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APPENDIX A – A GUIDE TO THE SURVEY FIELDWORK INSTRUMENTS

OVERVIEW OF SURVEY FORMS

Survey Form	Information about:	Information provided by:	Information collected by:	Number of forms required:
1 HOUSEHOLD RECORD FORM (HRF) Names, sex, age, date of birth, relationship to carers, State/Territory of birth and self-reported Indigenous status of each person in the household. Primary and secondary carer(s) of each child. Duration that each child has lived with primary carer. Relationships within the household. Any other children aged 3–17 years who usually live at that address but who are temporarily away.	Number of people in household and how they are related	Carer1	Filled in by interviewer	1 per family
2a CHILD HEALTH QUESTIONNAIRE (CHQLK) A form to collect information about children aged birth to 3 yrs 11 months.	Child health information on children 0–3 years	Carer1/Carer2	Filled in by interviewer	1 for each child 0–3 years
2b CHILD HEALTH QUESTIONNAIRE (CHQBK) A form to collect information about children aged 4 years to 17 yrs 11 months.	Child health information on children and youth 4–17yrs	Carer1/Carer2	Filled in by interviewer	1 for each child/youth 4–17 years
3a. PRIMARY CARER'S FORM (CARER1) A form to collect information about a carer who is the main person looking after a given child.	Family and community circumstances. Family life & parent health. Carer's background and experiences.	Carer1	Filled in by interviewer	1 per family
3b SECONDARY CARER'S FORM (CARER2) A form to collect information about another carer of a given child.	Carer's background and experiences	Carer2 or Carer1	Filled in by interviewer	1 per family
4. YOUTH QUESTIONNAIRE (YSR–S/YSR–I)) A form to collect information about young people. Two administration methods are available: YSR–S (self administered) YSR–I (administered by interview)	Youth aged 12–17 years	Young people 12–17 years	Filled in by youth or interviewer	1 for each youth 12–17 years
5. SCHOOL & TEACHER QUESTIONNAIRES	Children & youth attending school	Teachers and school leadership team	Filled in by teachers & school leadership team	1 for each child at school (consent required)



CONTENT OF THE SURVEY INSTRUMENTS

- 1. Household Record Form (HRF)**
 - Who is currently living in the household
 - Which children do we need to collect information on
 - Are there other children temporarily away

- 2a. Child Health Questionnaire 0–3 years (CHQLK)**
 - Information about birth mother
 - Feeding, sleeping and early development
 - Immunisation and health care
 - Common chronic illnesses
 - Dental health
 - Breathing and asthma
 - Separations, accidents & hospitalisations
 - Disability and functional impairment
 - Emotional and behavioural problems
 - Use of medical and other services
 - Use of day care
 - Parenting practices

- 2b. Child Health Questionnaire 4–17 years (CHQBK)**
 - Information about birth mother
 - Immunisation and health care
 - Common chronic illnesses
 - Dental health
 - Breathing and asthma
 - Separations, accidents & hospitalisations
 - Disability and functional impairments
 - Use of medical & other services
 - Use of day-care, kindergarten & preschool
 - School and educational progress
 - Emotions, problem behaviours and social development
 - Parenting practices
 - Diet and nutrition
 - Other concerns about this child

- 3. Carer’s Questionnaire (CARER1 and CARER2)**
 - Language(s) spoken at home
 - Participation and involvement in Aboriginal activities and culture
 - Carer’s education
 - Employment and training
 - Benefits, pensions & income support
 - Family financial strain, carer’s income
 - Family stress from alcohol, gambling & violence



Experience of forced separation or relocation
 Positive family interaction and family resilience*
 Family life stress events (last 12 months)*
 Personal and social supports*
 Religious beliefs and practice of religion*
 Housing arrangements and housing standards*
 Perception of local community problems*
 Adequacy of and access to community amenities and services*
 (* Asked of Primary Carer only)

4. **Youth Questionnaires (YSR–I and YSR–S)**

Knowledge of Aboriginal language, culture and heritage
 Health risk behaviour (smoking, sex, alcohol, drugs)
 Diet and nutrition
 Breathing and asthma
 Strengths and difficulties questionnaire (social skills, ADHD, behaviour & emotional problems)
 Depression and suicidal behaviour
 Perceptions and experience of school
 Experience of racism and bullying
 Exposure to family violence, alcohol & gambling
 Physical fitness and participation in sport
 Religious beliefs and practice of religion
 Special friends/mates and peer influence
 Family support and encouragement
 Anything else you would like to tell us

5a. **Principal’s Questionnaire: School Details**

School contact information, school system and year range
 Student enrolment details (Aboriginal & non–Aboriginal)
 Staff composition
 Non–teaching staff (Aboriginal & non–Aboriginal)
 Support staff external to the school (Aboriginal & non–Aboriginal)
 Proportion of new (inexperienced) teachers
 Implementation of Professional Development and curriculum activities for Aboriginal education
 Principal’s ratings of:

- School, social & community problems affecting the overall school environment
- School morale and pastoral care arrangements
- School’s resources for education of Aboriginal students

 School has access to an Aboriginal Islander Education Officer (AIEO)
 School has an Aboriginal Student Support and Parent Awareness Committee (ASSPA) Committee



5b. Principal's Questionnaire – Student Academic Details

Main language spoken – at home, in the playground, in the classroom

Rating of overall academic performance

Achievements in literacy and numeracy

Duration of current enrolment at this school

Attendance record this year

Boarding, hostel or day student

Removal from class for behaviour problems

School suspensions & exclusions

Use and need of educational support services:

(Visual impairment, hearing impairment, intellectual disability, emotional or behavioural disturbance, learning disability, talented & gifted, physical disabilities, speech &/or language disability)

5c. Teacher's Questionnaire – Student behaviour

Strengths & Difficulties Questionnaire (SDQ)

- Social skills
- Hyperactivity and attention problems
- Conduct problems
- Emotional problems

Duration and severity of emotional/behaviour problems

Functional impairment (peer relations, classroom learning)

Burden and need for professional help

5d. Teacher's Questionnaire* – Student Skills

Matrices – Non-verbal reasoning skills

Word Definitions – English language proficiency

(* For high school students, a school counsellor, form teacher, year head, or year coordinator completed this section)



APPENDIX B – SAMPLE DESIGN

INTRODUCTION

The WA Aboriginal Child Health Survey (WAACHS) was based on the WA Child Health Survey of mainstream children that was conducted in 1993. The sample design has a number of similarities to the design of the 1993 survey, but some changes have been necessary to restrict the scope of the survey to Aboriginal and Torres Strait Islander children.

The Australian Bureau of Statistics undertook the initial sample design work.

POPULATION

In scope for the survey were families in WA with one or more children under the age of 18 years who were identified as being of Aboriginal or Torres Strait Islander descent. The design used was a stratified multi-stage sample using an area-based frame. Area-based sampling had to be employed as there is no list of Aboriginal children from which a sample could be selected. The frame was compiled from the 1996 census and included all census collection districts (CDs) in WA where there were at least two children of Aboriginal or Torres Strait Islander descent enumerated in the 1996 census. CDs where less than two Aboriginal children were living at the time of the 1996 census were excluded to reduce enumeration costs. Of 3,480 CDs in WA in the 1996 census, only 1,690 (48.6 per cent) met this inclusion criterion. Based on 1996 census counts, this would have excluded 1.4 per cent of the population of in-scope children, who were living in CDs where there was only one Aboriginal child.

A special feature of the survey process was the need to search each sampled census district by going door to door to identify eligible families. This followed the National Aboriginal and Torres Strait Islander Survey (NATSIS) methodology and allowed a comprehensive identification of eligible families who lived in a wide range of circumstances, including those Aboriginal families living in areas with otherwise 'low prevalence' Aboriginal representation.

STRATIFICATION

The frame was stratified into four regions that were combinations of ABS Statistical Divisions (SDs):

Perth Metropolitan Area	(SD 505)
South West	(SD 510, 515, 520)
Central	(SD 525, 530, 535)
Far North	(SD 540, 545)

Within strata, CDs were selected with unequal probability without replacement, where selection probabilities were based on a cost model. This cost model took into account the number of Aboriginal or Torres Strait Islander children from the 1996 census, as well as the proportion of families that had one or more children as a measure of the screening load required to find in-scope children and families. The CD selection also excluded CDs that were selected in the ABS Monthly Population Survey.



Within selected CDs, dwellings were selected using systematic sampling without replacement. The field interviewers conducted the dwelling selection. The first step involved listing all the dwellings in a CD starting at a randomly chosen start point. A skip was run through the listing to select dwellings that were then screened in order to find in-scope households. The size of the skip depended on the number of families with Aboriginal children within the selected CD. Overall, 71 per cent of selected CDs had a skip of 1, i.e. where all listed dwellings were screened in search of in-scope families. These were CDs where the number of families with Aboriginal children was small. All in-scope children within selected in-scope families were then included in the sample. The survey interviewers knocked on 139,000 doors to find the survey sample families.

Although the survey team allowed for the possibility of multiple families or households living within a single dwelling, in accordance with standard ABS practice, the experience of the survey was that this distinction was not required in practice.

SAMPLE UNDER-ENUMERATION AND TOP-UP SAMPLES

The original sample included 360 CDs selected according to the above methodology. However, these CDs yielded significantly fewer than the expected number of in-scope families and children. As a result, two additional top-up samples were selected increasing the overall number of CDs selected to 786. The top-up samples were selected in a similar manner to the original selections.

Investigations into the undercount have suggested that one contributing factor was the mobility of the population and the time lag between the 1996 census and the field work for the survey which was carried out in 2000 and 2001. A study of movements in public housing stocks has suggested that perhaps somewhere between 12–15 per cent of the target population moved to CDs that were not included in the sampling frame and had no chance of being selected. Sample under-enumeration is the subject of a separate study and technical report.

TREATMENT OF NON-RESPONSE

The survey was conducted on a voluntary basis and achieved a high response rate, around 85 per cent. Non-response could occur at three levels — at the family level where a selected family could not be contacted or chose not to participate; at the individual form level where, for instance, completed questionnaires may be obtained from the parents but the youth self-report form was not obtained; or at the level of the individual question. Non-response at the first two levels were dealt with by means of weighting adjustments, with a separate set of weights being computed for each questionnaire. Item-level non-response was dealt with by means of imputation of missing values. A careful investigation of item non-response rates was undertaken, and forms that had a high proportion of data items with missing values were treated as non-respondents at the form level, and excluded from the analysis.

WEIGHTING

To assess overall non-response and under-coverage bias (due to possible migration of families out of the sampling frame) the distribution of the sample was compared with figures obtained from the 2001 census for a range of demographic variables, including sex, region, age, ability to speak an Aboriginal language, school attendance, carer education, carer income, household size, dwelling type, dwelling ownership and tenancy arrangements. Family structure was postulated to be an important variable, based on the experience of the 1993 WA Child Health Survey¹.



Unfortunately it was not possible to consider it in the weighting process due to limitations in census processing and output.

Of these factors, significant differences were found between sample and population distributions according to child's age, and number of persons living in the household. From age 12 years to age 17 years there was a continuing decline in representation in WAACHS. By age 17 years, participation in the survey was 40 per cent lower than expected based on census figures.

The survey also had a lower proportional representation of children living in small households. These factors were also found to be associated with survey participation in the 1993 WA Child Health Survey.¹ None of the other factors tested were found to be associated with response rate.

To adjust for differential non-response, post-stratification weighting was employed. However, because of the small size of the population and the number of factors involved, the weights were calculated using the generalised raking procedure of Deville and Särndal (1992).² Within survey strata (i.e. regions), weights were calculated to sum to marginal totals by age of child, sex and number of people living in the household. This procedure sets out to determine the set of weights that will sum to the correct benchmark population totals that minimise the difference between the final survey weights and the initial survey weights, based on the probabilities of selection.

Benchmark totals by age (in single years) and sex, by region were provided by the ABS from the Preliminary Estimated Indigenous Resident Population series, as at 30 June 2001 (ABS unpublished data). As estimated resident population benchmarks were not available by household size, these were estimated from 2001 census counts, by applying an adjustment procedure that included allowances for census under-enumeration and imputation for non-response on the census forms.

One set of weights was determined for the sample children, and a separate set of weights was calculated for the youth self-report data that achieved a lower response rate than the information collected from parents. The child weights were used as a basis for calculating the carer weights, with the harmonic mean of the child weights used to calculate the carer weight, after adjusting for non-response among carers. This procedure was necessary as there was no effective way to derive an independent population benchmark for carers of Aboriginal children.

Once weights were determined, estimates were produced as simple weighted sums of quantities of interest, and percentages and proportions of weighted sums as appropriate.

IMPUTATION

Almost all of the items collected in the WAACHS have some level of item non-response. Very few questionnaires are complete for every item. Item level non-response often arose in cases where the respondent did not know the answer to a particular question. While each survey form contained hundreds of data items, most forms only had missing or unknown responses for a handful of data items. In these cases it would be wasteful to exclude entire forms because of the lack of a small number of data items. For most of the data items there was only a small amount of item level non-response. It was decided to impute for non-response as generally speaking the low level of non-response has minimal substantive effect on the analysis, but the inclusion of a 'not stated' category in each table complicates the presentation or results, particularly when calculating ratios and percentages.



Random hot-deck imputation was used for imputing non-response at the item level. Imputation classes were formed based on age, sex and remoteness. Then within each imputation class, for each non-respondent a donor was chosen at random. The donor's response was then used to impute the value for the non-respondent (Kalton, 1983).³

This procedure doesn't add extra information about the non-respondents, but serves to fill out the data set to make analysis and interpretation of the results more straightforward. To prevent imputed values affecting the analysis in any substantive way, a maximum cut-off of 10 per cent of the applicable responses was set as a limit. If the level of non-response for any item exceeded this limit, no imputation for that item took place, and categories 'Don't know' and 'Not stated' were maintained and are presented in the published results. As sequencing of the questionnaires limits the sub-population answering some items on the survey, this cut-off was applied at the sub-population level. For instance, suppose that question one asks 'Are you the natural mother of the child?' and question two asks 'How long did you breast feed this child?'. If more than 10 per cent of the natural mothers either answered, 'Don't know' or didn't provide an answer no imputation would take place for this item. There was only a small number of items where this limit was exceeded.

No imputation was undertaken for basic demographic information recorded on the household record form (HRF). Also imputation was not performed for the percentage of cases that did not link to administrative records. Where linked administrative data are used in the analysis, figures relate only to the proportion of participants who were successfully linked to the relevant databases. Also no imputation was done for missing data where it existed within the administrative databases.

ESTIMATION

Because of the complex nature of the sample design it is not possible to derive a simple closed form for the variance of survey estimates. The survey has many features of modern complex survey designs with stratification, multiple stages of selection, and unequal selection probabilities. The survey design differs from many clustered survey designs in that, due to the nature of the distribution of the population, the sample size per CD varies significantly between CDs.

Wolter (1985)⁴ described the ultimate cluster variance estimation method (UCV) and demonstrates that it produces unbiased variance estimates from multi-stage sample designs where the first stage of selection is performed with replacement. This method of variance estimation has been implemented in common statistical packages such as STATA and SAS, along with a finite population correction factor to adjust for bias where the first stage of selection is performed without replacement. These common implementations of the UCV make the assumption (as per Rao, Wu and Yue (1992)⁵) that the sample within each primary selection unit (PSU) is the same size, and that an unbiased estimate of population total can be produced from each PSU by multiplying the weighted sum from the PSU by the number of clusters selected in the sample. Unfortunately this assumption is violated in the WAACHS. Because of the population distribution, there are many CDs where the entire CD was enumerated but yielded only one in-scope family (23 per cent of CDs), while some CDs yielded up to 17 in-scope families.

Empirical testing of the SAS and STATA procedures for variance estimation from stratified multi-stage samples found that the large fluctuation in sample size per PSU caused the resulting variance estimates to be highly unreliable and effectively unusable for the survey.



For the survey a modified form of the UCV method was used for calculating variances of estimates of total numbers of children, carers and families in various categories. A modified form of the Jack-knife variance estimation method (Jones, 1974)⁶ was used for calculating variances of proportions, percentages and ratios.

ENDNOTES

- 1 Zubrick SR, Silburn SR, Garton A, Burton P, Dalby R, Carlton J, Shepherd C, Lawrence D, (1995). Western Australian Child Health Survey: Developing Health and Well-being in the Nineties. Australian Bureau of Statistics and the Institute for Child Health Research. Perth. Western Australia.
- 2 Deville J-C, Särndal C-E, (1992). Calibration estimators in survey sampling. *Journal of the American Statistical Association*. 87: 376–382.
- 3 Kalton G, (1983). Compensating for missing survey data. Research Report Series, Institute for Social Research. The University of Michigan.
- 4 Wolter KM, (1985). Introduction to variance estimation. Springer-Verlag. New York.
- 5 Rao JNK, Wu CFJ, Yue K, (1992). Some recent work on resampling methods for complex surveys. *Survey Methodology*. 18: 209–217.
- 6 Jones HL, (1974). Jackknife estimation of functions of stratum means. *Biometrika*. 61: 343–348.



APPENDIX C – DETERMINATION OF LEVELS OF RELATIVE ISOLATION (LORI) BASED ON ARIA++

INTRODUCTION

In 1997 the Commonwealth Department of Health and Aged Care (DHAC) commissioned the National Key Centre for Social Applications of Geographic Information Systems (GISCA) to develop an index of remoteness and accessibility to services. The result of this work was the ARIA index.¹ ARIA measures accessibility to services by calculating road distances to population centres of varying sizes. The ARIA index quickly became widely accepted within both research and policy settings. As a result, the ABS decided to incorporate ARIA into the Australian Standard Geographic Classification in time for the 2001 Census of Population and Housing.^{2,3} The ABS did this based on a revised version of ARIA, which GISCA have called ARIA+. ARIA+ had two major changes compared to the original ARIA; the incorporation of an extra class of service centres, and changes to the cut-off scores that defined the 5 broad categories of remoteness.

It is clear that remoteness is a key part of describing the circumstances of Aboriginal children in Western Australia, and plays a key role in placing the well-being and development of Aboriginal children in the context of their environment. The WAACHS team looked to the ARIA index as a possible means of doing this. However, the ARIA has been defined in terms of the total population of Australia and was not specifically designed to describe the circumstances of Aboriginal children and families. In particular, the 'Very Remote' category of ARIA and ARIA+ contains only one per cent of the total population of Australia, but over 25 per cent of the WAACHS children were living in areas classified as 'Very Remote'. Analysis of the survey data showed that the families living in 'Very Remote' Western Australia could not be considered as a homogenous group in terms of their relative isolation and access to services. Geographically, the area classified as 'Very Remote' represents almost three-quarters of the land mass of Western Australia. As an example, within the Kimberley region of Western Australia only the area in the immediate vicinity of Broome is classified as Remote, the rest of the region is classified as 'Very Remote'. Even at the level of the underlying index values, there is no discrimination between, for example, Halls Creek which has a small hospital, and the much smaller community of Balgo, several hours drive south of Halls Creek and much more isolated. Both receive the maximum score of 12 under the original ARIA. While Halls Creek is a small town, it does act as a regional service centre for a number of communities in the East Kimberley. It was found that in terms of variables such as adherence to traditional culture and language, there was a considerable degree of variation within the Very Remote class that could not be described using ARIA.

The survey team approached GISCA who were already undertaking developmental work on a new product called ARIA++, which introduces another level of service centre and provides more flexibility in describing variations in isolation within the most remote regions of Australia. At the request of the survey team, GISCA produced a version of the ARIA++ based on the 1996 Census Collection Districts (CDs) that were used as the sampling frame for WAACHS. This has allowed a much greater degree of discrimination within the 'Very Remote' category. For the purposes of the survey, categories of relative isolation have been defined using the ARIA++ index that attempt to capture the diversity of locations where Aboriginal families live.



ARIA INDEX

The ARIA index measures remoteness by means of road distances from service centres of varying sizes. Four categories of service centre were defined based on population:

- A: 250,000 and greater
- B: 48,000 to 249,999
- C: 18,000 to 47,999
- D: 5,000 to 17,999

The calculations were based on a set of 11,340 populated localities as defined by the Australian Surveying and Land Information Group (AUSLIG). These localities include some locations that are not permanently settled. For each populated locality, the road distance to the nearest service centre in each category was calculated. Scores were assigned based on the ratio of the distance to the nearest service centre compared to the mean distance for that category. These scores were assigned on a scale of 0 to 3, and a total score derived by summing the component scores to give a score between 0 and 12. The four categories of service centre were chosen to represent different levels of service availability, with an expected strong correlation between number and type of services offered in a service centre and the population of that service centre.

Once ARIA scores are calculated for each populated locality, the scores are interpolated onto a 1 kilometre square grid. The scores on this grid are then averaged over specific areas to produce scores for these areas, for example CDs.

ARIA+ INDEX

There were two major differences between the ARIA and the ARIA+. The first is the inclusion of an extra category of service centre with population:

- E: 1,000 to 4,999

This results in a score from 0 to 15. Also, the cut-off scores for defining the categories of remoteness were altered. This reduced the size of the 'Highly Accessible' category, while increasing the size of the 'Remote' and 'Very Remote' categories. The ABS felt that the categories of 'Remote' and 'Very Remote' needed to be enlarged to ensure sufficient sample would fall in these areas in population surveys to allow results to be tabulated at this level. Note that in the ABS adoption of ARIA+, slightly different labels have been given to the five categories of remoteness.

ARIA++ INDEX

The ARIA++ index includes a sixth category of service centre with population:

- F: 200 to 999

This results in scores over the range 0–18. Category F service centres do play a role in Aboriginal life. For instance, the Warburton community, with population around 450, is the major regional centre for the central desert communities. Under the ARIA++ classification, Halls Creek receives a score of 12, and Warburton receives a score of 15, with the maximum score of 18 being reserved for truly remote, small and isolated communities (e.g. Balgo).



DEVELOPMENT OF CATEGORIES FOR LEVEL OF RELATIVE ISOLATION (LORI)

In order to use the ARIA++ index it was desired to produce a grouping of the index values into a small number of classes that have the following attributes:

- are sufficiently large in population to allow analysis of results
- are as internally homogeneous as possible with respect to variables that are likely to be associated with remoteness and isolation from services.

In order to determine suitable cut-off values an analysis was undertaken of survey data by ARIA++ for a range of variables that were potentially associated with access to services, and strength of adherence to traditional cultures. These included:

- whether carers can speak an Aboriginal language conversationally
- whether children can speak an Aboriginal language conversationally
- whether the carer has attended any Aboriginal ceremonies in the previous 12 months
- whether the carer has attended any Aboriginal festivals or carnivals in the previous 12 months
- whether the carer has been involved with any Aboriginal organisation in the previous 12 months
- carer reported distance to nearest doctor and nearest hospital
- carer reported condition of roads
- whether the community was classified as a remote Aboriginal community for the purposes of the survey. This was a binary classification determined at the time of the survey fieldwork that identified discrete Aboriginal communities that were isolated from medical services
- whether roads ever become unusable due to flooding.

The analysis involved producing detailed tables by fine classifications of ARIA++ as well as fitting spline curves to describe the shape of association between a variable and ARIA++. The method of Generalised Additive Models (GAM) was used to fit these spline curves (Hastie and Tibshirani, 1990)⁴. See, for example, Figure 2.8 in Chapter 2 which shows the proportion of children and carers who are conversant in Aboriginal languages by ARIA++.

A score of 0.2 was chosen as the cut-off for the most accessible category under ARIA+, and in WA this area corresponds with the Perth metropolitan area. It made sense to retain this category as the least isolated category, as it covers over 30 per cent of the Aboriginal population and matches well with other geographic classifications. However, for the purposes of describing the Aboriginal population of WA it did not make sense to try to maintain the other existing category boundaries. Table C1 shows the distribution of the WAACHS sample children by the five categories of ARIA and ARIA+. The geographical distribution of Aboriginal and Torres Strait Islander children is markedly different from non-Indigenous children and there are only modest populations of the three middle categories. It made sense to consider distributing the categories further towards the remote end of the scale.



TABLE C1: DISTRIBUTION WAACHS SURVEY CHILDREN BY ARIA AND ARIA+

Level of remoteness	ARIA	ARIA+(a)
	%	
Highly accessible	41.0	31.3
Accessible	10.3	10.5
Moderately accessible	11.2	17.9
Remote	11.5	13.8
Very remote	26.0	26.5

The results of these analyses suggested that there was a strong degree of homogeneity between ARIA++ values 0 and 8, another homogeneous group between 8 and 13, and a strong trend over the last few points of the scale, particularly between 17 and 18. As a result, the following groupings were proposed:

TABLE C2: RELATIONSHIP OF LEVEL OF RELATIVE ISOLATION AND ARIA++

Level of relative isolation	ARIA++ range
Highly accessible	0 – 0.2
Accessible	0.2 – 8
Moderately accessible	8 – 13
Remote	13 – 17
Very remote	17 – 18

Table C3 shows the distribution of the Aboriginal population of Western Australia, along with the survey sample, by these five levels of relative isolation. Although the size of each area, in terms of population numbers, declines with increasing level of relative isolation, the very strong differences between the 'Moderate', 'High' and 'Extreme' areas justified their establishment as separate regions. With almost 10 per cent of the population in areas of 'Extreme' relative isolation, the smallest of the five areas, there are still large enough numbers to allow proper analysis by this classification.

TABLE C3: WA ABORIGINAL POPULATION AND WAACHS SAMPLE, BY LEVEL OF RELATIVE ISOLATION (LORI)

LORI	1996 Census – Children		1996 Census – Persons		WAACHS – Children		WAACHS – Carers	
	Number	%	Number	%	Number	%	Number	%
None	7 818	33.6	16 509	32.5	1 636	30.9	983	31.1
Low	5 754	24.7	12 152	23.9	1 680	31.7	1 036	32.8
Moderate	4 987	21.4	11 218	22.1	971	18.3	556	17.6
High	2 800	12.0	6 325	12.4	520	9.8	275	8.7
Extreme	1 885	8.1	4 524	8.9	482	9.1	303	9.6
Total	23 244	100.0	50 728	100.0	5 289	100.0	3 153	100.0



Table C4 shows the distribution of selected characteristics used in the analysis, by level of relative isolation. While areas of ‘None’ or ‘Low’ relative isolation are very similar, there are strong differences between the remaining areas for these characteristics.

TABLE C4: SELECTED CHARACTERISTICS OF WAACHS CARERS, CHILDREN AND COMMUNITIES, BY LEVEL OF RELATIVE ISOLATION (LORI)

LORI	Remote community	Carer speaks Aboriginal language	Children speak Aboriginal language	Participate in Aboriginal cultural events	Roads ever become unusable	Roads in good condition
	%					
None	0.0	4.0	1.7	9.9	8.1	89.9
Low	0.0	6.0	3.3	9.4	13.2	87.8
Moderate	10.9	35.2	15.6	24.2	28.7	84.8
High	65.9	45.4	30.4	43.5	68.0	73.6
Extreme	100.0	80.0	59.6	61.7	82.2	69.0

To give an idea of how this index scores individual communities, values for selected localities in WA are shown in Table C5. The considerable differences between ARIA and ARIA++ can be clearly seen in this table. Under ARIA, small service centres such as Meekatharra and Derby are classified Very Remote, as well as the smaller and more outlying regions that these centres service.

SUMMARY

The ARIA++ index gives the opportunity to discriminate between grades of remoteness within remote Aboriginal communities. Compared to the original ARIA, which classified over one quarter of the WA Aboriginal population to the Very Remote category, the ARIA++ allows this group to be subdivided. These subdivisions reveal trends in Aboriginal culture and language, as well as trends in terms of access to medical services that would otherwise be obscured under the original ARIA. While ARIA can work well in describing non-Indigenous populations, ARIA++ is clearly superior in describing the Aboriginal population. It is the basis of much of the analysis presented in this publication and is the basis for our measure of Levels of Relative Isolation (LORI).



TABLE C5: ARIA++ AND ARIA VALUES FOR SELECTED LOCALITIES IN WA

Locality	ARIA++ Score	LORI	Original ARIA value	Original ARIA category
Perth	0	None	0	Perth
Rockingham	0.04	None	0.29	Highly Accessible
Mandurah	0.21	Low	0.47	Highly accessible
Bunbury	0.94	Low	1.14	Highly Accessible
Busselton	1.63	Low	1.84	Accessible
Albany	2.70	Low	2.69	Accessible
Geraldton	2.70	Low	2.76	Accessible
Kalgoorlie	3.97	Low	3.87	Moderately accessible
Merredin	5.32	Low	5.31	Moderately accessible
Kalbarri	6.61	Low	6.62	Remote
Esperance	7.51	Low	7.21	Remote
Carnarvon	8.15	Moderate	8.16	Remote
Port Hedland	9	Moderate	9	Remote
Broome	9	Moderate	9	Remote
Karratha	9	Moderate	9	Remote
Meekatharra	10.80	Moderate	10.79	Very Remote
Derby	11.10	Moderate	11.41	Very Remote
Newman	11.84	Moderate	8.8	Remote
Halls Creek	12	Moderate	12	Very Remote
Fitzroy Crossing	12	Moderate	12	Very Remote
Kununurra	12	Moderate	12	Very Remote
Laverton	13.07	High	10.17	Very Remote
Pannawonica	13.72	High	10.74	Very Remote
Wyndham	14.23	High	12	Very Remote
Coral Bay	14.44	High	12	Very Remote
Warburton	15	High	12	Very Remote
Oombulgurri	15.08	High	12	Very Remote
Kalumburu	15.10	High	12	Very Remote
Christmas Creek	17.12	Extreme	12	Very Remote
Jigalong	17.97	Extreme	10.52	Very Remote
Punmu	18	Extreme	12	Very Remote
Balgo	18	Extreme	12	Very Remote
Mulan	18	Extreme	12	Very Remote

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APPENDIX D – RELIABILITY OF ESTIMATES

MEASURING SAMPLING ERROR

Estimates from the WAACHS are based on information obtained from a sample of families, and are therefore subject to sampling variability. The figures from the sample may be different from the figures that would have been obtained had all families with Aboriginal Children in Western Australia been included in the collection, just by virtue of random chance. This variability is known as *sampling error*. The size of the survey sample and the way the sample is designed are factors in determining the amount of sampling error.

Sampling errors can be estimated from the survey data. One measure of the sampling error is given by the 95% confidence interval. The confidence interval measures the degree to which an estimate may vary from the value that would have been obtained from a complete enumeration of the entire population. There are about nineteen chances in twenty (i.e. a 95% chance) that the population value will lie in the range indicated by the confidence interval.

For example, the proportion of Aboriginal and Torres Strait Islander children who have ever had asthma was estimated to be 23.2 per cent with a 95% confidence interval (21.6%–24.9%). This means that there is a 95% chance that if the entire population had been enumerated, and not just the sample, that the population value would lie between 21.6 per cent and 24.9 per cent (a range of 3.3 percentage points).

The size of a confidence interval is a measure of the accuracy of an estimate. The smaller the confidence interval the more accurate the estimate. As a general rule, the smaller the sample size used for calculating an estimate, the less accurate that estimate will be. For instance, the proportion of Aboriginal and Torres Strait Islander children living in Perth who have ever had asthma was 30.5 per cent with a 95% confidence interval of (27.3%–33.8%). As only approximately 30 per cent of survey children live in Perth this estimate is based on a smaller sample size than the estimate for WA overall. For all of WA the confidence interval has a range of 3.3 percentage points. When restricted to Perth only, the confidence interval has a range of 6.5 percentage points.

ASSESSING STATISTICAL SIGNIFICANCE

Confidence intervals provide a means to assess the statistical significance of differences between figures. When comparing different estimates it is possible that differences could arise by chance alone, because the data is based on a random sample only. Differences between figures are said to be *statistically significant* when it is very unlikely that the difference could be attributed to random chance. The confidence interval gives a ready means of identifying the statistical significance of differences between figures.

For example, the estimated lifetime occurrence of asthma was 30.5 per cent among children living in Perth, and 7.3 per cent among children living in areas of extreme relative isolation. The respective 95% confidence intervals are (27.3%–33.8%) and (5.3%–9.7%). If two confidence intervals overlap it is concluded that there is a possibility the difference could be due to chance variation. When there is no overlap, as in this example, it is concluded that the difference is statistically significant. That is, it is likely to represent a real difference in the occurrence of asthma between the two areas that cannot be explained by random chance alone. However, the lifetime occurrence of asthma among children living in areas of low relative isolation was



26.3 per cent with a 95% confidence interval (22.7%–30.2%). As this confidence interval overlaps with the confidence interval for the figure from Perth it is possible that this difference could be due to chance variation. The difference between the figures for Perth and for areas of low relative isolation would be regarded as not statistically significant.

It is important to note that just because a difference is not statistically significant does not mean that there is no real difference between the groups being compared. Where there is a true, but small difference, it is possible that the difference is smaller than the accuracy of the estimates as measured by the confidence interval. For instance, if there was a one per cent difference in the true population estimates of the occurrence of asthma between Perth and areas of low relative isolation, the survey could not detect this, as the confidence intervals for the estimates are wider than this. This is referred to as the *power* of the survey. Generally speaking, the survey does not have the power to detect differences in figures less than two to three per cent, and the power of the survey is reduced for small subsets of the survey population.

NON-SAMPLING ERRORS

In addition to sampling error, survey estimates can be subject to other inaccuracies, which are referred to collectively as *non-sampling error*. Non-sampling errors can occur because of form design limitations, errors in reporting by respondents due to difficulties recalling certain data or lack of appropriate records for certain data, errors made in collection such as in recording and coding data by the interviewers, and errors in the processing of the data. Non-sampling errors may occur in any enumeration, whether it be a full census or a sample.

Every effort is made to reduce non-sampling error to a minimum by careful design and testing of questionnaires, thorough training for interviewers, efficient operating procedures including quality control procedures, and use of appropriate survey methodologies.



APPENDIX E – AUSTRALIAN GOVERNMENT AND WESTERN AUSTRALIAN GOVERNMENT ABORIGINAL HEALTH POLICIES

While there is currently no cohesive or discrete **Aboriginal Children’s Health Policy Framework**, some of the existing national policy frameworks and strategies, which relate to Aboriginal health, are outlined here.

NATIONAL ABORIGINAL HEALTH STRATEGY (NAHS)¹

The 1989 National Aboriginal Health Strategy (NAHS) was a landmark document. It is still extensively used by health services and continues to guide policy makers.

The main recommendations of the Strategy included:

- Improving health services (minimum standards, increased recurrent funding, and improved access to mainstream services)
- Improving essential services and community infrastructure
- Improving education, training and employment in Aboriginal health.

While the NAHS was a comprehensive statement of Aboriginal and Torres Strait Islander health objectives it was never fully implemented.

NATIONAL STRATEGIC FRAMEWORK FOR ABORIGINAL AND TORRES STRAIT ISLANDER HEALTH²

The National Strategic Framework for Aboriginal and Torres Strait Islander Health was endorsed by the Australian and State/Territory governments and signed by all Health Ministers in July 2003. It is a complementary document that builds on the 1989 NAHS. Framework Agreements are also in place in every State and Territory and in the Torres Strait. The main purpose of the Agreements is to have a common commitment in each jurisdiction to regional planning, data collection, increased resources and increased access to the mainstream health sector. Under the Agreements, partnership forums have been established to undertake regional planning and to provide a mechanism for the community sector to be involved in policy development and planning. The aims of the Strategy are measured against national performance indicators.

One of the priorities of the Framework is child and maternal health. The Framework recognises that the health of women during pregnancy has a major impact on young children, which in turn has an impact on the incidence of chronic disease later in life.

The Framework includes an action area to develop an Aboriginal and Torres Strait Islander maternal and child health framework that addresses the physical, emotional and social well-being of women and children (aged 0-5 years).

NATIONAL DRUG STRATEGY ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLES’ COMPLEMENTARY ACTION PLAN 2003 – 2006³

Australia’s National Drug Strategic Framework 1998-99 to 2002-03 was set up to improve health, and social and economic outcomes by reducing use of harmful drugs. It is an umbrella framework under which national plans tackling alcohol, tobacco and illicit drugs, and education about drugs have been formed. The Aboriginal and Torres Strait Islander Peoples Complementary Action Plan 2003–2006 was developed to complement the issues raised in these national plans and make them more applicable to Aboriginal and Torres Strait Islander peoples.



NATIONAL INDIGENOUS AUSTRALIANS SEXUAL HEALTH STRATEGY (NIASHS)⁴

The National Indigenous Australians Sexual Health Strategy (NIASHS) provides a comprehensive approach to preventing the spread of HIV and other sexually transmissible infections in Aboriginal and Torres Strait Islander communities. The NIASHS recommends action in four priority areas: prevention; treatment, care and support; workforce issues; and research and data collection. It aims to strengthen the capacity of the community controlled primary health care sector to respond to Indigenous sexual health and build partnerships with the mainstream health sector.

NATIONAL CHILD NUTRITION PROGRAM GRANTS - TARGETED INDIGENOUS PROJECTS⁵

The National Child Nutrition Program is a community grants program targeting the nutrition and long term eating patterns of children aged 0–12 years of age and pregnant women. A high priority has been given to projects in rural and remote communities, Aboriginal and Torres Strait Islander communities and communities with greater levels of socio-economic disadvantage. The Program was launched in December 1999.

The Program supports community-based projects aiming to improve nutrition-related knowledge and skills of children and their parents; the capacity of communities to promote better nutritional health; and access to, and availability of, nutritious foods.

An Indigenous specific round commenced in late 2001. Unlike the first round, this round included an education focus in support of the National Indigenous English Literacy and Numeracy Strategy. This strategy identifies poor nutrition as a primary cause of a child's reduced capacity to concentrate and learn in the classroom setting. Six projects have been launched in Western Australian – mainly located in schools in remote regions (Yalgoo, Mt Magnet, Meekatharra, Onslow, Roebourne and Perth).

The Strategy notes that the health status of children is a powerful influence on their ability to come to school and when at school, on their capacity to learn and fully participate in schooling opportunities. The Strategy states that children who are hungry or deficient in nutrients, particularly iron, have diminished concentration and cognitive function.

NATIONAL PERFORMANCE INDICATORS FOR ABORIGINAL AND TORRES STRAIT ISLANDER HEALTH⁶

The Performance Indicators were developed through a collaboration of the State/Territory Aboriginal health units and the Commonwealth government on behalf of the Australian Health Ministers' Health Advisory Council. The indicators are used to monitor and report progress in Aboriginal and Torres Strait Islander health. The Performance Indicators also include a set of emotional and social well being indicators which are currently being trialled.

Western Australian policy frameworks have mirrored many of the national initiatives but also reflect local emphasis and requirements. Among the important policy developments are:

WESTERN AUSTRALIAN ABORIGINAL HEALTH STRATEGY⁷

The Western Australian Aboriginal Health Strategy (WAAHS) is an initiative of the Joint Planning Forum (JPF), which holds representation from the Office of Aboriginal Health (OAH), the Office of Aboriginal and Torres Strait Islander Health (OATSIH), the Aboriginal and Torres Strait Islander Commission (ATSIC) and



the Western Australian Aboriginal Community Controlled Health Organisation (WAACCHO). It has evolved from the work of six regional health-planning teams throughout WA and is based on the Regional Aboriginal Health Plans.

The strategy sets the strategic agenda for all components of the health system to achieve lasting improvements in Aboriginal health in Western Australia. The strategy has six domains of action. These are:

- Increasing access to health services
- Reforming the health system
- Reconciling community control and empowerment
- Improving health information management
- Strengthening intersectoral collaboration on health
- Improving health financing.

The first domain includes sub-strategies to decrease risk factors such as smoking, substance misuse, and lack of fresh vegetables, and to increase access to primary, specialist, mental and dental health services.

WESTERN AUSTRALIAN FRAMEWORK AGREEMENT ON ABORIGINAL AND TORRES STRAIT ISLANDER HEALTH⁸

This agreement underpins the way in which Aboriginal health strategies, programs and services are developed and delivered. Its objective is to improve health outcomes for Aboriginal and Torres Strait Islander peoples in Western Australia through a coordinated approach to the planning, funding and delivery of health and health related services. The WA framework agreement has incorporated the domains reflected in the WA Aboriginal Health Strategy 2000.

This partnership operates through the Joint Planning Forum and associated Regional Aboriginal Health Planning Forums in the six Aboriginal health regions covering the State.

ABORIGINAL FOOD AND NUTRITION STRATEGY⁹

The Office of Aboriginal Health in conjunction with the Nutrition Program, Department of Health (WA) has developed a Food and Nutrition Policy to:

- Raise Aboriginal people's awareness of the importance of nutrition
- Identify specific Aboriginal concerns in this area
- Provide a focal point towards which a broad range of organisations can work to improve Aboriginal nutritional health in Western Australia.

The policy recognises that improvements in nutrition can reduce infections, hearing loss and learning problems among children.

WESTERN AUSTRALIAN AGENCY DRUG AND ALCOHOL ACTION PLANS¹⁰

The Western Australian government released the Government Agency and Area Drug and Alcohol Plans in 2003. The Plans were developed to provide a seamless



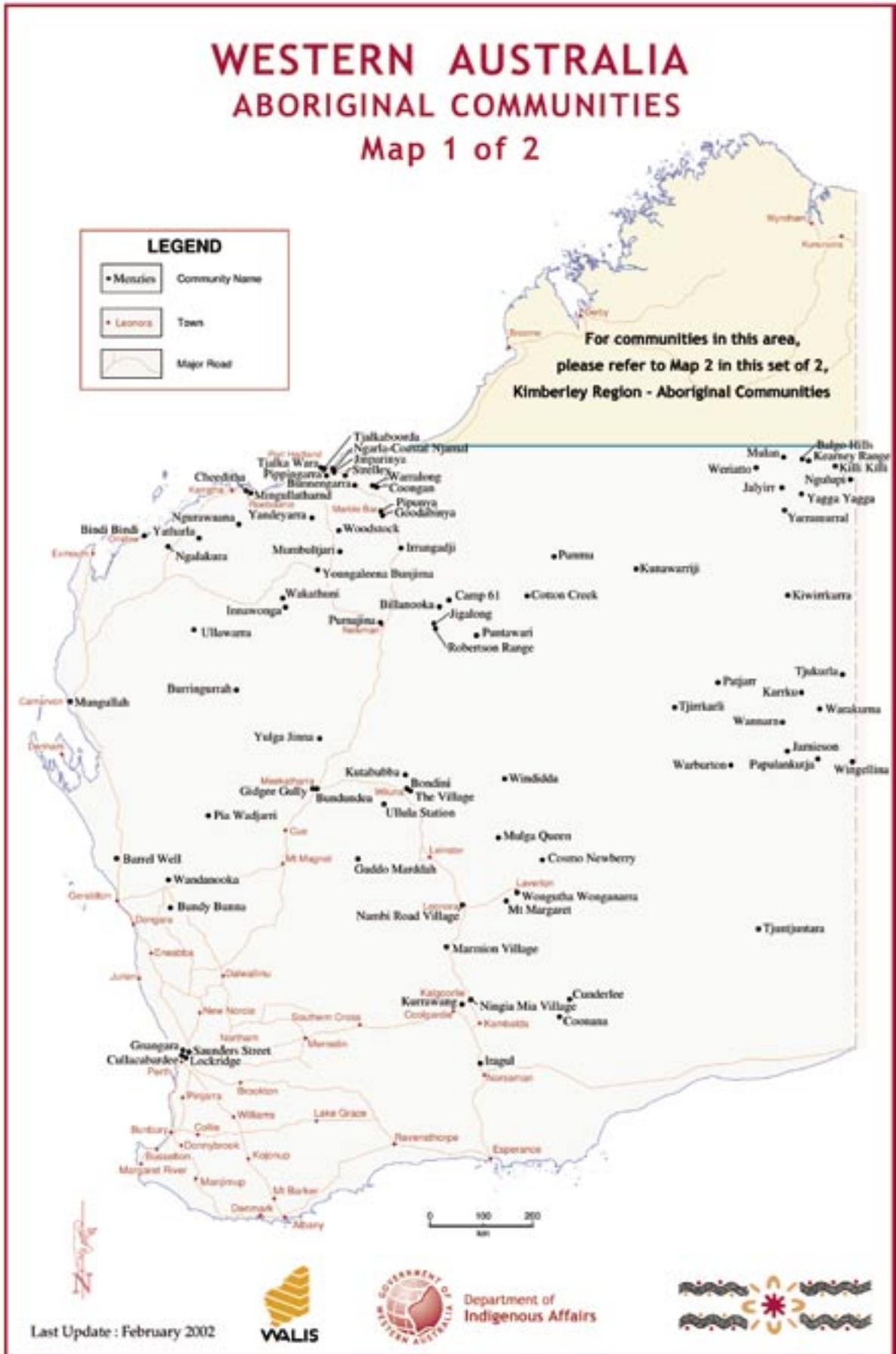
system of care for those in need and a more coordinated approach from the many agencies involved in addressing drug and alcohol issues. The Plans include initiatives to reduce the incidence of alcohol and drug related harm in Aboriginal communities.

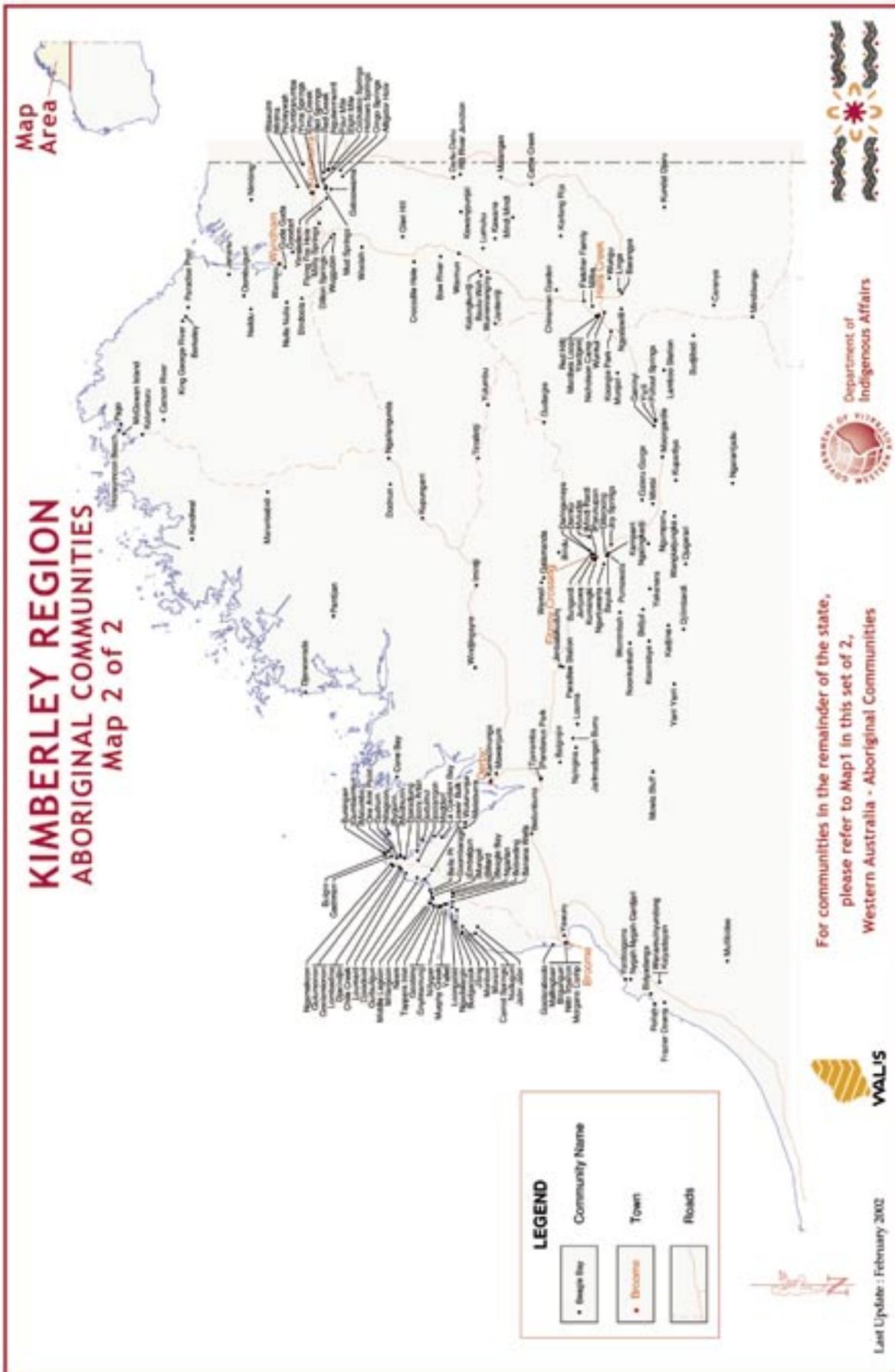
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APPENDIX – F





GLOSSARY

APGAR SCORE

A score, determined by the five characteristics of colour, muscle tone, heart rate, respiration and reflex activity, which is assigned to newborn babies at one and five minutes after birth.

AUSTRALIAN QUALIFICATIONS FRAMEWORK

The Australian Qualifications Framework (AQF) is a unified framework for classifying all qualifications in post-compulsory education and training in Australia.¹ It covers schools, vocational education and training (TAFEs and private providers) and the higher education sector (mainly universities). The second edition of the Australian Standard Classification of Occupations (ASCO) assigned each major occupation group to one of five broad skill levels. These skill levels were defined in terms of the levels of qualifications as defined in the AQF that are generally required for the occupations in each group and years of relevant work experience.

The ASCO major occupation groups have been grouped into skill levels as described in the following table.²

Major Occupation Group	Skill Level	Definition (a)
1 Managers and Administrators	Level 1	Bachelor degree or higher qualification or at least 5 years relevant experience.
2 Professionals	Level 1	Bachelor degree or higher qualification or at least 5 years relevant experience.
3 Associate Professionals	Level 2	AQF Diploma or Advanced Diploma or at least 3 years relevant experience.
4 Tradespersons and Related Workers	Level 3	AQF Certificate III or IV or at least 3 years relevant experience.
5 Advanced Clerical and Service Workers	Level 3	AQF Certificate III or IV or at least 3 years relevant experience.
6 Intermediate Clerical, Sales and Service Workers	Level 4	AQF Certificate II or at least 1 year of relevant experience.
7 Intermediate Production and Transport Workers	Level 4	AQF Certificate II or at least 1 year of relevant experience.
8 Elementary Clerical, Sales and Service Workers	Level 5	Completion of compulsory secondary education or an AQF Certificate I.
9 Labourers and Related Workers	Level 5	Completion of compulsory secondary education or an AQF Certificate I.

(a) In some instances relevant experience is required in addition to the formal qualification.

CARER EDUCATION

The level of educational attainment achieved by carers was determined from two survey questions: the highest grade finished at school, and what post-school qualifications have been achieved. Post-school qualifications were classified as:

- Trade/apprenticeship
- Certificate from college
- Diploma (beyond year 12)
- Bachelor Degree
- Post Graduate Diploma/higher degree
- Other



Carers who had completed a diploma, bachelor degree, post graduate diploma or higher degree were classified as having 13+ years education. Otherwise educational attainment was classified by highest grade finished at school. The following categories have been used in this publication:

- Did not attend school
- 1–9 years education
- 10 years education
- 11–12 years education
- 13+ years education

Note that educational attainment refers to highest level achieved, not the number of years taken to achieve the qualification.

COMMUNITY HOUSING

Carers who reported that their dwelling was rented were asked if their dwelling was a private rental, or rented from HomesWest, the Aboriginal Housing Authority or Community Housing. HomesWest and the Aboriginal Housing Authority are two schemes administered by the Department of Housing and Works, with HomesWest being the general public housing scheme for WA.

Community Housing generally refers to housing that is provided in discrete Aboriginal Communities where the housing comes under the control of an Aboriginal Housing Organisation. Funding for community housing organisations comes from a combination of Commonwealth and State government sources. One key difference with Community Housing is the degree of direct Aboriginal involvement in the planning and delivery of housing through Aboriginal Housing Organisations.

DWELLINGS

In household surveys a distinction is often made between dwellings, households and families as per the Census of Population and Housing, with allowance made for the possibility of more than one household living in a single dwelling, and for a household to comprise more than one family. In the census, a dwelling is a habitable structure, a household is a group of related or unrelated people who make common provision for food, while a family is a group of people related by blood, marriage, adoption, step or fostering who usually reside within a single family. Note that in a block of flats, for example, each flat is considered to be a separate dwelling.³

In practice, the distinction between dwellings, households and families was found to have little importance in the WAACHS. Aboriginal families living together often contain extended family relationships. However, there were hardly any cases where two or more unrelated families were found to be living in the same household and no cases were found where multiple households were residing in the same dwelling. In this volume, the terms household and family are used interchangeably, while the term dwelling is used to describe the physical structure in which a household or family is living.

Note that the survey only included private dwellings. Non-private dwellings, such as hotels or boarding schools, were not included in the scope of the survey. However,



carers were asked if there were any children aged less than 18 years who usually live at this address but who are temporarily away. Information about these children was collected from the carers where appropriate.

FAMILY TREES

One of the first tasks for interviewers at the beginning of each interview was the completion of the Household Record Form which included listing all usual residents of the household and the relationships between them. To assist in describing these relationships interviewers also drew a family tree to summarise relationships within the household. The Household Record Forms were used in conjunction with the family trees to classify the household structure and the family care arrangements for each child.

HOUSEHOLD CARE ARRANGEMENTS

Two classifications have been used to describe the structure of each household. The first described the overall household structure (*See household composition below*). The second classification describes the care arrangements for each child and has been assigned at the child level. In many cases both classifications will be equivalent. For instance, for a family with two original parents and two children the household composition would be classified as 'Two parent household - nuclear type', and the care arrangement for each child would be classified as 'Both original parents'. However, for a blended household with, say, two parents and one child, plus a child from a previous union, the care arrangements for each child would not be the same. For one child the care arrangement would be classified as 'Both original parents', while for the other child the care arrangement would be classified as 'one parent and new partner'.

In the case of extended families, where say Aunts and Uncles, Grandparents and other relatives are living in the household, the household composition classification would describe all the usual residents of the household. In terms of the care arrangements for each child, extended family relationships are only classified as part of the care arrangements for the child if the extended family member was involved in caring for the child.

HOUSEHOLD COMPOSITION

Two separate classifications have been developed for describing the structure of each household. The first describes the composition of the household. Households were classified based on the information recorded on the Household Record Forms and the family trees that were drawn by interviewers describing each family. The household classification discriminates between nuclear and extended families and describes the generational complexity of extended families.

INDEX OF RELATIVE SOCIO-ECONOMIC DISADVANTAGE

The index of relative socio-economic disadvantage is one of five measures of socio-economic status calculated by the ABS in their SEIFA product.⁴ The index is a summary measure calculated from census data which ranks the relative level of disadvantage of each census collection district (CD). As one of the factors included in the standard SEIFA product is proportion of Aboriginal and Torres Strait Islander people in each CD, the ABS produced a special version of the index for use in this survey that excluded this variable as a factor. The index is scaled to have a mean of 1,000 and a standard deviation of 100. Lower values indicate greater levels of disadvantage.



INDIGENOUS STATUS

To be included in the survey, carers had to identify their children as being of Aboriginal or Torres Strait Islander origin. Only Aboriginal or Torres Strait Islander children (under the age of 18 years) were included in the survey, even in those cases where there were both Aboriginal and non-Aboriginal children living in the same household. Note that the carers did not have to be Aboriginal for the family to be included in the survey.

Carers were also asked whether they were of Aboriginal or Torres Strait Islander descent. Approximately 17 per cent of primary carers and 21 per cent of secondary carers of Aboriginal and Torres Strait Islander children and young people were not of Aboriginal or Torres Strait Islander descent.

LEVEL OF RELATIVE ISOLATION (LORI)

A new classification of remoteness and isolation has been introduced in this survey – the Level of Relative Isolation (LORI). The LORI is based on a recently introduced product from the National Key Centre for Social Application of Geographic Information Systems at Adelaide University (GISCA) called ARIA++. The ARIA++ is an extension of ARIA (the Accessibility/Remoteness Index of Australia), which was first published in 1997 and has been widely adopted as the standard classification of remoteness in Australia. Because ARIA is based on describing the entire population of Australia, it has not been specifically designed to describe the circumstances of Aboriginal people living in remote areas. The ARIA++ gives much greater discrimination among more remote areas by including more service centres, of smaller sizes, in calculating its remoteness scores.

Based on the ARIA++ scores, five categories of isolation have been defined specifically for the survey that reflect differences in access to services for Aboriginal children. To avoid confusion with the original ARIA, the five categories are referred to as Levels Of Relative Isolation (LORI) and range from None (the Perth Metropolitan area) to Low (e.g. Albany), Moderate (e.g. Broome), High (e.g. Kalumburu) and Extreme (e.g. Yiyili).

See *A New Way of Looking at Remoteness and Isolation* in Chapter 1, and *Appendix C - Determination of Levels of Relative Isolation from ARIA++* for more details.

LOGISTIC REGRESSION

Logistic regression is a modelling technique that is used to investigate the relationship between the probability of a certain outcome (for example, a child having a particular health condition) and a set of explanatory variables. Logistic regression is discussed in several statistical publications – see, for example, Hosmer and Lemeshow (2000).⁵ In this publication, logistic regression models have been fitted using a weighted version of multi-level modelling which allows for community level, family level and individual level factors to be included as explanatory variables in the models (see Pfeiffermann *et al*, 1997).⁶



ODDS RATIO

The odds of a given event is the ratio of the probability of its occurrence to the probability of its non-occurrence. For instance the odds of obtaining heads in a coin toss are one to one, the odds of any given face in the roll of a die are one to five. The odds ratios used in this publication are a measure of relative risk, derived from a formula which examines the association between, in most of the survey cases, a risk factor (exposure), and an adverse health outcome. In this publication odds ratios have been estimated using logistic regression which estimates the effect of each risk factor included in a model after adjusting for the independent effects of all other factors included in the model.

OUTSTATIONS

Generally speaking outstations are small Aboriginal communities where families live in close connection with the natural environment. These outstation communities are often linked to a larger parent Aboriginal community for the provision and maintenance of services.

PRIMARY CARER

For each child in the survey, the family was asked to identify the primary carer of that child. This was the person who was considered to spend the most time with the child or who had primary responsibility for the upbringing of the child. In many cases, the primary carer was the child's mother. The primary carer was then asked to provide information about each of their children for the survey.

RELATIVE RISK

Relative risk is a measure of how much a particular factor influences the risk of a particular outcome. It is calculated as the ratio of the proportion of a particular group of individuals that have a condition to the proportion with the same condition in a reference group of individuals. In this survey the reference group is usually either the total WA population in the same age range, or the non-Aboriginal population in the same age range.

SECONDARY CARER

Each family was asked to identify the primary and secondary carer of each child. Often the secondary carer was the father of the child, but may also have been a grandparent or other relative of the child, or other person involved in the upbringing of the child.

TENURE TYPE

Tenure type describes the legal right of a household to occupy a dwelling (e.g. fully owned, being purchased, rented or some other arrangement).

USUAL RESIDENTS

The survey was conducted with interviewers going from door to door in search of Aboriginal families. Each family was asked "Are there any Aboriginal children or teenagers living at this address who are aged between 0 and 18 years?" Families answering yes to this question were included in the scope of the survey. Thus the survey was based on carers identifying their children as being of Aboriginal or



Torres Strait Islander origin. Note that the carers need not be Aboriginal for the family to be included in the survey.

The names of all people who usually live at the dwelling were listed on the Household Record Form. In addition carers were asked if there were any children under 18 years who usually live at this address but who were temporarily away. For example, if a child was away at boarding school, information about that child would still be collected from the carer.

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