of clusters at this level is problematic, as SLAs are often large, heterogeneous areas, and their average values sometimes disguise a wide range of sub-area variation in the values of the population characteristics under analysis.

It should also be noted that cluster analysis is an exploratory technique and, as with all such techniques, the real test of a solution is whether it makes any sense. Decisions as to the variables to be used, or the number of clusters in a solution, all impact on the final result.

The results of the cluster analysis, therefore, represent indicative groupings of areas with broadly similar characteristics among the variables analysed in each set. They will be a useful tool for some purposes: on other occasions, however, the individual variables on which they are based may also be relevant.

Methods

Cluster analysis (using the squared Euclidean measure) was undertaken by the Ward's method. This (hierarchic) clustering method seeks to partition a set of objects (eg. postcodes or, in this case, SLAs) into a set of non-overlapping groups so as to maximise some external criterion of 'goodness of clustering', typically the extent to which the within-cluster inter-object similarities are maximised and the between-cluster similarities minimised.

In cluster analysis, 10 records (ie. SLAs, or other small areas) per variable is considered desirable, with an absolute minimum of five. Had all the datasets been used in the analysis there would have been many fewer than this. A variety of techniques was used to attempt to overcome this problem, including applying a factor analysis or undertaking an experimental fit of the full data set, and using the results to reduce the number of variables included in the final analysis.

Table 8.3 lists the variables used in the analysis. The analysis was undertaken separately for the major urban centres and the rest of the State. The datasets used in the cluster analysis (based on boundaries in existence from 1991 to 1997) were aggregated to a common set of boundaries (1996). Where the areas differ from the 1996 boundaries, the variations are noted in the text.

Table 8.3: Variables used in cluster analysis

Socioeconomic status
- % single parent families
- % low income families
- % unskilled or semi-skilled workers
- % unemployed
- % female labour force participation
- People who left school at age 15 or earlier, or who did not attend school (Standardised Ratio)
- % Aboriginal & Torres Strait Islander people
- % Housing authority rented dwellings
- % Dwellings without a motor vehicle

Health status
- ***Self-reported health status***
- ***Physical Component Summary score [SF-36]***
- ***Disability and handicap status*** (Standardised Ratio)
  - with a disability
  - with a handicap
- ***Deaths*** (Standardised Death Ratio)
- Infant deaths
- Deaths
  - of males aged 15-64 years, from all causes
  - of females aged 15-64 years, from all causes
  - of persons aged 15-64 years
    - from cancer
    - from circulatory system diseases
    - from respiratory system diseases
    - from accidents, poisonings & violence
  - of persons aged 15-24 years
    - from accidents, poisonings & violence
- Years of potential life lost as a result of deaths at ages 15-64 years
- ***Total Fertility Rate***

Utilisation of health services
- ***Hospital admissions*** (Standardised Admission Ratio)
  - to public acute hospitals
  - to private acute & private psychiatric hospitals
  - to public acute & private hospitals, admissions
    - total
    - of males
    - of females
    - for infectious diseases
    - for all cancers
    - for lung cancer
    - for breast cancer for women aged 40 years or more
    - for psychoses
    - for neuroses
    - for circulatory system diseases
    - for ischaemic heart disease
    - for respiratory system diseases
    - for respiratory system diseases in 0 to 4 year old children
    - for bronchitis, emphysema & asthma
    - from accidents, poisonings and violence
    - for all surgical procedures
    - for all surgical procedures as same day admission
    - for tonsillectomy and/or adenoidectomy
    - for myringotomy in children aged 0-9 years
    - for Caesarean sections in women aged 15-44 years
    - for hysterectomy in women aged 30 years and over
    - for hip replacements
    - for lens insertion in people aged 50 years or more
    - for endoscopy
- ***General medical practitioner services*** (Standardised Ratio)
  - for males
  - for females
- ***Children fully immunised at 12 months***

Results

Socioeconomic clusters in the major urban centres

Variables considered for inclusion were those listed in **Table 8.3** under the heading *Socioeconomic status*. The ABS Index of Relative Socio-Economic Disadvantage (IRSD) was also used in the analysis, as an independent check on the solution.

Although a number of other variables were available for analysis, previous experience (Glover, 1996) has shown that the inclusion of variables regarding non-English speaking background is not beneficial to the analysis. The congregation of persons of the same ethnic group does not necessarily indicate a pocket of disadvantage. Although on average we may expect these variables to also show higher levels in disadvantaged areas, their inclusion in the cluster analyses does not assist in the search for viable and sensible solutions.

Table 8.4: Composition of small area clusters in Brisbane

SLA	Socioeconomic status	Health status	Health service utilisation	Social health[1]
Albany Creek	High	Good	Low	High
Albion	High	Medium	Low	High
Algester/Parkinson-Drewvale	High	Good	Medium	High
Annerley/Fairfield	High	Medium	Medium	Medium
Anstead/Bellbowrie/Moggill	High	Good	Low	High
Archerfield/Coopers Plains	Medium	Medium	High	Medium
Ascot/Hamilton	High	Medium	Low	High
Ashgrove/The Gap	High	Good	Low	High
Bald Hills	Medium	Good	High	High
Balmoral/Bulimba/Hawthorne	High	Medium	Medium	High
Bardon	High	Good	Low	High
Birkdale/Ormiston	Medium	Good	Medium	High
Bracken Ridge/Sandgate	Medium	Medium	Medium	Medium
Bray Park	Medium	Good	High	High
Bridgeman Downs/Boondall	High	Good	Medium	High
Browns Plains	Medium	Good	Medium	High
Burbank/Belmont-Mackenzie	High	Good	Medium	High
Caboolture Part A	Medium	Medium	High	Medium
Calamvale/Stretton	High	Good	Medium	High
Camp Hill/Carindale	High	Good	Medium	High
Cannon Hill/Morningside/Norman Park	High	Medium	Medium	Medium
Capalaba West	High	Good	Low	High
Capalaba/Redland Bay	Medium	Good	Medium	High
Chandler/Capalaba West	High	Good	Medium	High
Chelmer/Taringa	High	Good	Low	High
Chermside West/Chermside	High	Medium	Medium	Medium
City/Spring Hill	High	Poor	Not grouped	Medium
Clayfield/Hendra	High	Medium	Medium	High
Cleveland	High	Good	Low	High
Coorparoo	High	Medium	Medium	High
Darra-Sumner/Wacol	Low	Poor	High	Low
Dutton Park/Woolloongabba	High	Poor	High	Medium
E Brisbane/Kangaroo Point	High	Poor	Medium	Medium
Ferny Hills/Everton Hills	High	Good	Low	High
Gold Coast [Part A]	Medium	Medium	High	Medium
Graceville/Oxley	High	Medium	Low	High
Greenbank [Part A]/ Beaudesert	Medium	Good	Low	High
Greenbank [Part B]/Waterford West	Medium	Medium	High	Medium
Greenslopes	High	Medium	High	Medium
Gumdale/Ransome/Wakerley	Medium	Medium	Low	High
Hemmant-Lytton/Wynnum/Wynnum West	Medium	Medium	Medium	Medium
Herston/Newstead	High	Poor	Medium	Medium
Holland Park/Tarragindi	High	Good	Medium	High
Inala/Durack/Doolandella-Forest Lake/Ellen Groves/Richlands	Low	Poor	High	Low
Ipswich	Medium	Medium	High	Medium

Table 8.4: Composition of small area clusters in Brisbane... *cont*

SLA	Socioeconomic status	Health status	Health service utilisation	Social health[1]
Jindalee/River Hills	High	Good	Low	High
Kallangur	Medium	Medium	High	High
Karawatha/Kingston	Low	Poor	High	Low
Kedron	High	Medium	Medium	Medium
Keperra/Upper Kedron	High	Good	Medium	High
Kuraby	Medium	Good	Medium	High
Lawnton	Medium	Medium	Medium	Medium
Loganlea	Low	Poor	High	Low
Lota/Manly/Manly West	Medium	Medium	Medium	Medium
MacGregor/Pallara-Heathwood-Larapinta	High	Good	Medium	High
Marsden	Medium	Medium	High	Low
Milton/Paddington	High	Medium	Low	High
Moorooka/Yeerongpilly	High	Good	Medium	High
Moreton Island	Medium	Medium	Low	Medium
Mt Gravatt/Rochedale	High	Good	Medium	High
Murarrie	Medium	Poor	Medium	Medium
Nathan	High	Good	Low	High
New Farm	High	Poor	Medium	Medium
Northgate	Medium	Poor	Medium	Medium
Nudgee Beach/Virginia	Medium	Medium	Low	Medium
Nundah/Wavell Heights	High	Medium	Medium	Medium
Petrie	Medium	Good	Medium	High
Pine Rivers Balance	High	Good	Low	High
Pinkenba-Eagle Farm	Medium	Poor	Medium	Medium
Red Hill/Kelvin Grove	High	Medium	High	High
Redcliffe	Medium	Medium	High	Medium
Redland Balance	Low	Poor	Low	Low
Rochedale South/Slacks Creek	Medium	Good	Low	High
Rocklea	Medium	Poor	Medium	Medium
Runcorn/Eight Mile Plains	Medium	Good	Low	High
Salisbury	Medium	Medium	High	Medium
Seventeen Mile Rocks	High	Good	Low	High
St Lucia	High	Good	Low	High
Stafford Heights/Mitchelton	High	Good	Medium	High
Strathpine	Medium	Good	Medium	High
Tanah Merah/Carbrook Cornubia	Medium	Good	Low	High
Thorneside	Medium	Medium	High	Medium
Thornlands	Medium	Good	Medium	High
Tingalpa	Medium	Medium	High	Medium
Toowong	High	Good	Low	High
Underwood	Medium	Medium	Low	Medium
Upper Brookfield/Fig Tree Pocket	High	Good	Low	High
West End/South Brisbane/Highgate Hill	High	Poor	Medium	Medium
Wilston/Enoggera	High	Medium	Medium	High
Windsor/Lutwyche/Wooloowin	High	Medium	Medium	Medium
Yeronga	High	Medium	Medium	High

[1] Social health 'clusters were produced by a joint analysis of the socioeconomic status and health status variables

The variables relating to people born in predominantly non-English speaking countries (and their proficiency in English) were accordingly dropped from the analysis, leaving nine variables for inclusion. There was data for 91 postcode groups across **Brisbane**. These 91 records are ample to carry out a cluster analysis with nine input variables. Accordingly, a cluster analysis was performed on the available data, and the solution examined.

Problems of scale can affect the analysis as more common data items will dominate the solution. To avoid these problems, the variables were standardised and the resultant z scores were entered into the cluster analysis.

The agglomeration schedule and dendogram indicated a three cluster solution. The solution was examined and found to be a

very clean solution which was accepted (see **Table 8.4** and **Map 8.1**). The three clusters have been labelled as High (50 postcode groups), Medium (36 postcode groups) and Low (5 postcode groups) socioeconomic status clusters.

The ABS Index of Relative Socio-Economic Disadvantage (IRSD) was also available for the specified postcode groups, but was withheld from the analysis and used as an independent check on the solution. This comparison showed that of the five postcode groups with the lowest IRSD scores in **Brisbane**, all were classified to the Low socioeconomic status group in this analysis; and that 40 of the 50 postcode groups with the highest scores for the IRSD were classified to the High socioeconomic status group.

There were data for 18 postcodes groups across **Gold Coast-Tweed Heads**. These 18 records are not theoretically sufficient to carry out a cluster analysis with nine input variables. However, the acid test of a cluster analysis is whether the solution is interpretable, and it is still possible for an analysis to provide an interpretable solution even when there is a shortage of input records. Accordingly, a cluster analysis was performed on the available data, and the solution examined before attempting more complicated techniques to find a solution.

The dendogram and agglomeration schedule clearly indicated a three cluster solution, which was examined and found to be of good quality. The three clusters have been labelled as High (two areas), Medium (12 areas) and Low (four areas) (see **Table 8.5** and **Map 8.1**).

It was found that of the bottom four postcode groups for **Gold Coast-Tweed Heads** as classified by the IRSD, all were classified to the Low socioeconomic status group in this analysis. Further, of the top two postcode groups under the IRSD, one was classified to the High socioeconomic status group.

After completion of the analysis for the **Brisbane**, the postcode groups in **Townsville-Thuringowa** were allocated to the clusters generated in **Brisbane** using the quick cluster command in SPSS. This procedure allocates the postcode groups based on the minimum euclidean distance from each cluster centre. It therefore does not interfere with the formation of clusters in the capital city statistical division, but can be said to be on the same basis.

This analysis produced two groupings, shown in **Table 8.5** and **Map 8.1**.

Of the bottom two postcode groups as classified by the IRSD, one (50.0 per cent) was not classified to the Medium socioeconomic status group in this analysis. Further, of the top three postcode groups under the IRSD, two (66.7 per cent) were classified to the High socioeconomic status group.

Health status clusters in Brisbane

The data variables available for this analysis were the variables of premature death, disability and handicap status, the Total Fertility Rate and the two synthetically predicted estimates from the 1995 National Health Survey (the Physical Component Summary and the measure of fair/poor health).

Table 8.5: Composition of small area clusters in Gold Coast-Tweed Heads and Townsville-Thuringowa

SLA	Socioeconomic status	Health status	Health service utilisation	Social health[1]
Gold Coast-Tweed Heads				
Arundel/Ashmore	Medium	Good	Medium	High
Benowa/Surfers Paradise	High	Medium	Medium	High
Broadbeach/Burleigh Heads	Medium	Poor	High	Medium
Broadbeach Waters/Mermaid Waters	Medium	Good	Low	High
Carrara-Merrimac	Medium	Good	Medium	High
Currumbin Waters/Elanora	Medium	Good	Low	High
Gold Coast [Part B] Balance	Medium	Good	Low	High
Helensvale	Medium	Good	Low	High
Hope Island	High	Poor	Medium	Medium
Labrador/Southport	Low	Poor	High	Medium
Nerang	Medium	Medium	Medium	Medium
Oxenford	Medium	Good	Medium	High
Palm Beach/Currumbin	Low	Medium	High	Medium
Paradise Point/Biggera Waters	Medium	Medium	Medium	High
Robina/Kerrydale/Burleigh Waters	Medium	Good	Low	High
Tugun/Coolangatta	Low	Poor	High	Medium
Tweed Heads	Low	Medium	High	Medium
Worongary-Tallai/Mudgeeraba	Medium	Good	Medium	High
Townsville-Thuringowa				
Gulliver/Hermit Park	High	Medium	Low	Medium
Murray/Mt Louisa	High	Good	Medium	High
Thuringowa Part A	Medium	Good	Low	High
Townsville Coastal/Magnetic Island	High	Poor	Medium	Medium
Townsville South East	Medium	Medium	Medium	Medium

With the exception of the infant death rate (shown as the number of deaths per 1,000 live births), all of the variables were represented by age-sex standardised ratios. Missing data values (where there were fewer than five cases for any SLA and a standardised ratio was not calculated) were substituted by zero. Legitimate zero coded values remained as zero.

The variables for infant deaths, deaths of people aged 15 to 64 years from lung cancer and respiratory system diseases and deaths of people aged 15 to 24 years from the external causes of accidents, poisoning and violence were excluded from the analysis because 5 per cent or more of the small areas had no cases. Thus there were 11 variables to analyse 91 records. Clearly this was enough data.

A cluster analysis of all the above variables was tried to see if it gave a sensible solution. This produced a three cluster solution of good quality which was accepted without further investigation. (see **Table 8.4** and **Map 8.2**).

Note that the Poor Status group did have higher status than the Good Status group for the Total Fertility Rate and disability status of the population.

The ABS Index of Relative Socio-Economic Disadvantage (IRSD) was also available for the specified postcode groups, but was withheld from the analysis and used as an independent check on the solution. It was found that of the bottom 15 postcode groups for **Brisbane** as classified by the IRSD, nine (60.0 per cent) were classified to the Poor health status group in this analysis. Further, of the top 40 postcode groups under the IRSD, 28 (70.0 per cent) were classified to the Good health status group.

After completion of the analysis for **Brisbane** the SLAs in the major urban centres of **Gold Coast-Tweed Heads** and **Townsville-Thuringowa** were allocated to the clusters generated in **Brisbane** as discussed above under *Socioeconomic clusters in the major urban centres*.

This resulted in the **Townsville-Thuringowa** SLAs of Thuringowa [Part A] and Murray/Mt Louisa being grouped into the Good health status cluster; Gulliver/Hermit Park and Townsville South East being grouped into the Medium health status cluster; and Townsville Coastal/Magnetic Island grouped in the Poor health status cluster. For **Gold Coast-Tweed Heads,** four postcode areas were grouped into the Poor health status cluster, while nine of the postcode areas were grouped into the Good health status cluster (**Table 8.5** and **Map 8.2**).

The IRSD was again used as an independent check on the solution. It was found that of the bottom 5 postcode groups for **Gold Coast-Tweed Heads** and **Townsville-Thuringowa** as classified by the IRSD, three (60.0 per cent) were classified to the Poor health status group in this analysis. Further, of the top 11 postcode groups under the IRSD, 9 (81.8 per cent) were classified to the Good health status group.

Health service utilisation clusters in Brisbane

All but one of the variables in this data set were represented by age-sex standardised ratios: the immunisation variable is of the proportion of children fully immunised at one year of age. Missing data values (SLAs where fewer than 5 hospital admissions were predicted from the Australian rates) were substituted by zero. Legitimate zero coded values remained as zero.

Problems of scale can affect the analysis as more common data items will dominate the solution. To avoid these problems the variables were standardised and the resultant z scores were entered into the analysis. Thus there were 30 variables to analyse 91 records. Clearly this was not quite enough data. Alternative strategies were tried in an attempt to produce a useful solution.

A cluster analysis of all the above variables was tried to see if it gave a sensible solution despite the lack of data. This produced a promising three cluster solution.

An exploratory factor analysis was run on the data using Maximum Likelihood extraction and oblique (oblimin) rotation. The analysis failed to converge at iteration 8.

An exploratory factor analysis was run on the data using Principal Component extraction and orthogonal (varimax) rotation. The analysis produced a eight factor solution. It should be noted that there was not enough data to sustain a factor analysis either.

Factor scales saved in the above analysis were used as input to a cluster analysis. This approach assumes the factor structure is accurate for the SLA data. This analysis resulted in a 3 cluster solution of dubious merit.

In an effort to produce a better solution, the drivers of the factor solution were selected for entry into a cluster analysis. The first four drivers of the first factor (admissions of males and admissions for accidents, poisonings and violence, neurotic, personality and other mental disorders and psychosis), the first two drivers of the second to seventh factors (same day admissions for a surgical procedure; admissions for ischaemic heart disease, cancer, lung cancer, breast cancer, a surgical procedure, hip replacement, myringotomy, Caesarean section and hysterectomy; and general medical practitioner services to males and females) and the first driver of the eighth factor (admissions for infectious diseases) were chosen.

This analysis again produced a three cluster solution. The solution was very similar to the original solution, and this consistency is comforting.

The drivers of the first factor (admissions of males; admissions to a public hospital; and admissions for respiratory system diseases, respiratory system diseases of children aged 0 to 4 years, bronchitis, emphysema and asthma, neurotic, personality and other mental disorders, psychosis and accidents, poisonings and violence) were entered into a cluster analysis. The solution again contained three clusters but these clusters were more evenly spread. Since this solution is based on eight variables analysing 99 records, it does not have the same validity concerns attached to the previously tried methods. Also the solution is of slightly better quality and therefore accepted (see **Table 8.4** and **Map 8.3**).

Note that the Low service use group did have higher use of some services (admissions for Caesarean section and immunisation).

Of the bottom 20 postcode groups for **Brisbane** as classified by the IRSD, 13 (65.0 per cent) were classified to the High service use group in this analysis. Further, of the top 28 postcode

groups under the IRSD, 18 (64.3 per cent) were classified to the Low health service use group.

After completion of the analysis for **Brisbane**, the SLAs in **Gold Coast-Tweed Heads** and **Townsville-Thuringowa** were allocated to the clusters generated in **Brisbane** as discussed above under *Socioeconomic clusters in Brisbane*.

This resulted in the **Townsville-Thuringowa** SLAs of Thuringowa [Part A] and Gulliver/Hermit Park being grouped into the Low health status cluster; with Murray/Mt Louisa, Townsville South East and Townsville Coastal/Magnetic Island being grouped into the Medium health status cluster. For **Gold Coast-Tweed Heads,** Labrador/Southport, Coolangatta/Tugun, Broadbeach/ Burleigh Heads, Palm Beach/Currumbin and Tweed Part A were grouped into the High health status cluster (**Table 8.5** and **Map 8.3**).

This solution was checked with the IRSD which showed that, of the bottom five postcode groups for **Gold Coast-Tweed Heads** and **Townsville-Thuringowa** as classified by the IRSD, all five were classified to the High service use group in this analysis. Further, of the top seven postcode groups under the IRSD, five (71.4 per cent) were classified to the Low health service use group.

Social health status clusters in Brisbane

The cluster analysis technique has also been applied to a combination of the socioeconomic status and health status data sets. The results of the cluster analysis for the combination of these data sets may be useful as a summary indicator of the 'social health' of the population of each grouping of SLAs.

Data considered for inclusion were the demographic variables in the final model for SLAs in **Brisbane**, used to examine socioeconomic status, and the health status variables used in the final health status model. The variables excluded from the health status model because of missing data were excluded from this model as well.

The variables infant deaths, deaths of people aged from 15 to 64 years from lung cancer and respiratory system diseases and deaths of people aged 15 to 24 years from the combined causes of accidents, poisonings and violence were excluded from the analysis because five per cent or more of the postcode groups had no cases. Thus there were 19 variables to analyse 91 records. This was just enough data.

A cluster analysis was tried to see if it gave a sensible solution, this produced a very clean two cluster solution of good quality. However, alternative strategies were tried in an attempt to produce a better solution.

An exploratory factor analysis was run on the data using Principal Component extraction and orthogonal (varimax) rotation. The analysis produced a three factor solution.

The variables (unemployed, low income families, people reporting fair or poor health, Physical Component Summary, Aboriginal and Torres Strait Islander people, single parent families, female labour force participation and premature deaths from circulatory system diseases) were entered into a cluster analysis. The solution was very clean three cluster solution. This solution was equally as clean as the two cluster solution above, but performed slightly worse against the IRSD than the original solution. Since either solution is perfectly acceptable, the three clusters solution is shown in **Table 8.4** and **Map 8.4**.
The ABS Index of Relative Socio-Economic Disadvantage (IRSD) was again used as an independent check on the solution. It was found that, of the bottom six SLAs for **Brisbane** as classified by the IRSD, three (50.0 per cent) were classified to the Low social health status group in this analysis. Further, of the top 52 postcode groups under the IRSD, 47 (90.4 per cent) were classified to the High social health status group.

After completion of the analysis for **Brisbane**, the postcode groups in **Gold Coast-Tweed Heads** and **Townsville-Thuringowa** were allocated to the clusters generated in **Brisbane** as discussed above under *Socioeconomic clusters in Brisbane*.

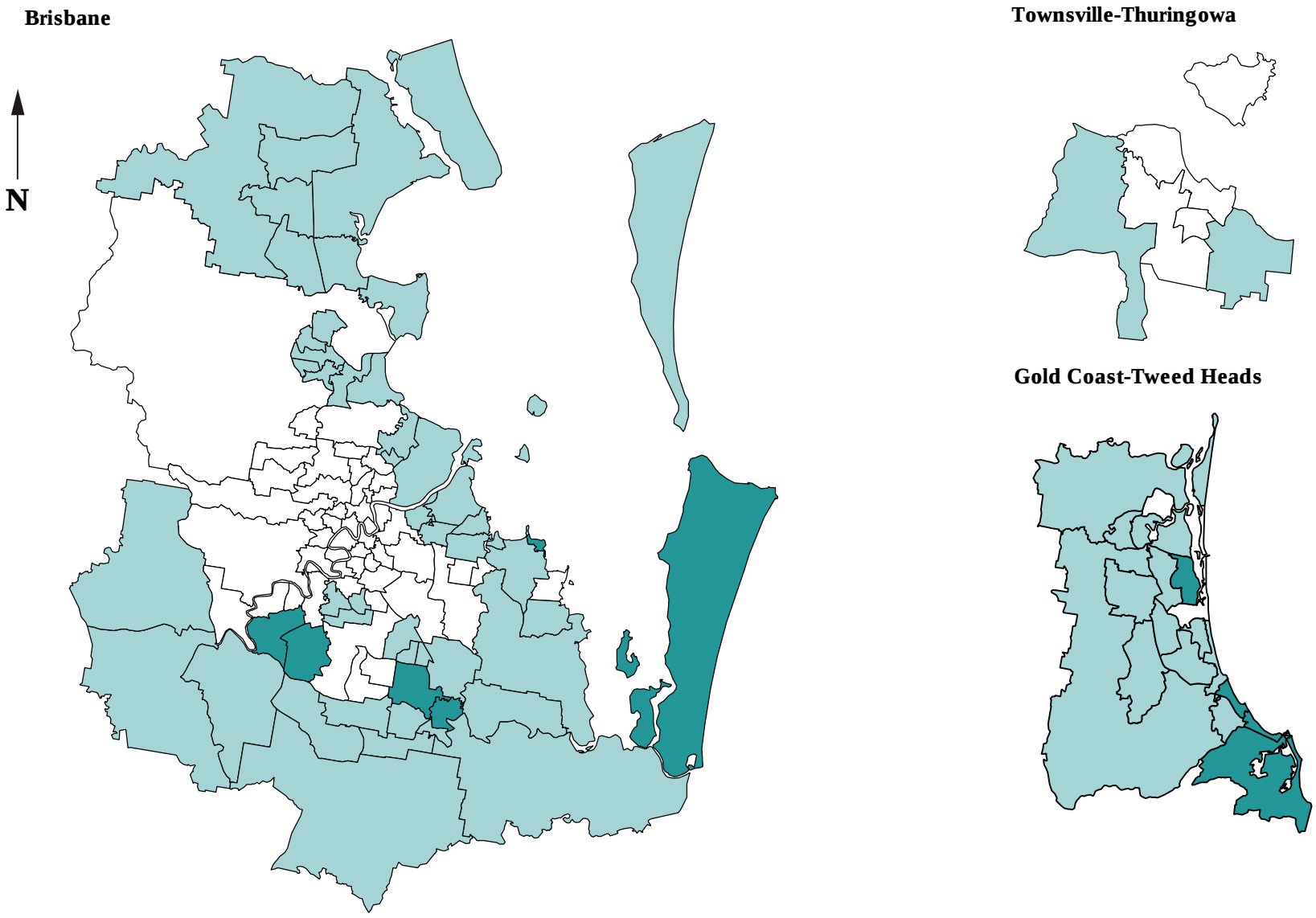
This analysis produced two groupings, with the **Townsville-Thuringowa** postcode areas of Thuringowa [Part A] and Murray/Mt Louisa classified to the High social health status cluster and Gulliver/Hermit Park, Townsville Coastal/Magnetic Island and Townsville South East being classified to the Medium social health status cluster. For **Gold Coast-Tweed Heads,** 11 postcode areas were grouped in the High social health status cluster and seven postcode areas in the Medium social health status cluster (**Table 8.5** and **Map 8.4**).

The IRSD was also available for the specified postcode groups, and was used as an independent check on the solution. It was found that, of the bottom ten postcode groups for **Gold Coast-Tweed Heads** and **Townsville-Thuringowa** as classified by the IRSD, seven (70.0 per cent) were classified to the High social health status group in this analysis. Further, of the top 13 postcode groups under the IRSD, 10 (76.9 per cent) were classified to the Low social health status group.

Map 8.1

Socioeconomic status clusters based on Statistical Local Areas, Brisbane, Gold Coast-Tweed Heads and Townsville-Thuringowa, 1996

clusters of areas* with generally similar socioeconomic status characteristics



*Most SLAs have been grouped to approximate postcode areas

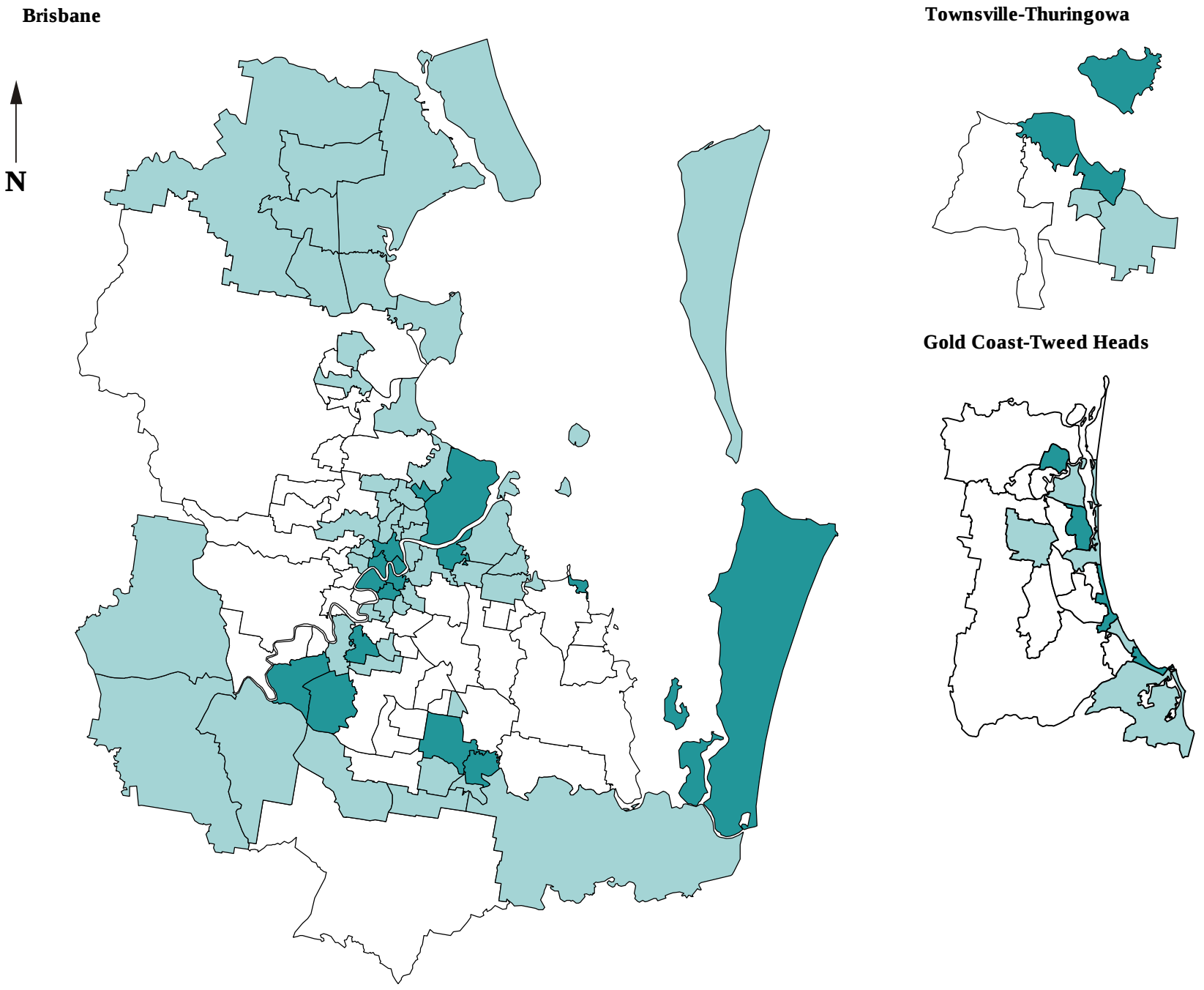
Source: Compiled from project sources

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Map 8.2
Health status clusters based on Statistical Local Areas, Brisbane, Gold Coast-Tweed Heads and Townsville-Thuringowa, 1996

clusters of areas* with generally similar health status characteristics



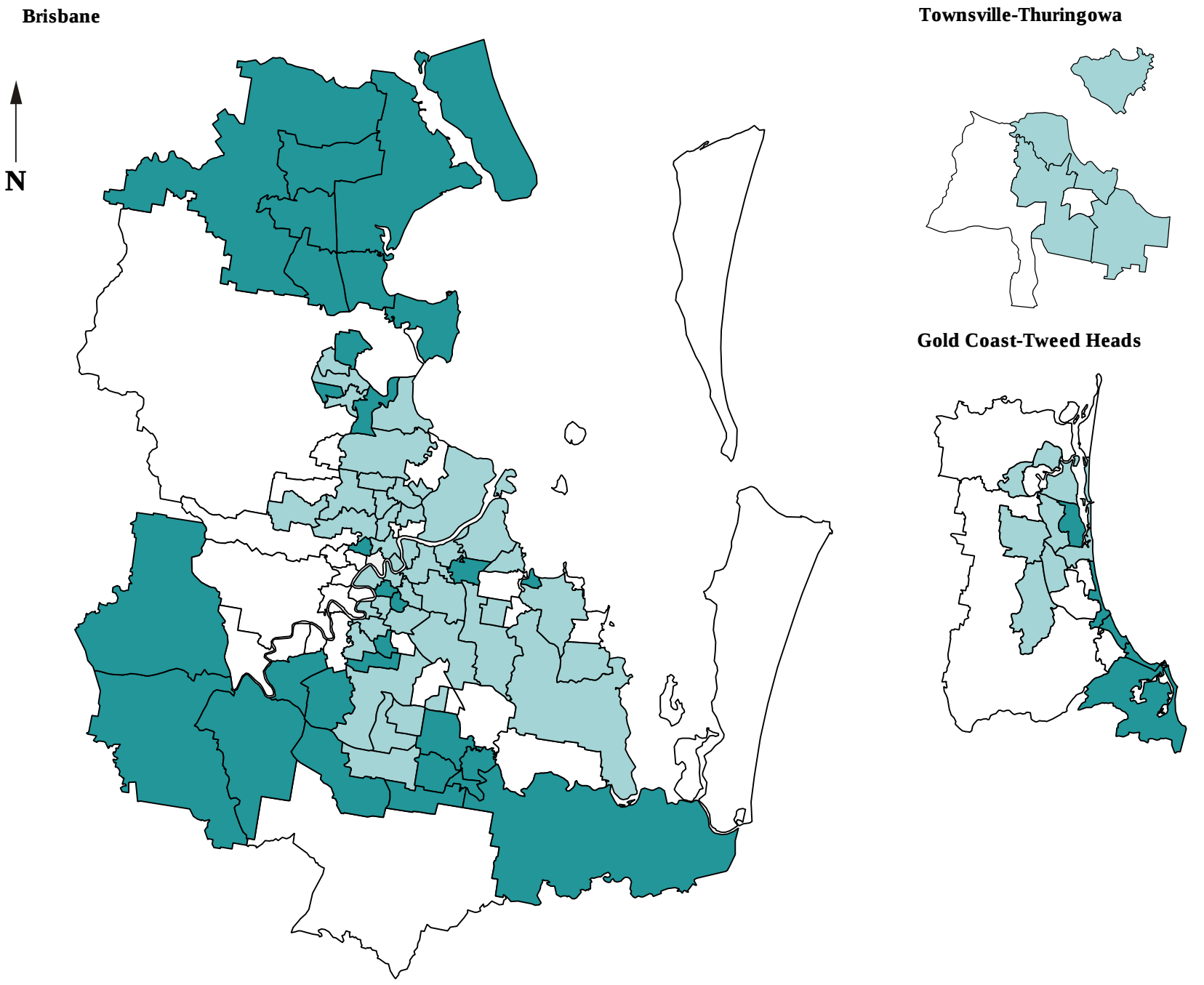
*Most SLAs have been grouped to approximate postcode areas

Source: Compiled from project sources

Details of map boundaries are in Appendix 1.2

Map 8.3
Health service utilisation clusters based on Statistical Local Areas, Brisbane, Gold Coast-Tweed Heads and Townsville-Thuringowa, 1996

clusters of areas* with generally similar health service utilisation characteristics



*Most SLAs have been grouped to approximate postcode areas

Source: Compiled from project sources

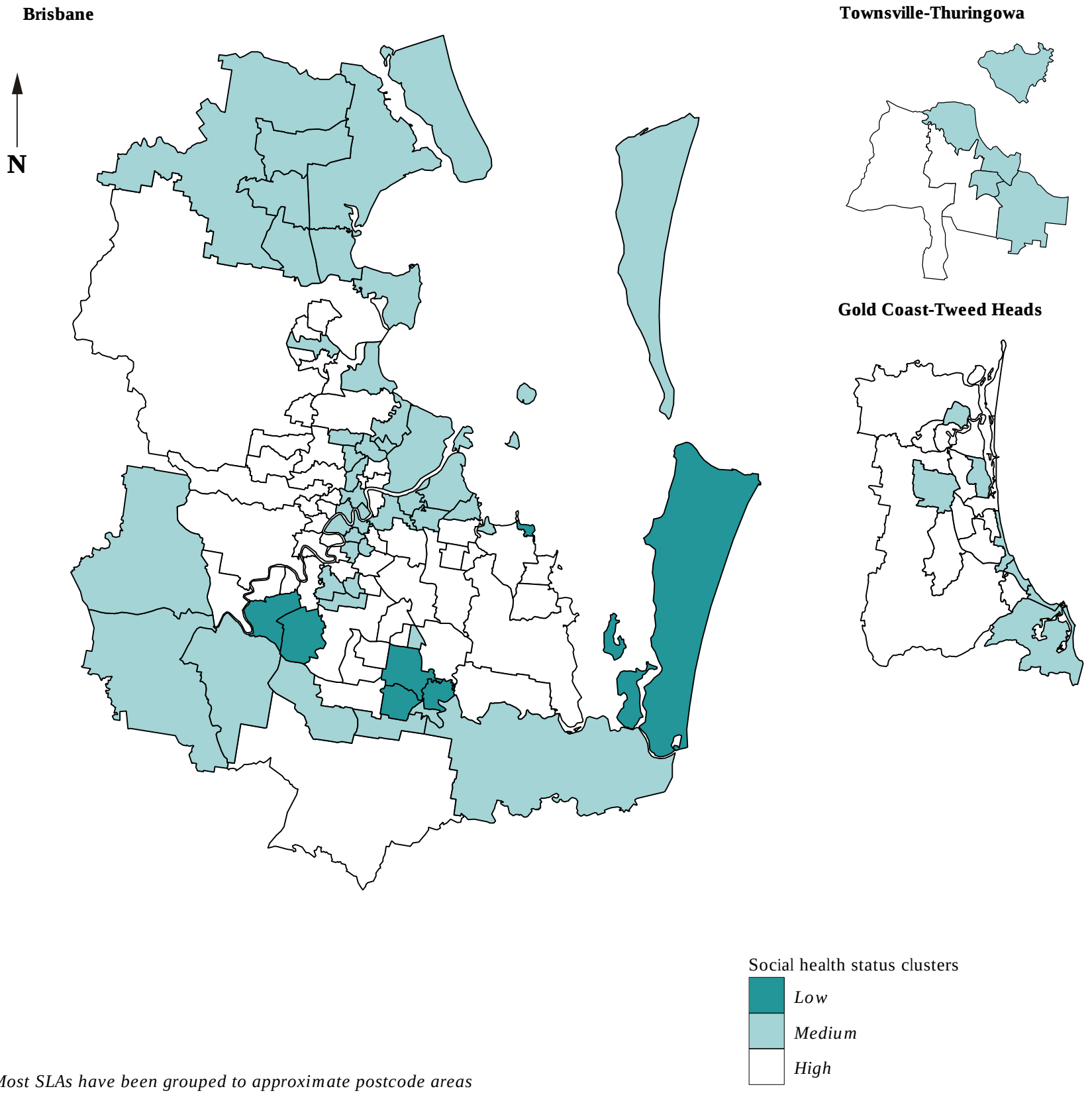
Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Map 8.4

Social health status clusters based on Statistical Local Areas, Brisbane, Gold Coast-Tweed Heads and Townsville-Thuringowa, 1996

clusters of areas* with generally similar social health status characteristics



Most SLAs have been grouped to approximate postcode areas

Source: Compiled from project sources

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Socioeconomic clusters of SLAs in the non-metropolitan areas

The production of clusters at the SLA level in the non-metropolitan areas is even more problematic (than for **Brisbane**), with SLAs varying enormously in size and composition. For example, large urban centre SLAs such as Cairns, Toowoomba and Rockhampton (population 121,038, 83,632 and 59,732 respectively) stand in contrast to rural SLAs such as Perry and Croydon (each with a population of 27). Aboriginal people, generally the most disadvantaged population group, are unevenly distributed throughout these SLAs, from as high as 88.6 per cent of the total population in Aurukun, 84.8 per cent in Mornington and 79.9 per cent in Torres to less than two per cent Aboriginal population in some 69 non-metropolitan SLAs (45.1 per cent of all non-metropolitan SLAs).

There was data for 126 SLAs across Queensland. These records are ample to carry out a cluster analysis with seven input variables. A cluster analysis was performed on the available data, and the solution examined. The dendogram and agglomeration schedule suggested a three cluster solution. The solution was examined, and found to be of only fair quality because it did not discriminate particularly well between the Medium and Low SES clusters (ie. the clusters did not segregate neatly on the input variables), although checking against the SEIFA index gave good results.

The data was subjected to a factor analysis (with maximum likelihood extraction and oblimin rotation, producing two factors), and the factor scores produced were used as input to a cluster analysis. This produced a three cluster solution of poor quality.

The data was subjected to a factor analysis (with principal components extraction and varimax rotation, producing two factors), and the factor scores produced were used as input to a cluster analysis. This again produced a three cluster solution of poor quality.

The drivers of the first factor of the factor solutions were then examined. The principal component solution with the orthogonal (varimax) rotation produced a first factor of Aboriginal people, dwellings without a motor vehicle and single parent families. These variables were entered into a cluster analysis which produced a fairly clean two cluster solution, which performed well against the IRSD but was reasonably uninformative (the clusters were size 117 and 9).

The maximum likelihood solution with the oblique (oblimin) rotation produced a first factor of unemployed people, low income families and female labour force participation. These variables were entered into a cluster analysis that produced a two cluster solution also, which was cleaner than the previous solution, although it did not perform quite as well against the IRSD. This solution was also slightly more informative than the previous solution since the cluster sizes were 95 and 31. For this reason this solution was accepted.

The Low socioeconomic status cluster is comprised mainly of rural areas in the outer northern and western regions, including Aurukun, Boulia, Burke, Carpentaria and Cook. SLAs in the High socioeconomic status cluster are grouped in a number of locations, and include the State's largest regional centres of Noosa, Cairns, Toowoomba and Warwick.

Of the 31 lowest SLAs for the IRSD, 17 (54.8 per cent) were classified to the Low socioeconomic status cluster; and of the top 95 SLAs for the IRSD, 81 (85.3 per cent) were classified to the High socioeconomic status group.

Health status clusters of SLAs in the non-metropolitan areas

The variables for infant deaths; deaths of females aged from 15 to 64 years; deaths of 15 to 64 year olds from cancer, lung cancer, circulatory system diseases, respiratory system diseases and the combined causes of accidents, poisonings and violence; and deaths of 15 to 24 year olds from the combined causes of accidents, poisonings and violence were excluded from the analysis because 5 per cent or more of the SLAs had no cases.

Thus there were 7 variables to analyse 126 records. Clearly this was enough data.

A cluster analysis of all the above variables was tried to see if it gave a sensible solution. This produced a very clean, high quality four cluster solution and was therefore accepted (see **Table 8.5** and **Map 8.6**).

The ABS Index of Relative Socio-Economic Disadvantage (IRSD) was again used as an independent check on the solution. It was found that Aurukun was the bottom SLA as classified by the IRSD, and of the next bottom 22 SLAs for the non-metropolitan SLAs in Queensland as classified by the IRSD, 17 (77.3 per cent) were classified to the Poor health status group in this analysis. Further, of the top 52 SLAs under the IRSD, 34 (65.4 per cent) were classified to the Good health status group.

Health service utilisation clusters of SLAs in the non-metropolitan areas

The variables for admissions for lung cancer, breast cancer, psychosis, tonsillectomy, myringotomy, hysterectomy and hip replacement were excluded from the analysis because five per cent or more records were had no cases.

Thus there were 23 variables to analyse 126 records. This was clearly enough data. Alternative strategies were tried in an attempt to produce a useful solution.

A cluster analysis of all the above variables was tried to see if it gave a sensible solution. The solution was promising, but not ideal.

An exploratory factor analysis was run on the data using Maximum Likelihood extraction and oblique (oblimin) rotation. The analysis failed to converge at iteration 5.

An exploratory factor analysis was run on the data using Principal Component extraction and orthogonal (varimax) rotation. The analysis produced a five factor solution.

Factor scales saved in the above analysis were used as input to a cluster analysis. This approach assumes the factor structure is accurate for the SLA data. This analysis resulted in a solution of dubious merit.

In an effort to produce a better solution, the drivers of the factor solution were selected for entry into a cluster analysis. The first four drivers of the first factor (total admissions, admissions to a

public hospital, admissions of males and admissions for respiratory system diseases), the first three drivers of the second factor (same day admissions, same day admissions for a surgical procedure and admissions for endoscopy), the first two drivers of the third factor (general medical practitioner services to males and females), and the first drivers of the remaining factors (admissions for lens insertion and immunisation status) were chosen. This analysis produced a three cluster solution which was of poor quality.

The seven drivers of the first factor (total admissions, admissions to a public hospital, admissions of males and females, and admissions for respiratory system diseases, neurotic, personality or other mental disorder and accidents, poisonings and violence) were entered into a cluster analysis. This analysis produced a three cluster solution. The solution was very similar to that produced above by the full variable set. The solution is of slightly better quality and was therefore accepted (**Table 8.5**, **Map 8.7**).

There was moderate agreement with the IRSD: of the lowest nine SLAs for IRSD, five (55.6 per cent) were in the High health service use cluster and of the highest 67, 45 (67.2 per cent) were in the Low health service use cluster.

Social health clusters of SLAs in the non-metropolitan areas

Data considered for inclusion were the demographic variables in the final model for SLAs in the non-metropolitan areas of Queensland used to examine socioeconomic status, and the health status variables used in the final health status model. The variables excluded from the health status model because of missing data were excluded from this model also. Thus there were 18 variables to analyse 126 records. A cluster analysis of all the above variables was tried to see if it gave a sensible solution. This produced a very clean three cluster solution of good quality. The SLAs in each cluster are listed in **Table 8.6** and shown in **Map 8.8**.

Of the four lowest SLAs for the IRSD, three (75.0 per cent) were classified to the Low social health status cluster; and of the top 105 SLAs for the SEIFA index, 96 (91.4 per cent) were classified to the High social health status cluster.

Table 8.6: Composition of SLA clusters in the non-metropolitan areas of Queensland

SLA	Socioeconomic status	Health status	Health service utilisation	Social health[1]
Aramac (S)	High	Good	High	High
Atherton (S)	High	Medium	Medium	High
Aurukun (S)	Low	Very Poor	High	Low
Balonne (S)	High	Good	Medium	High
Banana (S)	High	Good	Low	High
Barcaldine (S)	High	Good	Medium	High
Barcoo (S)	High	Good	Low	High
Bauhinia (S)	High	Good	Low	High
Beaudesert (S) - Part B	High	Good	Low	High
Belyando (S)	High	Good	Medium	High
Bendemere (S)	High	Good	Medium	High
Biggenden (S)	Low	Poor	Low	Medium
Blackall (S)	High	Medium	Medium	High
Boonah (S)	High	Medium	Low	High
Booringa (S)	High	Good	Medium	High
Boulia (S)	High	Poor	Medium	High
Bowen (S)	High	Medium	Low	High
Broadsound (S)	High	Good	Low	High
Bulloo (S)	High	Good	Medium	High
Bundaberg/Burnett	Low	Medium	Low	High
Bungil (S)	High	Good	Low	High
Burdekin (S) Dalrymple (S) Thuringowa (C: Part B) Townsville (C: Part B)	High	Good	Low	High
Burke (S)	Low	Poor	High	Low
Caboolture (S) - Part B	Low	Medium	Low	Medium
Cairns (C)	High	Medium	Low	High
Cairns (C) - Part B	High	Medium	Medium	High
Calliope (S) - Part A	High	Good	Low	High
Calliope (S) - Part B	Low	Medium	Low	High
Caloundra (C) - Part A	Low	Medium	Low	High
Caloundra (C) - Part B	Low	Good	Low	High
Cambooya (S)	High	Good	Low	High
Cardwell (S)	High	Good	Medium	High
Carpentaria (S)	High	Poor	High	High
Charters Towers (C)	High	Medium	Medium	High
Chinchilla (S)	High	Medium	Low	High
Clifton (S)	High	Good	Low	High
Cloncurry (S)	High	Medium	High	High
Cook (S) (excl. Weipa)	Low	Poor	High	High
Cook (S) - Weipa only	High	Good	Medium	High
Cooloola (S) (excl. Gympie)	High	Poor	Low	Medium
Cooloola (S) - Gympie only	Low	Medium	Medium	High
Crow's Nest (S)	High	Medium	Low	High
Croydon (S)	Low	Poor	Medium	High
Dalby (T)	High	Good	Medium	High
Diamantina (S)	High	Good	Low	High
Douglas (S)	High	Medium	Medium	High
Duaringa (S)	High	Good	Medium	High
Eacham (S)	High	Good	Low	High
Eidsvold (S)	High	Medium	Medium	High
Emerald (S)	High	Good	Low	High
Esk (S)	Low	Poor	Low	Medium
Etheridge (S)	High	Medium	Low	High
Fitzroy (S) - Part A	High	Good	Low	High
Fitzroy (S) - Part B	High	Good	Low	High
Flinders (S)	High	Good	Medium	High
Gatton (S)	High	Medium	Low	High
Gayndah (S)	High	Medium	Medium	High

Table 8.6: Composition of SLA clusters in the non-metropolitan areas of Queensland ... *cont*

SLA	Socioeconomic status	Health status	Health service utilisation	Social health[1]
Gladstone (C)	High	Good	Low	High
Goondiwindi (T)	High	Good	Medium	High
Herberton (S)	Low	Poor	Medium	Medium
Hervey Bay (C)	Low	Poor	Low	Medium
Hinchinbrook (S)	High	Medium	Medium	High
Ilfracombe (S)	High	Good	Low	High
Inglewood (S)	High	Medium	Medium	High
Isis (S)	Low	Poor	Medium	Medium
Isisford (S)	High	Good	High	High
Jericho (S)	High	Good	Medium	High
Johnstone (S)	High	Medium	Medium	High
Jondaryan (S)	High	Good	Low	High
Kilcoy (S)	High	Medium	Medium	High
Kilkivan (S)	Low	Medium	Low	Medium
Kingaroy (S)	High	Medium	Low	High
Kolan (S)	Low	Poor	Medium	Medium
Laidley (S)	Low	Poor	Low	Medium
Livingstone (S)	High	Medium	Low	High
Longreach (S)	High	Good	Low	High
Mackay (C) - Part A	High	Medium	Medium	High
Mackay (C) - Part B	High	Medium	Low	High
Mareeba (S)	High	Medium	Medium	High
Maroochy (S: Pt A)	Low	Medium	Low	High
Maroochy (S: Pt B)	High	Medium	Low	High
Maryborough (C) Woocoo (S)	Low	Medium	Low	High
McKinlay (S)	High	Good	Medium	High
Millmerran (S)	High	Good	Medium	High
Mirani (S)	High	Good	Medium	High
Miriam Vale (S)	Low	Poor	Low	Medium
Monto (S)	High	Medium	Low	High
Moreton Part B	High	Medium	Low	High
Mornington (S)	Low	Poor	Not grouped	Low
Mount Isa (C)	High	Good	Medium	High
Mount Morgan (S)	Low	Poor	Medium	Medium
Mundubbera (S)	High	Good	Medium	High
Murgon (S)	High	Poor	High	High
Murilla (S)	High	Medium	Medium	High
Murweh (S)	High	Medium	Low	High
Nanango (S)	Low	Poor	Low	Medium
Nebo (S)	High	Good	Low	High
Noosa (S: Pt A)	Low	Medium	Low	High
Noosa (S: Pt B)	Low	Medium	Low	Medium
Paroo (S)	High	Poor	High	High
Peak Downs (S)	High	Good	Low	High
Perry (S)	Low	Good	Low	High
Pittsworth (S)	High	Good	Low	High
Quilpie (S)	High	Medium	Medium	High
Richmond (S)	High	Good	Medium	High
Rockhampton (C)	High	Medium	Low	High
Roma (T)	High	Good	Medium	High
Rosalie (S)	High	Good	Low	High
Sarina (S)	Low	Good	Medium	High
Stanthorpe (S)	High	Medium	Low	High
Tambo (S)	High	Good	Medium	High
Tara (S)	Low	Poor	Medium	Medium
Taroom (S)	High	Good	Low	High
Tiaro (S)	Low	Poor	Low	Medium
Toowoomba (C)	High	Medium	Low	High

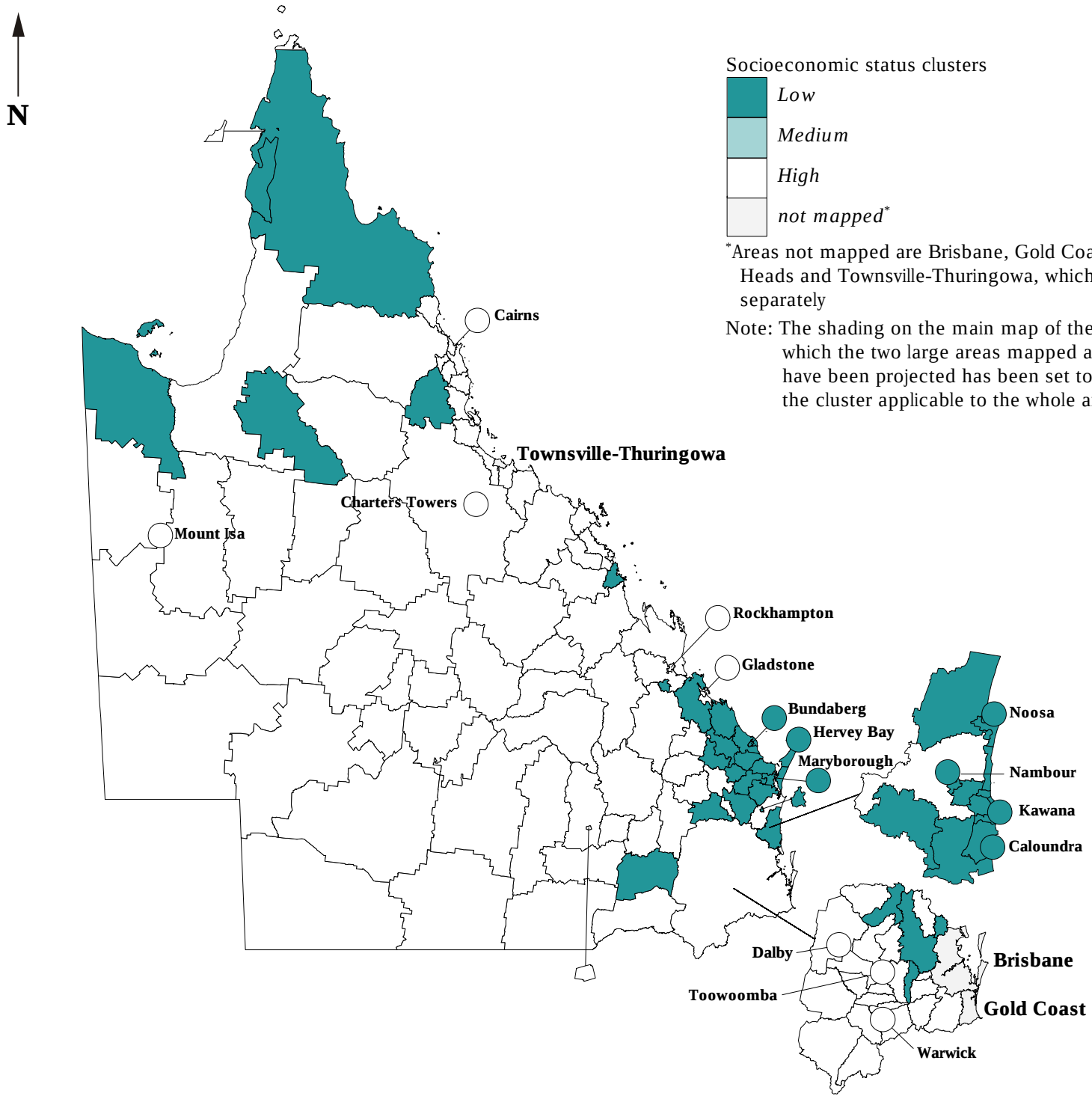
Table 8.6: Composition of SLA clusters in the non-metropolitan areas of Queensland ...*cont*

SLA	Socioeconomic status	Health status	Health service utilisation	Social health[1]
Torres (S)	High	Poor	Medium	Low
Waggamba (S)	High	Good	Low	High
Wambo (S)	High	Good	Low	High
Warroo (S)	High	Medium	Low	High
Warwick (S) - Central	High	Medium	Medium	High
Warwick (S) - East	High	Medium	Low	High
Warwick (S) - North	High	Medium	Low	High
Warwick (S) - West	High	Medium	Low	High
Whitsunday (S)	High	Medium	Low	High
Winton (S)	High	Medium	Medium	High
Wondai (S)	Low	Medium	Low	Medium

[1] Social health 'clusters were produced by a joint analysis of the socioeconomic status and health status variables

Map 8.5: Socioeconomic status clusters based on Statistical Local Areas, Queensland, 1996

clusters of SLAs with generally similar socioeconomic status characteristics

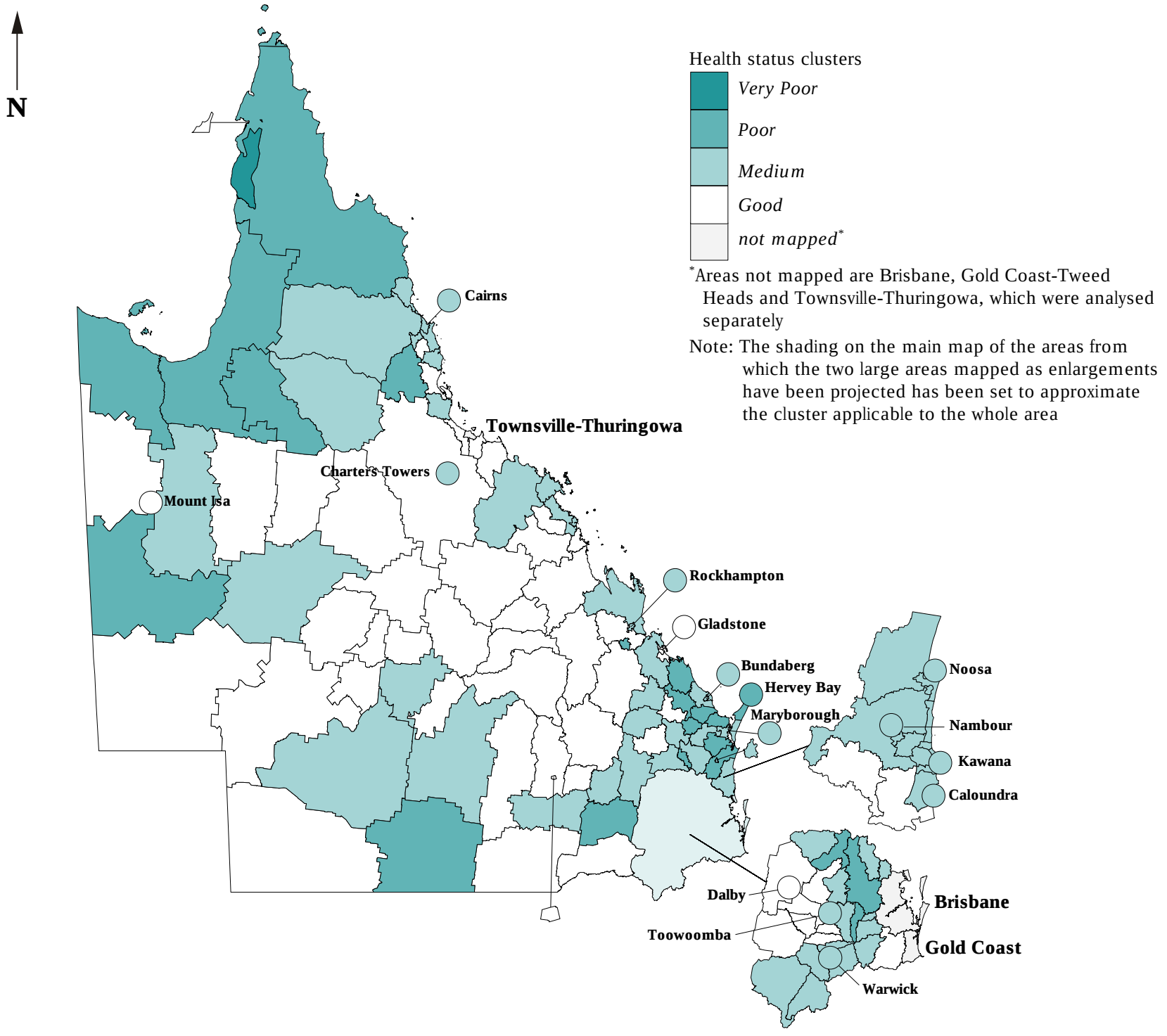


Source: Compiled from project sources

Details of map boundaries are in Appendix 1.2

Map 8.6: Health status clusters based on Statistical Local Areas, Queensland, 1996

clusters of SLAs with generally similar health status characteristics



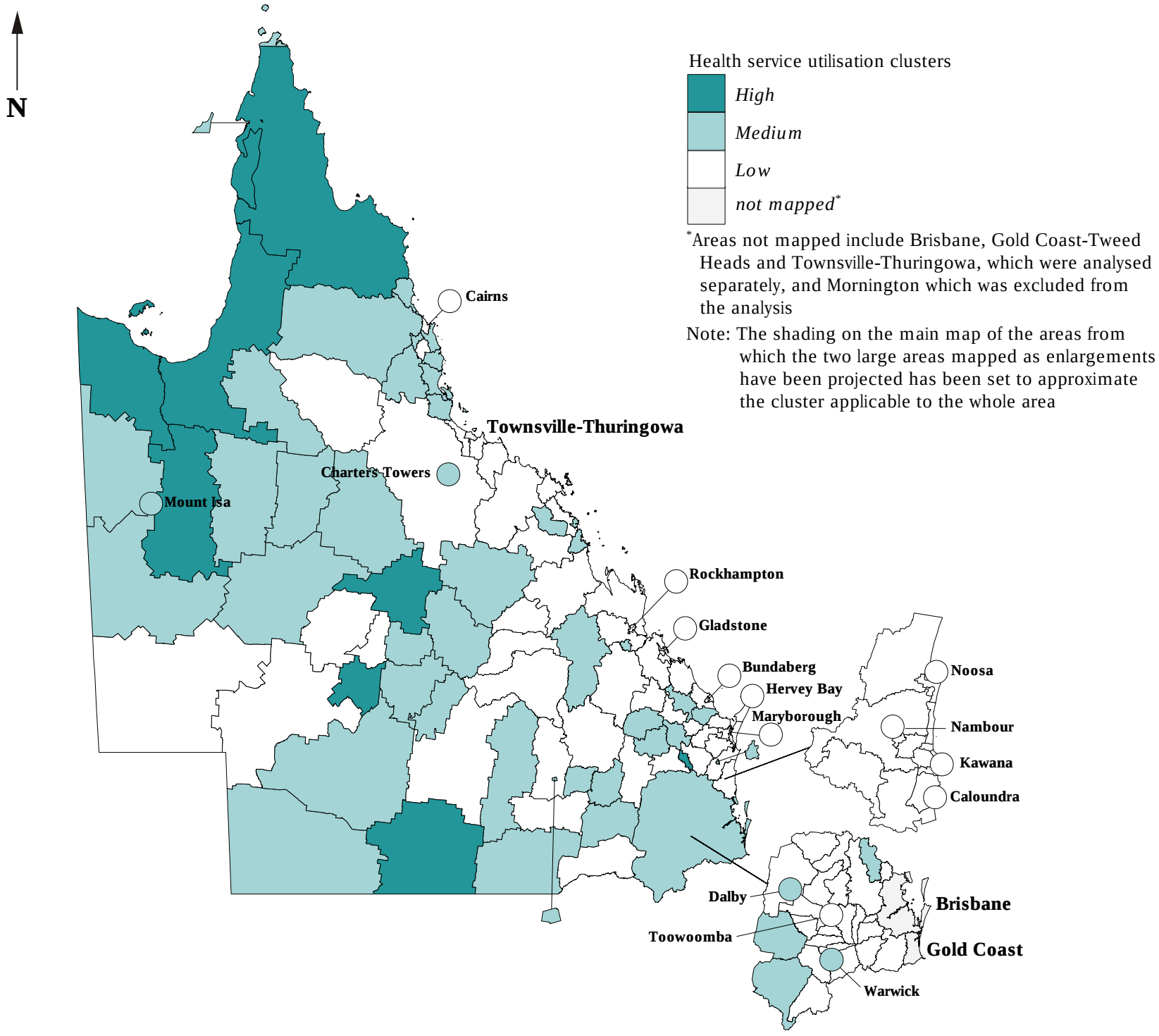
Source: Compiled from project sources

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Map 8.7: Health service utilisation clusters based on Statistical Local Areas, Queensland, 1996

clusters of SLAs with generally similar health service utilisation characteristics

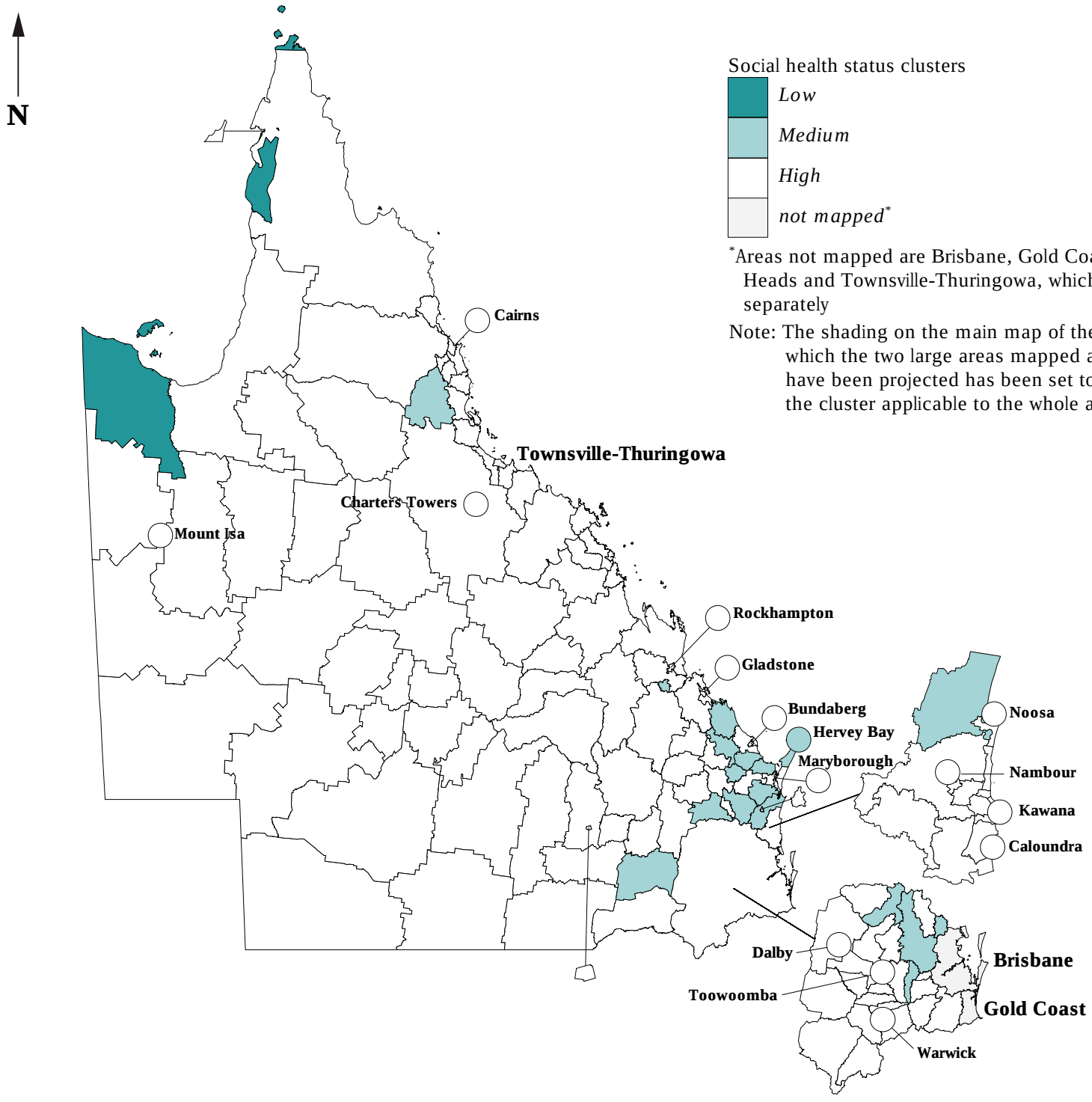


Source: Compiled from project sources

Details of map boundaries are in Appendix 1.2

Map 8.8: Social health status clusters based on Statistical Local Areas, Queensland, 1996

clusters of SLAs with generally similar social health status characteristics



Social health status clusters

- *Low*
- *Medium*
- *High*
- *not mapped**

*Areas not mapped are Brisbane, Gold Coast-Tweed Heads and Townsville-Thuringowa, which were analysed separately

Note: The shading on the main map of the areas from which the two large areas mapped as enlargements have been projected has been set to approximate the cluster applicable to the whole area

Source: Compiled from project sources

Details of map boundaries are in Appendix 1.2

Socioeconomic clusters of towns

A cluster analysis was undertaken for the 55 towns (urban centres) across Australia that had populations of 7,500 or more at the 1996 Census and were identifiable in the non-Census datasets (see Appendix 1.2 for further details of the selection of these towns). These 55 records are sufficient to carry out a cluster analysis with the nine input variables.

As the analysis was somewhat complicated, only the main results are discussed below. The full description is in Appendix 1.6.

A cluster analysis was performed on the available data, and the solution examined before attempting more complicated techniques to find a solution. This analysis provided a three cluster solution of fair to average quality. It did not discriminate particularly well between clusters, and the High socioeconomic cluster did not perform particularly well against the IRSD.

The 55 records also provided enough information for an exploratory factor analysis, since this analysis has the same data requirements as the previous model.

Although several analyses were tried, the best solution was a four cluster solution (based on low income families, unemployed people, early school leavers, unskilled and semi-skilled workers, Indigenous people and single parent families). This solution is reproduced in **Table 8.7**.

The ABS Index of Relative Socio-Economic Disadvantage (IRSD) was available for the specified towns, but was withheld from the analysis and used as an independent check on the solution. It was found that, of the bottom 17 towns as classified by the IRSD, 16 (94.1 per cent) were classified to the Low socioeconomic group in this analysis. Further, of the top 20 towns under the IRSD, 15 (75.0 per cent) were classified to the High socioeconomic group.

Health status clusters of towns

There were 15 variables to analyse 55 records. This was not quite enough data. A number of alternative strategies were tried in an attempt to produce a satisfactory solution, with the outcome being a three cluster solution of good quality. The clusters were better spread than in other solutions, and it performed better against the IRSD than other solutions (**Table 8.7**).

The IRSD was again used as an independent check on the solution. It was found that, of the bottom 12 towns as classified by the IRSD, five (41.7 per cent) were classified to the Poor health status group in this analysis. Further, of the top 22 towns under the IRSD, 14 (63.6 per cent) were classified to the Good health status group.

Health service utilisation clusters of towns

There were 30 variables to analyse 55 records. This was not enough data. A number of alternative strategies were tried in an attempt to produce a satisfactory solution, with the outcome being a three cluster solution of good quality. The clusters were better spread than in other solutions, and it performed better against the IRSD than other solutions (**Table 8.7**).

A check with the IRSD showed that, of the bottom ten towns as classified by the IRSD, three (30.0 per cent) were classified to the High health service use group in this analysis. Further, of the top 26 towns under the IRSD, 13 (50.0 per cent) were classified to the Low health service use group.

Social health clusters of towns

The cluster analysis technique has also been applied to a combination of the socioeconomic status and health status data sets. Data considered for inclusion were the variables in the final models for towns used to examine socioeconomic status and health status.

There were 24 variables to analyse 55 records. This was clearly not enough data. A cluster analysis of all the above variables was tried to see if it gave a reasonable solution despite the lack of data. This produced a three cluster solution of fair to average quality. The solution did not perform at all well against the IRSD for the Low status group, and lacked definition between the Medium and Low status groups.

Alternative strategies were tried in an attempt to produce a better solution, with the outcome a three cluster solution of reasonable quality, with Charters Towers (C) not grouped. The clusters were better spread than in other solutions, and the solution performed better against the IRSD than other solutions (**Table 8.7**).

Of the 17 lowest towns for the IRSD, nine (52.9 per cent) were classified to the Low social health status cluster; and of the top 14 towns for the IRSD, seven (50.0 per cent) were classified to the High social health status cluster.

Table 8.7: Composition of town clusters in Australia

SLA	Socioeconomic status	Health status	Health service utilisation	Social health status[1]
Albany (T)	Very low	Medium	Low	Medium
Albury (C)	High	Medium	Low	Low
Alice Springs (T)	Low	Medium	Medium	Low
Armidale (C)	High	Good	High	High
Ballarat (C)	High	Good	Low	Medium
Bathurst (C)	High	Good	Low	High
Benalla	High	Medium	High	Medium
Bendigo (C)	High	Good	Low	Medium
Broken Hill (C)	Very low	Poor	Low	Medium
Broome (S)	Low	Medium	Medium	Medium
Bunbury (C)	Medium	Good	Medium	High
Burnie (C)	Very low	Poor	Low	Low
Cairns (C)	High	Good	Low	High
Casino (A)	Very low	Medium	Medium	Low
Charters Towers (C)	Medium	Poor	Medium	Not mapped
Colac	Medium	Poor	Low	Low
Dalby (T)	Medium	Medium	Low	High
Deniliquin (A)	High	Poor	Medium	Medium
Devonport (C)	Very low	Medium	Low	Low
Dubbo (C)	High	Good	Medium	Medium
Echuca	High	Medium	Low	Medium
Geraldton (C)	Very low	Medium	Low	Medium
Gladstone (C)	Medium	Good	Low	High
Goulburn (C)	Medium	Medium	Medium	Low
Grafton (C)	Very low	Medium	Medium	Medium
Hamilton	High	Good	Low	Medium
Hervey Bay (C)	Very low	Medium	Low	Low
Horsham (RC)	High	Good	Low	Medium
Inverell (A)	Very low	Medium	High	Medium
Kalgoorlie/Boulder (C)	Medium	Poor	Medium	High
Katherine (T)	Low	Poor	Medium	Low
Launceston (C)	High	Good	Low	Medium
Mandurah (C)	Very low	Medium	Low	Low
Maryborough (C)	Very low	Medium	Low	Medium
Mount Gambier (C)	Medium	Good	High	High
Mount Isa (C)	Medium	Medium	Medium	High
Murray Bridge (RC)	Very low	Medium	Low	Low
Noosa	High	Good	Low	Medium
Orange (C)	High	Good	Medium	Low
Port Augusta (C)	Very low	Poor	Medium	Low
Port Hedland (T)	Medium	Medium	Medium	High
Port Lincoln (C)	Very low	Poor	High	Low
Port Pirie (C)	Very low	Poor	High	Medium
Portland	Very low	Poor	High	Medium
Queanbeyan (C)	High	Good	High	High
Rockhampton (C)	Medium	Good	Low	High
Sale	High	Good	Low	Medium
Shepparton (C)	Medium	Good	Medium	Low
Swan Hill (RC)	High	Good	Low	Medium
Tamworth (C)	High	Medium	Medium	Medium
Toowoomba (C)	Medium	Good	Low	High
Wagga Wagga (C)	High	Good	Medium	High
Wangaratta (RC)	Medium	Good	Medium	Low
Warwick (S)	Medium	Poor	High	Medium
Whyalla (C)	Very low	Medium	High	Low

[1] **Social health 'status clusters were produced by a joint analysis of the socioeconomic status and health status variables**

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