2003

Northern Rivers Equity Profile (Phase 1)

Sallie Newell  
*Southern Cross University*

Donna Lloyd

Therese Dunn  
*North Coast Area Health Service*

Uta C. Dietrich  
*Northern Rivers Area Health Service*

Publication details

Newell, S, Lloyd, D, Dunn, T & Dietrich, UC 2003, *Northern Rivers Equity Profile (Phase 1)*, prepared for Health Equity Working Group, Northern Rivers Area Health Service, Lismore, NSW.
Northern Rivers Area
Health Service

Northern Rivers
Equity Profile

Phase 1
September 2003

Northern Rivers Area Health Service
Suggested Citation
Northern Rivers Health Equity Working Group. *Northern Rivers Equity Profile – Phase 1* Northern Rivers Area Health Service: Lismore, September 2003.

State Health Publication No: (NRAHS) 030246 ISBN: 0 7347 3606 1

**Northern Rivers HEWG Members**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greg Bell</td>
<td>Director, Public Health Unit, Population Health &amp; Planning Directorate</td>
</tr>
<tr>
<td>Uta Dietrich</td>
<td>Manager, Health Promotion Unit, Population Health &amp; Planning Directorate</td>
</tr>
<tr>
<td>Thérèse Dunn</td>
<td>Health Information Manager, Public Health Unit, Population Health &amp; Planning Directorate</td>
</tr>
<tr>
<td>Anthony Franks</td>
<td>Aboriginal Health Promotion Officer, Health Promotion Unit, Population Health &amp; Planning Directorate</td>
</tr>
<tr>
<td>Donna Lloyd</td>
<td>Health Equity Coordinator, Health Promotion Unit, Population Health &amp; Planning Directorate</td>
</tr>
<tr>
<td>Geoff Morgan</td>
<td>Epidemiologist, Northern Rivers University Department of Rural Health</td>
</tr>
<tr>
<td>Sallie Newell</td>
<td>Research &amp; Evaluation Coordinator, Health Promotion Unit, Population Health &amp; Planning Directorate</td>
</tr>
<tr>
<td>Megan Passey</td>
<td>Manager, Clinical Research, Evaluation and Support Team, Northern Rivers University Department of Rural Health</td>
</tr>
<tr>
<td>Vahid Saberi</td>
<td>Manager, Policy and Health Service Development Unit, Population Health &amp; Planning Directorate</td>
</tr>
<tr>
<td>Justine Waters</td>
<td>Director, Population Health &amp; Planning Directorate</td>
</tr>
</tbody>
</table>

**Primary Responsibilities**

- Management
- Management and report preparation
- Data identification and preparation and report preparation
- Aboriginal health content expertise
- Content expertise, literature review and report preparation
- Epidemiological and environmental health expertise
- Methodological and content expertise and report preparation
- Epidemiological and population health expertise
- Management

For further information please contact: Thérèse Dunn, Health Information Manager, Population Health & Planning Directorate, Northern Rivers Area Health Service, PO Box 498, LISMORE NSW 2480

Phone: (02) 66 207506 Fax: (02) 66 222151 Email: tmdunn@nrhs.health.nsw.gov.au

For more copies of the most up-to-date *Northern Rivers Equity Profile* go to:
http://www.nrahs.nsw.gov.au
Contents

LIST OF TABLES........................................................................................................................................................................... IX
LIST OF FIGURES.................................................................................................................................................................................. X
ABBREVIATIONS USED IN THIS REPORT........................................................................................................................................... XIII

SECTION 1 – HOW TO USE THE NORTHERN RIVERS EQUITY PROFILE ................................................................. 1

STRUCTURE OF THE NORTHERN RIVERS EQUITY PROFILE ........................................................................................................... 2

FINDING YOUR WAY AROUND THE PROFILE ................................................................................................................................. 3

Getting a Quick Overview of the Methods and Results of the Profile ................................................................................................ 3
Finding Data for Specific Indicators ................................................................................................................................................... 3
Finding the References ........................................................................................................................................................................ 3

INTERPRETING INFORMATION IN THE PROFILE .......................................................................................................................... 4

Understanding the Data Sets Used ................................................................................................................................................... 4
Understanding the Statistical Methods Used ................................................................................................................................... 4
Understanding Whether Differences Between Groups are Meaningful .......................................................................................... 4
Understanding Why Some Comparisons Have Not Been Made Where Data Exist ........................................................................ 4

ISSUES TO CONSIDER WHILE READING THE PROFILE ............................................................................................................. 5

Limitations of Data Regarding Aboriginal Populations ................................................................................................................... 5
Need for Further Data Comparisons for Current Indicators ......................................................................................................... 5
Need for Data on Additional Indicators ........................................................................................................................................ 6

SECTION 2 – PROFILE OVERVIEW................................................................................................................................................ 7

EXECUTIVE SUMMARY .............................................................................................................................................................................. 8

Rationale for Developing the Northern Rivers Equity Profile ....................................................................................................... 8
Nature of an Equity Profile ................................................................................................................................................................. 8
Objectives of the Northern Rivers Equity Profile ............................................................................................................................ 9
Developing the Northern Rivers Equity Profile .................................................................................................................................. 9

Contents of the Northern Rivers Equity Profile .................................................................................................................................. 11
Phases of the Northern Rivers Equity Profile ................................................................................................................................... 13

Findings from Phase 1 of the Northern Rivers Equity Profile ........................................................................................................ 14
Recommendations of this First Phase of the Northern Rivers Equity Profile .................................................................................... 19

BACKGROUND TO THE EQUITY PROFILE ...................................................................................................................................... 21

Why Develop an Equity Profile? ........................................................................................................................................................... 21
Objectives of the Northern Rivers Equity Profile .................................................................................................................................. 22

Principles Employed in Developing the Northern Rivers Equity Profile ............................................................................................. 22

An Holistic Definition of Health ............................................................................................................................................................ 23
The Population Health Approach .......................................................................................................................................................... 23
The Life Course Approach ...................................................................................................................................................................... 23
The Health Gradient Approach ............................................................................................................................................................... 24

Process of Developing the Northern Rivers Equity Profile ................................................................................................................ 24

Establishing the Health Equity Working Group .................................................................................................................................. 24
Developing the Northern Rivers Equity Profile Content .................................................................................................................. 24
Developing a Framework for Identifying the Determinants of Health .................................................................................................. 25
The HEWG Determinants of Health Model ......................................................................................................................................... 27
Selecting the Indicators ........................................................................................................................................................................... 32
Presenting the Data ................................................................................................................................................................................ 32
Mortality – Other Injuries............................................................................................................... 56
   Intra-Area Comparisons – by gender....................................................................................... 56
   Intra-Area Comparisons – by Aboriginality ............................................................................. 56
Mortality – Diabetes Mellitus ........................................................................................................... 56
   Intra-Area Comparisons – by gender....................................................................................... 56
   Intra-Area Comparisons – by Aboriginality ............................................................................. 56
Mortality – Nervous System Diseases ............................................................................................ 56
   Intra-Area Comparisons – by gender....................................................................................... 56
   Intra-Area Comparisons – by Aboriginality ............................................................................. 56
Mortality – Genitourinary Diseases .................................................................................................. 57
   Intra-Area Comparisons – by gender....................................................................................... 57
   Intra-Area Comparisons – by Aboriginality ............................................................................. 57
Mortality – Neonatal Causes............................................................................................................. 57
   Intra-Area Comparisons – by gender....................................................................................... 57
   Intra-Area Comparisons – by Aboriginality ............................................................................. 57
Mortality – All Cancers ...................................................................................................................... 57
   Area Comparisons – overall by gender...................................................................................... 57
   Intra-Area Comparisons – by gender....................................................................................... 57
   Intra-Area Comparisons – by Aboriginality ............................................................................. 57
   Intra-Area Comparisons – males by LGA.................................................................................. 57
   Intra-Area Comparisons – males by SES .................................................................................. 57
   Intra-Area Comparisons – females by LGA.............................................................................. 57
   Intra-Area Comparisons – females by SES .............................................................................. 57
Mortality – Lung Cancer .................................................................................................................... 60
   Area Comparisons – overall by gender...................................................................................... 60
   Intra-Area Comparisons – by gender....................................................................................... 60
Mortality – Colorectal Cancer .......................................................................................................... 60
   Area Comparisons – overall by gender...................................................................................... 60
   Intra-Area Comparisons – by gender....................................................................................... 60
Mortality – Melanoma ....................................................................................................................... 61
   Area Comparisons – overall by gender...................................................................................... 61
   Intra-Area Comparisons – by gender....................................................................................... 61
Mortality – Prostate Cancer .............................................................................................................. 61
   Area Comparisons – overall........................................................................................................ 61
Mortality – Breast Cancer ............................................................................................................... 61
   Area Comparisons – overall........................................................................................................ 61
Mortality – Cervical Cancer ............................................................................................................. 61
   Area Comparisons – overall........................................................................................................ 61
Mortality – All Respiratory Diseases ............................................................................................... 62
   Area Comparisons – overall by gender...................................................................................... 62
   Intra-Area Comparisons – by gender....................................................................................... 62
   Intra-Area Comparisons – males by LGA.................................................................................. 62
   Intra-Area Comparisons – males by SES .................................................................................. 63
   Intra-Area Comparisons – females by LGA.............................................................................. 63
   Intra-Area Comparisons – females by SES .............................................................................. 63
Mortality – All Injury and Poisoning ............................................................................................... 64
   Area Comparisons – overall by gender...................................................................................... 64
   Intra-Area Comparisons – by gender....................................................................................... 64
   Intra-Area Comparisons – males by LGA.................................................................................. 64
   Intra-Area Comparisons – males by SES .................................................................................. 65
   Intra-Area Comparisons – females by LGA.............................................................................. 65
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intra-Area Comparisons – females by SES</td>
<td>65</td>
</tr>
<tr>
<td>Total Avoidable Mortality</td>
<td>66</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>66</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by gender</td>
<td>66</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by SLA</td>
<td>66</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by SES</td>
<td>67</td>
</tr>
<tr>
<td>Primary Avoidable Mortality</td>
<td>67</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>67</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by SLA</td>
<td>68</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by SES</td>
<td>69</td>
</tr>
<tr>
<td>Secondary Avoidable Mortality</td>
<td>69</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>69</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by SLA</td>
<td>70</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by SES</td>
<td>71</td>
</tr>
<tr>
<td>Tertiary Avoidable Mortality</td>
<td>71</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>71</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by SLA</td>
<td>72</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by SES</td>
<td>73</td>
</tr>
<tr>
<td>Morbidity – Lung Cancer Incidence</td>
<td>74</td>
</tr>
<tr>
<td>Area Comparisons – overall by gender</td>
<td>74</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by gender</td>
<td>74</td>
</tr>
<tr>
<td>Morbidity – Colorectal Cancer Incidence</td>
<td>74</td>
</tr>
<tr>
<td>Area Comparisons – overall by gender</td>
<td>74</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by gender</td>
<td>74</td>
</tr>
<tr>
<td>Morbidity – Melanoma Incidence</td>
<td>75</td>
</tr>
<tr>
<td>Area Comparisons – overall by gender</td>
<td>75</td>
</tr>
<tr>
<td>Intra-Area Comparisons – by gender</td>
<td>75</td>
</tr>
<tr>
<td>Morbidity – Prostate Cancer Incidence</td>
<td>75</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>75</td>
</tr>
<tr>
<td>Morbidity – Breast Cancer Incidence</td>
<td>75</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>75</td>
</tr>
<tr>
<td>Morbidity – Cervical Cancer Incidence</td>
<td>75</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>75</td>
</tr>
<tr>
<td>Morbidity – Asthma Prevalence</td>
<td>76</td>
</tr>
<tr>
<td>Intra-Area Comparisons – gender by time</td>
<td>76</td>
</tr>
<tr>
<td>Morbidity – Diabetes Prevalence</td>
<td>76</td>
</tr>
<tr>
<td>Intra-Area Comparisons – gender by time</td>
<td>76</td>
</tr>
<tr>
<td>Morbidity – Pertussis (Whooping Cough) Notifications</td>
<td>77</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>77</td>
</tr>
<tr>
<td>Morbidity – Q Fever Notifications</td>
<td>78</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>78</td>
</tr>
<tr>
<td>Morbidity – Gonorrhoea Notifications</td>
<td>79</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>79</td>
</tr>
<tr>
<td>Morbidity – Syphilis Notifications</td>
<td>80</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>80</td>
</tr>
<tr>
<td>Morbidity – Hepatitis A Notifications</td>
<td>81</td>
</tr>
<tr>
<td>Area Comparisons – overall</td>
<td>81</td>
</tr>
<tr>
<td>Morbidity – Hepatitis B Notifications</td>
<td>82</td>
</tr>
</tbody>
</table>
Northern Rivers Equity Profile – Phase 1 (September  2003)

Area Comparisons – overall ................................................................. 82
Morbidity – Hepatitis C Notifications .......................................................... 83
Area Comparisons – overall ................................................................. 83
Morbidity – Salmonella Notifications ......................................................... 84
Area Comparisons – overall ................................................................. 84
Oral Health - No Natural Teeth Missing among Adults ................................. 85
Area Comparisons – overall by gender and time ........................................ 85
Intra-Area Comparisons – by gender and time .......................................... 85
Additional Indicators to be Explored ......................................................... 86

EARLY CHILDHOOD DEVELOPMENT DETERMINANTS........................................... 87
Rationale for Inclusion ............................................................................. 87
Teenage Mothers ..................................................................................... 87
Area Comparisons – overall ................................................................. 87
Area Comparisons – by Aboriginality ....................................................... 88
Intra-Area Comparisons – by Aboriginality ............................................. 88
Intra-Area Comparisons – by SES ......................................................... 88
Immunisation Adequacy (12 – 15 months) .................................................. 89
Area Comparisons – overall ................................................................. 89
Intra-Area Comparisons – by LGA ......................................................... 90
Intra-Area Comparisons – by SES ......................................................... 91
Domestic Violence Against Children ......................................................... 92
Area Comparisons – by gender .............................................................. 92
Intra-Area Comparisons – by gender ...................................................... 92
Oral Health in Kindergarten .................................................................. 93
Area Comparisons – overall ................................................................. 93
Oral Health in Year 6 .............................................................................. 94
Area Comparisons – overall ................................................................. 94
Additional Indicators to be Explored ......................................................... 95

CULTURE / ETHNICITY DETERMINANTS................................................................. 96
Rationale for Inclusion ............................................................................. 96
Aboriginal Ethnicity ............................................................................... 96
Additional Indicators to be Explored ......................................................... 96

LIFESTYLE DETERMINANTS ................................................................................. 97
Rationale for Inclusion ............................................................................. 97
Influenza Immunisation for Older People .................................................. 97
Area Comparisons – overall ................................................................. 97
Mammographic Screening ....................................................................... 98
Area Comparisons – overall ................................................................. 98
Pap Testing ............................................................................................. 98
Area Comparisons – overall ................................................................. 98
Tobacco Smoking ................................................................................... 99
Area Comparisons – overall by gender and time ....................................... 99
Intra-Area Comparisons – by gender and time ........................................ 99
At-risk Alcohol Drinking ....................................................................... 100
Area Comparisons – overall by gender and time ....................................... 100
Intra-Area Comparisons – by gender and time ........................................ 100
Adequate Daily Fruit Intake ................................................................... 101
Additional Indicators to be Explored ......................................................... 118

COMMUNITY & SOCIAL CONTEXT DETERMINANTS ............................................. 118
Rationale for Inclusion .................................................................................. 118
Family Structure .......................................................................................... 119
  Area Comparisons – overall ...................................................................... 119
Crime Rates – Assaults ................................................................................. 120
  Area Comparisons – overall ...................................................................... 120
  Intra-Area Comparisons – LGA by time ..................................................... 121
  Intra-Area Comparisons – SES by time ....................................................... 121
Crime Rates – Robbery ................................................................................. 122
  Area Comparisons – overall ...................................................................... 122
  Intra-Area Comparisons – LGA by time ..................................................... 122
  Intra-Area Comparisons – SES by time ....................................................... 123
Crime Rates – Theft ..................................................................................... 123
  Area Comparisons – overall ...................................................................... 123
  Intra-Area Comparisons – LGA by time ..................................................... 123
  Intra-Area Comparisons – SES by time ....................................................... 124
Crime Rates – Drug Offences ....................................................................... 124
  Intra-Area Comparisons – LGA by time ..................................................... 124
  Intra-Area Comparisons – SES by time ....................................................... 124
Crime Rates – Sexual Offences .................................................................... 125
  Intra-Area Comparisons – LGA by time ..................................................... 125
  Intra-Area Comparisons – SES by time ....................................................... 125
Additional Indicators to be Explored ......................................................... 126

SECTION 5 – APPENDICES .............................................................................. 127
APPENDIX 1: ACKNOWLEDGMENTS .............................................................. 128
APPENDIX 2: REFERENCES USED THROUGHOUT THE PROFILE ......................... 129
APPENDIX 3: GLOSSARY OF TERMS USED THROUGHOUT THE PROFILE .......... 132
APPENDIX 4: DATA SETS FROM WHICH DATA WERE OBTAINED .................. 136
  Health Outcomes Information Statistical Toolkit (HOIST) ............................ 136
  Population Data ........................................................................................ 136
  Australian Bureau of Statistics Mortality Collection ................................... 137
  NSW Inpatient Statistics Collection (ISC) .................................................... 138
  New South Wales Midwives Data Collection (MDC) ....................................... 139
  NSW Health Surveys 1997, 1998 and 2002 ................................................... 140
  NSW Older People’s Health Survey 1999 ...................................................... 140
  NSW Child Health Survey 2001 ................................................................... 141
  NSW Central Cancer Registry Data ............................................................. 141
  Save Our Kids Smiles (SOKS) Data .............................................................. 142
  NSW Notifiable Diseases Database (NDD) .................................................... 142
  Australian Childhood Immunisation Register (ACIR) .................................... 143
APPENDIX 5: STATISTICAL METHODS .............................................................. 144
  Crude Death Rates .................................................................................... 144
  Age-adjusted Rates .................................................................................. 144
Graphical Presentation ................................................................................................................... 145
Avoidable Mortality Analyses ...................................................................................................... 146
Socioeconomic Group Analyses ................................................................................................. 147
Poisson Regression Models.......................................................................................................... 147
Psychological Distress Analyses................................................................................................ 148

APPENDIX 6: ISSUES TO BE CONSIDERED FURTHER IN PHASE 2 ..................................................... 150
List of Tables

Table 1: Summary of Northern Rivers Equity Profile population health outcome indicators .... 11
Table 2: Summary of Northern Rivers Equity Profile health determinant indicators .................... 12
Table 3: Summary of Area and Intra-Area comparisons for population health outcomes included in Phase 1 ........................................................................................................................................................................ 15
Table 4: Summary of Area and Intra-Area comparisons for health determinants included in Phase 1 ........................................................................................................................................................................ 17
Table 5: Northern Rivers SEIFA Index of Relative Socioeconomic Disadvantage scores, by LGA (1996) ........................................................................................................................................................................ 43
Table 6: Cancer death rates for Northern Rivers and NSW residents, by type of cancer (1996-2000) ........................................................................................................................................................................ 60
Table 7: Cancer incidence rates for Northern Rivers and NSW residents, by type of cancer (1996-2000) ..................................................................................................................................................... 74
Table 8: Self-reported current asthma among Northern Rivers residents aged 16 years and over, by gender (1997, 1998, 2002) ........................................................................................................................................ 76
Table 9: Self-reported doctor-diagnosed diabetes or high blood sugar among Northern Rivers residents aged 16 years and over, by gender (1997, 1998, 2002) ........................................................................ 76
Table 10: Immunisation coverage among children aged 12 - 15 months in Northern Rivers LGAs (December 2001) ........................................................................................................................................ 90
Table 11: Biennial cancer screening rates for Northern Rivers and NSW women, by screen type (2000) ........................................................................................................................................ 98
List of Figures

Figure 1: The cycle of disadvantage................................................................................................... 27
Figure 2: Northern Rivers HEWG Determinants of Health Model ................................................... 28
Figure 3: The Northern Rivers Area – Showing LGA boundaries .................................................. 40
Figure 4: The Northern Rivers and NSW populations, by age and gender (2001)......................... 41
Figure 5: NSW socioeconomic index scores, by Area Health Service (1996) ............................... 42
Figure 6: The Northern Rivers Aboriginal and overall populations, by age and gender (2001)...... 44
Figure 7: Proportion and number of Aboriginal residents in Northern Rivers LGAs (2001)........... 45
Figure 8: Deaths per annum, from all causes, for males of all ages, by LGA, NRA and NSW (1996-2000) ........................................................................................................................... 47
Figure 9: Deaths per annum, from all causes, for females of all ages, by LGA, NRA and NSW (1996-2000) ........................................................................................................................... 48
Figure 10: Deaths per annum, by category of cause, for Northern Rivers Area (NRA) and other NSW male residents (1996-2000) ......................................................................................................... 49
Figure 11: Deaths per annum, by category of cause, for Northern Rivers Area (NRA) and other NSW female residents (1996-2000) ......................................................................................................... 50
Figure 12: Deaths per annum, by category of cause, for Northern Rivers Area (NRA) Aboriginal and non-Aboriginal male residents (1996-2000) ................................................................. 51
Figure 13: Deaths per annum, by category of cause, for Northern Rivers Area (NRA) Aboriginal and non-Aboriginal female residents (1996-2000) ............................................................... 52
Figure 14: Deaths per annum, from cardiovascular diseases, for males of all ages, by LGA, NRA and NSW (1996-2000) .......................................................................................................................... 53
Figure 15: Deaths per annum, from cardiovascular diseases, for females of all ages, by LGA, NRA and NSW (1996-2000) ....................................................................................................................... 54
Figure 16: Deaths per annum, from cancers, for males of all ages, by LGA, NRA and NSW (1996-2000) ................................................................................................................................. 58
Figure 17: Deaths per annum, from cancers, for females of all ages, by LGA, NRA and NSW (1996-2000) ................................................................................................................................. 59
Figure 18: Deaths per annum, from all respiratory diseases, for males of all ages, by LGA, NRA and NSW (1996-2000) ....................................................................................................................... 62
Figure 19: Deaths per annum, from all respiratory diseases, for females of all ages, by LGA, NRA and NSW (1996-2000) ....................................................................................................................... 63
Figure 20: Deaths per annum, from all injuries and poisonings, for males of all ages, by LGA, NRA and NSW (1996-2000) ....................................................................................................................... 64
Figure 21: Deaths per annum, from all injuries and poisonings, for females of all ages, by LGA, NRA and NSW (1996-2000) ....................................................................................................................... 65
Figure 22: Northern Rivers premature (< 75 years) and avoidable deaths per annum, by SLA (1996-2000) ........................................................................................................................................... 66
Figure 23: Northern Rivers total avoidable mortality per annum, by SLA and SEIFA IRSD score (1996-2000) .............................................................................................................................................................. 67
Figure 24: Northern Rivers premature (<75 yrs) and primary avoidable mortality (PAM), by SLA (1996-2000) ...................................................................................................................................................... 68
Figure 25: Northern Rivers primary avoidable mortality (PAM) per annum, by SLA and SEIFA IRSD score (1996-2000) ........................................................................................................................................... 69
Figure 26: Northern Rivers premature (<75 yrs) and secondary avoidable mortality (SAM), by SLA (1996-2000)........................................................................................................................................ 70

Figure 27: Northern Rivers secondary avoidable deaths (SAM) per annum, by SLA and SEIFA IRSD score (1996-2000)........................................................................................................................................ 71

Figure 28: Northern Rivers premature (<75 yrs) and tertiary avoidable mortality (TAM), by SLA (1996-2000)........................................................................................................................................ 72

Figure 29: Northern Rivers tertiary avoidable deaths (TAM) per annum, by SLA and SEIFA IRSD score (1996-2000)........................................................................................................................................ 73

Figure 30: Pertussis notification rates, by Area Health Service (2001)................................................................................................................................. 77

Figure 31: Q fever notification rates, by Area Health Service (1997-2001)................................................................................................................................. 78

Figure 32: Gonorrhoea notification rates, by Area Health Service (2001)................................................................................................................................. 79

Figure 33: Syphilis notification rates, by Area Health Service (1999-2001)................................................................................................................................. 80

Figure 34: Hepatitis A notification rates, by Area Health Service (1999-2001)................................................................................................................................. 81

Figure 35: Hepatitis B notification rates, by Area Health Service (1999-2001)................................................................................................................................. 82

Figure 36: Hepatitis C notification rates, by Area Health Service (2001)................................................................................................................................. 83

Figure 37: Salmonella notification rates, by Area Health Service (1999-2001)................................................................................................................................. 84

Figure 38: Self-reported missing natural teeth status among Northern Rivers and NSW residents aged 16 years and over (1998 and 2002).......................................................................... 85

Figure 39: Northern Rivers teenage confinements (10-19 years), as proportion of all confinements, by SLA and SEIFA IRSD score (1996-1999)..................................................................................... 88

Figure 40: Immunisation coverage of children aged 12 to 15 months, NSW (31 December 2001)................................................................................................................................. 89

Figure 41: Northern Rivers immunisation coverage among children aged 12-15 months, by LGA and SEIFA IRSD score (December 2001)..................................................................................... 91

Figure 42: Interpersonal violence-related hospitalisations for children aged 0 – 14 years, by Area Health Service (95/96-99/00)................................................................................................................................. 92

Figure 43: Oral health among children in kindergarten, by Area Health Service (1998 & 1999)................................................................................................................................. 93

Figure 44: Oral health among children in Year, by Area Health Service (1998 & 1999)................................................................................................................................. 94

Figure 45: Self-reported influenza immunisation rates, persons aged 65 years and over, by Area Health Service (1999)................................................................................................................................. 97

Figure 46: Self-reported smoking status among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)................................................................................................................................. 99

Figure 47: Self-reported at-risk alcohol drinking among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)................................................................................................................................. 100

Figure 48: Self-reported adequate daily fruit intakes among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)................................................................................................................................. 101

Figure 49: Self-reported adequate daily vegetable intakes among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)................................................................................................................................. 102

Figure 50: Self-reported adequate physical activity among Northern Rivers and NSW residents aged 16 years and over (1998 & 2002)................................................................................................................................. 103

Figure 51: Self-reported psychological distress among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)................................................................................................................................. 105

Figure 52: Rates of difficulty accessing health care among residents aged 16 years and over, Northern Rivers and NSW (1997, 1998 & 2002)................................................................................................................................. 107

Figure 53: Proportion of residents, aged 16 years and over, rating hospital care as excellent, very good or good, Northern Rivers and NSW (1997, 1998 & 2002)................................................................................................................................. 108
Figure 54: Proportion of residents, aged 16 years and over, rating emergency department care as excellent, very good or good, Northern Rivers and NSW (1997, 1998 & 2002)............. 109
Figure 55: Self-reported smokefree household status among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002) ........................................................................... 111
Figure 56: Housing tenure, by Area Health Service (2001) ........................................................................... 114
Figure 57: Unemployment rates, by Area Health Service (1996) ................................................................. 115
Figure 58: Rates of government financial assistance, by region (March 2001). ........................................... 116
Figure 59: Proportion of NSW residents, aged 15 years and over, reporting no post-school education (1996) ................................................................................................................. 117
Figure 60: Structure of families with dependent children, by Area Health Service (2001) ............. 119
Figure 61: Reported assaults and thefts/robberies in NSW, by Area Health Service (2001)............. 120
Figure 62: Northern Rivers recorded assaults, by LGA (2000-2002) .......................................................... 121
Figure 63: Northern Rivers recorded robberies, by LGA (2000-2002) ...................................................... 122
Figure 64: Northern Rivers recorded thefts, by LGA (2000-2002) ............................................................. 123
Figure 65: Northern Rivers recorded drug offences, by LGA (2000-2002) ................................................... 124
Figure 66: Northern Rivers recorded sexual offences, by LGA (2000-2002) ............................................. 125
**Abbreviations Used in this Report**

* indicates terms explained further in Appendix 3;  
# indicates terms explained further in Appendix 4;  
$ indicates terms explained further in Appendix 5

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>ACIR</td>
<td>Australian Childhood Immunisation Register</td>
</tr>
<tr>
<td>AHS</td>
<td>Area Health Service</td>
</tr>
<tr>
<td>AIHW</td>
<td>Australian Institute of Health and Welfare</td>
</tr>
<tr>
<td>CATI</td>
<td>Computer-Aided Telephone Interviews</td>
</tr>
<tr>
<td>CHO</td>
<td>NSW Chief Health Officer</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence Interval (usually 95%)</td>
</tr>
<tr>
<td>CREST</td>
<td>Clinical Research Evaluation and Support Team, Northern Rivers University Department of Rural Health</td>
</tr>
<tr>
<td>DMFT</td>
<td>Decayed, missing or filled teeth</td>
</tr>
<tr>
<td>ED</td>
<td>Emergency Department</td>
</tr>
<tr>
<td>EDUOCC</td>
<td>Index of Education and Occupation – a SEIFA subset</td>
</tr>
<tr>
<td>EPAG</td>
<td>Northern Rivers Equity Profile Advisory Group</td>
</tr>
<tr>
<td>ERP</td>
<td>ABS Estimated Resident Population</td>
</tr>
<tr>
<td>GP</td>
<td>General Practitioner</td>
</tr>
<tr>
<td>HEWG</td>
<td>Northern Rivers Health Equity Working Group</td>
</tr>
<tr>
<td>HIC</td>
<td>Health Insurance Commission</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>HOIST</td>
<td>Health Outcomes Information Statistical Toolkit</td>
</tr>
<tr>
<td>ICD-9</td>
<td>International Classification of Diseases – Version 9</td>
</tr>
<tr>
<td>ICD-9-CM</td>
<td>International Classification of Diseases – Version 9, Clinical Modification</td>
</tr>
<tr>
<td>ICD-10</td>
<td>International Classification of Diseases – Version 10</td>
</tr>
<tr>
<td>ICD-10-AM</td>
<td>International Classification of Diseases – Version 10, Australian Modification</td>
</tr>
<tr>
<td>ICD-O-2</td>
<td>International Classification of Diseases for Oncology – Version 2</td>
</tr>
<tr>
<td>IDSS</td>
<td>NSW Infectious Diseases Surveillance System</td>
</tr>
<tr>
<td>IRSD</td>
<td>Index of Relative Socioeconomic Disadvantage – a SEIFA subset</td>
</tr>
<tr>
<td>ISC</td>
<td>NSW Inpatients Statistics Collection</td>
</tr>
<tr>
<td>K10</td>
<td>Kessler 10</td>
</tr>
<tr>
<td>LGA</td>
<td>Local Government Area</td>
</tr>
<tr>
<td>LL</td>
<td>Lower limit (for confidence intervals)</td>
</tr>
<tr>
<td>MDC</td>
<td>NSW Midwives’ Data Collection</td>
</tr>
<tr>
<td>NDD</td>
<td>NSW Notifiable Diseases Database</td>
</tr>
<tr>
<td>NHIS</td>
<td>US National Health Interview Survey</td>
</tr>
</tbody>
</table>
NR  Northern Rivers
NRA  Northern Rivers Area
NRAHS  Northern Rivers Area Health Service
NRUDRH  Northern Rivers University Department of Rural Health
NSMHW  National Survey of Mental Health and Wellbeing
NSW  New South Wales
PAM  * Primary Avoidable Mortality
PHPD  Northern Rivers Population Health and Planning Directorate
PHU  Public Health Unit
SAM  * Secondary Avoidable Mortality
SAS  Statistical software package
SEIFA  $ Socioeconomic Indexes for Areas
SES  $ Socioeconomic Status
SLA  Statistical Local Area
SOKS  # Save Our Kids’ Smiles program
TAM  * Tertiary Avoidable Mortality
UL  Upper limit (for confidence intervals)
WHO  World Health Organisation
Section 1 – How to Use the *Northern Rivers Equity Profile*
Structure of the *Northern Rivers Equity Profile*

The *Northern Rivers Equity Profile* consists of five sections:

- **Section 1 – How to Use the *Northern Rivers Equity Profile***: Explains how to find your way around the *Profile*, how to interpret the information presented throughout and issues to consider while reading the *Profile*.

- **Section 2 – Profile Overview**: Overviews the reasons for, and methods of, development of the *Northern Rivers Equity Profile* and the Northern Rivers Health Equity Working Group’s *Determinants of Health Model*, provides background information and summary results for all indicators included in Phase 1, as well as listing the additional indicators already prioritised for inclusion, or for exploration, in future phases.

- **Section 3 – Indicator Data Sources and In-text Table / Figure References**: Provides a tabular summary of every indicator included in Phase 1, detailing the exact measure used, the data source from which it was obtained and the Tables and/or Figures in the *Profile* which include data for it.

- **Section 4 – Indicator Data**: Provides an analysis of health outcomes and determinants data included in Phase 1 and lists additional indicators to be included, or explored, in future phases. Comparisons are made between the Northern Rivers Area and the rest of NSW (overall and rural) and between local government areas within the Northern Rivers Area. Where feasible and appropriate, comparisons within the Northern Rivers Area are also made in relation to gender, age, Aboriginality and socioeconomic status.

- **Section 5 – Appendices**: Includes sections providing information about the people who helped develop the *Profile*; the references cited throughout the *Profile*; the technical, and other specialist, terms used throughout the *Profile*; the data sets from which the data presented were obtained; the methods used to analyse the data; and about data and presentation issues to be considered further in Phase 2 of the *Northern Rivers Equity Profile*. 
Finding Your Way Around the Profile

The Northern Rivers Equity Profile is, by necessity, a very wide-ranging document and it is likely that any individual reader will be specifically interested in only a small part of the information provided. Therefore, this section gives some suggestions to try to enhance your ease of using the Profile, based on its expected main uses.

Getting a Quick Overview of the Methods and Results of the Profile

The Executive Summary, at the beginning of Section 2, overviews the reasons for, and methods of, development of the Northern Rivers Equity Profile and the Northern Rivers Health Equity Working Group’s Determinants of Health Model and provides summary results for all indicators included in Phase 1, as well as listing the additional indicators already prioritised for inclusion, or for exploration, in future phases.

Finding Data for Specific Indicators

If you're interested in finding whether the Profile includes data for a specific indicator, the easiest way is to refer to Tables 1 and 2, in Section 2. These tables summarise all the indicators currently included in the Profile, as well as those already planned for inclusion. If the indicator of interest is listed among the included indicators, then refer to Section 3 (which is ordered similarly to Tables 1 and 2) to find out the relevant Figures and Tables to look up in Section 4. Finding data for specific indicators will become much easier when the Profile becomes available on the internet – allowing hyperlinks to take you straight to the relevant sections, direct from either the contents section or from Section 3.

Finding the References

References are indicated as superscript numbers throughout the Profile, with all references listed, in numerical order, in Appendix 2.
Interpreting Information in the Profile

Understanding the Data Sets Used
Most of the data included in this phase of the Profile have been taken from standard Australian Bureau of Statistics or NSW Health data sets, which are explained further in Appendix 4.

Understanding the Statistical Methods Used
Most of the statistical methods employed in this phase of the Profile have been based on those in the 2002 NSW Chief Health Officer’s Report and are explained further in Appendix 5.

Understanding Whether Differences Between Groups are Meaningful
As many readers will know, rates and proportions of the population experiencing any particular indicator are only estimates – i.e.: they are not precise and absolute rates and proportions. Depending on the size of the samples, and on how they are calculated, they can only be estimated to a given degree of accuracy. Therefore, the true rates or proportions can only confidently be said to fall within a range of the estimated value – this is known as the confidence interval (CI) around the estimate. Usually, a 95% confidence interval has been used, meaning that the true rate or proportion has a 95% chance of falling somewhere within the CI range. Any two rates or proportions can be considered significantly different, in a statistical sense, only when the confidence intervals around the two rates, or the two proportions, do not overlap. Therefore, throughout the Profile, care has been taken when interpreting the data presented – where confidence intervals overlap, the two rates, or proportions, are said to be comparable, even though the estimated rates or proportions may appear quite different. Where confidence intervals do not overlap, the two rates, or proportions are said to be significantly different.

Understanding Why Some Comparisons Have Not Been Made Where Data Exist
As the Profile relies largely on data from existing data sets, options for analysis are often limited by the size of their samples, as well as by how the samples are selected from populations. For example, each NSW Health Survey includes 800 – 1000 respondents from the Northern Rivers, which is sufficient to allow us to confidently estimate overall proportions for our region, as well as separate proportions for Northern Rivers males and females. However, we have not produced separate proportions for each of our 10 LGAs, although the data are available – as we could have little confidence in the estimates obtained, due to large confidence intervals and concerns about the adequacy of sampling procedures at this level. Future phases of the Northern Rivers Equity Profile will explore the feasibility of collecting additional, better-stratified Northern Rivers data in the NSW Health Surveys to allow these additional comparisons to be made.
Issues to Consider while Reading the Profile

Limitations of Data Regarding Aboriginal Populations

Throughout the Profile, all data concerning Aboriginal residents, and particularly those comparing Aboriginal and non-Aboriginal residents, must be interpreted very cautiously as Aboriginal status is consistently under-reported (due to a range of reasons, including non-participation, a reluctance to self-identify on documents and lack of enquiry by those collecting the data). Therefore, the actual number and proportion of Aboriginal residents, in the Northern Rivers or in NSW generally, is likely to be considerably higher. Similarly, most data sets where Aboriginal status is available to allow comparisons also suffer from the same under-reporting of Aboriginal status. Therefore, for any indicator, the proportion of Aboriginal residents experiencing it will likely be an under-estimate. This is particularly apparent in the data regarding Aboriginal deaths, which appear to be gross under-estimates and are likely to result in substantial under-estimates of the levels of health inequities experienced by Northern Rivers Aboriginal residents. Future phases of the Northern Rivers Equity Profile will involve the EPAG exploring ways in which these data discrepancies can be minimised, or adjusted, to provide more realistic estimates of both the Aboriginal population size and the health inequities they face.

Need for Further Data Comparisons for Current Indicators

This first phase of the Northern Rivers Equity Profile relies largely on data currently and easily accessible. Unfortunately, the scope and structure of many of these data sets, as well as time limitations, did not allow all the desired comparisons to be made. To maximise ease of using the Profile, only those comparisons currently available are discussed. However, future phases of the Northern Rivers Equity Profile will conduct further comparative analyses, where the existing data permit, and will explore the feasibility of alternative data sources, or collecting additional data, to allow comparisons not currently possible. Therefore, it is hoped that, ultimately, data will be presented as follows for each indicator in the Profile:

- Area Comparisons
  - overall Northern Rivers data versus overall NSW data;
  - overall Northern Rivers data versus rural NSW data;
  - Northern Rivers males versus overall NSW males;
  - Northern Rivers males versus rural NSW males;
  - Northern Rivers females versus overall NSW females;
  - Northern Rivers females versus rural NSW females;
  - Northern Rivers Aboriginal residents versus overall NSW Aboriginal residents; and
  - Northern Rivers Aboriginal residents versus rural NSW Aboriginal residents.
• **Intra-Area Comparisons**
  - various age-groups of Northern Rivers residents compared to each other, where relevant;
  - Northern Rivers males versus Northern Rivers females, where relevant;
  - Northern Rivers Aboriginal residents versus Northern Rivers non-Aboriginal residents;
  - the 10 Northern Rivers local government areas (LGAs) compared to each other;
  - the 10 Northern Rivers LGAs compared to the Northern Rivers overall;
  - socioeconomic gradients, by plotting LGAs in ascending order, by SEIFA IRSD score; and
  - comparisons from different points in time, allowing progress at reducing health inequities to be monitored.

**Need for Data on Additional Indicators**

At the end of each indicator group throughout Section 4 of the *Northern Rivers Equity Profile* are lists of:

- **Any additional indicators to be included** in future phases – these represent indicators where data are available but could not be included in the current phase, due to time restrictions.

- **Any additional indicators to be explored for inclusion** in future phases – these represent indicators where no data could be identified currently but which were considered a priority for inclusion. Therefore, future phases will involve additional efforts to identify existing data sources or, if none can be found, recommendations about how to collect data for such indicators.
Section 2 – Profile Overview

What is Equity in Health?

According to the World Health Organisation (WHO), equity in health implies that everyone should have a fair opportunity to attain their full potential and that no one should be disadvantaged from achieving this potential, if it can be avoided.

The aim of equity in health is not to eliminate all health differences so that everyone has the same level of health, but rather to reduce or eliminate those differences, which result from factors considered avoidable and unfair. Equity in health is concerned with creating opportunities for health and with bringing health differentials down to the lowest possible levels.  

---

Executive Summary

*Individuals and their ill health cannot be understood solely by looking inside their bodies and brains; one must also look inside their communities, their networks, their workplaces, their families and even the trajectories of their life.*

Lomas (1996)²

Rationale for Developing the Northern Rivers Equity Profile

Equity in health is a core value of NSW Health and has been highlighted as such through the publication of two important documents; *Healthy People 2005 – New Directions for Public Health*³ and the *NSW Health and Equity Statement*⁴. The 2002 *Report of the Chief Health Officer, The Health of the People of NSW* documented consistent evidence of differences, related to social and economic circumstances, in mortality rates, levels of illness and disability, health behaviours, risk factors for disease and the use of preventive services⁵. Over the last century, there have been substantial improvements in life expectancy and general population health within NSW, Australia and internationally⁵. However, these gains have not been shared equally throughout the population and there is evidence that health inequities between the most and least disadvantaged may be widening⁴.

Before any strategic planning to reduce health inequities can take place, the inequities, and their determinants, must be identified. Once intervention strategies are in place, inequities must be monitored. Therefore, to gauge health inequities across populations, and to assess the effectiveness of strategies identified by the *NSW Health and Equity Statement*⁴ key focus areas, each Area Health Service within NSW has been required to develop an Equity Profile of their region. This requirement emerged as part of the implementation of *Healthy People 2005 – New Directions for Public Health in NSW*³.

Nature of an Equity Profile

An Equity Profile consists of a collection of indicators that allows us to measure population health outcomes (ie: traditional mortality and morbidity data), but also other factors that impact on health, or health determinants (ie: personal, economic, social, community and environmental factors which help or hinder a person achieve optimal health outcomes). These baseline indicators can then be used to identify existing inequities, to develop and prioritise intervention strategies and to monitor changes in health outcomes over time. An Equity Profile itself does not explain the causes of widening, stagnant or narrowing gaps: its primary role is to identify that certain health trends are occurring and, thereby, to inform, guide and measure the progress of strategic planning processes.
Objectives of the Northern Rivers Equity Profile

- Identify appropriate indicators to measure the key health determinants;
- Identify population groups with the greatest need;
- Allow comparisons of inequities to be made between appropriate population groups;
- Provide a mechanism to compare inequities across geographical areas, charting the changing health of communities over time and across the life course;
- Provide a mechanism to allow the regular collection of cumulative health data;
- Assist in identifying data gaps and, thereby, indicate priorities for additional data collections; and
- Act as a framework to support strategic planning processes across the Area. The Northern Rivers Equity Profile will link data with action by directing which goals and targets are set during planning stages, supporting the allocation of resources and monitoring and evaluating strategies implemented to address health inequities across the Area.

Developing the Northern Rivers Equity Profile

The Northern Rivers Health Equity Working Group (HEWG) was established, comprising representatives from the three units of the then Directorate of Population Health – the Public Health Unit, the Clinical Research Evaluation and Support Team (CREST) and the Health Promotion Unit as well as a representative from the, then, Policy and Health Service Development Directorate.

NSW Health nominated a core set of key indicators that should be included in each Area Health Service’s Equity Profile. However, the HEWG considered it necessary to adopt a more holistic view of health and to include data for the full range of health determinants, as well as for a broad range of population health outcomes. Therefore, a review of the literature was conducted on a local, state, national and international level, to identify existing profiles and indicators already in use. Although considerable work had been undertaken around the development of indicators for health inequities and various attempts had been made to combine these indicators into various types of profile, the HEWG determined that none of these attempts adequately reflected the full range of determinants.

However, the comprehensive literature review did identify the following four principles, which are explained in more depth later in the Profile, as central to the development of a comprehensive Equity Profile:

- **Using an Holistic Definition of Health** – health refers not only to the absence of disease and illness, but encompasses social, economic, physical, cultural and psychological well-being and the ability to adapt to stressors of every day life.
• **Using a Population Health Approach** – population health strategies are designed to affect whole groups, or populations, of people to maintain and improve the health status of the entire population and to reduce inequities in health status between population groups\(^8\).

• **Using a Life Course Approach** – examining health from conception to death, in order to emphasise that the accumulation of advantage or disadvantage is crucial in influencing morbidity, mortality and overall physical and mental health outcomes in later life\(^9, 10\).

• **Using a Health Gradient Approach** – almost all health outcomes and health determinants consistently present themselves as gradients when assessed against socioeconomic circumstances – ie: health status worsens at every step down the socioeconomic ladder\(^11\).

Working from these four major principles, the HEWG developed the *Northern Rivers HEWG Determinants of Health Model* to act as the foundation for selecting indicators for the Equity Profile.

**Northern Rivers HEWG Determinants of Health Model**

All potential indicators identified in the literature review were collated and grouped, by health outcomes and determinants, according to this model. HEWG members and other NRAHS staff with relevant expertise then reviewed each group of outcomes and determinants, prioritising those considered most important and appropriate for inclusion in the *Northern Rivers Equity Profile*. 
Contents of the Northern Rivers Equity Profile

As summarised in Table 1, the Northern Rivers Equity Profile presents data on a wide range of population health outcome indicators – exploring the inequities experienced by our Area as a whole, as well as exploring the inequities experienced by various population sub-groups within our Area. Future phases of the Northern Rivers Equity Profile will also include data on additional health outcome indicators, as indicated. For information about the comparisons currently available for each included indicator, please refer to the Content section, which lists the indicators (including the comparisons made) in the same order as Table 1.

Table 1: Summary of Northern Rivers Equity Profile population health outcome indicators

<table>
<thead>
<tr>
<th>Population Health Outcome (PHO) Indicators Currently Included</th>
<th>PHO Indicators to be Included in Future Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mortality</strong></td>
<td></td>
</tr>
<tr>
<td>• All cause</td>
<td></td>
</tr>
<tr>
<td>• Major causes</td>
<td></td>
</tr>
<tr>
<td>• Cardiovascular disease</td>
<td></td>
</tr>
<tr>
<td>• Chronic respiratory disease</td>
<td></td>
</tr>
<tr>
<td>• Unintentional injury</td>
<td></td>
</tr>
<tr>
<td>• Other injury</td>
<td></td>
</tr>
<tr>
<td>• Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>• Nervous system disease</td>
<td></td>
</tr>
<tr>
<td>• Genitourinary disease</td>
<td></td>
</tr>
<tr>
<td>• Neonatal cause</td>
<td></td>
</tr>
<tr>
<td>• All cancers</td>
<td></td>
</tr>
<tr>
<td>• Lung cancer</td>
<td></td>
</tr>
<tr>
<td>• Colorectal cancer</td>
<td></td>
</tr>
<tr>
<td>• Melanoma</td>
<td></td>
</tr>
<tr>
<td>• Prostate cancer</td>
<td></td>
</tr>
<tr>
<td>• Breast cancer</td>
<td></td>
</tr>
<tr>
<td>• Cervical cancer</td>
<td></td>
</tr>
<tr>
<td>• All respiratory disease</td>
<td></td>
</tr>
<tr>
<td>• All injury / poisoning</td>
<td></td>
</tr>
<tr>
<td>• Total avoidable mortality</td>
<td></td>
</tr>
<tr>
<td>• Primary avoidable mortality</td>
<td></td>
</tr>
<tr>
<td>• Secondary avoidable mortality</td>
<td></td>
</tr>
<tr>
<td>• Tertiary avoidable mortality</td>
<td></td>
</tr>
<tr>
<td><strong>Morbidity</strong></td>
<td></td>
</tr>
<tr>
<td>• Lung cancer incidence</td>
<td></td>
</tr>
<tr>
<td>• Colorectal cancer incidence</td>
<td></td>
</tr>
<tr>
<td>• Melanoma incidence</td>
<td></td>
</tr>
<tr>
<td>• Prostate cancer incidence</td>
<td></td>
</tr>
<tr>
<td>• Breast cancer incidence</td>
<td></td>
</tr>
<tr>
<td>• Cervical cancer incidence</td>
<td></td>
</tr>
<tr>
<td>• Asthma prevalence</td>
<td></td>
</tr>
<tr>
<td>• Diabetes prevalence</td>
<td></td>
</tr>
<tr>
<td><strong>Disease Notifications</strong></td>
<td></td>
</tr>
<tr>
<td>• Pertussis (whooping cough)</td>
<td></td>
</tr>
<tr>
<td>• Q fever</td>
<td></td>
</tr>
<tr>
<td>• Gonorrhoea</td>
<td></td>
</tr>
<tr>
<td>• Syphilis</td>
<td></td>
</tr>
<tr>
<td>• Hepatitis A</td>
<td></td>
</tr>
<tr>
<td>• Hepatitis B</td>
<td></td>
</tr>
<tr>
<td>• Hepatitis C</td>
<td></td>
</tr>
<tr>
<td>• Salmonella</td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
</tr>
<tr>
<td>• No natural teeth missing among adults</td>
<td></td>
</tr>
<tr>
<td><strong>Disease Notifications</strong></td>
<td></td>
</tr>
<tr>
<td>• Measles</td>
<td></td>
</tr>
<tr>
<td>• Rubella</td>
<td></td>
</tr>
<tr>
<td>• Meningococcal</td>
<td></td>
</tr>
<tr>
<td>• Ross River Virus</td>
<td></td>
</tr>
<tr>
<td>• Barmah Forest Virus</td>
<td></td>
</tr>
<tr>
<td>• Tuberculosis</td>
<td></td>
</tr>
<tr>
<td>• Pneumococcal</td>
<td></td>
</tr>
<tr>
<td>• HIV</td>
<td></td>
</tr>
<tr>
<td>• Legionnaires’ disease</td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
</tr>
<tr>
<td>• Self-rated mental health status</td>
<td></td>
</tr>
<tr>
<td>• Physical functioning</td>
<td></td>
</tr>
</tbody>
</table>

As population health outcomes are the result of a complex interaction of many determinant factors, Table 2 summarises how the Northern Rivers Equity Profile also provides data on a wide range of health determinants, grouped according to the HEWG Determinants of Health Model described earlier – again allowing exploration of the inequities experienced by our Area as a whole, as well as by various population sub-groups within our Area. Future phases of the Northern Rivers Equity Profile will also include data on additional health determinant indicators, as well as exploring the feasibility of locating or collecting data on
yet further indicators, as indicated. For information about the comparisons currently available for each included indicator, please refer to the Contents section, which lists the indicators (including the comparisons made) in the same order as Table 2.

Table 2: Summary of Northern Rivers Equity Profile health determinant indicators

<table>
<thead>
<tr>
<th>Indicators Currently Included, by Determinant Type</th>
<th>Indicators to be Included in Future Phases</th>
<th>Indicators to be Explored for Inclusion in Future Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early childhood development</td>
<td>Early childhood development</td>
<td>Early childhood development</td>
</tr>
<tr>
<td>• Teenage mothers</td>
<td>• Antenatal care before 20 weeks</td>
<td>• Childhood sun protection</td>
</tr>
<tr>
<td>• Immunisation adequacy (12 – 15 months)</td>
<td>• Perinatal mortality</td>
<td>• Child abuse notifications</td>
</tr>
<tr>
<td>• Domestic violence against children</td>
<td>• Premature birth rates</td>
<td>• Childhood literacy skills</td>
</tr>
<tr>
<td>• Oral health in kindergarten</td>
<td>• Low birthweight</td>
<td>• Childhood numeracy skills</td>
</tr>
<tr>
<td>• Oral health in Year 6</td>
<td>• Birth defects</td>
<td>• Parental literacy skills</td>
</tr>
<tr>
<td></td>
<td>• Postnatal depression</td>
<td>• Parental numeracy skills</td>
</tr>
<tr>
<td></td>
<td>• Breastfeeding duration</td>
<td>• Early childhood care attendance</td>
</tr>
<tr>
<td></td>
<td>• Mature-age mothers</td>
<td>• Preschool / kindergarten attendance</td>
</tr>
<tr>
<td></td>
<td>• Smoking during pregnancy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Immunisation adequacy (24 – 26 months)</td>
<td></td>
</tr>
<tr>
<td>Culture / ethnicity</td>
<td>Dental visits among children</td>
<td></td>
</tr>
<tr>
<td>• Aboriginality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifestyle</td>
<td>Culture / ethnicity</td>
<td>Culture / ethnicity</td>
</tr>
<tr>
<td>• Influenza immunisation</td>
<td>• All ethnicity</td>
<td>• Religious status</td>
</tr>
<tr>
<td>• Mammographic screening</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pap testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Tobacco smoking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• At-risk alcohol drinking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Adequate daily fruit intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Adequate daily vegetable intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Adequate physical activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Age distribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Gender distribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Aboriginal population</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychosocial</td>
<td>Psychosocial</td>
<td>Psychosocial</td>
</tr>
<tr>
<td>• Psychological distress</td>
<td>• Anxiety</td>
<td>• Happiness / Life satisfaction</td>
</tr>
<tr>
<td></td>
<td>• Depression</td>
<td>• Self-esteem</td>
</tr>
<tr>
<td></td>
<td>• Mental disorder prevalence</td>
<td>• Perceptions of personal control</td>
</tr>
<tr>
<td></td>
<td>• Suicide &amp; self-inflicted injury</td>
<td></td>
</tr>
<tr>
<td>Indicators Currently Included, by Determinant Type</td>
<td>Indicators to be Included in Future Phases</td>
<td>Indicators to be Explored for Inclusion in Future Phases</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Access</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Difficulty getting health care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Quality of hospital care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Quality of Emergency Dept care</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Smokefree households</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Socioeconomic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Housing tenure</td>
<td>• Personal income</td>
<td>• Housing affordability</td>
</tr>
<tr>
<td>• Unemployment</td>
<td>• Household income</td>
<td>• Goods &amp; service affordability</td>
</tr>
<tr>
<td>• Government financial assistance</td>
<td>• Landlord type</td>
<td>• Food security</td>
</tr>
<tr>
<td>• No post-school education</td>
<td>• Occupational status</td>
<td>• Labour force participation</td>
</tr>
<tr>
<td>• Year 12 completion</td>
<td>• Year 12 completion</td>
<td>• Adult literacy skills</td>
</tr>
<tr>
<td><strong>Community &amp; social context</strong></td>
<td></td>
<td>• Adult numeracy skills</td>
</tr>
<tr>
<td>• Family structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Crime rates – assaults</td>
<td>• Social capital</td>
<td></td>
</tr>
<tr>
<td>• Crime rates – robberies</td>
<td>• Social networks</td>
<td></td>
</tr>
<tr>
<td>• Crime rates – thefts</td>
<td>• Community trust levels</td>
<td></td>
</tr>
<tr>
<td>• Crime rates – drug offences</td>
<td>• Community safety perceptions</td>
<td></td>
</tr>
<tr>
<td>• Crime rates – sexual offences</td>
<td>• Organisational memberships</td>
<td></td>
</tr>
<tr>
<td><strong>Phases of the Northern Rivers Equity Profile</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This first phase of the *Northern Rivers Equity Profile*, primarily, identifies baseline levels of indicators, allowing changes to be monitored and trends to be tracked over time. It will also assist in identifying existing data gaps and, thereby, help to indicate priorities for ongoing data collection across the Area.
The *Northern Rivers Equity Profile* is a living and evolving document: indicators will be added and refined as part of an ongoing process to monitor health outcome and determinant trends across the Northern Rivers Area. Development of the *Northern Rivers Equity Profile* will be undertaken in six monthly phases. With each phase, data on additional indicators will be added to the *Northern Rivers Equity Profile* until data are available for all determinants. In addition, more recent data for current indicators will be included, as it becomes available, allowing progress in reducing health inequities to be monitored. It will take approximately two to five years before trends can be observed and data can be collated for all determinants. Data analyses will be available in hard and electronic copy. Maintaining the *Northern Rivers Equity Profile* will be the responsibility of the Health Information Manager, Public Health Unit, Population Health & Planning Directorate.

**Findings from Phase 1 of the Northern Rivers Equity Profile**

Table 3 below provides a summary of how Northern Rivers residents compare (better☺, worse☹ or comparable😊) with overall NSW and rural NSW populations and of sub-group differences within the Northern Rivers, in relation to population health outcomes. The population sub-groups listed in brackets after each symbol indicate those whose results fall into that category for that indicator. The following examples explain how to interpret the different sorts of results:

- ☺ (males) in the *Northern Rivers vs overall NSW* column indicates that figures for Northern Rivers males were comparable to those for overall NSW males.

- ☻ (males; females) in the *Northern Rivers vs rural NSW* column indicates that figures for Northern Rivers males were better than those for rural NSW males and that figures for Northern Rivers females were also better than those for rural NSW females.

- ☹ (males; males (Ab); Aboriginal females; Richmond Valley & Grafton males; lower SES) in the *Within Northern Rivers* column indicates that figures for males were worse than those for females within the Northern Rivers; that figures for Aboriginal males were worse than those for Aboriginal females within the Northern Rivers; that figures for Aboriginal females were worse than those for non-Aboriginal females within the Northern Rivers; that figures for males living in Richmond Valley and Grafton were worse than those for males in the Northern Rivers generally; and that figures were worse in LGAs with lower, as opposed to higher, socioeconomic status, indicating a socioeconomic gradient throughout the Northern Rivers.

- 😊 (gender; SES; other LGAs) in the *Within Northern Rivers* column indicates that figures for Northern Rivers males and females were comparable; that there was no clear relationship between LGAs’ rates of the indicator and their socioeconomic status; and that figures for LGAs not mentioned in the better or worse categories were comparable to the Northern Rivers generally.
Table 3: Summary of Area and Intra-Area comparisons for population health outcomes included in Phase 1

<table>
<thead>
<tr>
<th>Population health outcome</th>
<th>Northern Rivers vs overall NSW</th>
<th>Northern Rivers vs rural NSW</th>
<th>Within Northern Rivers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Comparisons = male vs female, Aboriginal vs non-Aboriginal, LGAs vs NR, LGAs by SES)</td>
</tr>
<tr>
<td>All cause mortality</td>
<td>☺ (males) ☝ (females)</td>
<td>☝ (males; females)</td>
<td>☺ (Aboriginal males; Aboriginal females; Richmond Valley &amp; Grafton males; Richmond Valley, Kyogle, Grafton &amp; Lismore females)</td>
</tr>
<tr>
<td>Cardiovascular disease mortality</td>
<td>☝ (males) ☝ (females)</td>
<td>no data yet</td>
<td>☺ (Aboriginal males; Aboriginal females; Richmond Valley &amp; Grafton males; Richmond Valley, Kyogle, Grafton &amp; Lismore females) (SES; Maclean, Pristine Waters, Tweed, Byron &amp; Lismore males; Tweed &amp; Byron females)</td>
</tr>
<tr>
<td>Chronic respiratory disease mortality</td>
<td>☺ (males; females)</td>
<td>no data yet</td>
<td>☺ (Aboriginal males)</td>
</tr>
<tr>
<td>Unintentional injury mortality</td>
<td>☺ (males; females)</td>
<td>no data yet</td>
<td>☝ (Aboriginal males; Aboriginal females) (genders (Ab))</td>
</tr>
<tr>
<td>Other injury mortality</td>
<td>☝ (males) ☝ (females)</td>
<td>no data yet</td>
<td>☝ (Aboriginal males; Aboriginal females) (genders (Ab))</td>
</tr>
<tr>
<td>Diabetes mellitus mortality</td>
<td>☝ (males; females)</td>
<td>no data yet</td>
<td>☝ (Aboriginal males; Aboriginal females) (genders; genders (Ab))</td>
</tr>
<tr>
<td>Nervous system disease mortality</td>
<td>☝ (males; females)</td>
<td>no data yet</td>
<td>☝ (Aboriginal females) (genders; Aboriginal males)</td>
</tr>
<tr>
<td>Genitourinary disease mortality</td>
<td>☝ (males; females)</td>
<td>no data yet</td>
<td>☝ (genders)</td>
</tr>
<tr>
<td>Neonatal cause mortality</td>
<td>☝ (males; females)</td>
<td>no data yet</td>
<td>☝ (Aboriginal females) (genders; Aboriginal males)</td>
</tr>
<tr>
<td>All cancer mortality</td>
<td>☝ (males; females)</td>
<td>no data yet</td>
<td>☝ (Aboriginal males; Aboriginal females) (genders (Ab); SES; Aboriginal females; Richmond Valley, Maclean, Pristine Waters, Grafton, Byron, Copmanhurst, Lismore &amp; Ballina males; Richmond Valley, Maclean, Pristine Waters, Kyogle, Tweed, Byron, Copmanhurst, Lismore &amp; Ballina females)</td>
</tr>
<tr>
<td>Lung cancer mortality</td>
<td>☝ (males; females)</td>
<td>☝ (males; females)</td>
<td>☝ (Aboriginal males; Kyogle males) (genders; Tweed males; Grafton females)</td>
</tr>
<tr>
<td>Population health outcome</td>
<td>Northern Rivers vs overall NSW</td>
<td>Northern Rivers vs rural NSW</td>
<td>Within Northern Rivers</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>(males; females)</td>
<td>(males; females)</td>
<td>(males)</td>
</tr>
<tr>
<td>Colorectal cancer mortality</td>
<td>☒</td>
<td>☒</td>
<td>☒ (Richmond Valley &amp; Kyogle males; Kyogle females)</td>
</tr>
<tr>
<td>Melanoma mortality</td>
<td>☒ (males)</td>
<td>☒ (males)</td>
<td>☒ (SES; Maclean, Pristine Waters, Grafton, Tweed, Byron, Lismore &amp; Ballina males; Richmond Valley, Maclean, Pristine Waters, Grafton, Tweed, Byron, Copmanhurst, Lismore &amp; Ballina females)</td>
</tr>
<tr>
<td>Prostate cancer mortality</td>
<td>☒ (males)</td>
<td>☒ (males)</td>
<td>☒ (Copmanhurst males)</td>
</tr>
<tr>
<td>Breast cancer mortality</td>
<td>☒ (females)</td>
<td>☒ (females)</td>
<td>no data yet</td>
</tr>
<tr>
<td>Cervical cancer mortality</td>
<td>☒ (females)</td>
<td>☒ (females)</td>
<td>no data yet</td>
</tr>
<tr>
<td>All respiratory disease mortality</td>
<td>☒ (males; females)</td>
<td>no data yet</td>
<td>☒ (Grafton males; Byron females)</td>
</tr>
<tr>
<td>All injury / poisoning mortality</td>
<td>☒ (males; females)</td>
<td>no data yet</td>
<td>☒ (SES; Richmond Valley, Maclean, Pristine Waters, Kyogle, Tweed, Byron, Copmanhurst &amp; Lismore males; Richmond Valley, Maclean, Pristine Waters, Grafton, Kyogle, Tweed, Copmanhurst, Lismore &amp; Ballina females)</td>
</tr>
<tr>
<td>Total avoidable mortality</td>
<td>no data yet</td>
<td>no data yet</td>
<td>☒ (males; Casino &amp; Grafton; lower SES)</td>
</tr>
<tr>
<td>Primary avoidable mortality</td>
<td>no data yet</td>
<td>no data yet</td>
<td>☒ (lower SES)</td>
</tr>
<tr>
<td>Secondary avoidable mortality</td>
<td>no data yet</td>
<td>no data yet</td>
<td>☒ (lower SES)</td>
</tr>
<tr>
<td>Tertiary avoidable mortality</td>
<td>no data yet</td>
<td>no data yet</td>
<td>☒ (SLAs; SES)</td>
</tr>
<tr>
<td>Lung cancer incidence</td>
<td>☒ (males; females)</td>
<td>☒ (males; females)</td>
<td>☒ (males)</td>
</tr>
<tr>
<td>Colorectal cancer incidence</td>
<td>☒ (males; females)</td>
<td>☒ (males; females)</td>
<td>☒ (males)</td>
</tr>
<tr>
<td>Melanoma incidence</td>
<td>☒ (males; females)</td>
<td>☒ (males; females)</td>
<td>☒ (males)</td>
</tr>
<tr>
<td>Prostate cancer incidence</td>
<td>☒ (males)</td>
<td>☒ (males)</td>
<td>no data yet</td>
</tr>
<tr>
<td>Breast cancer incidence</td>
<td>☒ (females)</td>
<td>☒ (females)</td>
<td>no data yet</td>
</tr>
<tr>
<td>Cervical cancer incidence</td>
<td>☒ (females)</td>
<td>☒ (females)</td>
<td>no data yet</td>
</tr>
<tr>
<td>Asthma prevalence</td>
<td>no data yet</td>
<td>no data yet</td>
<td>☒ (genders)</td>
</tr>
</tbody>
</table>
### Population health outcome

<table>
<thead>
<tr>
<th>Determinant Category</th>
<th>Indicator</th>
<th>Northern Rivers vs overall NSW</th>
<th>Northern Rivers vs rural NSW</th>
<th>Within Northern Rivers (Comparisons = male vs female, Aboriginal vs non-Aboriginal, LGAs vs NR, LGAs by SES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pertussis (whooping cough) notifications</td>
<td>☒ (overall)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
<td></td>
</tr>
<tr>
<td>Q fever notifications</td>
<td>☒ (overall)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
<td></td>
</tr>
<tr>
<td>Gonorrhea notifications</td>
<td>☒ (overall)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
<td></td>
</tr>
<tr>
<td>Syphilis notifications</td>
<td>☒ (overall)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
<td></td>
</tr>
<tr>
<td>Hepatitis A notifications</td>
<td>☒ (overall)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B notifications</td>
<td>☒ (overall)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
<td></td>
</tr>
<tr>
<td>Hepatitis C notifications</td>
<td>☒ (overall)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
<td></td>
</tr>
<tr>
<td>Salmonella notifications</td>
<td>☒ (overall)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
<td></td>
</tr>
<tr>
<td>Natural teeth missing in adults</td>
<td>☒ (males in 2002; females in 2002)</td>
<td>☒ (males in 1998; females in 1998)</td>
<td>no data yet</td>
<td>☒ (genders)</td>
</tr>
</tbody>
</table>

**Key to Comparisons:** ☒ = results better than comparison group; ☐ = results comparable to comparison group; ☒ = results worse than comparison group. See explanation before table for more information.

Similarly, Table 4 below provides a summary of how Northern Rivers residents compare (better, worse or comparable) with overall NSW and rural NSW populations and of sub-group differences within the Northern Rivers, in relation to the broad range of health determinants. Refer to paragraph before Table 3 for advice regarding interpreting the data presented.

### Table 4: Summary of Area and Intra-Area comparisons for health determinants included in Phase 1

<table>
<thead>
<tr>
<th>Determinant Category</th>
<th>Indicator</th>
<th>Northern Rivers vs overall NSW</th>
<th>Northern Rivers vs rural NSW</th>
<th>Within Northern Rivers (Comparisons = male vs female, Aboriginal vs non-Aboriginal, LGAs vs NR, LGAs by SES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Childhood development</td>
<td>Teenage mothers</td>
<td>inadequate data</td>
<td>inadequate data</td>
<td>☒ (lower SES)</td>
</tr>
<tr>
<td></td>
<td>Immunisation adequacy (12 – 15 months)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
<td>☒ (LGAs; SES)</td>
</tr>
<tr>
<td></td>
<td>Domestic violence against children</td>
<td>☒ (boys; girls)</td>
<td>☒ (boys; girls)</td>
<td>☒ (genders)</td>
</tr>
<tr>
<td></td>
<td>Oral health in kindergarten</td>
<td>☒ (overall)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
</tr>
<tr>
<td></td>
<td>Oral health in Year 6</td>
<td>☒ (overall)</td>
<td>☒ (overall)</td>
<td>no data yet</td>
</tr>
<tr>
<td>Determinant Category</td>
<td>Indicator</td>
<td>Northern Rivers vs overall NSW</td>
<td>Northern Rivers vs rural NSW</td>
<td>Within Northern Rivers (Comparisons = male vs female, Aboriginal vs non-Aboriginal, LGAs vs NR, LGAs by SES)</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------</td>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Culture / ethnicity</strong></td>
<td>Ethnicity</td>
<td>See Biological section of table</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Influenza immunisation</td>
<td>😊 (overall)</td>
<td>😊 (overall)</td>
<td>no data yet</td>
</tr>
<tr>
<td></td>
<td>Mammographic screening</td>
<td>😊 (females)</td>
<td>😊 (females)</td>
<td>no data yet</td>
</tr>
<tr>
<td></td>
<td>Pap testing</td>
<td>😊 (females)</td>
<td>😊 (females)</td>
<td>no data yet</td>
</tr>
<tr>
<td></td>
<td>Tobacco smoking</td>
<td>😊 (males in 2002); 😊 (males in 1997 &amp; 1998; females)</td>
<td>no data yet</td>
<td>😊 (males in 2002); 😊 (genders in 1997 &amp; 1998)</td>
</tr>
<tr>
<td></td>
<td>At-risk alcohol drinking</td>
<td>😊 (females in 1997); 😊 (males; females in 1998 &amp; 2002)</td>
<td>no data yet</td>
<td>😊 (males)</td>
</tr>
<tr>
<td></td>
<td>Adequate physical activity</td>
<td>😊 (males; females)</td>
<td>😊 (males; females)</td>
<td>😊 (genders)</td>
</tr>
<tr>
<td><strong>Biological</strong></td>
<td>Overall population</td>
<td>😊 (SES); 😊 (gender); More older, younger &amp; Aboriginal people</td>
<td>no data yet</td>
<td>😊 (lower SES in Richmond Valley, Maclean, Pristine Waters, Kyogle, Grafton &amp; Tweed LGAs); 😊 (higher SES in Byron, Copmanhurst, Lismore &amp; Ballina LGAs)</td>
</tr>
<tr>
<td></td>
<td>Aboriginal population</td>
<td>More younger people</td>
<td>no data yet</td>
<td>😊 (genders); Higher proportion in Richmond Valley, Maclean, Kyogle, Grafton, Copmanhurst &amp; Lismore LGAs; and in lower SES LGAs; Lower proportion in Pristine Waters, Tweed, Byron &amp; Ballina LGAs; and in higher SES LGAs</td>
</tr>
<tr>
<td><strong>Psychosocial</strong></td>
<td>Psychological distress</td>
<td>😊 (males; females)</td>
<td>no data yet</td>
<td>😊 (genders)</td>
</tr>
<tr>
<td>Determinant Category</td>
<td>Indicator</td>
<td>Northern Rivers vs overall NSW</td>
<td>Northern Rivers vs rural NSW</td>
<td>Within Northern Rivers (Comparisons = male vs female, Aboriginal vs non-Aboriginal, LGAs vs NR, LGAs by SES)</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Quality of hospital care</td>
<td>☹ (males; females)</td>
<td>no data yet</td>
<td>☹ (gender)</td>
</tr>
<tr>
<td>Socioeconomic</td>
<td>Housing tenure</td>
<td>☺ (overall)</td>
<td>no data yet</td>
<td>no data yet</td>
</tr>
<tr>
<td></td>
<td>Unemployment</td>
<td>inadequate data</td>
<td>no data yet</td>
<td>inadequate data</td>
</tr>
<tr>
<td></td>
<td>Government financial assistance</td>
<td>inadequate data</td>
<td>inadequate data</td>
<td>no data yet</td>
</tr>
<tr>
<td></td>
<td>Post-school education</td>
<td>inadequate data</td>
<td>no data yet</td>
<td>inadequate data</td>
</tr>
<tr>
<td>Community &amp; social context</td>
<td>Family structure</td>
<td>inadequate data</td>
<td>no data yet</td>
<td>no data yet</td>
</tr>
<tr>
<td></td>
<td>Crime rates – assaults</td>
<td>inadequate data</td>
<td>inadequate data</td>
<td>inadequate data</td>
</tr>
<tr>
<td></td>
<td>Crime rates – robberies</td>
<td>inadequate data</td>
<td>inadequate data</td>
<td>inadequate data</td>
</tr>
<tr>
<td></td>
<td>Crime rates – thefts</td>
<td>inadequate data</td>
<td>inadequate data</td>
<td>inadequate data</td>
</tr>
<tr>
<td></td>
<td>Crime rates – drug offences</td>
<td>no data yet</td>
<td>no data yet</td>
<td>inadequate data</td>
</tr>
<tr>
<td></td>
<td>Crime rates – sexual offences</td>
<td>no data yet</td>
<td>no data yet</td>
<td>inadequate data</td>
</tr>
</tbody>
</table>

**Key to Comparisons:** ☺ = results better than comparison group; ☻ = results comparable to comparison group; ☹ = results worse than comparison group. See explanation before Table 3 for more information.

**Recommendations of this First Phase of the Northern Rivers Equity Profile**

- The *Northern Rivers Equity Profile* be endorsed by the Area Executive and the Health Services & Organisational Ethics Committee and disseminated across the Northern Rivers Area Health Service.
- The *Northern Rivers Equity Profile* be adopted as the framework to inform and guide strategic planning processes, including the *Northern Rivers Population Health Plan*, and service delivery across the Area, not only within health but also in partnerships with external government and non-government organisations.
- The NRAHS Population Health & Planning Directorate be responsible for ensuring that the full *Northern Rivers Equity Profile* is converted into a fully interactive internet format and made available on the
Northern Rivers internet site within 6 months – replacing the existing NRA Health Profile intranet site. The current report will be made available in pdf format as soon as the NRA internet site is launched.

- The NRAHS Population Health & Planning Directorate be responsible for delivering the future phases of the *Northern Rivers Equity Profile*, as outlined in the document.

- An Equity Profile Advisory Group be established, comprising representatives from:
  - the Public Health Unit, PHPD;
  - the Health Promotion Unit, PHPD;
  - the Policy and Health Service Development Unit, PHPD;
  - the Clinical Research Evaluation and Support Team (CREST), NRUDRH; and
  - the NRUDRH.

- The Equity Profile Advisory Group develop Terms of Reference (including frequency of meetings) and be responsible for:
  - Overseeing the dissemination of the *Profile* – within the Northern Rivers and beyond;
  - Advising on optimal internet layout for the *Profile*;
  - Advising about strategies for actively marketing the *Profile* when it is available on the internet;
  - Supporting and advising the Population Health & Planning Directorate staff member responsible for future phases of the *Northern Rivers Equity Profile*;
  - Exploring options for gathering data where none, or insufficient, are currently available;
  - Making recommendations about future data collection requirements;
  - Considering and recommending solutions for outstanding data quality issues;
  - Overseeing the implementation of these recommendations, reviewing progress against each recommendation at each meeting.

- Collaborative partnerships be developed and maintained with external government and non-government agencies interested in using the *Northern Rivers Equity Profile* information. Where possible, such partners may contribute data to assist with the ongoing development of the *Northern Rivers Equity Profile*.

- Appropriate longer time frames be set for planning processes that allow not only short term but long term outcomes to be monitored.

- A Northern Rivers Health and Equity Statement be developed, by the Policy and Health Service Development Unit, with input from key internal and external stakeholders, including the Equity Profile Advisory Group. The information collected in the *Northern Rivers Equity Profile* should inform its development. This statement would follow along similar lines to the *NSW Health and Equity Statement*[^4], identifying key focus areas and strategies undertaken at the local level to reduce health inequities.
Background to the Equity Profile

Why Develop an Equity Profile?

The 2002 Report of the Chief Health Officer, The Health of the People of NSW documented consistent evidence of differences in health related to gender, family composition, education level, employment status, place of birth and residence\(^5\). These differences are reflected in mortality rates, levels of illness and disability, health behaviours, risk factors for disease and the use of preventive services and are related to differences in social and economic circumstances\(^3\), \(^4\). Over the last century, there have been substantial improvements in life expectancy and general population health within NSW, Australia and internationally. However, these gains have not been shared equally throughout the population and there is evidence that health inequities between the most and least disadvantaged may be widening\(^4\).

Achieving equity in health is about fairness and improving life opportunities for those people who are most disadvantaged. It is about:

- equal access to services for people with equal need;
- the equal uptake of services by people in equal need; and
- equal quality of care or services for all people, with a focus on improving health outcomes\(^4\).

Equity in health is a core value of NSW Health. It is not an additional responsibility but fundamental to the work of NSW Health and Area Health Services. NSW Health recognises the important role it plays in reducing health inequities through the publication of two important documents; Healthy People 2005 – New Directions for Public Health\(^3\) and the NSW Health and Equity Statement\(^4\). The former aims to improve health for all people in NSW through an effective and comprehensive public health framework for action that identifies reducing health inequities as one of three streams for improving health outcomes\(^3\). The latter identifies six key focus areas to effectively reduce health inequities across NSW \(^4\):

- investing in the early years of life;
- recognising the importance of individual and community participation and fostering partnerships between consumers, the community and the health system to improve health outcomes;
- developing a stronger primary health care system, making it more accessible and proactive in meeting the needs of local communities;
- working collaboratively through regional planning and intersectoral action;
- improving systems and infrastructure through organisational development; building our capacity to act; and
- interventions which are implemented over realistic timeframes and are adequately resourced to achieve long term improvement in health and equity.
Before any strategic planning to reduce health inequities can take place, the inequities, and their determinants, must be identified. Once intervention strategies are in place, inequities must be monitored. Therefore, to gauge health inequities across populations, and to assess the effectiveness of strategies identified by the *NSW Health and Equity Statement* key focus areas, each Area Health Service within NSW has been required to undertake an Equity Profile of their region. This requirement emerged as part of the implementation of *Healthy People 2005 – New Directions for Public Health in NSW*.

An Equity Profile consists of a collection of indicators that allows us to measure health outcomes and factors that impact on health. These baseline indicators can then be used to identify existing inequities, to develop and prioritise intervention strategies and to monitor changes in health outcomes over time.

An Equity Profile itself does not explain the causes of widening, stagnant or narrowing gaps: its primary role is to identify that certain health trends are occurring and, thereby, to inform, guide and measure the progress of strategic planning processes.

**Objectives of the Northern Rivers Equity Profile**

- Identify appropriate indicators to measure the key health determinants;
- Identify population groups with the greatest need;
- Allow comparisons of inequities to be made between appropriate population groups;
- Provide a mechanism to compare inequities across geographical areas, charting the changing health of communities over time and across the life course;
- Provide a mechanism to allow the regular collection of cumulative health data;
- Assist in identifying data gaps and, thereby, indicate priorities for additional data collections; and
- Act as a framework to support strategic planning processes across the Area. The *Northern Rivers Equity Profile* will link data with action by directing which goals and targets are set during planning stages, supporting the allocation of resources and monitoring and evaluating strategies implemented to address health inequities across the Area.

**Principles Employed in Developing the Northern Rivers Equity Profile**

It is a particularly complex task to consider how inequities might be identified and what indicators might be used to measure disparities across population groups. According to the literature, the most effective means of measuring overall inequities is by somehow measuring health outcomes and determinants. This provides an early warning alert of developing health inequities.
How can we achieve an equity in health approach?

An equity approach recognises that:

- some people have more life opportunities than others;
- therefore, not everyone shares the same level of health or level of resources to deal with their health problems; and
- people have differing needs, therefore in working towards more equitable health outcomes, it is important to respond to people in different ways.

An Holistic Definition of Health

Among individuals, health refers not only to the absence of disease and illness, but encompasses social, economic, physical, cultural and psychological well-being and the ability to adapt to stressors of every day life. Good health enables us to pursue our goals, acquire skills and education and to grow and satisfy personal aspirations. This is a whole of life view and includes the cyclical concept of life-death-life. Health care services should strive to achieve the state where every individual can achieve their full potential as human beings and thus bring about the total well being of their communities. Contributing factors that make people healthy or unhealthy can be identified as the determinants of health.

The Population Health Approach

Population health strategies are designed to affect whole groups, or populations, of people to maintain and improve the health status of the entire population and to reduce inequities in health status between population groups. Population health outcomes extend beyond improved health status. A healthier population makes more productive contributions to overall societal development, requires less support in the form of health care and social benefits and is better able to support and sustain itself over the long term. Actions that bring about positive health also bring wider social, economic and environmental benefits for the population at large, including a sustainable and equitable health care system, strengthened social cohesion and citizen engagement, increased national growth and productivity and improved quality of life.

The Life Course Approach

The life course approach examines health from conception to death, in order to emphasise that the accumulation of advantage or disadvantage is crucial in influencing morbidity, mortality and overall physical and mental health outcomes in later life. It also provides opportunities to examine how social factors may influence health and is important in attempting to establish any causal pathways from poverty in childhood to health outcomes in adulthood. It recognises that life events are influenced by social
status, economic considerations, gender, community supports and other health determinants and that these determinants have differential impacts across the life cycle, depending on age and stage of the life cycle. The more disadvantaged the individual, the greater the risk at each transition\textsuperscript{8, 15-17}.

**The Health Gradient Approach**

Health inequities affect the whole of society not just the disadvantaged. Health conditions consistently present themselves as gradients when assessed against the social and economic circumstances of individuals\textsuperscript{11}. In wealthy countries, health status worsens at every step down the socioeconomic ladder: the further people are down the ladder, the greater their risk of higher morbidity and mortality than those further up the ladder\textsuperscript{15, 18}. This social gradient in health occurs not only between rich and poor but runs right across societies and over time for virtually all health outcomes\textsuperscript{15, 18}. Lower socioeconomic groups may be the most at risk, but everyone is affected\textsuperscript{19, 20}.

**Process of Developing the Northern Rivers Equity Profile**

**Establishing the Health Equity Working Group**

- A Project Coordinator was employed to coordinate development of the Equity Profile. The Coordinator established a working group to oversee the development of the *Northern Rivers Equity Profile*.
- The Northern Rivers Health Equity Working Group (HEWG) was established, comprising representatives from the three units of the then Directorate of Population Health – the Public Health Unit, the Clinical Research Evaluation and Support Team (CREST) and the Health Promotion Unit as well as a representative from the, then, Policy and Health Service Development Directorate.
- Terms of Reference were established and HEWG met on a regular basis to develop the content and format of the *Northern Rivers Equity Profile* and recommendations regarding its use.

The Equity Profile Project Coordinator resigned after six months and the task of preparing *the Profile* was transferred to the Equity Coordinator, Health Promotion Unit, the Health Information Manager, Public Health Unit and the Research and Evaluation Coordinator, Health Promotion Unit, still under the auspices of the HEWG.

**Developing the Northern Rivers Equity Profile Content**

Working from the four major principles described above, the Northern Rivers HEWG *Determinants of Health Model* was developed (see Figure 2), which acted as the foundation for collecting indicators for *the Profile*. 

Northern Rivers Equity Profile – Phase 1 (September 2003) 24
NSW Health nominated a core set of key indicators that should be included in each Area Health Service’s Equity Profile. However, the HEWG considered it necessary to adopt a more holistic view of health and to include data for the full range of health determinants, as well as for a broad range of population health outcomes. Therefore, a review of the literature was conducted on a local, state, national and international level, to identify existing profiles and indicators already in use. A basket of indicators and their data sources were identified. Although considerable work had been undertaken around the development of indicators for health inequities and various attempts had been made to combine these indicators into various types of profile, the HEWG determined that none of these attempts adequately reflected the full range of determinants6.

Therefore, all the potential indicators identified in the literature review were collated and grouped by health outcomes and determinants. HEWG members and other NRAHS staff with relevant expertise then reviewed each group of outcomes and determinants, prioritising those considered most important and appropriate for inclusion in the Northern Rivers Equity Profile. The format of the Northern Rivers Equity Profile was then developed and finalised. It was agreed that presenting data according to LGA would be beneficial for Profile users. Given the extensive range of indicators to be gathered, data collection will be staggered with indicators with available data presented in this first phase. Every six months, new phases of the Northern Rivers Equity Profile will be released, with additional indicators and sub-group comparisons included.

Developing a Framework for Identifying the Determinants of Health

The causes of ill health are complex, with a wide range of factors working together to influence health, including:

- global forces and government policies;
- the social and economic environment;
- the physical environment; and
- a person’s individual characteristics and behaviours.

The well-being of the population depends not only on medical care, but also on relatively equitable distribution of income; on a social environment which provides people with a sense of security and control; on stable and satisfying employment; and on the availability of social support19, 21. There is growing discussion in the literature supporting the psychosocial impact of these determinants on individual health status and, especially, on the importance of early childhood development and its impact on coping,
competency and overall developmental, physical, mental, emotional, educational and social outcomes and, thereby, its impact on health throughout the life cycle. Understanding the determinants of health and their interdependence has an important influence on the strategies and interventions adopted to reduce these inequities.

To develop a better understanding of the determinants of health and their complex and interdependent nature, seven existing frameworks were reviewed:

- Dahlgren and Whitehead;
- Healthy People in Healthy Communities;
- Model of the Social and Economic Determinants of Health;
- Framework for Human Development and the Social Determinants of Health;
- A Framework for Addressing the Social Determinants of Health and Wellbeing;
- A Framework of Socio-economic Determinants of Health; and
- Evans and Stoddart.

As no single existing model was considered an adequate explanation on its own, the HEWG developed a model of its own, one that incorporated an holistic view of health and that borrowed predominantly from the work of Dahlgren and Whitehead and Queensland Health’s A Framework of Socio-economic Determinants of Health.

The model was developed to provide a structure for describing the various determinants of health and the multidimensional impact these determinants have on health status. The determinants of health do not exist in isolation from each other. There are dynamic interactions, both within and between the layers. The model is presented in concentric circles to highlight the inter-relationship between the various determinants: outcomes of one determinant will influence other determinants and produce other outcomes. For example, as presented in Figure 1, low income and reduced early childhood stimulation can result in reduced cognitive development which, in turn, can result in lower levels of education which, in turn, influences employment opportunities which, in turn, influences where people live, their social contact, their behaviour, lifestyle and, ultimately, their overall health status.
Outcomes also have a cumulative impact on health: individuals or groups who experience low income, low educational attainment, lack of control, lack of social supports and inadequate coping skills have a poorer health status than those with higher levels\textsuperscript{30}.

**The HEWG Determinants of Health Model**

The *Northern Rivers HEWG Determinants of Health Model*, shown in Figure 2, comprises an inner circle and a number of outer circles. The inner circle represents the traditionally measured population health outcomes, such as mortality, morbidity, life expectancy and quality of life. All of these outcomes are associated with high levels of inequity. The outer circles represent the determinants of health that contribute to the population health outcomes, including the inequities consistently demonstrated in these outcomes. The relevance of the components in these outer circles are overviewed below but more detailed rationales, including the supporting references, are available in an extensive complementary literature review prepared by the Northern Rivers Area Health Promotion Unit (on which these overviews are based)\textsuperscript{31}.
In the Indicators section of this Equity Profile, data will be grouped and presented under the headings used in this Northern Rivers HEWG Determinants of Health Model.

**Early child development**

This is represented as the closest layer to the population health outcomes because early childhood experiences mediate the impact of all the other determinants on an individual's health outcomes. Early childhood is a critical and vulnerable stage and strong evidence has highlighted the importance of the early years in influencing adult health and well-being. National and international studies have consistently demonstrated that individuals who receive a healthy start in life enjoy significant long term physical, mental and emotional health benefits. The quality and development of parent and child bonding, emotional regulation and attachment, language development and the development of motor skills set the scene and will influence the quality of life a person experiences throughout their life course.

**Biological determinants**

Age, gender and genetic endowment are fundamental determinants of health. Inherited dispositions influence how long people live and whether or not they are affected by particular diseases or health
challenges. These factors influence health outcomes and cannot be changed. However, their influence is usually in the form of setting health or developmental boundaries, within which many of the other determinants, especially early childhood development, can mediate these biological influences – for better or for worse\textsuperscript{31}.

**Culture/Ethnicity determinants**

Culture and ethnicity influence health in complex ways: customs, traditions and cultural beliefs affect the overall health of individuals and communities as these factors influence what people think, feel, do and believe to be important. Levels of the broader community’s acceptance of cultural diversity (community and social context) also mediate the impact of these cultural influences on individuals’ health outcomes – again, for better or for worse\textsuperscript{31}.

**Lifestyle determinants**

Personal behaviours such as smoking, use of alcohol and other drugs, dietary and physical activity patterns are well known to directly affect individuals’ health and wellbeing. However, it is of limited use to focus on these behaviours in isolation, as many of the other determinants influence the likelihood of individuals engaging in these behaviours and even mediate the impact of these behaviours on their health outcomes\textsuperscript{31}.

**Psychosocial determinants**

Psychosocial determinants, including self-esteem, coping and perceived personal control are strongly influenced by early childhood experiences and strongly correlated with socioeconomic status. Coping skills refer to the way we relate to people around us and handle life’s stresses and challenges, whether that be with family and friends, within the community, social or work environment. A sense of control over life circumstances is a key factor influencing health outcomes – both directly and indirectly, by interacting with many of the other determinants. Mental health disorders account for nearly 30\% of the non-fatal burden of disease in Australia. Anxiety, stress, shame, insecurity, social isolation, depression, low self esteem, lack of personal control over work and home life accumulate during the life course and increase the chances of developing poor mental and physical health, resulting in premature morbidity\textsuperscript{31}.

**Environmental determinants**

Factors in the natural environment such as soil, water and air quality, and factors in the built environment such as housing, workplace safety, community and road design affect health outcomes – again, both directly and indirectly, by interacting with many of the other determinants\textsuperscript{31}. 

---

Northern Rivers Equity Profile – Phase 1 (September 2003) 29
Socioeconomic status

Socioeconomic status can be measured in a variety of ways but all socioeconomic indicators are consistently associated with health outcomes, even when age, gender and other traditional risk factors are taken into account.31.

- **Income, income distribution and social status:** Research indicates that income, especially income distribution, and social status are the single most important and influential determinant of health. Studies have shown that health improves with each step up the income and social hierarchy and the greater the gap between the rich and poor, the greater the differences in health within that community. In addition, societies which are reasonably prosperous and have more equitable distributions of wealth have healthier populations, regardless of the amount of money they spend on health care. The level of receipt of income support in a community provides a measure of the amount of poverty. The level of receipt of government financial assistance (ie: unemployment benefits, aged pension, family assistance benefits and disability benefits) provides an indication of the number of people who are both economically disadvantaged, and have higher needs for health services.31.

- **Education:** Health status improves with people’s levels of education and literacy. Education increases opportunities for income and job security and provides people with a sense of control. Low literacy skills and poor education also clearly influence other determinants – having been linked to higher stress levels, reduced self confidence, poor employment opportunities and poor social support. People with higher levels of education, as a group, experience better physical and psychological wellbeing. Higher levels of parental education are also associated with better health. Reasons for this may include not only the potential for better occupations, job opportunities and incomes, but also a greater sense of personal control and reward for work.31.

- **Employment and working conditions:** Unemployment and high workplace stress is directly linked with poor health. People who have more control over their work circumstances and fewer stress related demands on their job enjoy better health status.31.

Community and social context

Societal values and rules affect the health and well being of individuals and populations. Risks to health are reduced when there is social stability, recognition of diversity, safety, good human relationships and cohesive communities. Support from family, friends and communities, and the quality of these supports, determine how people will handle difficult circumstances and, therefore, the impact these circumstances will have on their overall health outcomes. Some studies have shown that the negative health impact of social isolation may be as significant as other traditional risk factors such as smoking, obesity, high blood pressure and sedentary lifestyle. Family structure has a strong impact on the health and wellbeing of
children and their parents and can impact on the availability to families of resources and skills needed to achieve resilience to life stresses caused by work and financial problems. Inadequate family income is more common in single parent families and poverty has a strong impact on health. Family breakdown can also have adverse social and health consequences for children and their parents.

Access to services
Appropriate and reliable access to population based services and facilities such as health, education, social, transport and recreation is essential for protecting and promoting health. Health services, especially those that focus on maintaining and promoting health, are designed to prevent disease and injury and so contribute greatly to improving population health. Communities most at risk of ill health tend to access these types of preventive services less than lower risk communities.

Many factors influence access to health care including:

- Geographic distribution and availability of services, especially in rural and remote areas;
- Availability and expertise of staff;
- Range and quality of facilities;
- Cultural sensitivity of the service;
- Availability of affordable and safe means of transport to and from the service;
- Cost of referrals and treatments;
- Waiting times for publicly funded health service, especially allied health services, outpatient medical specialist services, dental services and elective procedures.

Global forces and government policies
World economies, markets and trade, governmental policies, environmental conditions such as global warming, natural and manmade disasters all have direct effects on physical and mental health outcomes across nations. Government policies are embedded in the history, geography, and culture of societies. Policies are an important contributor to health as they set the context for systems that impact on the resources available to individuals. Therefore, policies from many sectors, including education, welfare, regional development and criminal justice systems, contribute to the health of the population. While state and federal government policies and global forces are outside the scope of the Northern Rivers Equity Profile, the multi-sectoral approach to developing and implementing the Northern Rivers Population Health Plan will deal with these forces on a more regional level.
**Selecting the Indicators**

In addition to the core set of key indicators nominated by NSW Health, a summary of all the indicators employed or recommended in the existing literature, especially in relation to the seven determinant models discussed earlier, was prepared, with indicators grouped under the headings used in the Northern Rivers HEWG Determinants of Health Model and HEWG members, and other NRAHS staff, with expertise in each of the topic areas reviewed the relevant sets of indicators and made recommendations about which indicators should be prioritised for inclusion within the Northern Rivers Equity Profile. The criteria used to prioritise potential indicators included:

- the availability and accessibility of data at both Area (Northern Rivers) and, where appropriate, intra-Area (Local Government Area) levels;
- the availability of evidence supporting their use as valid and reliable measures;
- the availability of existing knowledge indicating a high likelihood of inequities being identified;
- the existence of, or potential for, ongoing data collections with minimal costs to the NRAHS to allow comparisons on a regular basis, over time without excessive burden on NRAHS funds; and
- the likelihood of being able to detect changes – over time or between geographical areas.

Tables 1 and 2 in the Executive Summary provide detailed lists of the indicators selected to measure the various population health outcomes and determinants.

**Presenting the Data**

Data are presented within the headings used in the Northern Rivers HEWG Determinants of Health Model. For each indicator, data are presented:

- comparing the Northern Rivers data to those for the rest of NSW and, where available, to those for rural NSW overall, allowing identification of regional health inequities;
- comparing data, where available, across the 10 Local Government Areas within the Northern Rivers, allowing identification of geographically-based health inequities within our Area; and
- comparing relevant population sub-groups (eg: by age groups, gender, Aboriginality and socioeconomic status), where appropriate data are available, allowing identification of other health inequities within our Area.

Indicators will be monitored and updated on a regular basis, with indicators being added, changed, updated or removed according to the availability and appropriateness of data. Trends will be reported regularly, with the most up-to-date data always available electronically, via the NRAHS internet site. In addition, hard copies will be presented to the NRAHS Board and Executive each March and September.
Section 3 – Indicator Data Sources and In-text Table / Figure References

There is a growing body of evidence that the determinants of health go beyond individual genetic endowment, lifestyle behaviour and the health care system to the more pervasive forces in the physical, social and economic environment. Health policy makers and analysts urge us to direct attention towards modifying not only risk factors and risk behaviours but also risk conditions such as poverty, powerlessness and lack of social support when tackling health issues and inequities... Raphael (2001)\textsuperscript{16}
### Table 12: Summary of Indicator Sources included in Phase 1 and Associated Tables and Figures Throughout the *Northern Rivers Equity Profile*

This table details the measures used for each indicator, within each health outcome or health determinant group. For information regarding the rationales for including groups of, or individual, indicators, please refer to the *Northern Rivers HEWG Determinants of Health Model* section or the extensive, complementary literature review prepared by the Northern Rivers Area Health Promotion Unit.31.

<table>
<thead>
<tr>
<th>Outcome / Determinant Type</th>
<th>Indicator</th>
<th>Measure</th>
<th>Data Source</th>
<th>See Tables / Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population health outcomes</td>
<td>All cause mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 8, Figure 9</td>
</tr>
<tr>
<td></td>
<td>Major causes of mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 10, Figure 11, Figure 12, Figure 13</td>
</tr>
<tr>
<td></td>
<td>Cardiovascular disease mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 10, Figure 11, Figure 12, Figure 13</td>
</tr>
<tr>
<td></td>
<td>Chronic respiratory disease mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 10, Figure 11, Figure 12, Figure 13</td>
</tr>
<tr>
<td></td>
<td>Unintentional injury mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 10, Figure 11, Figure 12, Figure 13</td>
</tr>
<tr>
<td></td>
<td>Other injury mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 10, Figure 11, Figure 12, Figure 13</td>
</tr>
<tr>
<td></td>
<td>Diabetes mellitus mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 10, Figure 11, Figure 12, Figure 13</td>
</tr>
<tr>
<td></td>
<td>Nervous system disease mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 10, Figure 11, Figure 12, Figure 13</td>
</tr>
<tr>
<td></td>
<td>Genitourinary disease mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 10, Figure 11, Figure 12, Figure 13</td>
</tr>
<tr>
<td></td>
<td>Neonatal cause mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 10, Figure 11, Figure 12, Figure 13</td>
</tr>
<tr>
<td></td>
<td>All cancer mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 10, Figure 11, Figure 12, Figure 13</td>
</tr>
<tr>
<td></td>
<td>Lung cancer mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 6</td>
</tr>
<tr>
<td></td>
<td>Colorectal cancer mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 6</td>
</tr>
<tr>
<td>Outcome / Determinant Type</td>
<td>Indicator</td>
<td>Measure</td>
<td>Data Source</td>
<td>See Tables / Figures</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Population health outcomes (continued)</td>
<td>Melanoma mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 6</td>
</tr>
<tr>
<td></td>
<td>Prostate cancer mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 6</td>
</tr>
<tr>
<td></td>
<td>Breast cancer mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 6</td>
</tr>
<tr>
<td></td>
<td>Cervical cancer mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 6</td>
</tr>
<tr>
<td></td>
<td>All respiratory disease mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 18, Figure 19</td>
</tr>
<tr>
<td></td>
<td>All injury / poisoning mortality</td>
<td>Age-adjusted death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 20, Figure 21</td>
</tr>
<tr>
<td></td>
<td>Total avoidable mortality</td>
<td>Age-adjusted avoidable death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 22, Figure 23</td>
</tr>
<tr>
<td></td>
<td>Primary avoidable mortality</td>
<td>Age-adjusted primary avoidable death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 24, Figure 25</td>
</tr>
<tr>
<td></td>
<td>Secondary avoidable mortality</td>
<td>Age-adjusted secondary avoidable death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 26, Figure 27</td>
</tr>
<tr>
<td></td>
<td>Tertiary avoidable mortality</td>
<td>Age-adjusted tertiary avoidable death rate per 100,000 population per annum</td>
<td>ABS Mortality Data &amp; Population Estimates (HOIST)</td>
<td>Figure 28, Figure 29</td>
</tr>
<tr>
<td></td>
<td>Lung cancer incidence</td>
<td>Age-adjusted incidence rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 7</td>
</tr>
<tr>
<td></td>
<td>Colorectal cancer incidence</td>
<td>Age-adjusted incidence rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 7</td>
</tr>
<tr>
<td></td>
<td>Melanoma incidence</td>
<td>Age-adjusted incidence rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 7</td>
</tr>
<tr>
<td></td>
<td>Prostate cancer incidence</td>
<td>Age-adjusted incidence rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 7</td>
</tr>
<tr>
<td></td>
<td>Breast cancer incidence</td>
<td>Age-adjusted incidence rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 7</td>
</tr>
<tr>
<td></td>
<td>Cervical cancer incidence</td>
<td>Age-adjusted incidence rate per 100,000 population per annum</td>
<td>2002 NSW Chief Health Officer’s Report</td>
<td>Table 7</td>
</tr>
<tr>
<td>Outcome / Determinant Type</td>
<td>Indicator</td>
<td>Measure</td>
<td>Data Source</td>
<td>See Tables / Figures</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-----------</td>
<td>---------</td>
<td>-------------</td>
<td>----------------------</td>
</tr>
<tr>
<td><strong>Population health outcomes (continued)</strong></td>
<td>Asthma prevalence</td>
<td>Self-reported current asthma</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Table 8</td>
</tr>
<tr>
<td></td>
<td>Diabetes prevalence</td>
<td>Self-reported doctor-diagnosed diabetes or high blood sugar</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Table 9</td>
</tr>
<tr>
<td></td>
<td>Pertussis (whooping cough) notifications</td>
<td>Age-adjusted notification rate per 100,000 population per annum</td>
<td>NSW Notifiable Diseases Database &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 30</td>
</tr>
<tr>
<td></td>
<td>Q fever notifications</td>
<td>Age-adjusted notification rate per 100,000 population per annum</td>
<td>NSW Notifiable Diseases Database &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 31</td>
</tr>
<tr>
<td></td>
<td>Gonorrhea notifications</td>
<td>Age-adjusted notification rate per 100,000 population per annum</td>
<td>NSW Notifiable Diseases Database &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 32</td>
</tr>
<tr>
<td></td>
<td>Syphilis notifications</td>
<td>Age-adjusted notification rate per 100,000 population per annum</td>
<td>NSW Notifiable Diseases Database &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 33</td>
</tr>
<tr>
<td></td>
<td>Hepatitis A notifications</td>
<td>Age-adjusted notification rate per 100,000 population per annum</td>
<td>NSW Notifiable Diseases Database &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 34</td>
</tr>
<tr>
<td></td>
<td>Hepatitis B notifications</td>
<td>Age-adjusted notification rate per 100,000 population per annum</td>
<td>NSW Notifiable Diseases Database &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 35</td>
</tr>
<tr>
<td></td>
<td>Hepatitis C notifications</td>
<td>Age-adjusted notification rate per 100,000 population per annum</td>
<td>NSW Notifiable Diseases Database &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 36</td>
</tr>
<tr>
<td></td>
<td>Salmonella notifications</td>
<td>Age-adjusted notification rate per 100,000 population per annum</td>
<td>NSW Notifiable Diseases Database &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 37</td>
</tr>
<tr>
<td></td>
<td>Natural teeth missing in adults</td>
<td>Self-reported no natural teeth missing</td>
<td>NSW Health Survey, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 38</td>
</tr>
<tr>
<td><strong>Early childhood development</strong></td>
<td>Teenage mothers</td>
<td>Teenage (10-19 years) confinements as proportion of all confinements</td>
<td>NSW Midwives’ Data Collection (HOIST)</td>
<td>Figure 39</td>
</tr>
<tr>
<td></td>
<td>Immunisation adequacy (12 – 15 months)</td>
<td>Proportion of children (12 – 15 months) fully immunised</td>
<td>Australian Childhood Immunisation Register (HOIST)</td>
<td>Table 10, Figure 41</td>
</tr>
<tr>
<td></td>
<td>Domestic violence against children</td>
<td>Age-adjusted interpersonal violence-related hospitalisation rate per 100,000 population per annum (0 – 14 year olds)</td>
<td>NSW Health Inpatient Statistics Collection &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 42</td>
</tr>
<tr>
<td></td>
<td>Oral health in kindergarten Oral health in Year 6</td>
<td>Mean number decayed, missing or filled teeth</td>
<td>NSW Save Our Kids’ Smiles data &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proportion children with no decayed, missing or filled teeth</td>
<td>NSW Save Our Kids’ Smiles data &amp; ABS Population Estimates (HOIST)</td>
<td>Figure 43, Figure 44</td>
</tr>
<tr>
<td>Outcome / Determinant Type</td>
<td>Indicator</td>
<td>Measure</td>
<td>Data Source</td>
<td>See Tables / Figures</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------</td>
<td>---------</td>
<td>-------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Culture / ethnicity</td>
<td>Ethnicity</td>
<td>Proportion of Aboriginal residents</td>
<td>ABS 2001 Census Basic Community Profile (CDATA 2001)</td>
<td>Figure 7</td>
</tr>
<tr>
<td></td>
<td>Influenza immunisation</td>
<td>Self-reported proportion immunised</td>
<td>1999 NSW Older Persons’ Health Survey (HOIST)</td>
<td>Figure 45</td>
</tr>
<tr>
<td></td>
<td>Mammographic screening</td>
<td>Proportion of women (50 – 69 years) screened in last 2 years</td>
<td>Breastscreen NSW data (2002 NSW CHO Report)</td>
<td>Table 11</td>
</tr>
<tr>
<td></td>
<td>Pap testing</td>
<td>Proportion of women (20 – 69 years) screened in last 2 years</td>
<td>NSW Pap Test Register data (2002 NSW CHO Report)</td>
<td>Table 11</td>
</tr>
<tr>
<td></td>
<td>Tobacco smoking</td>
<td>Self-reported current smoker</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 46</td>
</tr>
<tr>
<td></td>
<td>At-risk alcohol drinking</td>
<td>Self-reported at-risk alcohol drinking</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 47</td>
</tr>
<tr>
<td></td>
<td>Adequate daily fruit intake</td>
<td>Self-reported adequate daily fruit intake</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 48</td>
</tr>
<tr>
<td></td>
<td>Adequate daily vegetable intake</td>
<td>Self-reported adequate daily vegetable intake</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 49</td>
</tr>
<tr>
<td></td>
<td>Adequate physical activity</td>
<td>Self-reported adequate physical activity</td>
<td>NSW Health Survey, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 50</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>Overall population</td>
<td>Number of males and females in 5 year age-groups</td>
<td>ABS 2001 Census Usual Residents Profile (CDATA 2001)</td>
<td>Figure 4</td>
</tr>
<tr>
<td></td>
<td>Aboriginal population</td>
<td>Number of Aboriginal males and females in 5 year age-groups</td>
<td>ABS 2001 Census Usual Residents Profile (CDATA 2001)</td>
<td>Figure 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proportion &amp; number of Aboriginal residents</td>
<td>ABS 2001 Census Basic Community Profile (CDATA 2001)</td>
<td>Figure 7</td>
</tr>
<tr>
<td>Biological</td>
<td>Psychological distress</td>
<td>Self-reported high &amp; very high psychological distress</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 51</td>
</tr>
<tr>
<td>Access</td>
<td>Difficulty getting health care</td>
<td>Self-reported difficulties getting health care when needed</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 52</td>
</tr>
<tr>
<td></td>
<td>Quality of hospital care</td>
<td>Proportion rating hospital care as excellent, very good or good</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 53</td>
</tr>
<tr>
<td></td>
<td>Quality of Emergency Dept care</td>
<td>Proportion rating emergency department care as excellent, very good or good</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 54</td>
</tr>
<tr>
<td>Environmental</td>
<td>Smokefree households</td>
<td>Proportion households self-reported as smokefree</td>
<td>NSW Health Survey, 1997, 1998 &amp; 2002 (HOIST)</td>
<td>Figure 55</td>
</tr>
<tr>
<td>Outcome / Determinant Type</td>
<td>Indicator</td>
<td>Measure</td>
<td>Data Source</td>
<td>See Tables / Figures</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------</td>
<td>---------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Socioeconomic</td>
<td>SEIFA Index of Relative Socioeconomic Disadvantage</td>
<td>ABS 1996 Socioeconomic Indexes for Areas (HOIST)</td>
<td>Figure 5, Table 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SEIFA Education and Occupation Index</td>
<td>ABS 1996 Socioeconomic Indexes for Areas (HOIST)</td>
<td>Figure 5, Table 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Housing tenure</td>
<td>Proportion houses owned or rented</td>
<td>ABS 2001 Census (HOIST)</td>
<td>Figure 56</td>
</tr>
<tr>
<td></td>
<td>Unemployment</td>
<td>Proportion of labour force unemployed</td>
<td>ABS 1996 Census (HOIST)</td>
<td>Figure 57</td>
</tr>
<tr>
<td></td>
<td>Government financial assistance</td>
<td>Proportion of eligible residents receiving unemployment benefits, family assistance benefits, aged pension &amp; disability benefits</td>
<td>Centrelink, Canberra (unpublished data)</td>
<td>Figure 58</td>
</tr>
<tr>
<td></td>
<td>No post-school education</td>
<td>Proportion residents (15+ years) with no post-school education</td>
<td>ABS 1996 Census Basic Community Profile (HOIST)</td>
<td>Figure 59</td>
</tr>
<tr>
<td>Community &amp; social context</td>
<td>Family structure</td>
<td>Proportion families with 1 or 2 parents</td>
<td>ABS 2001 Census Basic Community Profile (HOIST)</td>
<td>Figure 60</td>
</tr>
<tr>
<td></td>
<td>Crime rates – assaults</td>
<td>Reported rate per 100,000 population per annum</td>
<td>NSW Bureau of Crime Statistics &amp; Research data</td>
<td>Figure 61, Figure 62</td>
</tr>
<tr>
<td></td>
<td>Crime rates – robberies</td>
<td>Reported rate per 100,000 population per annum</td>
<td>NSW Bureau of Crime Statistics &amp; Research data</td>
<td>Figure 61, Figure 63</td>
</tr>
<tr>
<td></td>
<td>Crime rates – thefts</td>
<td>Reported rate per 100,000 population per annum</td>
<td>NSW Bureau of Crime Statistics &amp; Research data</td>
<td>Figure 61, Figure 64</td>
</tr>
<tr>
<td></td>
<td>Crime rates – drug offences</td>
<td>Reported rate per 100,000 population per annum</td>
<td>NSW Bureau of Crime Statistics &amp; Research data</td>
<td>Figure 65</td>
</tr>
<tr>
<td></td>
<td>Crime rates – sexual offences</td>
<td>Reported rate per 100,000 population per annum</td>
<td>NSW Bureau of Crime Statistics &amp; Research data</td>
<td>Figure 66</td>
</tr>
</tbody>
</table>
Section 4 – Indicator Data
Geography of the Northern Rivers Region

As shown in Figure 3, the Northern Rivers region covers North Eastern New South Wales, extending from Tweed Heads in the North, to Tabulam and Urbenville in the West and to Nymboida in the South. It covers an area of 24,555 km\(^2\) and includes approximately 255,647 residents. It encompasses a diverse mix of rural, remote, urban and semi-urban areas, with differing health needs and differing health delivery systems.

Figure 3: The Northern Rivers Area – Showing LGA boundaries

The region is split into 10 Local Government Areas (LGAs): Ballina, Byron, Copmanhurst, Grafton, Kyogle, Lismore, Maclean, Pristine Waters (previously Nymboida and Ulmarra), Richmond Valley (previously Casino and Richmond River) and Tweed. The majority of the population lives in the coastal LGAs of Tweed, Ballina and Byron, although Lismore has the greatest inland population and the second highest population within the Northern Rivers. In general, the coastal LGAs have more mobile populations whilst the inland LGAs are more stable, but with lower proportions of the total population.
Demography of the Northern Rivers Region

Overall Population

Area Comparisons – by age groups

At the 2001 Census, the population for the Northern Rivers was 255,647 people, comprised of 125,551 males and 130,096 females. The population pyramid in Figure 4 illustrates the Northern Rivers population structure, by gender and five-year age groups, and how it differs from the overall NSW population structure. The Northern Rivers population is skewed towards the younger and older age-groups, probably reflecting the movement of young adults away from the region, a common phenomenon in rural areas, and the attractiveness of the Northern Rivers region for families with young children and for retirees.

Figure 4: The Northern Rivers and NSW populations, by age and gender (2001)

Source: ABS 2001 Census Usual Residents Profile (CDATA2001)

Area Comparisons – by gender

At the 2001 Census, males comprised 49.1% and females comprised 50.9% of the Northern Rivers population, which is comparable to the overall NSW population (49.4% males, 50.6% females).

Area Comparisons – by Aboriginality

At the 2001 Census, the 8108 Northern Rivers residents identified themselves as Aboriginal, representing 3.2% of our total population. This represents a higher proportion of Aboriginal residents than the rest of NSW, where only 1.9% of residents identify themselves as Aboriginal. The higher proportion of Aboriginal residents in the Northern Rivers is also reflected by the fact that our region includes 6.8% of the total
Aboriginal population but only 4% of the total non-Aboriginal population of NSW. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

**Area Comparisons – overall by socioeconomic status**

As shown in Figure 5, the Northern Rivers scored lower than both overall NSW and rural NSW on both the SEIFA Index of Relative Socioeconomic Disadvantage and the SEIFA Index of Education and Occupation, indicating slightly higher levels of socioeconomic disadvantage and slightly lower educational and occupational status among our residents than in overall NSW or in rural NSW generally.

**Figure 5:** NSW socioeconomic index scores, by Area Health Service (1996)

![Figure 5: NSW socioeconomic index scores, by Area Health Service (1996)](image)

**Source:** ABS 1996 Socioeconomic Indexes for Areas (HOIST)

**Intra-Area Comparisons – Aboriginality by LGA**

See Figure 7 in section on Aboriginal Population – Intra-Area comparisons by LGA.
Intra-Area Comparisons – SES by LGA

As shown in Table 5, although all Northern Rivers LGAs score below the NSW average, some are more disadvantaged than others. LGAs are presented in ascending order of disadvantage, according to the Index of Relative Socioeconomic Disadvantage – a format that is consistently applied throughout the rest of this report.

Table 5: Northern Rivers SEIFA Index of Relative Socioeconomic Disadvantage scores, by LGA (1996)

<table>
<thead>
<tr>
<th>Local Government Area</th>
<th>Index of Relative Socioeconomic Disadvantage</th>
<th>Index of Education and Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richmond Valley</td>
<td>926</td>
<td>910</td>
</tr>
<tr>
<td>Maclean</td>
<td>938</td>
<td>930</td>
</tr>
<tr>
<td>Pristine Waters</td>
<td>940</td>
<td>933</td>
</tr>
<tr>
<td>Kyogle</td>
<td>943</td>
<td>946</td>
</tr>
<tr>
<td>Grafton</td>
<td>945</td>
<td>942</td>
</tr>
<tr>
<td>Tweed</td>
<td>946</td>
<td>939</td>
</tr>
<tr>
<td>Byron</td>
<td>964</td>
<td>995</td>
</tr>
<tr>
<td>Copmanhurst</td>
<td>968</td>
<td>954</td>
</tr>
<tr>
<td>Lismore</td>
<td>984</td>
<td>1002</td>
</tr>
<tr>
<td>Ballina</td>
<td>988</td>
<td>986</td>
</tr>
<tr>
<td><strong>Northern Rivers</strong></td>
<td><strong>957</strong></td>
<td><strong>960</strong></td>
</tr>
<tr>
<td><strong>Rural NSW</strong></td>
<td><strong>972</strong></td>
<td><strong>965</strong></td>
</tr>
<tr>
<td><strong>Overall NSW</strong></td>
<td><strong>1007</strong></td>
<td><strong>1012</strong></td>
</tr>
</tbody>
</table>

*Source: ABS 1996 Socioeconomic Indexes for Areas (HOIST)*

Aboriginal Population

Area Comparisons – overall

As discussed earlier in the Overall Population – Area Comparisons – by Aboriginality section, Aboriginal residents represent a higher proportion of our Northern Rivers population than in the rest of NSW. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.
**Intra-Area Comparisons – by age**

The population pyramid in Figure 6 illustrates the Northern Rivers Aboriginal population structure, by gender and five-year age groups, showing how it is very skewed towards the younger age-groups, in comparison to the overall Northern Rivers population. This could reflect higher death rates and higher fertility among Northern Rivers Aboriginal residents than among the overall Northern Rivers population. It could also be influenced by the migration of non-Aboriginal retirees into the Northern Rivers or by the migration of older Aboriginal residents out of the Northern Rivers.

**Figure 6: The Northern Rivers Aboriginal and overall populations, by age and gender (2001)**

*Source: ABS 2001 Census Usual Residents Profile (CDATA2001)*

**Intra-Area Comparisons – by gender**

At the 2001 Census, males comprised 49.4% and females comprised 50.6% of the Northern Rivers Aboriginal population, which is comparable to the overall Northern Rivers population (49.1% males, 50.9% females).
Intra-Area Comparisons – by LGA

As shown in Figure 7, our Aboriginal population are spread throughout our region, representing between 1.2% and 5.6% of each LGA’s overall population, with the lowest proportion in Byron LGA and the highest proportion in Richmond Valley LGA. As discussed earlier, actual numbers and proportions of Aboriginal residents are likely to be considerably higher throughout the Northern Rivers – due to under-reporting of Aboriginal status. Future phases of the Northern Rivers Equity Profile will involve the EPAG exploring ways in which these data discrepancies can be minimised, or adjusted, to provide more realistic estimates.

Figure 7: Proportion and number of Aboriginal residents in Northern Rivers LGAs (2001)

Source: ABS 2001 Census Basic Community Profile (CDATA2001)

Intra-Area Comparisons – by SES

As shown in Figure 7, Aboriginal residents tend to represent higher proportions of the population in the more socioeconomically disadvantaged LGAs (i.e. those higher up in the graph).
Population Health Outcomes

Mortality – All Causes

Area Comparisons – males

Between 1996 and 2000, 5,952 male Northern Rivers residents died – an average of 1,190 deaths each year. This represents an age-adjusted male death rate of 777 per 100,000 Northern Rivers males per annum, which is comparable to the rest of NSW, at 769 male deaths per 100,000 per annum but significantly lower than rural NSW generally, at 822 male deaths per 100,000 per annum.

Area Comparisons – females

Between 1996 and 2000, 4,734 female Northern Rivers residents died – an average of 947 deaths each year. This represents an age-adjusted female death rate of 455 per 100,000 Northern Rivers females per annum, which is significantly lower than both the rest of NSW, at 477 female deaths per 100,000 per annum, and rural NSW generally, at 498 female deaths per 100,000 per annum.

Area Comparisons – Aboriginal males

According to Australian Bureau of Statistics Mortality Data, between 1996 and 2000, 45 Aboriginal male Northern Rivers residents died – an average of nine deaths each year. This represents an age-adjusted death rate of 893 per 100,000 Northern Rivers Aboriginal males per annum. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

Area Comparisons – Aboriginal females

According to Australian Bureau of Statistics Mortality Data, between 1996 and 2000, 52 Aboriginal female Northern Rivers residents died – an average of 10 deaths each year. This represents an age-adjusted death rate of 738 per 100,000 Northern Rivers Aboriginal females per annum. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

Intra-Area Comparisons – Aboriginality by gender

According to Australian Bureau of Statistics Mortality Data discussed earlier, between 1996 and 2000, Northern Rivers Aboriginal males had an age-adjusted death rate of 893 deaths per 100,000 population, which was significantly higher than the 776 deaths per 100,000 population among non-Aboriginal Northern Rivers males. Similarly, Northern Rivers Aboriginal females had an age-adjusted death rate of 738 deaths per 100,000 population, which was significantly higher than the 452 deaths per 100,000 population among non-Aboriginal Northern Rivers females. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.
**Intra-Area Comparisons – males by LGA**

As shown in Figure 8, there is much variation in male all cause death rates within the Northern Rivers. Although our overall Northern Rivers male all cause death rate was not significantly different to overall NSW, the death rates in many of our LGAs were: with Richmond Valley and Grafton LGAs significantly higher and Kyogle, Copmanhurst and Ballina LGAs significantly lower than both overall NSW and the Northern Rivers overall.

**Figure 8: Deaths per annum, from all causes, for males of all ages, by LGA, NRA and NSW (1996-2000)**

![Figure 8](image)

*Source: ABS Mortality Data and Population Estimates (HOIST)*

**Intra-Area Comparisons – males by SES**

Figure 8 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and male all cause death rates.
Intra-Area Comparisons – females by LGA

As shown in Figure 9, there is much variation in female all cause death rates within the Northern Rivers. As with our overall Northern Rivers data, Maclean, Pristine Waters, Tweed, Byron, Copmanhurst and Ballina LGAs had female all cause death rates significantly lower than overall NSW, with all except the Tweed and Byron rates also being below the overall Northern Rivers female rate. However, Grafton and Lismore LGAs had female all cause death rates significantly higher than both overall NSW and Northern Rivers females overall. In addition, although comparable to the overall NSW rate, Richmond Valley and Kyogle LGAs had significantly higher female all cause death rates than the Northern Rivers overall.

Figure 9: Deaths per annum, from all causes, for females of all ages, by LGA, NRA and NSW (1996-2000)

Source: ABS Mortality Data and Population Estimates (HOIST)

Intra-Area Comparisons – females by SES

Figure 9 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and female all cause death rates.

Intra-Area Comparisons – females by SES

Figure 9 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and female all cause death rates.
Mortality – Major Causes

Area Comparisons – males

Between 1996 and 2000, based on unadjusted deaths data, the most common causes of Northern Rivers male deaths were the same as for the rest of NSW: cardiovascular diseases (41%); malignant neoplasms, or cancers (29%); chronic respiratory diseases (7%); unintentional injuries (4%); and other injuries (3%).

The age-adjusted death rates shown in Figure 10 indicate that Northern Rivers male death rates were comparable to the rest of NSW for all major causes, except cardiovascular diseases and other injuries, which Northern Rivers males were significantly more likely to die from than their counterparts from the rest of NSW.

Figure 10: Deaths per annum, by category of cause, for Northern Rivers Area (NRA) and other NSW male residents (1996-2000)

Source: ABS Mortality Data and Population Estimates (HOIST)
**Area Comparisons – females**

Between 1996 and 2000, based on unadjusted deaths data, the most common causes of Northern Rivers female deaths were the same as for the rest of NSW: cardiovascular diseases (47%); malignant neoplasms, or cancers (24%); chronic respiratory diseases (6%); nervous system diseases (4%); and unintentional injuries (3%).

The age-adjusted death rates shown in Figure 11 indicate that Northern Rivers female death rates were comparable to the rest of NSW for all major causes.

**Figure 11:** Deaths per annum, by category of cause, for Northern Rivers Area (NRA) and other NSW female residents (1996-2000)

<table>
<thead>
<tr>
<th>Category of cause</th>
<th>NPA</th>
<th>Other NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Cardiovascular disease</td>
<td>200.0</td>
<td>200.0</td>
</tr>
<tr>
<td>2 Malignant neoplasms</td>
<td>150.0</td>
<td>150.0</td>
</tr>
<tr>
<td>3 Chronic respiratory diseases</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>4 Nervous system diseases</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>5 Unintentional injuries</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td>6 Acute respiratory infections</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>7 Digestive system diseases</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>8 Genitourinary diseases</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>9 Other injuries</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>10 Diabetes mellitus</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>11 Mental disorders</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>12 Other endocrine diseases</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>13 Infectious diseases</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>14 Musculoskeletal diseases</td>
<td>0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Source: ABS Mortality Data and Population Estimates (HOIST)

**Intra-Area Comparisons – by gender**

According to Australian Bureau of Statistics Mortality Data discussed earlier, between 1996 and 2000, the most common causes of deaths within the Northern Rivers were similar for males and females – with over three quarters of both groups dying from cardiovascular diseases, cancers or chronic respiratory diseases. See earlier sections on Mortality – Major Causes – Area Comparisons – males and Mortality – Major Causes – Area Comparisons – females for more information.
Intra-Area Comparisons – Aboriginal males

According to Australian Bureau of Statistics Mortality Data, between 1996 and 2000, based on unadjusted deaths data, the most common causes of death for Northern Rivers Aboriginal males were cardiovascular diseases (38%); chronic respiratory diseases (11%); unintentional injuries (11%); cancers (9%); and neonatal causes (9%). Although similar to all Northern Rivers males in having cardiovascular diseases as the most common cause of death, higher proportions of Northern Rivers Aboriginal males died from chronic respiratory diseases, unintentional injuries and neonatal causes, and lower proportions from cancers, in comparison to Northern Rivers non-Aboriginal males.

As shown in Figure 12, Northern Rivers Aboriginal males were significantly more likely to die from cardiovascular diseases, chronic respiratory diseases and diabetes mellitus than their non-Aboriginal counterparts within the Northern Rivers but significantly less likely to die from cancers. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

Figure 12: Deaths per annum, by category of cause, for Northern Rivers Area (NRA) Aboriginal and non-Aboriginal male residents (1996-2000)

![Graph showing deaths per annum by category of cause for Aboriginal and non-Aboriginal males.](image)

Source: ABS Mortality Data and Population Estimates (HOIST)
Intra-Area Comparisons – Aboriginal females

According to Australian Bureau of Statistics Mortality Data, between 1996 and 2000, based on unadjusted deaths data, the most common causes of death for Northern Rivers Aboriginal females were cardiovascular diseases (40%); cancers (15%); diabetes mellitus (8%); nervous system diseases (8%) and neonatal causes (8%). Although similar to all Northern Rivers females in having cardiovascular diseases, cancers and nervous system diseases as three of the most common causes of death, higher proportions of Northern Rivers Aboriginal females died from diabetes mellitus and neonatal causes, and lower proportions from chronic respiratory diseases and unintentional injuries, in comparison to Northern Rivers non-Aboriginal females.

As shown in Figure 13, Northern Rivers Aboriginal females were significantly more likely to die from cardiovascular diseases, diabetes mellitus, nervous system diseases, genitourinary diseases and neonatal causes than their non-Aboriginal counterparts within the Northern Rivers. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

Figure 13: Deaths per annum, by category of cause, for Northern Rivers Area (NRA) Aboriginal and non-Aboriginal female residents (1996-2000)

Source: ABS Mortality Data and Population Estimates (HOIST)

Mortality – Cardiovascular Diseases

Area Comparisons – overall by gender

As shown earlier in Figures 10 and 11, Northern Rivers females had a cardiovascular disease death rate comparable to females in the rest of NSW but Northern Rivers males were significantly more likely to die from cardiovascular diseases than males in the rest of NSW.
**Intra-Area Comparisons – by gender**

As shown earlier in Figures 10 and 11, although cardiovascular diseases were the major cause of death for both males and females within our region, Northern Rivers males had a significantly higher age-adjusted cardiovascular disease death rate than Northern Rivers females, as did Northern Rivers Aboriginal males, in comparison to Northern Rivers Aboriginal females.

**Intra-Area Comparisons – by Aboriginality**

As shown earlier in Figures 12 and 13, both Aboriginal males and females had age-adjusted cardiovascular disease death rates significantly higher than their non-Aboriginal counterparts within the Northern Rivers. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this *Profile*.

**Intra-Area Comparisons – males by LGA**

As shown in Figure 14, like Northern Rivers males overall, Richmond Valley, Maclean, Pristine Waters, Grafton and Lismore LGA males had cardiovascular disease death rates significantly higher than overall NSW males, with only Tweed LGA having a significantly lower rate than overall NSW males. Although higher than the overall NSW male cardiovascular disease death rate, Maclean, Pristine Waters and Lismore LGA males' rates were comparable to Northern Rivers males overall.

**Figure 14: Deaths per annum, from cardiovascular diseases, for males of all ages, by LGA, NRA and NSW (1996-2000)**

![Figure 14: Deaths per annum, from cardiovascular diseases, for males of all ages, by LGA, NRA and NSW (1996-2000)](image)

**Source:** ABS Mortality Data and Population Estimates (HOIST)

**Note:** Cardiovascular disease deaths were classified by ICD-9 (390-459) up to 1998 and by ICD-10 (I00-I99, G45, G46) from 1999 onwards.
**Intra-Area Comparisons – males by SES**

Figure 14 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and male cardiovascular disease death rates.

**Intra-Area Comparisons – females by LGA**

As shown in Figure 15, there is much variation in female cardiovascular disease death rates within the Northern Rivers. Although our overall Northern Rivers female cardiovascular disease death rate was not significantly different to overall NSW, the death rates in most of our LGAs were, with Kyogle, Grafton and Lismore LGAs having significantly higher female cardiovascular disease death rates than overall NSW and Pristine Waters, Byron, Copmanhurst and Ballina LGAs having significantly lower rates than overall NSW. Each of these LGA’s rates was also significantly different from the overall Northern Rivers female cardiovascular disease death rate.

**Figure 15: Deaths per annum, from cardiovascular diseases, for females of all ages, by LGA, NRA and NSW (1996-2000)**

Source: ABS Mortality Data and Population Estimates (HOIST)

Note: Cardiovascular disease deaths were classified by ICD-9 (390-459) up to 1998 and by ICD-10 (I00-I99, G45, G46) from 1999 onwards.
Intra-Area Comparisons – females by SES

Figure 15 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and female cardiovascular disease death rates.

Mortality – Chronic Respiratory Diseases

Intra-Area Comparisons – by gender

As shown earlier in Figures 10 and 11, although chronic respiratory diseases were the third most common cause of death for both males and females within our region, Northern Rivers males had a significantly higher age-adjusted chronic respiratory disease death rate than Northern Rivers females, as did Northern Rivers Aboriginal males, in comparison to Northern Rivers Aboriginal females.

Intra-Area Comparisons – by Aboriginality

As shown earlier in Figures 12 and 13, chronic respiratory diseases were a substantially more common cause of death among Aboriginal males than among Aboriginal females within the Northern Rivers, with the male age-adjusted chronic respiratory disease death rate significantly higher than their non-Aboriginal counterparts within the Northern Rivers – although Aboriginal and non-Aboriginal females were comparable within our region. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

Mortality – Unintentional Injuries

Intra-Area Comparisons – by gender

As shown earlier in Figures 10 and 11, although unintentional injuries were among the top five causes of death for both males and females within our region, Northern Rivers males had a significantly higher age-adjusted unintentional injury death rate than Northern Rivers females. However, Northern Rivers Aboriginal males and females had comparable age-adjusted unintentional injury death rates.

Intra-Area Comparisons – by Aboriginality

As shown earlier in Figures 12 and 13, unintentional injuries were a more common cause of death among Aboriginal males than among Aboriginal females within the Northern Rivers, although both age-adjusted unintentional injury death rates were comparable to their non-Aboriginal counterparts within the Northern Rivers. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.
Mortality – Other Injuries

**Intra-Area Comparisons – by gender**

As shown earlier in Figures 10 and 11, other injuries were a more common cause of death among males than among females within the Northern Rivers, with Northern Rivers males having a significantly higher age-adjusted other injury death rate than Northern Rivers females. However, Northern Rivers Aboriginal males and females had comparable age-adjusted other injury death rates.

**Intra-Area Comparisons – by Aboriginality**

As shown earlier in Figures 12 and 13, other injuries were the seventh most common cause of death among both Aboriginal males and females within the Northern Rivers, with both age-adjusted other injury death rates comparable to their non-Aboriginal counterparts within the Northern Rivers. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

Mortality – Diabetes Mellitus

**Intra-Area Comparisons – by gender**

As shown earlier in Figures 10 and 11, diabetes mellitus was only the tenth most common cause of death among both males and females within the Northern Rivers, with both groups having comparable age-adjusted diabetes mellitus death rates, as did Northern Rivers Aboriginal males and females.

**Intra-Area Comparisons – by Aboriginality**

As shown earlier in Figures 12 and 13, diabetes mellitus was among the top four causes of death for both Aboriginal males and females within the Northern Rivers, with both age-adjusted diabetes mellitus death rates significantly higher than their non-Aboriginal counterparts within the Northern Rivers. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

Mortality – Nervous System Diseases

**Intra-Area Comparisons – by gender**

As shown earlier in Figures 10 and 11, nervous system diseases were among the top six causes of death for both males and females within the Northern Rivers, with both groups having comparable age-adjusted nervous system disease death rates. However, Northern Rivers Aboriginal males had a nervous system disease death rate significantly higher than Northern Rivers Aboriginal females.
**Intra-Area Comparisons – by Aboriginality**

As shown earlier in Figures 12 and 13, nervous system diseases were a more common cause of death among Aboriginal females than among Aboriginal males within the Northern Rivers, with the female age-adjusted nervous system disease death rate significantly higher than their non-Aboriginal counterparts within the Northern Rivers. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

**Mortality – Genitourinary Diseases**

**Intra-Area Comparisons – by gender**

As shown earlier in Figures 10 and 11, genitourinary diseases were among the top six causes of death for both males and females within the Northern Rivers, with both groups having comparable age-adjusted genitourinary disease death rates.

**Mortality – Neonatal Causes**

**Intra-Area Comparisons – by gender**

As shown earlier in Figures 10 and 11, neonatal causes were not a major cause of death for either males or females within the Northern Rivers.

**Intra-Area Comparisons – by Aboriginality**

As shown earlier in Figures 12 and 13, neonatal causes were the eighth most common cause of death among both Aboriginal males and females within the Northern Rivers, with the female age-adjusted neonatal cause death rate significantly higher than their non-Aboriginal counterparts within the Northern Rivers. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

**Mortality – All Cancers**

**Area Comparisons – overall by gender**

As shown earlier in Figures 10 and 11, Northern Rivers males and females both had cancer death rates which were comparable to the rest of NSW.

**Intra-Area Comparisons – by gender**

As shown earlier in Figures 10 and 11, although cancers were the second major cause of death for both males and females within the Northern Rivers, Northern Rivers males had a significantly higher age-
adjusted cancer death rate than Northern Rivers females. However, Northern Rivers Aboriginal males and females had comparable age-adjusted cancer death rates.

**Intra-Area Comparisons – by Aboriginality**

As shown earlier in Figures 12 and 13, cancers were the third major cause of death for Aboriginal males and the second major cause of death for Aboriginal females within the Northern Rivers. Although the latter’s age-adjusted cancer death rate was comparable to non-Aboriginal females within the Northern Rivers, Aboriginal males were significantly less likely to die from cancers than non-Aboriginal Northern Rivers males. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this Profile.

**Intra-Area Comparisons – males by LGA**

As shown in Figure 16, like our overall Northern Rivers male cancer death rate, most of our LGAs’ rates were also comparable to the overall NSW rate, with only Tweed LGA having a significantly higher male cancer death rate than overall NSW and only Kyogle LGA having a significantly lower rate than overall NSW. These were also the only significant differences from the overall Northern Rivers male cancer death rate.

**Figure 16: Deaths per annum, from cancers, for males of all ages, by LGA, NRA and NSW (1996-2000)**

![Figure 16: Deaths per annum, from cancers, for males of all ages, by LGA, NRA and NSW (1996-2000)](chart)

Source: ABS Mortality Data and Population Estimates (HOIST)

Note: Cancer deaths were classified by ICD-9 (140-208) up to 1998 and by ICD-10 (C00-C97) from 1999 onwards.
**Intra-Area Comparisons – males by SES**

Figure 16 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and male cancer death rates.

**Intra-Area Comparisons – females by LGA**

As shown in Figure 17, there is some variation in female cancer death rates within the Northern Rivers. Although our overall Northern Rivers female cancer death rate was not significantly different to overall NSW, the death rates in most of our LGAs were, with Grafton LGA significantly higher and Maclean, Kyogle and Ballina LGAs significantly lower than overall NSW. However, only the Grafton LGA rate was also significantly different to the overall Northern Rivers female cancer death rate.

**Figure 17: Deaths per annum, from cancers, for females of all ages, by LGA, NRA and NSW (1996-2000)**

![Graph showing female cancer death rates by LGA.](image)

**Source:** ABS Mortality Data and Population Estimates (HOIST)

**Note:** Cancer deaths were classified by ICD-9 (140-208) up to 1998 and by ICD-10 (C00-C97) from 1999 onwards.

**Intra-Area Comparisons – females by SES**

Figure 17 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and female cancer death rates.
Mortality – Lung Cancer

Area Comparisons – overall by gender

As shown in Table 6, between 1996 and 2000, the Northern Rivers had lung cancer death rates, per annum, of 50.3 per 100,000 men and 18.2 per 100,000 women, which were both comparable to both the overall NSW and rural NSW rates.

Table 6: Cancer death rates for Northern Rivers and NSW residents, by type of cancer (1996-2000)

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Age-adjusted death rate per 100,000 per annum (95% CI)</th>
<th>Significant difference?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Northern Rivers</td>
<td>Overall NSW</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>M</td>
<td>50.3 (45.5 – 55.4)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>18.2 (15.5 – 21.2)</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>M</td>
<td>25.9 (22.5 – 29.7)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>16.4 (13.8 – 19.2)</td>
</tr>
<tr>
<td>Melanoma</td>
<td>M</td>
<td>12.0 (9.7 – 14.8)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>3.0 (1.9 – 4.4)</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>M</td>
<td>30.7 (26.9 – 34.8)</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>F</td>
<td>54.8 (42.8 – 69.1)</td>
</tr>
<tr>
<td>Cervical cancer</td>
<td>F</td>
<td>2.2 (1.3 – 3.6)</td>
</tr>
</tbody>
</table>

Source: 2002 NSW Chief Health Officer’s Report

Note: F = female rates; M = male rates

Intra-Area Comparisons – by gender

As shown in Table 6 above, and as with the NSW figures, the lung cancer death rate was significantly higher among Northern Rivers males than Northern Rivers females.

Mortality – Colorectal Cancer

Area Comparisons – overall by gender

As shown earlier in Table 6, between 1996 and 2000, the Northern Rivers had colorectal cancer death rates, per annum, of 25.9 per 100,000 men and 16.4 per 100,000 women, which were both comparable to both the overall NSW and rural NSW rates.

Intra-Area Comparisons – by gender

As shown earlier in Table 6, and as with the NSW figures, the colorectal cancer death rate was significantly higher among Northern Rivers males than Northern Rivers females.
Mortality – Melanoma

*Area Comparisons – overall by gender*

As shown earlier in Table 6, between 1996 and 2000, the Northern Rivers had a melanoma death rate, per annum, of 12.0 per 100,000 men, which was significantly higher than both the overall NSW and rural NSW male rates. However, the melanoma death rate, per annum, of 3.0 per 100,000 Northern Rivers women was comparable to both the overall NSW and rural NSW female rates.

*Intra-Area Comparisons – by gender*

As shown earlier in Table 6, and as with the NSW figures, the melanoma death rate was significantly higher among Northern Rivers males than Northern Rivers females.

Mortality – Prostate Cancer

*Area Comparisons – overall*

As shown earlier in Table 6, between 1996 and 2000, the Northern Rivers had a prostate cancer death rate, per annum, of 30.7 per 100,000 men, which was comparable to both the overall NSW and rural NSW rates.

Mortality – Breast Cancer

*Area Comparisons – overall*

As shown earlier in Table 6, between 1996 and 2000, the Northern Rivers had a breast cancer death rate, per annum, of 54.8 per 100,000 women, which was comparable to both the overall NSW and rural NSW rates.

Mortality – Cervical Cancer

*Area Comparisons – overall*

As shown earlier in Table 6, between 1996 and 2000, the Northern Rivers had a cervical cancer death rate, per annum, of 2.2 per 100,000 women, which was comparable to both the overall NSW and rural NSW rates.
Mortality – All Respiratory Diseases

Area Comparisons – overall by gender

As shown later in Figures 18 and 19, both Northern Rivers males and females had respiratory disease death rates comparable to the overall NSW rates.

Intra-Area Comparisons – by gender

Future phases of the Northern Rivers Equity Profile will directly compare Northern Rivers males’ and females’ death rates from all respiratory diseases.

Intra-Area Comparisons – males by LGA

As shown in Figure 18, there is much variation in male respiratory disease death rates within the Northern Rivers, with Richmond Valley and Kyogle LGAs having significantly higher rates and Copmanhurst LGA having a significantly lower rate than the Northern Rivers overall. While not significantly lower than the overall Northern Rivers rate, Tweed and Ballina LGAs also had male respiratory disease death rates that were lower than the overall NSW rate.

Figure 18: Deaths per annum, from all respiratory diseases, for males of all ages, by LGA, NRA and NSW (1996-2000)

Source: ABS Mortality Data and Population Estimates (HOIST)

Note: Respiratory disease deaths were classified by ICD-9 (460-519) up to 1998 and by ICD-10 (J00-J99) from 1999 onwards.
Intra-Area Comparisons – males by SES

Figure 18 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and male respiratory disease death rates.

Intra-Area Comparisons – females by LGA

As shown in Figure 19, there is some variation in female respiratory disease death rates within the Northern Rivers, but only Kyogle LGA had a significantly higher rate than the Northern Rivers overall. While not significantly lower than the overall Northern Rivers rate, Tweed LGA also had a female respiratory disease death rate that was lower than the overall NSW rate.

Figure 19: Deaths per annum, from all respiratory diseases, for females of all ages, by LGA, NRA and NSW (1996-2000)

Source: ABS Mortality Data and Population Estimates (HOIST)

Note: Respiratory disease deaths were classified by ICD-9 (460-519) up to 1998 and by ICD-10 (J00-J99) from 1999 onwards.

Intra-Area Comparisons – females by SES

Figure 19 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and female respiratory disease death rates.
Mortality – All Injury and Poisoning

**Area Comparisons – overall by gender**

As shown later in Figures 20 and 21, both Northern Rivers males and females had injury/poisoning death rates significantly higher than the overall NSW rates.

**Intra-Area Comparisons – by gender**

Future phases of the *Northern Rivers Equity Profile* will directly compare Northern Rivers males’ and females’ death rates from injuries and poisonings.

**Intra-Area Comparisons – males by LGA**

As shown in Figure 20, there is some variation in male death rates from injuries and poisonings within the Northern Rivers but only Grafton LGA had a significantly higher rate and only Ballina LGA a significantly lower rate than the Northern Rivers overall. While not significantly different to the overall Northern Rivers rate, Richmond Valley, Pristine Waters, Kyogle, Tweed and Lismore LGAs also had a male injury/poisoning death rates that were significantly higher than the overall NSW rate.

**Figure 20:** Deaths per annum, from all injuries and poisonings, for males of all ages, by LGA, NRA and NSW (1996-2000)

![Graph showing mortality rates by LGA](image)

**Source:** ABS Mortality Data and Population Estimates (HOIST)

**Note:** Injury and poisoning deaths were classified by ICD-9 (E800-E869, E880-E929, E950-E999) up to 1998 and by ICD-10 (V00-X99, Y00-Y39, Y85-Y87, Y89) from 1999 onwards.
**Intra-Area Comparisons – males by SES**

Figure 20 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and male death rates from injuries and poisonings.

**Intra-Area Comparisons – females by LGA**

As shown in Figure 21, there is much less variation in female death rates from injuries and poisonings within the Northern Rivers – only Byron LGA had a significantly higher rate than the Northern Rivers overall. However, Richmond Valley and Tweed LGAs’ female injury/poisoning death rates were significantly higher than the overall NSW rate.

**Figure 21:** Deaths per annum, from all injuries and poisonings, for females of all ages, by LGA, NRA and NSW (1996-2000)

![Graph showing female injury/poisoning death rates](Image)

Source: ABS Mortality Data and Population Estimates (HOIST)

Note: Injury and poisoning deaths were classified by ICD-9 (E800-E869, E880-E929, E950-E999) up to 1998 and by ICD-10 (V00-X99, Y00-Y39, Y85-Y87, Y89) from 1999 onwards.

**Intra-Area Comparisons – females by SES**

Figure 21 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and female death rates from injuries and poisonings.
**Total Avoidable Mortality**

**Area Comparisons – overall**

Between 1996 and 2000, 4,354 (41%) of all 10,686 Northern Rivers residents deaths were premature (aged less than 75 years). Of these premature deaths, 2,189 (50%) were avoidable, giving us an age-adjusted avoidable mortality rate of 299 per 100,000. Future phases of the *Northern Rivers Equity Profile* will explore how this rate compares with the overall NSW and rural NSW avoidable mortality rates during this period. See Appendix 3 for more information about what constitutes avoidable mortality.

**Intra-Area Comparisons – by gender**

Within the Northern Rivers, males were significantly more likely than females to suffer avoidable mortality, accounting for two thirds of all avoidable deaths, with an age-adjusted Northern Rivers male avoidable mortality rate of 402 per 100,000, compared to the age-adjusted Northern Rivers female avoidable mortality rate of 199 per 100,000.

**Intra-Area Comparisons – by SLA**

As shown in Figure 22, avoidable mortality rates for most Northern Rivers SLAs are comparable to the overall NSW rate. However, Casino and Grafton SLAs both had rates significantly above overall NSW.

**Figure 22:** Northern Rivers premature (< 75 years) and avoidable deaths per annum, by SLA (1996-2000)

![Figure 22: Northern Rivers premature (< 75 years) and avoidable deaths per annum, by SLA (1996-2000)](image)

**Source:** ABS Mortality Data and Population Estimates (HOIST)

**Note:** The data for Figure 22 were supplied by NSW Health as a prerequisite for inclusion in each Area Health Service’s Equity Profile and presents data according to the Northern Rivers previous SLA divisions. Future phases of the *Northern Rivers Equity Profile* will reanalyse these data according to our current SLA divisions, presenting them in ascending SEIFA IRSD score order, in order to allow better comparison with the other data presented.
**Intra-Area Comparisons – by SES**

As shown in Figure 23, there is an observable relationship between SLAs’ SEIFA IRSD score and their avoidable mortality rates: SLAs with higher SEIFA scores tend to have lower avoidable mortality rates.

**Figure 23:** Northern Rivers total avoidable mortality per annum, by SLA and SEIFA IRSD score (1996-2000)

![Graph showing the relationship between SEIFA IRSD score and avoidable mortality](image)

**Source:** ABS Mortality Data and Population Estimates (HOIST)

**Note:** The data for Figure 23 were supplied by NSW Health as a prerequisite for inclusion in each Area Health Service’s Equity Profile and presents data according to the Northern Rivers previous SLA divisions. Future phases of the Northern Rivers Equity Profile will reanalyse these data according to our current SLA divisions, presenting them in ascending SEIFA IRSD score order, in order to allow better comparison with the other data presented.

**Primary Avoidable Mortality**

**Area Comparisons – overall**

Between 1996 and 2000, of all avoidable Northern Rivers deaths, 56% were primary avoidable. Future phases of the Northern Rivers Equity Profile will explore how this proportion compares with those for overall NSW and rural NSW during this period. See Appendix 3 for more information about what constitutes primary avoidable mortality.
**Intra-Area Comparisons – by SLA**

As shown in Figure 24, primary avoidable mortality rates for all Northern Rivers SLAs are comparable to the overall NSW rate.

**Figure 24:** Northern Rivers premature (<75 yrs) and primary avoidable mortality (PAM), by SLA (1996-2000)

![Figure 24: Northern Rivers premature (<75 yrs) and primary avoidable mortality (PAM), by SLA (1996-2000)](image)

**Source:** ABS Mortality Data and Population Estimates (HOIST)

**Note:** The data for Figure 24 were supplied by NSW Health as a prerequisite for inclusion in each Area Health Service’s Equity Profile and presents data according to the Northern Rivers previous SLA divisions. Future phases of the *Northern Rivers Equity Profile* will reanalyse these data according to our current SLA divisions, presenting them in ascending SEIFA IRSD score order, in order to allow better comparison with the other data presented.
Intra-Area Comparisons – by SES

As shown in Figure 25, there is an observable relationship between SLAs’ SEIFA IRSD score and their primary avoidable mortality rates: SLAs with higher SEIFA scores tend to have lower primary avoidable mortality rates.

Figure 25: Northern Rivers primary avoidable mortality (PAM) per annum, by SLA and SEIFA IRSD score (1996-2000)

Source: ABS Mortality Data and Population Estimates (HOIST)

Note: The data for Figure 25 were supplied by NSW Health as a prerequisite for inclusion in each Area Health Service’s Equity Profile and presents data according to the Northern Rivers previous SLA divisions. Future phases of the Northern Rivers Equity Profile will reanalyse these data according to our current SLA divisions, presenting them in ascending SEIFA IRSD score order, in order to allow better comparison with the other data presented.

Secondary Avoidable Mortality

Area Comparisons – overall

Between 1996 and 2000, of all avoidable Northern Rivers deaths, 23% were secondary avoidable. Future phases of the Northern Rivers Equity Profile will explore how this proportion compares with those for overall NSW and rural NSW during this period. See Appendix 3 for more information about what constitutes secondary avoidable mortality.
Intra-Area Comparisons – by SLA

As shown in Figure 26, secondary avoidable mortality rates for all Northern Rivers SLAs are comparable to the overall NSW rate.

Figure 26: Northern Rivers premature (<75 yrs) and secondary avoidable mortality (SAM), by SLA (1996-2000)

Source: ABS Mortality Data and Population Estimates (HOIST)

Note: The data for Figure 26 were supplied by NSW Health as a prerequisite for inclusion in each Area Health Service’s Equity Profile and presents data according to the Northern Rivers previous SLA divisions. Future phases of the Northern Rivers Equity Profile will reanalyse these data according to our current SLA divisions, presenting them in ascending SEIFA IRSD score order, in order to allow better comparison with the other data presented.
Intra-Area Comparisons – by SES

As shown in Figure 27, there is an observable relationship between SLAs’ SEIFA IRSD score and their secondary avoidable mortality rates: SLAs with higher SEIFA scores tend to have lower secondary avoidable mortality rates.

Figure 27: Northern Rivers secondary avoidable deaths (SAM) per annum, by SLA and SEIFA IRSD score (1996-2000)

Source: ABS Mortality Data and Population Estimates (HOIST)

Note: The data for Figure 27 were supplied by NSW Health as a prerequisite for inclusion in each Area Health Service’s Equity Profile and presents data according to the Northern Rivers previous SLA divisions. Future phases of the Northern Rivers Equity Profile will reanalyse these data according to our current SLA divisions, presenting them in ascending SEIFA IRSD score order, in order to allow better comparison with the other data presented.

Tertiary Avoidable Mortality

Area Comparisons – overall

Between 1996 and 2000, of all avoidable Northern Rivers deaths, 20% were tertiary avoidable. Future phases of the Northern Rivers Equity Profile will explore how this proportion compares with those for overall NSW and rural NSW during this period. See Appendix 3 for more information about what constitutes tertiary avoidable mortality.
**Intra-Area Comparisons – by SLA**

As shown in Figure 28, tertiary avoidable mortality rates for all Northern Rivers SLAs are comparable to the overall NSW rate.

**Figure 28: Northern Rivers premature (<75 yrs) and tertiary avoidable mortality (TAM), by SLA (1996-2000)**

**Source:** ABS Mortality Data and Population Estimates (HOIST)

**Note:** The data for Figure 28 were supplied by NSW Health as a prerequisite for inclusion in each Area Health Service’s Equity Profile and presents data according to the Northern Rivers previous SLA divisions. Future phases of the *Northern Rivers Equity Profile* will reanalyse these data according to our current SLA divisions, presenting them in ascending SEIFA IRSD score order, in order to allow better comparison with the other data presented.
**Intra-Area Comparisons – by SES**

As shown in Figure 29, there is less of an observable relationship between SLAs’ SEIFA IRSD score and their tertiary avoidable mortality rates.

**Figure 29:** Northern Rivers tertiary avoidable deaths (TAM) per annum, by SLA and SEIFA IRSD score (1996-2000)

![Graph showing relationship between SEIFA Index and Tertiary Avoidable Mortality (TAM) rates for various SLAs.](image)

**Source:** ABS Mortality Data and Population Estimates (HOIST)

**Note:** The data for Figure 29 were supplied by NSW Health as a prerequisite for inclusion in each Area Health Service’s Equity Profile and presents data according to the Northern Rivers previous SLA divisions. Future phases of the Northern Rivers Equity Profile will reanalyse these data according to our current SLA divisions, presenting them in ascending SEIFA IRSD score order, in order to allow better comparison with the other data presented.
Morbidity – Lung Cancer Incidence

Area Comparisons – overall by gender

As shown in Table 7, between 1996 and 2000, the Northern Rivers had lung cancer incidence rates, per annum, of 56.5 per 100,000 males and 21.7 per 100,000 females, which were both comparable to both the overall NSW and rural NSW rates.

Table 7: Cancer incidence rates for Northern Rivers and NSW residents, by type of cancer (1996-2000)

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Age-adjusted incidence rate per 100,000 per annum (95% CI)</th>
<th>Significant difference?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Northern Rivers</td>
<td>Overall NSW</td>
</tr>
<tr>
<td>Lung cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>56.5 (51.4 – 61.9)</td>
<td>57.3 (56.1 – 58.5)</td>
</tr>
<tr>
<td>F</td>
<td>21.7 (18.7 – 25.0)</td>
<td>23.0 (22.3 – 23.7)</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>69.0 (63.3 – 75.0)</td>
<td>68.0 (66.7 – 69.3)</td>
</tr>
<tr>
<td>F</td>
<td>43.5 (39.3 – 48.0)</td>
<td>45.6 (44.7 – 46.6)</td>
</tr>
<tr>
<td>Melanoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>69.7 (63.7 – 76.1)</td>
<td>49.1 (48.0 – 50.2)</td>
</tr>
<tr>
<td>F</td>
<td>42.3 (37.5 – 47.4)</td>
<td>32.0 (31.2 – 32.9)</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>108.8 (101.7 – 116.3)</td>
<td>114.3 (112.6 – 116.0)</td>
</tr>
<tr>
<td>Breast cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>279.8 (251.8 – 310.1)</td>
<td>286.7 (280.6 – 292.9)</td>
</tr>
<tr>
<td>Cervical cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>9.2 (7.0 – 11.9)</td>
<td>8.5 (8.1 – 8.9)</td>
</tr>
</tbody>
</table>

Source: 2002 NSW Chief Health Officer’s Report

Note: F = female rates; M = male rates

Intra-Area Comparisons – by gender

As shown in Table 7 above, and as with the NSW figures, lung cancer incidence was significantly higher among Northern Rivers males than Northern Rivers females.

Morbidity – Colorectal Cancer Incidence

Area Comparisons – overall by gender

As shown earlier in Table 7, between 1996 and 2000, the Northern Rivers had colorectal cancer incidence rates, per annum, of 69.0 per 100,000 males and 43.5 per 100,000 females, which were both comparable to both the overall NSW and rural NSW rates.

Intra-Area Comparisons – by gender

As shown earlier in Table 7, and as with the NSW figures, colorectal cancer incidence was significantly higher among Northern Rivers males than Northern Rivers females.
Morbidity – Melanoma Incidence

Area Comparisons – overall by gender
As shown earlier in Table 7, between 1996 and 2000, the Northern Rivers had a melanoma incidence rate, per annum, of 69.7 per 100,000 males, which was significantly higher than both the overall NSW and rural NSW male rates. The melanoma incidence rate, per annum, of 42.3 per 100,000 Northern Rivers females was also significantly higher than the overall NSW female rate but was comparable to the rural NSW female rate.

Intra-Area Comparisons – by gender
As shown earlier in Table 7, and as with the NSW figures, melanoma incidence was significantly higher among Northern Rivers males than Northern Rivers females.

Morbidity – Prostate Cancer Incidence

Area Comparisons – overall
As shown earlier in Table 7, between 1996 and 2000, the Northern Rivers had a prostate cancer incidence rate, per annum, of 108.8 per 100,000 males, which was comparable to both the overall NSW and rural NSW rates.

Morbidity – Breast Cancer Incidence

Area Comparisons – overall
As shown earlier in Table 7, between 1996 and 2000, the Northern Rivers had a breast cancer incidence rate, per annum, of 279.8 per 100,000 females, which was comparable to both the overall NSW and rural NSW rates.

Morbidity – Cervical Cancer Incidence

Area Comparisons – overall
As shown earlier in Table 7, between 1996 and 2000, the Northern Rivers had a cervical cancer incidence rate, per annum, of 9.2 per 100,000 females, which was comparable to both the overall NSW and rural NSW rates.
Morbidity – Asthma Prevalence

**Intra-Area Comparisons – gender by time**

As shown in Table 8, Northern Rivers males and females have reported comparable rates of current asthma in all of the NSW Health Surveys.

**Table 8:** Self-reported current asthma among Northern Rivers residents aged 16 years and over, by gender (1997, 1998, 2002)

<table>
<thead>
<tr>
<th>Year</th>
<th>Proportion reporting current asthma (95% CI)</th>
<th>Significant difference?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>1997</td>
<td>9.1% (6.3 – 11.9)</td>
<td>12.2% (9.0 – 15.3)</td>
</tr>
<tr>
<td>1998</td>
<td>7.2% (4.6 – 9.8)</td>
<td>10.6% (7.9 – 13.2)</td>
</tr>
<tr>
<td>2002</td>
<td>16.5% (9.8 – 23.1)</td>
<td>12.9% (9.2 – 16.5)</td>
</tr>
</tbody>
</table>


Note: Estimates are based on the following numbers of respondents, aged 16 years and over: 1997 - 998; 1998 - 1009; 2002 - 799.

Note: The question used was: Have you had symptoms of asthma or taken treatment for asthma in the last 12 months? The indicator includes those saying Yes.

Morbidity – Diabetes Prevalence

**Intra-Area Comparisons – gender by time**

As shown in Table 9, Northern Rivers males and females have reported comparable rates of doctor-diagnosed diabetes, or high blood sugar, in the two most recent NSW Health Surveys. However, Northern Rivers males reported higher rates of diabetes than Northern Rivers females in the 1997 survey.

**Table 9:** Self-reported doctor-diagnosed diabetes or high blood sugar among Northern Rivers residents aged 16 years and over, by gender (1997, 1998, 2002)

<table>
<thead>
<tr>
<th>Year</th>
<th>Proportion reporting diabetes / high blood sugar (95% CI)</th>
<th>Significant difference?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>1997</td>
<td>8.1% (5.5 – 10.6)</td>
<td>3.4% (1.8 – 4.9)</td>
</tr>
<tr>
<td>1998</td>
<td>5.6% (2.6 – 8.6)</td>
<td>4.6% (2.9 – 6.4)</td>
</tr>
<tr>
<td>2002</td>
<td>8.8% (5.3 – 12.3)</td>
<td>6.9% (4.5 – 9.4)</td>
</tr>
</tbody>
</table>


Note: Estimates are based on the following numbers of respondents, aged 16 years and over: 1997 - 998; 1998 - 1003; 2002 - 793.

Note: The questions used were: “Have you ever been told by a doctor or at a hospital that you have diabetes?”; “Have you ever been told by a doctor or at a hospital that you have high sugar levels in your blood or urine?”; if female, “Were you pregnant when you were first told that you had diabetes / high blood sugar?” and “Have you ever had diabetes / high blood sugar apart from when you were pregnant?” The indicator includes those saying they had either diabetes or high blood sugar but did not have gestational diabetes.
Morbidity – Pertussis (Whooping Cough) Notifications

Area Comparisons – overall

As shown in Figure 30, in 2001, the Northern Rivers had an age-adjusted rate of 155 pertussis notifications per 100,000 persons, which was the second highest in the state, representing more than double the overall NSW rate. It was also significantly higher than the rural NSW rate.

Figure 30: Pertussis notification rates, by Area Health Service (2001)

Morbidity – Q Fever Notifications

Area Comparisons – overall

As shown in Figure 31, between 1997 and 2001, the Northern Rivers had an age-adjusted rate of 12 Q fever notifications per 100,000 persons per annum, which was significantly higher than the overall NSW rate but comparable to the rural NSW rate.

Figure 31: Q fever notification rates, by Area Health Service (1997-2001)

Morbidity – Gonorrhoea Notifications

Area Comparisons – overall

As shown in Figure 32, in 2001, the Northern Rivers had an age-adjusted rate of 39 gonorrhoea notifications per 100,000 persons, which was significantly less than the overall NSW rate but comparable to the rural NSW rate.

Morbidity – Syphilis Notifications

Area Comparisons – overall

As shown in Figure 33, between 1999 and 2001, the Northern Rivers had an age-adjusted rate of 6.5 syphilis notifications per 100,000 persons per annum, which was comparable to both the overall NSW and rural NSW rates.

Figure 33: Syphilis notification rates, by Area Health Service (1999-2001)

Morbidity – Hepatitis A Notifications

Area Comparisons – overall

As shown in Figure 34, between 1999 and 2001, the Northern Rivers had an age-adjusted rate of 2 Hepatitis A notifications per 100,000 persons per annum, which was significantly less than the overall NSW rate but comparable to the rural NSW rate.

Figure 34: Hepatitis A notification rates, by Area Health Service (1999-2001)

Morbidity – Hepatitis B Notifications

Area Comparisons – overall

As shown in Figure 35, between 1999 and 2001, the Northern Rivers had an age-adjusted rate of 14 Hepatitis B notifications per 100,000 persons per annum, which was significantly less than the overall NSW rate but comparable to the rural NSW rate.

Figure 35: Hepatitis B notification rates, by Area Health Service (1999-2001)

Morbidity – Hepatitis C Notifications

Area Comparisons – overall

As shown in Figure 36, in 2001, the Northern Rivers had an age-adjusted rate of 163.5 Hepatitis C notifications per 100,000 persons, which was significantly higher than both the overall NSW and the rural NSW rates.

Figure 36: Hepatitis C notification rates, by Area Health Service (2001)

Morbidity – Salmonella Notifications

Area Comparisons – overall

As shown in Figure 37, between 1999 and 2001, the Northern Rivers had an age-adjusted rate of 67 salmonella notifications per 100,000 persons per annum, which was the highest in the state, representing almost three times the overall NSW rate and more than double the rural NSW rate.

Figure 37: Salmonella notification rates, by Area Health Service (1999-2001)

Oral Health - No Natural Teeth Missing among Adults

**Area Comparisons – overall by gender and time**

As shown in Figure 38, slightly under a third of Northern Rivers males and females reported having no natural teeth missing at both the 1998 and 2002 NSW Health Surveys, which were both significantly lower than overall NSW rates in 1998 but comparable in 2002.

**Figure 38:** Self-reported missing natural teeth status among Northern Rivers and NSW residents aged 16 years and over (1998 and 2002)

<table>
<thead>
<tr>
<th>Area</th>
<th>Year</th>
<th>Males (95% CI)</th>
<th>Females (95% CI)</th>
<th>Persons (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Rivers AHS</td>
<td>1997</td>
<td>. (. -)</td>
<td>. (. -)</td>
<td>. (. -)</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>28.9 (23.3-34.5)</td>
<td>28.0 (24.0-32.1)</td>
<td>28.4 (25.0-31.9)</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>30.2 (22.9-37.5)</td>
<td>32.2 (26.5-37.9)</td>
<td>31.2 (26.6-35.8)</td>
</tr>
<tr>
<td>NSW</td>
<td>1997</td>
<td>. (. -)</td>
<td>. (. -)</td>
<td>. (. -)</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>36.3 (34.8-37.8)</td>
<td>33.7 (32.4-35.0)</td>
<td>35.0 (34.0-36.0)</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>37.9 (36.0-39.9)</td>
<td>36.6 (34.9-38.2)</td>
<td>37.2 (36.0-38.5)</td>
</tr>
</tbody>
</table>

**Source:** NSW Health Survey 1997, 1998 and 2002 (HOIST)

**Note:** Estimates are based on the following numbers of respondents: 1998 – 1011 (NRAHS) and 17,434 (NSW); 2002 – 799 (NRAHS) and 12,618 (NSW).

**Note:** The question used to define the indicator was: Are any of your natural teeth missing? (Natural teeth does not include dentures, includes wisdom teeth). The indicator includes respondents indicating they had no natural teeth missing.

**Intra-Area Comparisons – by gender and time**

Within the Northern Rivers, the data under Figure 38 indicate that comparable proportions of males and females reported having no natural teeth missing at both time periods.
**Additional Indicators to be Explored**

Future phases of the *Northern Rivers Equity Profile* will include data, with both Area and Intra-Area comparisons, regarding:

- measles notification rates;
- rubella notification rates;
- meningococcal notification rates;
- Ross River Virus notification rates;
- Barmah Forest Virus notification rates;
- tuberculosis notification rates;
- pneumococcal notification rates;
- HIV notification rates;
- legionnaires’ disease notification rates;
- self-rated health status;
- self-rated mental health status; and
- self-rated physical functioning (from SF36 data).
Early Childhood Development Determinants

To strengthen our economy for the future and the liveability of our communities, we must provide the best possible developmental opportunities for the next generation. We can turn away from this challenge and hope that our helping systems - schools, social and health services will be able to cope even though they tell us they are having increasing difficulty meeting the demand. We can hope that children will grow out of behaviour and learning problems that were set in early life even though evidence suggests that many of them will have great difficulty doing so and will not reach their full potential. We can put more money into policing and correctional services although that will be expensive and unlikely to make a huge difference.

Or we can take a major leap into the future, just as we did when we had the chance to provide safe drinking water and immunise all children against diseases that have taken a terrible toll in infancy for centuries. When science provided us with the tools - inoculation against polio, smallpox, diphtheria and other scourges of childhood we used them. We used them to protect individual children and society as a whole.

We have new knowledge today. We must seize the opportunity to use that knowledge to benefit all children. We believe the priorities and choices are clear. Ontario Children's Secretariat (1999)32

Rationale for Inclusion

As discussed earlier, early childhood experiences mediate the impact of all the other determinants on an individual's health outcomes. Early childhood is a critical and vulnerable stage and strong evidence has highlighted the importance of the early years in influencing adult health and well-being. National and international studies have consistently demonstrated that individuals who receive a healthy start in life enjoy significant long term physical, mental and emotional health benefits. The quality and development of parent and child bonding, emotional regulation and attachment, language development and the development of motor skills set the scene and will influence the quality of life a person experiences throughout their life course. For a more detailed rationale, including supporting references, please refer to the complementary literature review prepared by the Northern Rivers Area Health Promotion Unit31.

Teenage Mothers

Area Comparisons – overall

According to the NSW Midwives’ Data Collection (HOIST), between 1996 and 1999, a total of 799 Northern Rivers confinements were for mothers aged 10 – 19 years, representing 7% of all Northern Rivers confinements during that period. Future phases of the Northern Rivers Equity Profile will explore how this proportion compares with those for overall NSW and rural NSW during this period.
**Area Comparisons – by Aboriginality**

According to the NSW Midwives’ Data Collection (HOIST), between 1996 and 1999, a total of 105 Northern Rivers confinements were for Aboriginal mothers aged 10 – 19 years, representing 17% of all Aboriginal Northern Rivers confinements during that period. Future phases of the *Northern Rivers Equity Profile* will explore how this proportion compares with those for overall NSW and rural NSW during this period. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this *Profile*.

**Intra-Area Comparisons – by Aboriginality**

As discussed earlier, between 1996 and 1999, 7% of all Northern Rivers confinements versus 17% of all Aboriginal Northern Rivers confinements were for mothers aged 10 – 19 years. Future phases of the *Northern Rivers Equity Profile* will explore whether these proportions are significantly different. See warning to interpret data about Aboriginal populations cautiously in Section 1 of this *Profile*.

**Intra-Area Comparisons – by SES**

As shown in Figure 39, there is an observable relationship between SLAs’ SEIFA IRSD score and their rates of teenage confinements: SLAs with higher SEIFA scores tend to have lower proportions of teenage confinements.

**Figure 39:** Northern Rivers teenage confinements (10-19 years), as proportion of all confinements, by SLA and SEIFA IRSD score (1996-1999)

![Figure 39: Northern Rivers teenage confinements (10-19 years), as proportion of all confinements, by SLA and SEIFA IRSD score (1996-1999)](image)

**Source:** NSW Midwives’ Data Collection (HOIST)

**Note:** The data for Figure 39 were supplied by NSW Health as a prerequisite for inclusion in each Area Health Service’s Equity Profile and presents data according to the Northern Rivers previous SLA divisions. Future phases of the *Northern Rivers Equity Profile* will reanalyse these data according to our current SLA divisions, presenting them in ascending SEIFA IRSD score order, in order to allow better comparison with the other data presented.
Immunisation Adequacy (12 – 15 months)

Area Comparisons – overall

As shown in Figure 40, according to the Australian Childhood Immunisation Register, at the end of 2001, 84% of Northern Rivers children aged 12 – 15 months were fully immunised, which was comparable to overall NSW.

Figure 40: Immunisation coverage of children aged 12 to 15 months, NSW (31 December 2001)

Intra-Area Comparisons – by LGA

As shown in Table 10, immunisation rates varied throughout the Northern Rivers but each LGA's rate was comparable to the overall Northern Rivers rate. However, Maclean, Grafton, Ballina and Pristine Waters LGAs all had immunisation rates significantly higher than at least one other Northern Rivers LGA, whereas Richmond Valley, Tweed, Byron and Lismore LGAs all had immunisation rates significantly lower than at least one other Northern Rivers LGA.

Table 10: Immunisation coverage among children aged 12 - 15 months in Northern Rivers LGAs (December 2001)

<table>
<thead>
<tr>
<th>LGA</th>
<th>N children in age group</th>
<th>N children fully immunised</th>
<th>% children fully immunised (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richmond Valley</td>
<td>53</td>
<td>40</td>
<td>75% (61.9-86.3)</td>
</tr>
<tr>
<td>Maclean</td>
<td>62</td>
<td>59</td>
<td>95% (86.5-99.0)</td>
</tr>
<tr>
<td>Kyogle</td>
<td>31</td>
<td>26</td>
<td>84% (66.4-94.6)</td>
</tr>
<tr>
<td>Pristine Waters</td>
<td>28</td>
<td>26</td>
<td>93% (76.6-99.1)</td>
</tr>
<tr>
<td>Grafton</td>
<td>48</td>
<td>47</td>
<td>98% (89.0-99.9)</td>
</tr>
<tr>
<td>Tweed</td>
<td>208</td>
<td>169</td>
<td>81% (75.2-86.3)</td>
</tr>
<tr>
<td>Byron</td>
<td>74</td>
<td>48</td>
<td>65% (52.9-75.6)</td>
</tr>
<tr>
<td>Copmanhurst</td>
<td>16</td>
<td>15</td>
<td>94% (69.8-99.8)</td>
</tr>
<tr>
<td>Lismore</td>
<td>135</td>
<td>112</td>
<td>83% (75.5-88.9)</td>
</tr>
<tr>
<td>Ballina</td>
<td>96</td>
<td>86</td>
<td>90% (81.7-94.9)</td>
</tr>
<tr>
<td>Northern Rivers</td>
<td>751</td>
<td>627</td>
<td>84% (73.4-93.6)</td>
</tr>
<tr>
<td>Overall NSW</td>
<td></td>
<td></td>
<td>90%</td>
</tr>
</tbody>
</table>

Source: Australian Childhood Immunisation Register
Intra-Area Comparisons – by SES

As shown in Figure 41, there is no clearly observable relationship between SLAs’ SEIFA IRSD score and their rates of childhood immunisation.

Figure 41: Northern Rivers immunisation coverage among children aged 12 - 15 months, by LGA and SEIFA IRSD score (December 2001)

Source: Australian Childhood Immunisation Register (HOIST)

Note: The data for Figure 39 were supplied by NSW Health as a prerequisite for inclusion in each Area Health Service’s Equity Profile and presents data according to the Northern Rivers previous SLA divisions. Future phases of the Northern Rivers Equity Profile will reanalyse these data according to our current SLA divisions, presenting them in ascending SEIFA IRSD score order, in order to allow better comparison with the other data presented.
Domestic Violence Against Children

**Area Comparisons – by gender**

As shown in Figure 42, between 1995/96 and 1999/2000, 49 per 100,000 Northern Rivers boys and 39 per 100,000 Northern Rivers girls were hospitalised, per annum, as a result of interpersonal violence, which were both comparable to both the rural NSW and overall NSW rates.

**Figure 42: Interpersonal violence-related hospitalisations for children aged 0 – 14 years, by Area Health Service (95/96-99/00)**

![Graph showing hospitalisations rates for boys and girls in different health areas](image)


**Intra-Area Comparisons – by gender**

Within the Northern Rivers, rates of hospitalisation for interpersonal violence among children aged 0 – 14 years were comparable for both boys and girls.
Oral Health in Kindergarten

Area Comparisons – overall

As shown in Figure 43, in 1998 and 1999, Northern Rivers kindergarten children had a mean of 1.6 teeth decayed, missing or filled, which represented the second worst result in the state and was significantly more than both rural NSW and overall NSW children. Consequently, only 61% of Northern Rivers kindergarten children had not experienced tooth decay, which also represented the second worst result in the state and was significantly lower than both rural NSW and overall NSW children.

![Figure 43: Oral health among children in kindergarten, by Area Health Service (1998 & 1999)](source)


Note: Ages greater than four standard deviations from the mean were excluded. Mean DFMT = mean number of decayed, missing or filled deciduous and permanent teeth. Decay-free proportion = persons with no decayed, missing or filled teeth.
Oral Health in Year 6

Area Comparisons – overall

As shown in Figure 44, in 1998 and 1999, Northern Rivers Year 6 children had a mean of 1.1 teeth decayed, missing or filled, which represented the worst result in the state and was significantly more than both rural NSW and overall NSW children. Consequently, only 61% of Northern Rivers Year 6 children had not experienced tooth decay, which also represented the worst result in the state and was significantly lower than both rural NSW and overall NSW children.

Figure 44: Oral health among children in Year, by Area Health Service (1998 & 1999)


Note: Ages greater than four standard deviations from the mean were excluded. Mean DFMT = mean number of decayed, missing or filled deciduous and permanent teeth. Decay-free proportion = persons with no decayed, missing or filled teeth.
Additional Indicators to be Explored

Future phases of the Northern Rivers Equity Profile will include data, with both Area and Intra-Area comparisons, regarding:

- the proportion of women receiving antenatal care before 20 weeks gestation;
- perinatal mortality rates;
- infant (under one year) mortality rates;
- premature birth rates;
- low birthweight rates;
- rates of birth defects;
- postnatal depression rates;
- the duration of breastfeeding;
- births to women aged over 35 years;
- the proportion of women smoking during pregnancy;
- children’s immunisation adequacy at 24 – 26 months; and
- rates of childhood dental visits among 5 – 12 year olds.

In addition, future phases of the Northern Rivers Equity Profile will involve the EPAG exploring the feasibility of collecting data, allowing both Area and Intra-Area comparisons, regarding:

- sun protection during childhood;
- child abuse notification rates;
- literacy skills during early childhood;
- numeracy skills during early childhood;
- parents’ literacy skills;
- parents' numeracy skills;
- the proportion of children attending early childhood care facilities; and
- the proportion of children attending preschool or kindergarten.
Culture / Ethnicity Determinants

Rationale for Inclusion
As discussed earlier, culture and ethnicity influence health in complex ways: customs, traditions and cultural beliefs affect the overall health of individuals and communities by influencing what people think, feel, do and believe to be important. Levels of the broader community’s acceptance of cultural diversity (community and social context) also mediate the impact of these cultural influences on individuals’ health outcomes – again, for better or for worse. For a more detailed rationale, including supporting references, please refer to the complementary literature review prepared by the Northern Rivers Area Health Promotion Unit31.

Aboriginal Ethnicity
The Northern Rivers Aboriginal population’s age and gender distributions are discussed in the Demography of the Northern Rivers Region – Aboriginal Population section.

Additional Indicators to be Explored
Future phases of the Northern Rivers Equity Profile will include data, with both Area and Intra-Area comparisons, regarding:
- all Northern Rivers residents’ ethnic backgrounds.

In addition, future phases of the Northern Rivers Equity Profile will involve the EPAG exploring the feasibility of collecting data, allowing both Area and Intra-Area comparisons, regarding:
- residents’ religious status.
Lifestyle Determinants

Rationale for Inclusion
As discussed earlier, personal behaviours, such as smoking, use of alcohol and other drugs, dietary and physical activity patterns are well known to directly affect individuals’ health and wellbeing. For a more detailed rationale, including supporting references, please refer to the complementary literature review prepared by the Northern Rivers Area Health Promotion Unit31.

Influenza Immunisation for Older People

Area Comparisons – overall
As shown in Figure 45, about two thirds of older (65+ years) Northern Rivers residents reported having been immunised against influenza in 1999, which was comparable to both the overall NSW and the rural NSW rates.

Figure 45: Self-reported influenza immunisation rates, persons aged 65 years and over, by Area Health Service (1999)

Source: 1999 NSW Older Persons’ Health Survey (HOIST)

Note: Estimates are based on the following numbers of respondents: 8881 (NSW).
Mammographic Screening

Area Comparisons – overall

As shown in Table 11, in 2000, almost 60% of Northern Rivers women (aged 50 – 69 years) had had a mammogram in the previous two years, which was significantly higher both the overall NSW and rural NSW rates.

Table 11: Biennial cancer screening rates for Northern Rivers and NSW women, by screen type (2000)

<table>
<thead>
<tr>
<th>Screening Test</th>
<th>Proportion women screened in last two years (95% CI)</th>
<th>Significant difference?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammogram (50-69 years)</td>
<td>59.6% (59.1 – 60.2)</td>
<td>53.7% (53.6 – 53.8)</td>
</tr>
<tr>
<td>Pap test (20-69 years)</td>
<td>61.3% (61.1 – 61.6)</td>
<td>59.2% (59.1 – 59.2)</td>
</tr>
</tbody>
</table>

Source: Breastscreen NSW and NSW Pap Test Register (2002 CHO Report)

Pap Testing

Area Comparisons – overall

As shown earlier in Table 11, in 2000, over 60% of Northern Rivers women (aged 20 – 69 years) had had a Pap test in the previous two years, which was significantly higher both the overall NSW and rural NSW rates. However, due to the high precision data, this difference is less meaningful in absolute terms.
Tobacco Smoking

Area Comparisons – overall by gender and time

As shown in Figure 46, approximately 20% of Northern Rivers females reported current (daily or occasional) smoking at the 2002 NSW Health Survey, which was comparable to overall NSW females. However, although comparable in the 1997 and 1998 surveys, in 2002, Northern Rivers males reported a significantly higher rate of current smoking than overall NSW males (34% vs 24%). Although Northern Rivers males rate of current smoking has not risen significantly, the overall NSW male rate has fallen significantly between the 1997 and 2002 NSW Health Surveys.

Figure 46: Self-reported smoking status among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)

<table>
<thead>
<tr>
<th>Area</th>
<th>Year</th>
<th>Males (95% CI)</th>
<th>Females (95% CI)</th>
<th>Persons (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Rivers</td>
<td>1997</td>
<td>26.2 (21.5-31.0)</td>
<td>22.4 (18.6-26.1)</td>
<td>24.3 (21.2-27.3)</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>28.8 (23.5-34.1)</td>
<td>22.0 (18.4-25.6)</td>
<td>25.3 (22.2-28.5)</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>33.7 (26.8-40.5)</td>
<td>19.5 (14.9-24.0)</td>
<td>26.4 (22.2-30.6)</td>
</tr>
<tr>
<td>NSW</td>
<td>1997</td>
<td>27.2 (25.9-28.5)</td>
<td>21.0 (20.0-22.0)</td>
<td>24.0 (23.2-24.9)</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>26.2 (24.8-27.5)</td>
<td>21.3 (20.2-22.4)</td>
<td>23.7 (22.9-24.6)</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>23.9 (22.2-25.6)</td>
<td>18.9 (17.6-20.2)</td>
<td>21.4 (20.3-22.4)</td>
</tr>
</tbody>
</table>


Note: Estimates are based on the following numbers of respondents: 1997 - 1000 (NRAHS) and 17,496 (NSW); 1998 - 1011 (NRAHS) and 17,457 (NSW); 2002 - 799 (NRAHS) and 12,617 (NSW).

Note: The question used was: Which of the following best describes your smoking status: smoke daily; smoke occasionally; don’t smoke now but I used to; I have tried it a few times but never smoked regularly; or I have never smoked? The indicator includes those saying they smoked daily or occasionally.

Intra-Area Comparisons – by gender and time

Within the Northern Rivers, the data under Figure 46 indicate that male and female self-reported smoking rates were comparable at the 1997 (26% vs 22%) and 1998 (29% to 22%) NSW Health Surveys. However, at the 2002 NSW Health Survey, Northern Rivers males reported a significantly higher current smoking rate than Northern Rivers females (34% vs 20%).

Northern Rivers Equity Profile – Phase 1 (September 2003)
At-risk Alcohol Drinking

Area Comparisons – overall by gender and time

As shown in Figure 47, at the 1997 and 1998 NSW Health Surveys, about 56% of Northern Rivers males and 40% of Northern Rivers females reported at-risk alcohol drinking, which was comparable to overall NSW rates for males at both time points and for females in 1998 – although Northern Rivers females reported significantly higher rates of at-risk drinking at the 1997 survey.

At the 2002 NSW Health Survey, 43% of Northern Rivers males and 26% of Northern Rivers females reported at-risk alcohol drinking, both of which were comparable to the overall NSW rates – all having fallen significantly from the earlier surveys. However, these differences should be interpreted cautiously as the questions were changed for the latter survey, which could explain some of the difference.

Figure 47: Self-reported at-risk alcohol drinking among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)

<table>
<thead>
<tr>
<th>Year</th>
<th>Males (95% CI)</th>
<th>Males (est. no.)</th>
<th>Females (95% CI)</th>
<th>Females (est. no.)</th>
<th>Persons (95% CI)</th>
<th>Persons (est. no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>56.3 (51.4-61.5)</td>
<td>52,000</td>
<td>40.3 (35.8-44.8)</td>
<td>39,000</td>
<td>46.2 (44.5-47.9)</td>
<td>91,000</td>
</tr>
<tr>
<td>1998</td>
<td>56.6 (50.1-61.4)</td>
<td>49,000</td>
<td>40.0 (35.7-44.4)</td>
<td>39,000</td>
<td>47.6 (44.6-50.6)</td>
<td>88,000</td>
</tr>
<tr>
<td>2002</td>
<td>43.4 (36.4-50.5)</td>
<td>39,000</td>
<td>26.3 (21.1-31.5)</td>
<td>26,000</td>
<td>34.5 (30.1-38.9)</td>
<td>65,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Males (95% CI)</th>
<th>Males (est. no.)</th>
<th>Females (95% CI)</th>
<th>Females (est. no.)</th>
<th>Persons (95% CI)</th>
<th>Persons (est. no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>50.7 (43.9-57.2)</td>
<td>1,174,000</td>
<td>34.1 (27.2-40.5)</td>
<td>817,000</td>
<td>42.3 (34.3-50.3)</td>
<td>1,990,000</td>
</tr>
<tr>
<td>1998</td>
<td>50.8 (43.9-57.1)</td>
<td>1,140,000</td>
<td>32.6 (27.8-37.4)</td>
<td>835,000</td>
<td>43.7 (36.2-51.1)</td>
<td>1,965,000</td>
</tr>
<tr>
<td>2002</td>
<td>58.5 (52.4-64.6)</td>
<td>849,000</td>
<td>28.9 (24.3-33.4)</td>
<td>747,000</td>
<td>34.5 (33.0-35.9)</td>
<td>1,596,000</td>
</tr>
</tbody>
</table>


Note: Estimates are based on the following numbers of respondents: 1997 – 991 (NRAHS) and 17,141 (NSW); 1998 – 968 (NRAHS) and 16,627 (NSW); 2002 – 785 (NRAHS) and 12,475 (NSW).

Note: Questions used to define the 2002 indicator were: How often do you usually drink alcohol? On a day when you drink alcohol, how many standard drinks do you usually have? In the past four weeks have you had more than (4 if male/2 if female) drinks in a day? In the past four weeks how often have you had (11 or more if male/7 or more if female) drinks in a day? Questions used to define the 1997 and 1998 indicator were: How often do you have an alcoholic drink of any kind? On a day when you have alcoholic drinks, how many standard drinks do you usually have? On the last occasion that you had more than (4 if male/2 if female) drinks in a day, how many drinks did you actually have? The indicator includes respondents indicating any at-risk alcohol drinking behaviour, defined as one or more of the following: consuming alcohol every day, consuming on average more than (4 if male/2 if female) standard drinks, consuming more than 6 if male/4 if female on any one occasion or day.

Intra-Area Comparisons – by gender and time

Within the Northern Rivers, the data under Figure 47 indicate that, as with the overall NSW rates, significantly more males reported at-risk alcohol drinking at all time periods than Northern Rivers females.
Adequate Daily Fruit Intake

Area Comparisons – overall by gender and time

As shown in Figure 48, at the 2002 NSW Health Survey, 41% of Northern Rivers males and 56% of Northern Rivers females reported adequate daily fruit intakes, both of which were comparable to overall NSW rates. However, at the 1997 survey, significantly more Northern Rivers males reported adequate fruit intakes, compared to overall NSW males and, in 1998, significantly more Northern Rivers females reported adequate fruit intakes, compared to overall NSW females. While comparable proportions of Northern Rivers males reported adequate fruit intakes across all time periods, significantly more Northern Rivers females reported adequate fruit intakes in 1998 than in 1997.

Figure 48: Self-reported adequate daily fruit intakes among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)

<table>
<thead>
<tr>
<th>Area</th>
<th>Year</th>
<th>Males (95% CI)</th>
<th>Males (est. no.)</th>
<th>Females (95% CI)</th>
<th>Females (est. no.)</th>
<th>Persons (95% CI)</th>
<th>Persons (est. no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nthm Rivers AHS</td>
<td>1997</td>
<td>51.3 (46.4-56.5)</td>
<td>49,000</td>
<td>51.5 (46.9-56.0)</td>
<td>49,000</td>
<td>51.4 (47.9-54.9)</td>
<td>97,000</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>42.1 (36.6-47.5)</td>
<td>40,000</td>
<td>61.7 (57.4-66.0)</td>
<td>60,000</td>
<td>52.1 (48.5-55.5)</td>
<td>106,000</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>41.2 (34.2-48.3)</td>
<td>59,000</td>
<td>55.4 (50.6-60.1)</td>
<td>59,000</td>
<td>48.7 (44.2-53.2)</td>
<td>95,000</td>
</tr>
<tr>
<td>NSW</td>
<td>1997</td>
<td>37.8 (36.4-39.2)</td>
<td>695,000</td>
<td>51.1 (49.8-52.4)</td>
<td>1,241,000</td>
<td>44.5 (43.6-45.5)</td>
<td>2,136,000</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>38.0 (36.5-39.5)</td>
<td>909,000</td>
<td>49.2 (47.9-50.5)</td>
<td>1,205,000</td>
<td>43.7 (42.7-44.7)</td>
<td>2,113,000</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>40.2 (38.2-42.1)</td>
<td>975,000</td>
<td>50.9 (48.5-51.7)</td>
<td>1,256,000</td>
<td>45.2 (43.9-46.5)</td>
<td>2,231,000</td>
</tr>
</tbody>
</table>


Note: Estimates are based on the following numbers of respondents: 1997 – 999 (NRAHS) and 17,481 (NSW); 1998 – 1004 (NRAHS) and 17,393 (NSW); 2002 – 798 (NRAHS) and 12,534 (NSW).

Note: The question used to define the indicator was: How many serves of fruit do you usually eat each day? The indicator includes respondents reporting meeting the Australian Healthy Eating Guidelines’ recommendations of three serves for people aged 16 to 18 years, and two serves for people aged 19 years and over. One serve is equivalent to one medium piece or 2 small pieces of fruit.

Intra-Area Comparisons – by LGA and SES

Unfortunately, the NSW Health Surveys to date have samples too small to allow meaningful comparisons between the LGAs of the Northern Rivers. The EPAG will be exploring the feasibility of collecting additional Northern Rivers data in future surveys to allow such comparisons.
Adequate Daily Vegetable Intake

Area Comparisons – overall by gender and time

As shown in Figure 49, at the 2002 NSW Health Survey, 41% of Northern Rivers males and 56% of Northern Rivers females reported adequate daily vegetable intakes, which was comparable to the overall NSW male rate but significantly higher than the overall NSW female rate. Northern Rivers males’ reported vegetable intakes were significantly higher than overall NSW males at the 1997 survey but became comparable at the 1998 survey. Conversely, Northern Rivers females’ reported vegetable intakes were comparable to overall NSW females at the 1997 survey but became significantly higher at the 1998 survey. While Northern Rivers males’ reported vegetable intakes were similar across all time periods, Northern Rivers females reported significantly higher vegetable intakes in 2002 than they did 1997.

Figure 49: Self-reported adequate daily vegetable intakes among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)

<table>
<thead>
<tr>
<th>Year</th>
<th>Males</th>
<th>Females</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(95% CI)</td>
<td>(95% CI)</td>
<td>(95% CI)</td>
</tr>
<tr>
<td></td>
<td>(est. no.)</td>
<td>(est. no.)</td>
<td>(est. no.)</td>
</tr>
<tr>
<td>1997</td>
<td>19.4 (15.4-23.3)</td>
<td>22.5 (16.8-28.2)</td>
<td>21.9 (16.2-23.7)</td>
</tr>
<tr>
<td>1998</td>
<td>14.1 (10.4-17.8)</td>
<td>28.7 (24.8-32.7)</td>
<td>21.5 (16.8-23.5)</td>
</tr>
<tr>
<td>2002</td>
<td>13.8 (10.1-17.5)</td>
<td>33.2 (27.8-38.5)</td>
<td>23.7 (20.3-27.1)</td>
</tr>
</tbody>
</table>

Note: Estimates are based on the following numbers of respondents: 1997 – 999 (NRAHS) and 17,455 (NSW); 1998 – 1003 (NRAHS) and 17,365 (NSW); 2002 – 786 (NRAHS) and 12,486 (NSW).

Note: The question used to define the indicator was: How many serves of vegetables do you usually eat each day? The indicator includes respondents reporting meeting the Australian Healthy Eating Guidelines’ recommendations of four serves/day for females of any age and for males aged 16-18 years or over 60 years, and five serves/day for males aged 19-60 years. One serve is equivalent to 1/2 cup of cooked vegetables or 1 cup of salad vegetables.

Intra-Area Comparisons – by gender and time

Within the Northern Rivers, the data under Figure 49 indicate that, although comparable at the 1997 survey, significantly more females than males reported adequate daily vegetable intakes at the 1998 and 2002 surveys. This is similar to the overall NSW figures, where females reported significantly higher vegetable intakes than males at all time periods.
Adequate Physical Activity

Area Comparisons – overall by gender and time

As shown in Figure 50, at both the 1998 and 2002 NSW Health Surveys, slightly over half of Northern Rivers males and slightly under half of Northern Rivers females reported adequate physical activity levels, which were both comparable to the overall NSW rates. No significant changes in adequacy of physical activity were seen between the two surveys, either within the Northern Rivers or overall NSW.

Figure 50: Self-reported adequate physical activity among Northern Rivers and NSW residents aged 16 years and over (1998 & 2002)

<table>
<thead>
<tr>
<th>Area</th>
<th>Year</th>
<th>Males (95% CI)</th>
<th>Males (est. no.)</th>
<th>Females (95% CI)</th>
<th>Females (est. no.)</th>
<th>Persons (95% CI)</th>
<th>Persons (est. no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nthrm Rivers AHS</td>
<td>1997</td>
<td>53.6 (46.0-60.9)</td>
<td>50,000</td>
<td>46.0 (41.6-50.4)</td>
<td>45,000</td>
<td>49.7 (46.1-53.2)</td>
<td>96,000</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>58.1 (49.3-62.6)</td>
<td>53,000</td>
<td>45.5 (42.6-51.3)</td>
<td>45,000</td>
<td>49.7 (46.2-55.2)</td>
<td>99,000</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSW</td>
<td>1997</td>
<td>53.1 (51.5-54.6)</td>
<td>1,272,000</td>
<td>43.3 (42.0-44.6)</td>
<td>1,085,000</td>
<td>48.1 (47.4-49.1)</td>
<td>2,337,000</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>50.5 (48.5-52.4)</td>
<td>1,236,000</td>
<td>43.0 (41.3-44.6)</td>
<td>1,085,000</td>
<td>46.7 (45.4-48.0)</td>
<td>2,321,000</td>
</tr>
</tbody>
</table>

Source: NSW Health Survey, 1998 & 2002 (HOIST)

Note: Estimates are based on the following numbers of respondents: 1998 – 1011 (NRAHS) and 17,452 (NSW); 2002 – 799 (NRAHS) and 12,622 (NSW).

Note: The questions used to define the indicator were: “In the last week, how many times have you walked continuously for at least 10 minutes for recreation or exercise or to get to or from places?”, “What do you estimate was the total time you spent walking in this way in the last week?”, “In the last week, how many times did you do any vigorous physical activity which made you breathe harder or puff and pant?”, “What do you estimate was the total time you spent doing this vigorous physical activity in the last week?”, “In the last week, how many times did you do any other more moderate physical activity that you haven’t already mentioned?”, “What do you estimate was the total time that you spent doing these activities in the last week?”. The indicator includes respondents reporting meeting the recommendations for adequate physical activity, being a total of 150 minutes per week on 5 separate occasions – total minutes were calculated by adding minutes in the last week spent walking (continuously for at least 10 minutes), minutes doing moderate physical activity, plus 2 x minutes doing vigorous physical activity.

Intra-Area Comparisons – by gender and time

Within the Northern Rivers, the data under Figure 50 indicate that males and females reported comparable rates of adequate physical activity at both the 1998 and 2002 surveys. This is contrary to the overall NSW figures, where males reported significantly higher physical activity adequacy than females each time.
**Additional Indicators to be Explored**

Future phases of the *Northern Rivers Equity Profile* will include data, with both Area and Intra-Area comparisons, regarding:

- rates of obesity and overweight; and
- the use of sun protection behaviours.

In addition, future phases of the *Northern Rivers Equity Profile* will involve the EPAG exploring the feasibility of collecting data, allowing both Area and Intra-Area comparisons, regarding:

- rates of colorectal cancer screening; and
- rates of illicit drug use.

**Biological Determinants**

**Rationale for Inclusion**

As discussed earlier, age, gender and genetic endowment are fundamental determinants of health, influencing how long people live and whether or not they are affected by particular diseases or health challenges. For a more detailed rationale, including supporting references, please refer to the complementary literature review prepared by the Northern Rivers Area Health Promotion Unit\(^3\)\(^1\).

**Age and Gender**

The age and gender distribution within our Northern Rivers population is discussed in detail in the *Demography of the Northern Rivers Region* section.
Psychosocial Determinants

Rationale for Inclusion

As discussed earlier, psychosocial determinants, which are strongly influenced by early childhood experiences and strongly correlated with socioeconomic status, are key factors influencing health outcomes – both directly and indirectly, by interacting with many of the other determinants. For a more detailed rationale, including supporting references, please refer to the complementary literature review prepared by the Northern Rivers Area Health Promotion Unit31.

Psychological Distress

Area Comparisons – overall by gender and time

As shown in Figure 51, at the 1997, 1998 and 2002 NSW Health Surveys, about a tenth of Northern Rivers males and females reported high or very high levels of psychological distress, which were all comparable to the overall NSW rates. No significant changes in psychological distress were seen between any of the time periods, either within the Northern Rivers or overall NSW.

Figure 51: Self-reported psychological distress among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)


Note: Estimates are based on the following numbers of respondents: 1997 - 998 (Northern Rivers AHS) and 17360 (NSW); 1998 – 1007 (NRAHS) and 17,375 (NSW); 2002 – 795 (NRAHS) and 12,528 (NSW).

Note: The questions used to define the indicator were: the K10, which is a 10-item questionnaire about levels of anxiety and depressive symptoms in the most recent four-week period33-35. K10 scores for respondents aged 65 years and over were derived using 6 questions from the K10 questionnaire. The indicator includes those with a Kessler 10 (K10) score of 22 or above.
Intra-Area Comparisons – by gender and time

Within the Northern Rivers, the data under Figure 5.1 indicate that males and females reported comparable rates of psychological distress at all time periods. This is contrary to the overall NSW figures, where females reported significantly higher levels of psychological distress than males at both time periods.

Additional Indicators to be Explored

Future phases of the Northern Rivers Equity Profile will include data, with both Area and Intra-Area comparisons, regarding:

- population anxiety levels;
- population depression levels;
- the prevalence of mental disorders; and
- rates of suicide and self-inflicted injuries.

In addition, future phases of the Northern Rivers Equity Profile will involve the EPAG exploring the feasibility of collecting data, allowing both Area and Intra-Area comparisons, regarding:

- rates of happiness, or satisfaction with life;
- rates of self-esteem among residents; and
- rates of perceived control over their own lives among residents.
Access Determinants

Rationale for Inclusion
As discussed earlier, appropriate and reliable access to population based services and facilities such as health, education, social, transport and recreation is essential for protecting and promoting health. Health services, especially those that focus on maintaining and promoting health, are designed to prevent disease and injury and so contribute greatly to improving population health. Communities most at risk of ill health tend to access these types of preventive services less than lower risk communities. For a more detailed rationale, including supporting references, please refer to the complementary literature review prepared by the Northern Rivers Area Health Promotion Unit31.

Difficulties Getting Health Care

Area Comparisons – overall by gender and time
As shown in Figure 52, the Northern Rivers 2002 rates of difficulties accessing health care when needed are comparable to overall NSW, for both men and women, with between 9% and 18% of people reporting difficulties. This was different for the 1997 and 1998 figures, which showed Northern Rivers women to have significantly more difficulty accessing health care than overall NSW women. Unfortunately, the current comparability is not a result of access improving within the Northern Rivers – rather, it is the result of significantly worsening accessibility in overall NSW.

Figure 52: Rates of difficulty accessing health care among residents aged 16 years and over, Northern Rivers and NSW (1997, 1998 & 2002)

<table>
<thead>
<tr>
<th>Year</th>
<th>Area</th>
<th>Males (95% CI)</th>
<th>Males (est. no.)</th>
<th>Females (95% CI)</th>
<th>Females (est. no.)</th>
<th>Persons (95% CI)</th>
<th>Persons (est. no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Northern Rivers</td>
<td>12.5 (8.9-16.0)</td>
<td>11,000</td>
<td>18.4 (14.8-22.0)</td>
<td>17,600</td>
<td>15.5 (13.0-18.0)</td>
<td>28,600</td>
</tr>
<tr>
<td></td>
<td>NSW</td>
<td>11.5 (8.3-14.7)</td>
<td>10,000</td>
<td>16.6 (13.5-19.7)</td>
<td>16,000</td>
<td>14.1 (11.9-16.4)</td>
<td>27,000</td>
</tr>
<tr>
<td>1997</td>
<td>Fighting River</td>
<td>13.2 (8.7-17.6)</td>
<td>12,000</td>
<td>17.8 (13.2-22.4)</td>
<td>17,000</td>
<td>15.5 (12.3-18.8)</td>
<td>28,000</td>
</tr>
<tr>
<td>2002</td>
<td>Fighting River</td>
<td>13.2 (8.7-17.6)</td>
<td>12,000</td>
<td>17.8 (13.2-22.4)</td>
<td>17,000</td>
<td>15.5 (12.3-18.8)</td>
<td>28,000</td>
</tr>
</tbody>
</table>

Note: Estimates are based on the following numbers of respondents: 1997 - 944 (NRAHS) and 16,968 (NSW); 1998 - 989 (NRAHS) and 17,112 (NSW); 2002 - 746 (NRAHS) and 12,017 (NSW).
Note: The question used was: Do you have any difficulties getting health care when you need it? The indicator includes those saying Yes and excludes those who said they do not need health care.
**Intra-Area Comparisons – gender by time**

Within the Northern Rivers, the data under Figure 52 indicate that males and females had comparable rates of accessibility to health care at all time periods.

**Quality of Hospital Care**

**Area Comparisons – overall by gender and time**

As shown in Figure 53, the Northern Rivers residents’ perceptions of the quality of hospital care were comparable to overall NSW – for both men and women and at all time periods. Overall, at least 90% of people rated their hospital care as excellent, very good or good.

**Figure 53:** Proportion of residents, aged 16 years and over, rating hospital care as excellent, very good or good, Northern Rivers and NSW (1997, 1998 & 2002)

<table>
<thead>
<tr>
<th>Area</th>
<th>Year</th>
<th>Males (95% CI)</th>
<th>Males (est. no.)</th>
<th>Females (95% CI)</th>
<th>Females (est. no.)</th>
<th>Persons (95% CI)</th>
<th>Persons (est. no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Rivers AHS</td>
<td>1997</td>
<td>90.3 (82.4-98.2)</td>
<td>11,000</td>
<td>93.0 (87.0-98.5)</td>
<td>12,000</td>
<td>91.7 (86.9-96.6)</td>
<td>22,000</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>93.5 (86.8-100)</td>
<td>8,000</td>
<td>93.3 (88.4-98.3)</td>
<td>16,000</td>
<td>93.4 (89.4-97.3)</td>
<td>24,000</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>88.9 (76.4-100)</td>
<td>11,000</td>
<td>94.6 (88.2-100)</td>
<td>16,000</td>
<td>92.2 (85.6-98.7)</td>
<td>28,000</td>
</tr>
<tr>
<td>NSW</td>
<td>1997</td>
<td>90.3 (87.9-92.7)</td>
<td>242,000</td>
<td>89.9 (87.9-91.5)</td>
<td>320,000</td>
<td>90.1 (88.5-91.6)</td>
<td>562,000</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>92.5 (90.3-94.6)</td>
<td>254,000</td>
<td>90.0 (88.1-94.9)</td>
<td>340,000</td>
<td>91.0 (89.6-92.5)</td>
<td>594,000</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>93.4 (90.6-96.2)</td>
<td>256,000</td>
<td>89.3 (86.4-92.2)</td>
<td>368,000</td>
<td>91.0 (89.3-92.6)</td>
<td>624,000</td>
</tr>
</tbody>
</table>

**Source:** NSW Health Survey, 1997, 1998 & 2002 (HOIST)

**Note:** Estimates are based on the following numbers of respondents: 1997 - 142 (NRAHS) and 2551 (NSW); 1998 - 154 (NRAHS) and 2659 (NSW); 2002 - 124 (NRAHS) and 1927 (NSW).

**Note:** The question used was "Overall, what do you think of the care you received at this hospital? Was it excellent, very good, good, fair or poor". The indicator includes those attending a hospital in the last 12 months.

**Intra-Area Comparisons – gender by time**

Within the Northern Rivers, the data under Figure 53 indicate that males and females were comparably satisfied with the quality of their emergency department care at all time periods.
Quality of Emergency Department Care

*Area Comparisons – overall by gender and time*

As shown in Figure 54, Northern Rivers residents’ 2002 perceptions of the quality of emergency department care were comparable to overall NSW – for both men and women. Overall, at least 70% of people rated their emergency department care as excellent, very good or good. Looking back, Northern Rivers men’s perceptions have always been comparable to overall NSW men, whereas Northern Rivers women were significantly happier, than overall NSW women, with their emergency department care in 1998.

**Figure 54**: Proportion of residents, aged 16 years and over, rating emergency department care as excellent, very good or good, Northern Rivers and NSW (1997, 1998 & 2002)

<table>
<thead>
<tr>
<th>Area</th>
<th>Year</th>
<th>Males (95% CI)</th>
<th>Males (est. no.)</th>
<th>Females (95% CI)</th>
<th>Females (est. no.)</th>
<th>Persons (95% CI)</th>
<th>Persons (est. no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Rivers AHS</td>
<td>1997</td>
<td>82.8 (73.9-91.8)</td>
<td>16,000</td>
<td>88.2 (80.6-95.8)</td>
<td>11,000</td>
<td>85.0 (78.7-91.2)</td>
<td>27,000</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>86.6 (81.3-91.6)</td>
<td>17,000</td>
<td>91.6 (84.9-98.2)</td>
<td>13,000</td>
<td>89.9 (84.8-95.0)</td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>69.4 (51.6-87.2)</td>
<td>13,000</td>
<td>86.8 (69.5-91.6)</td>
<td>16,000</td>
<td>75.3 (64.7-85.8)</td>
<td>26,000</td>
</tr>
<tr>
<td>NSW</td>
<td>1997</td>
<td>80.5 (77.7-83.4)</td>
<td>297,000</td>
<td>79.9 (77.6-82.2)</td>
<td>239,000</td>
<td>80.3 (78.2-82.3)</td>
<td>527,000</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>82.6 (79.5-85.6)</td>
<td>272,000</td>
<td>78.6 (75.7-81.5)</td>
<td>232,000</td>
<td>80.7 (78.6-82.8)</td>
<td>504,000</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>79.8 (75.6-83.7)</td>
<td>284,000</td>
<td>73.0 (69.1-76.9)</td>
<td>253,000</td>
<td>76.5 (73.7-79.2)</td>
<td>537,000</td>
</tr>
</tbody>
</table>


*Note*: Estimates are based on the following numbers of respondents: 1997 - 164 (NRAHS) and 2727 (NSW); 1998 - 176 (NRAHS) and 2581 (NSW); 2002 - 139 (NRAHS) and 2025 (NSW).

*Note*: The question used was "Overall, what do you think of the care you received at this emergency department? Was it excellent, very good, good, fair or poor". The indicator includes those attending an emergency department in the last 12 months.

**Intra-Area Comparisons – gender by time**

Within the Northern Rivers, the data under Figure 54 indicate that males and females were comparably satisfied with the quality of their emergency department care at all time periods.
Additional Indicators to be Explored

Future phases of the Northern Rivers Equity Profile will involve the EPAG exploring the feasibility of collecting data, allowing both Area and Intra-Area comparisons, regarding:

- availability of various health professionals (ie: hospital-based doctors, general practitioners, nurses, midwives, physiotherapists, speech therapists, occupational therapists, psychologists, dentists, pharmacists, social workers, etc);
- health care expenditure per capita, both overall and in major sub-groups (ie: inpatient care, outpatient care, ancillary care, home care, hospitals, community health services, etc);
- the length of waiting lists for surgical procedures, both overall and for major operations (ie: hip replacements, angioplasty, cataract surgery, etc);
- the length of waiting lists for dental procedures, both overall and for major procedures (ie: check-up, cavity fillings, extractions, denture fittings, etc);
- the number of bulk-billing general practitioners per capita;
- the number of female general practitioners per capita;
- the mean cost of a general practitioner consultation;
- the proportion of the population with private health insurance (hospital and ancillary);
- the mean distance travelled to attend a general practitioner; and
- the mean distance travelled to attend an Emergency Department.
Environmental Determinants

Rationale for Inclusion

As discussed earlier, factors in the natural environment, such as soil, water and air quality, and factors in the built environment such as housing, workplace safety, community and road design affect health outcomes – again, both directly and indirectly, by interacting with many of the other determinants. For a more detailed rationale, including supporting references, please refer to the complementary literature review prepared by the Northern Rivers Area Health Promotion Unit.\(^{31}\)

Smokefree Households

Area Comparisons – overall by gender and time

As shown in Figure 55, two thirds to three quarters of Northern Rivers residents reported living in smokefree households in each NSW Health Survey. For females, the Northern Rivers rates were comparable to the overall NSW rates at each survey and rates in the 1998 and 2002 surveys were significantly higher than at the 1997 survey. For males, the Northern Rivers rates were comparable to the overall NSW rates at the 1997 and 1998 survey but were significantly higher than overall NSW at the 2002 survey. Although rates of overall NSW males living in smokefree households increased significantly at each survey, rates for Northern Rivers males were comparable at all time periods.

Figure 55: Self-reported smokefree household status among Northern Rivers and NSW residents aged 16 years and over (1997, 1998 & 2002)

<table>
<thead>
<tr>
<th>Year</th>
<th>Area</th>
<th>Males (95% CI)</th>
<th>Males (est. no.)</th>
<th>Females (95% CI)</th>
<th>Females (est. no.)</th>
<th>Persons (95% CI)</th>
<th>Persons (est. no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>Nthrn Rivers AHS</td>
<td>67.4 (62.5-72.4)</td>
<td>63,000</td>
<td>67.3 (63.0-71.6)</td>
<td>65,000</td>
<td>67.4 (64.1-70.7)</td>
<td>128,000</td>
</tr>
<tr>
<td>1998</td>
<td>Nthrn Rivers AHS</td>
<td>76.7 (75.3-78.1)</td>
<td>67,000</td>
<td>75.7 (72.9-78.4)</td>
<td>74,000</td>
<td>75.2 (72.9-77.3)</td>
<td>141,000</td>
</tr>
<tr>
<td>2002</td>
<td>Nthrn Rivers AHS</td>
<td>71.3 (65.6-77.7)</td>
<td>65,000</td>
<td>78.9 (74.2-83.7)</td>
<td>75,000</td>
<td>75.2 (71.2-79.2)</td>
<td>146,000</td>
</tr>
<tr>
<td>1997</td>
<td>NSW</td>
<td>66.4 (61.9-70.7)</td>
<td>1,641,000</td>
<td>70.1 (69.0-71.3)</td>
<td>1,704,000</td>
<td>69.9 (68.0-71.6)</td>
<td>3,319,000</td>
</tr>
<tr>
<td>1998</td>
<td>NSW</td>
<td>73.2 (71.9-74.6)</td>
<td>1,755,000</td>
<td>73.2 (72.0-74.3)</td>
<td>1,798,000</td>
<td>73.2 (72.2-74.1)</td>
<td>3,553,000</td>
</tr>
<tr>
<td>2002</td>
<td>NSW</td>
<td>79.5 (78.0-81.1)</td>
<td>1,845,000</td>
<td>82.4 (81.2-83.7)</td>
<td>2,078,000</td>
<td>81.0 (80.0-82.0)</td>
<td>4,023,000</td>
</tr>
</tbody>
</table>


Note: Estimates are based on the following numbers of respondents: 1997 – 1000 (NRAHS) and 17,495 (NSW); 1998 – 1010 (NRAHS) and 17,451 (NSW); 2002 – 799 (NRAHS) and 12,610 (NSW).

Note: The question used to define the indicator was: “Which of the following best describes your home situation? My home is smokefree (includes smoking is allowed outside only), people occasionally smoke in the house, and people frequently smoke in the house”. The indicator includes households with respondents indicating their home was smokefree.
**Intra-Area Comparisons – by gender and time**

Within the Northern Rivers, the data under Figure 55 indicate that comparable proportions (67 – 79%) of males and females reported living in smokefree households at all time periods.

**Additional Indicators to be Explored**

Future phases of the *Northern Rivers Equity Profile* will involve the EPAG exploring the feasibility of collecting data, allowing both Area and Intra-Area comparisons, regarding:

- the proportion of households supplied from a public water supply;
- the proportion of households served by regular waste collection services;
- the proportion of households served by regular recycling services;
- the proportion of households connected to a sewer or other approved sanitation system;
- the proportion of households with adequate space and facilities for their number of residents;
- the proportion of council planning and development applications which include community involvement in decision-making;
- the proportion of communities with safe and compressive pedestrian and bicycle pathways;
- the proportion of public recreational spaces with adequate shade availability;
- the proportion of communities with appropriate buffer zones to reduce conflicts/disturbances between residential zones and urban/rural/public utility interfaces; and
- the proportion of residents with adequate knowledge of safe food hygiene practices.
Socioeconomic Determinants

Why is Jason in hospital? *Because he has a bad infection in his leg*

But why does he have an infection? *Because he has a cut on his leg and it got infected*

But why does he have a cut on his leg? *Because he was playing in the local tip near his house and there was some sharp, jagged steel there and he fell on it*

But why was he playing in the tip? *Because he lives in a poor neighbourhood. A lot of kids play there because there is no where else to play and there is no one to supervise them*

But why does he live in that neighbourhood? *Because his parents cannot afford to live anywhere else*

But why can’t his parents afford a nicer place to live? *Because his Dad is unemployed and his Mum is always sick*

But why is his Dad unemployed? *Because he doesn’t have much education and he can’t find a job*

But why………?

Health Canada (2001)28

Rationale for Inclusion

As discussed earlier, socioeconomic status can be measured in a variety of ways but all socioeconomic indicators are consistently associated with health outcomes, even when age, gender and other traditional risk factors are taken into account. As demonstrated by the quote above, socioeconomic status can influence an individual’s health outcomes both directly and indirectly. For a more detailed rationale, including supporting references, please refer to the complementary literature review prepared by the Northern Rivers Area Health Promotion Unit31.
Housing Tenure

Area Comparisons – overall

At the 2001 Census, 69% of Northern Rivers households were living in homes either fully owned or in the process of being purchased, whereas 28% were living in rented homes. As shown in Figure 56, these rates were very comparable to rates for overall NSW, as well as most other Area Health Services.

Figure 56: Housing tenure, by Area Health Service (2001)

Source: ABS 2001 Census (HOIST)
Unemployment

Area Comparisons – overall by gender

As shown in Figure 57, at the 1996 Census, the Northern Rivers had the second highest rates of unemployment among both males and females, at 17% and 13.5% respectively. These rates were almost double the corresponding rates for overall NSW but, unfortunately, confidence intervals for the proportions in Figure 57 are not currently available – so future phases of the Northern Rivers Equity Profile will explore whether our unemployment rates are significantly higher than the overall NSW rates.

Figure 57: Unemployment rates, by Area Health Service (1996)

Intra-Area Comparisons – by gender

As confidence intervals for the proportions in Figure 57 are not currently available, future phases of the Northern Rivers Equity Profile will explore whether the difference in unemployment rates between male and female Northern Rivers residents is significant.
Government Financial Assistance

Area Comparisons – overall

As shown in Figure 58, in 2001, Northern Rivers residents had higher rates of most forms of government financial assistance than either rural NSW or overall NSW. The only exception was the aged pension which was received by about two thirds of those eligible in all three geographic groups. Unfortunately, confidence intervals for the proportions in Figure 58 are not currently available – so future phases of the Northern Rivers Equity Profile will explore whether our rates of each type of government financial assistance are significantly higher than the overall NSW and rural NSW rates.

Figure 58: Rates of government financial assistance, by region (March 2001)

Source: Centrelink, Canberra (unpublished data)

Note: Unemployment benefits include Youth Allowance, Newstart Allowance and Mature Age Allowance – eligibility = females aged 15 – 61.5 years and males aged 15 – 64 years; Family assistance benefits include Family tax benefit parts A and B, Double orphan pension and Parenting payments (single and partnered) – eligibility = families meeting relevant income and asset tests; Aged pension – eligibility = females aged 61.5+ years and males aged 65+ years; Disability benefits include disability support pension, sickness allowance, mobility allowance and carer allowance – eligibility = females aged 15 – 61.5 years and males aged 15 – 64 years.
No Post-School Education

Area Comparisons – overall by gender

As shown in Figure 59, at the 1996 Census, 56% of male and 66% of female Northern Rivers residents reported having no post-school education. Unfortunately, confidence intervals for the proportions in Figure 59 are not currently available – so future phases of the Northern Rivers Equity Profile will explore whether our rates of no post-school education are significantly higher than the overall NSW rates.

Figure 59: Proportion of NSW residents, aged 15 years and over, reporting no post-school education (1996)

Source: ABS 1996 Census Basic Community Profile (HOIST)

Note: Includes all NSW residents aged 15 years and over reporting no basic or skilled vocational qualifications, as well as no tertiary diplomas or degrees.

Intra-Area Comparisons – by gender

As confidence intervals for the proportions in Figure 59 are not currently available, future phases of the Northern Rivers Equity Profile will explore whether the difference in post-school education rates between male and female Northern Rivers residents is significant.
Additional Indicators to be Explored

Future phases of the *Northern Rivers Equity Profile* will include data, with both Area and Intra-Area comparisons, regarding:

- individuals’ weekly incomes;
- households’ weekly incomes;
- landlord types (public or private);
- residents’ occupational status; and
- the proportion of residents completing Year 12, or equivalent, level of education.

In addition, future phases of the *Northern Rivers Equity Profile* will involve the EPAG exploring the feasibility of collecting data, allowing both Area and Intra-Area comparisons, regarding:

- the proportion of households’ weekly incomes spent on shelter (including mortgage, rent, rates, water, council services, insurance, etc);
- the proportion of households’ weekly incomes spent on goods and services (including food, clothing, electricity, gas, etc);
- the proportion of households’ running out of money for food;
- labour force participation rates (re: full-time, part-time and casual employment);
- adult literacy skills; and
- adult numeracy skills.

Community & Social Context Determinants

Rationale for Inclusion

As discussed earlier, societal values and rules affect the health and well being of individuals and populations. Risks to health are reduced when there is social stability, recognition of diversity, safety, good human relationships and cohesive communities. Support from family, friends and communities, and the quality of these supports, determine how people will handle difficult circumstances and, therefore, the impact these circumstances will have on their overall health outcomes. Family breakdown can also have adverse social and health consequences for children and their parents. For a more detailed rationale, including supporting references, please refer to the complementary literature review prepared by the Northern Rivers Area Health Promotion Unit.31.
Family Structure

Area Comparisons – overall

As shown in Figure 60, at the 2001 Census, of all families with dependent children in the Northern Rivers, 14% were single parent families, the highest rate in NSW. Similarly, the Northern Rivers had the second lowest proportion of couple families, at 33%. Unfortunately, confidence intervals for the proportions in Figure 60 are not currently available – so future phases of the Northern Rivers Equity Profile will explore whether our rates of single parent families and couple families are significantly different to the overall NSW rates.

Figure 60: Structure of families with dependent children, by Area Health Service (2001)

<table>
<thead>
<tr>
<th>Number</th>
<th>Couple families with dependent children</th>
<th>One parent families with dependent children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Health Area</td>
<td>Central Sydney</td>
</tr>
<tr>
<td>40,582</td>
<td>6.7</td>
<td>9.6</td>
</tr>
<tr>
<td>79,882</td>
<td>40.8</td>
<td>35.1</td>
</tr>
<tr>
<td>67,257</td>
<td>35.1</td>
<td>36.9</td>
</tr>
<tr>
<td>89,583</td>
<td>44.4</td>
<td>35.1</td>
</tr>
<tr>
<td>78,449</td>
<td>44.1</td>
<td>35.1</td>
</tr>
<tr>
<td>39,559</td>
<td>43.6</td>
<td>35.1</td>
</tr>
<tr>
<td>27,692</td>
<td>35.5</td>
<td>35.1</td>
</tr>
<tr>
<td>62,389</td>
<td>36.6</td>
<td>35.1</td>
</tr>
<tr>
<td>34,060</td>
<td>36.6</td>
<td>35.1</td>
</tr>
<tr>
<td>42,27</td>
<td>33.2</td>
<td>33.2</td>
</tr>
<tr>
<td>37,18</td>
<td>33.2</td>
<td>33.2</td>
</tr>
<tr>
<td>16,975</td>
<td>37.2</td>
<td>35.1</td>
</tr>
<tr>
<td>10,206</td>
<td>38.4</td>
<td>35.1</td>
</tr>
<tr>
<td>4,113</td>
<td>34.6</td>
<td>35.1</td>
</tr>
<tr>
<td>16,513</td>
<td>39.8</td>
<td>35.1</td>
</tr>
<tr>
<td>20,687</td>
<td>39.0</td>
<td>35.1</td>
</tr>
<tr>
<td>17,949</td>
<td>39.0</td>
<td>35.1</td>
</tr>
<tr>
<td>642,393</td>
<td>38.8</td>
<td>35.1</td>
</tr>
</tbody>
</table>

Source: ABS 2001 Census Basic Community Profile (HOIST)

Note: Dependent children are family members under 15 years and those aged 15-24 years attending an educational institution full-time.
Crime Rates – Assaults

Area Comparisons – overall

As shown in Figure 61, 11 per 100,000 Northern Rivers residents reported being assaulted during 2001. Unfortunately, confidence intervals for the proportions in Figure 61 are not currently available – so future phases of the Northern Rivers Equity Profile will explore whether our assault rate is significantly different to the overall NSW and rural NSW rates.

Figure 61: Reported assaults and thefts/robberies in NSW, by Area Health Service (2001)


Note: The counting units are recorded criminal incidents, which underestimate the true rates – as a large number of such offences are not reported.
**Intra-Area Comparisons – LGA by time**

As shown in Figure 62, rates of assaults, between 2000 and 2002, varied throughout the LGAs within the Northern Rivers. Unfortunately, confidence intervals for the proportions in Figure 62 are not currently available – so future phases of the *Northern Rivers Equity Profile* will explore whether any of these differences are significantly different to our overall Northern Rivers rates.

**Figure 62: Northern Rivers recorded assaults, by LGA (2000-2002)**

![Graph showing rates of assaults by LGA (2000-2002)]


**Note:** The counting units are recorded criminal incidents, which underestimate the true rates – as a large number of such offences are not reported.

**Intra-Area Comparisons – SES by time**

Figure 62 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and assault rates.
Crime Rates – Robbery

**Area Comparisons – overall**

As shown earlier in Figure 61, 53 per 100,000 Northern Rivers residents reported a theft or robbery during 2001. Unfortunately, confidence intervals for the proportions in Figure 61 are not currently available – so future phases of the *Northern Rivers Equity Profile* will explore whether our theft / robbery rate is significantly different to the overall NSW and rural NSW rates.

**Intra-Area Comparisons – LGA by time**

As shown in Figure 63, rates of robbery, between 2000 and 2002, varied throughout the LGAs within the Northern Rivers. Unfortunately, confidence intervals for the proportions in Figure 63 are not currently available – so future phases of the *Northern Rivers Equity Profile* will explore whether any of these differences are significantly different to our overall Northern Rivers rates.


*Note:* The counting units are recorded criminal incidents, which underestimate the true rates – as a large number of such offences are not reported.
**Intra-Area Comparisons – SES by time**

Figure 63 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and robbery rates.

**Crime Rates – Theft**

**Area Comparisons – overall**

As shown earlier in Figure 61, 53 per 100,000 Northern Rivers residents reported a theft or robbery during 2001. Unfortunately, confidence intervals for the proportions in Figure 61 are not currently available – so future phases of the Northern Rivers Equity Profile will explore whether our theft / robbery rate is significantly different to the overall NSW and rural NSW rates.

**Intra-Area Comparisons – LGA by time**

As shown in Figure 64, rates of theft, between 2000 and 2002, varied throughout the LGAs within the Northern Rivers. Unfortunately, confidence intervals for the proportions in Figure 64 are not currently available – so future phases of the Northern Rivers Equity Profile will explore whether any of these differences are significantly different to our overall Northern Rivers rates.

**Figure 64: Northern Rivers recorded thefts, by LGA (2000-2002)**


Note: The counting units are recorded criminal incidents, which underestimate the true rates – as a large number of such offences are not reported.
Intra-Area Comparisons – SES by time

Figure 64 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and theft rates.

Crime Rates – Drug Offences

Intra-Area Comparisons – LGA by time

As shown in Figure 65, rates of drug offences, between 2000 and 2002, varied throughout the LGAs within the Northern Rivers. Unfortunately, confidence intervals for the proportions in Figure 65 are not currently available – so future phases of the Northern Rivers Equity Profile will explore whether any of these differences are significantly different to our overall Northern Rivers rates.

Figure 65: Northern Rivers recorded drug offences, by LGA (2000-2002)


Note: The counting units are recorded criminal incidents, which underestimate the true rates – as a large number of such offences are not reported.

Intra-Area Comparisons – SES by time

Figure 65 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and drug offence rates.
Crime Rates – Sexual Offences

Intra-Area Comparisons – LGA by time

As shown in Figure 66, rates of sexual offences, between 2000 and 2002, varied throughout the LGAs within the Northern Rivers. Unfortunately, confidence intervals for the proportions in Figure 66 are not currently available – so future phases of the Northern Rivers Equity Profile will explore whether any of these differences are significantly different to our overall Northern Rivers rates.

Figure 66: Northern Rivers recorded sexual offences, by LGA (2000-2002)


Note: The counting units are recorded criminal incidents, which underestimate the true rates – as a large number of such offences are not reported.

Intra-Area Comparisons – SES by time

Figure 66 shows the Northern Rivers LGAs in ascending socioeconomic order, according to their SEIFA IRSD score. There is no clearly observable relationship between SES and sexual offence rates.
**Additional Indicators to be Explored**

Future phases of the *Northern Rivers Equity Profile* will involve the EPAG exploring the feasibility of collecting data, allowing both Area and Intra-Area comparisons, regarding:

- levels of social capital among residents;
- the nature, size and quality of social networks among residents;
- levels of community trust among residents;
- perceptions of community safety among residents;
- levels of organisational membership (ie: religious, political, social, community, etc organisations) among residents;
- levels of voluntary contributions, in terms of time, as well as financial contributions, among residents; and
- the availability and quality of public recreational spaces and facilities.
Section 5 – Appendices
Appendix 1: Acknowledgments

The Northern Rivers Health Equity Working Group gratefully acknowledge the support and assistance of the following people in preparing this report:

Mark Bartlett  Interim HEWG committee member
Lisa Beasley  Interim HEWG Chair and committee member
Liz Hay  Interim HEWG committee member
Jane Lloyd  Original project coordinator
Lyndy McPhee  Layout and design assistance
Keith Park  Interim HEWG committee member
Sigrid Patterson  Data identification assistance
Peter Waples  Data assistance
Appendix 2: References Used throughout the Profile


Appendix 3: Glossary of Terms Used throughout the Profile

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aboriginal</td>
<td>In accordance with NSW Health Circular 2003/55, the term Aboriginal is used, throughout this report to represent people of Aboriginal and Islander descent. The Northern Rivers Area Health Service acknowledges the cultural differences between these groups and hope readers will understand the need to use a global term, especially in figures and tables.</td>
</tr>
<tr>
<td>Age-adjusted rate</td>
<td>Rate adjusted to take account of differences in age composition when rates for different populations are compared. See Appendix 5 for more information.</td>
</tr>
<tr>
<td>Area comparisons</td>
<td>A heading used throughout the Profile to indicate where Northern Rivers data are being compared against overall NSW or rural NSW data.</td>
</tr>
<tr>
<td>Avoidable mortality</td>
<td>Avoidable deaths are those occurring before age 75 years AND attributed to conditions considered preventable, or otherwise avoidable, through earlier intervention or action. See Appendix 5 for more information.</td>
</tr>
<tr>
<td>Confidence interval</td>
<td>The computed interval with a given probability (for example, 95 per cent) that the true value of a variable such as a rate, mean or proportion, is contained within the interval.</td>
</tr>
<tr>
<td>Employed persons</td>
<td>All civilians aged 15 years and over who worked for pay or profit or worked without pay in a family business or farm.</td>
</tr>
<tr>
<td>Fetal death</td>
<td>Delivery of a child who did not, at any time after delivery, breathe or show any other evidence of life, such as a heartbeat.</td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>Gonorrhoea is a sexually transmitted infection caused by the <em>Neisseria gonorrhoea</em> bacteria. Infection usually causes a purulent (pus-containing) discharge, with difficulty in urinating in males, and inflammation of the urethra or cervix, and later pelvic inflammatory disease and infertility in females. Throat and ano-rectal infections are also reported.</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Hepatitis A is caused by infection with the hepatitis A virus, and is transmitted by the faecal-oral route, most often in food or from person-to-person. Infections are usually without symptoms in small children, but commonly cause an unpleasant illness in adults, characterised by general malaise, fever, abdominal discomfort, dark urine, pale stools, and jaundice.</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Hepatitis B is caused by infection with hepatitis B virus, and is transmitted mainly by contact with an infected person's blood or sexual fluids, or from an infected woman to her baby. Many people have no symptoms when first infected, but some experience anorexia, malaise, abdominal discomfort, and jaundice. Laboratory notifications do not distinguish between people who were newly infected, and those who were infected in the past but who still carry the virus. New or active infections are notified by doctors and hospitals. For these reasons, the notification data presented here represent a mix of recent and past hepatitis B infection patterns.</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>Hepatitis C is caused by infection with the hepatitis C virus. The virus was first identified in 1989, and is transmitted mainly by contact with an infected person's blood. Until a screening test was introduced in 1990, many people were infected through blood transfusions. Today, most new infections are acquired through sharing contaminated needles and syringes. Most people have no symptoms when first infected, but some experience anorexia, malaise, abdominal discomfort, and jaundice</td>
</tr>
</tbody>
</table>
**Hospitalisation**  
A formal process whereby an inpatient attends and leaves a hospital or other area health service facility, after completing an episode of care. For example, a discharge to home, discharge to another hospital or nursing home or death.

**Illicit drugs**  
The following drugs used for non-medicinal purposes: speed, cocaine, sleeping pills or tranquillisers, marijuana, analgesics, heroin, petrol sniffing, other inhalants, hallucinogens, designer drugs, and injecting of any illegal drug.

**Incidence**  
The rate at which new cases of a disorder occur in the population: that is, the number of new cases in a specified period, divided by the population at risk of the disorder in that period.

**Index of Education and Occupation (EDUOCC)**  
The EDUOCC, a subset of SEIFA, combines variables relating to occupational classification, unemployment, early school leaving and lack of educational qualifications, with the reference score for the whole of Australia set to 1,000. See Appendix 5 for more information.

**Index of Relative Socioeconomic Disadvantage (IRSD)**  
The IRSD, a subset of SEIFA, combines variables relating to education, occupation, non-English speaking background, Aboriginality and households’ economic resources, with the reference score for the whole of Australia set to 1,000. See Appendix 5 for more information.

**Infant death**  
The death of a child before its first birthday.

**Intra-Area comparison**  
A heading used throughout the Profile to indicate where data are being compared between two, or more, population sub-groups within the Northern Rivers.

**K10 or Kessler 10**  
The Kessler 10 (K10) yields a global measure of “psychological distress” based on 10 questions about the level of anxiety and depressive symptoms in the most recent four-week period. An arbitrary cut-off level of 60 classifies about the same proportion of males and females as having high levels of psychological distress as that found in other population studies of anxiety and depression. See Appendix 5 for more information.

**Labour force**  
All persons aged 15 years and over who are employed and unemployed.

**Live birth**  
The birth of a child who after delivery, breathes or shows any other evidence of life, such as heartbeat. For calculation of perinatal death rates, includes only infants weighing at least 400 grams at birth or, where birth-weight is unknown, of at least 20 weeks gestation.

**Malignant neoplasms**  
Cancers.

**Neonatal death**  
Death within 28 days of birth of any child who after delivery, breathed or showed any other evidence of life, such as a heartbeat.

**Notification**  
Certification in an approved form of a disease listed in the Schedule 3 of Notifiable Diseases of the NSW Public Health Act 1991. In this report, notifications concern cases of communicable diseases reported by general practitioners, hospitals and pathology laboratories to the Director General of the NSW Department of Health. See Appendix 5 for more information.

**Participation rate**  
The labour force expressed as a percentage of the civilian population aged 15 years and over.

**Perinatal death**  
A fetal or neonatal death.
Pertussis

Pertussis, or whooping cough, is caused by infection with *Bordetella pertussis* bacteria and can cause serious illness in both children and adults. Illness in children is characterised by fits of violent coughing, followed by a whooping sound as the child gasps for breath. The cough may last several months. The illness can be life-threatening particularly in young babies.

Prevalence

The number of people with a disease at a given time (point prevalence) or in a specified period (period prevalence), divided by the number of people at risk from that disease.

Primary avoidable mortality (PAM)

PAM refers to death from conditions preventable through either behaviour change or population level interventions – eg: lifestyle modifications, such as increased exercise and dietary change. See Appendix 5 for more information.

Principal diagnosis

The first ICD-9 or ICD-10 coding variable reported on the hospital separation form. It means the final diagnosis that best accounts for inpatient care. See Appendix 2 for more information.

Q fever

Q fever is a zoonotic disease caused by infection with the organism *Coxiella burnetti*. It is usually transmitted by inhalation of dust contaminated by birth products or faeces of certain animals (including sheep, cattle, and goats), and is especially frequent among abattoir workers. Symptoms include sudden onset of chills, headache, weakness, malaise and sweats. Laboratories are required by law to notify cases of Q fever to the NSW Department of Health.

Salmonella

Numerous species of Salmonella bacteria cause disease in both humans and animals. Salmonellosis is mainly a food-borne disease with symptoms of abdominal pain, fever, headache, diarrhoea, nausea and sometimes vomiting. Infants and young children are the most vulnerable to infection. Typhoid and paratyphoid, more serious forms of salmonellosis, are uncommon in Australia and not included in these data.

Secondary avoidable mortality (SAM)

SAM refers to deaths from conditions that respond to early detection and intervention, typically in a primary health care setting – eg: cancer screening and chronic diseases management, intended to delay the progression of diseases such as diabetes. See Appendix 5 for more information.

Social capital

A measure of individual and community wellbeing describing processes between people which establish networks, norms and social trust and facilitate coordination and cooperation for mutual benefit.

SocioeconomicIndexes for Areas (SEIFA)

The SEIFA were constructed by the Australian Bureau of Statistics, using data from the 1996 Census of Population and Housing, to summarise the social and economic conditions of Australia. SEIFA scores are derived from multiple-weighted variables, with the reference score for the whole of Australia set to 1,000. Lower scores indicate lower socioeconomic status. Five SEIFA scores were constructed to focus on different aspects of socioeconomic status – in this report, the Index of Relative Socioeconomic Disadvantage (IRSD) has been used, unless otherwise stated. See Appendix 5 for more information.

Socioeconomic status

A global measure of individuals' or regions' social and economic conditions. Throughout the *Northern Rivers Equity Profile*, the SEIFA Index of Relative Socioeconomic Disadvantage (IRSD) has been used, unless otherwise stated. See Appendix 5 for more information.
Syphilis is a sexually transmitted infection caused by the organism *Treponema pallidum*. Infection causes a primary lesion (chancre) that appears about 3 weeks after exposure. A generalised rash and lymphadenopathy can follow. Cardiovascular or neuro-syphilis may develop many years later. Many cases have no signs or symptoms at diagnosis and are detected by serological testing. Syphilis can be treated with antibiotics such as penicillin. If untreated, pregnant woman can pass the infection onto their foetuses, resulting in congenital syphilis.

Tertiary avoidable mortality (TAM) refers to deaths from conditions whose case fatality rate can be significantly reduced by existing medical or surgical treatments, even when the disease process is fully developed – eg: cancer treatments. See Appendix 5 for more information.

**Time period comparisons**

Where two sets of data for the same indicator are being compared.

**Unemployed**

Persons aged 15 years and over who were not employed and who were actively seeking work, or waiting to be called back to a job from which they had been stood down.

**Unemployment rate**

The number of unemployed expressed as a percentage of the labour force (that is, employed and unemployed).
Appendix 4: Data Sets from which Data were Obtained

This section of the Northern Rivers Equity Profile provides some information about the data sets from which the data presented were obtained and has been largely copied from the 2002 NSW Chief Health Officer’s Report.

Health Outcomes Information Statistical Toolkit (HOIST)

The Health Outcomes Information Statistical Toolkit (HOIST) is a SAS-based ‘data warehouse’ operated by the Centre for Epidemiology and Research of the NSW Department of Health. It brings together most of the data collections often used in population health surveillance in NSW, and contains all the available historical data for each collection. HOIST data is in one format - SAS datasets - and HOIST code values are, as far as possible, consistent across time and among datasets. HOIST provides a common data analysis environment across the public health network in NSW.

Population Data

Population estimates as at 30 June were used for calendar years, while estimates as at 30 December were used for financial years. Age- and sex-specific estimated resident populations (ERPs) for NSW Statistical Local Areas (SLAs) at 30 June were obtained from the Australian Bureau of Statistics (ABS) for use with calendar year data. A cubic spline interpolation between mid-year ERPs was used to derive 30 December age- and sex-specific population estimates for use with financial year data. Populations of NSW area health services were derived by aggregating the appropriate SLA-level ERPs, except in the case of Central Sydney and South Eastern Sydney Area Health Services, the border between which transects two SLAs. ERPs for these SLAs were apportioned according to the proportions derived from the usual resident counts from the 1996 Census at the collection district level.

The ERPs used were the latest available at the time of preparation of the report. However, around the time of publication, these ERPs will have been revised in the light of the results of the 2001 Census of Population and Housing. In most cases, the differences between the populations used in this report and the revised populations, will be negligible.

The 1991 Australian mid-year ERP, shown below, was used as the standard population for age-adjustment.

Australian standard population (30 June 1991)
<table>
<thead>
<tr>
<th>Age</th>
<th>Persons</th>
<th>Age</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4 yrs</td>
<td>1,271,703</td>
<td>50-54 yrs</td>
<td>846,934</td>
</tr>
<tr>
<td>5-9 yrs</td>
<td>1,272,208</td>
<td>55-59 yrs</td>
<td>725,950</td>
</tr>
<tr>
<td>10-14 yrs</td>
<td>1,241,619</td>
<td>60-64 yrs</td>
<td>736,868</td>
</tr>
<tr>
<td>15-19 yrs</td>
<td>1,364,074</td>
<td>65-69 yrs</td>
<td>671,390</td>
</tr>
<tr>
<td>20-24 yrs</td>
<td>1,396,764</td>
<td>70-74 yrs</td>
<td>510,755</td>
</tr>
<tr>
<td>25-29 yrs</td>
<td>1,399,663</td>
<td>75-79 yrs</td>
<td>384,495</td>
</tr>
<tr>
<td>30-34 yrs</td>
<td>1,425,735</td>
<td>80-84 yrs</td>
<td>229,828</td>
</tr>
<tr>
<td>35-39 yrs</td>
<td>1,328,387</td>
<td>85+ yrs</td>
<td>154,247</td>
</tr>
<tr>
<td>40-44 yrs</td>
<td>1,294,271</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-49 yrs</td>
<td>1,029,145</td>
<td>All ages</td>
<td>17,284,036</td>
</tr>
</tbody>
</table>

**Source:** ABS Population Estimates (HOIST)

### Australian Bureau of Statistics Mortality Collection

All deaths for which a coronial inquiry is not required must be certified by a registered medical practitioner as to cause and date; the certificate is registered by the registrar of births, deaths and marriages in each state or territory. Most deaths due to accidental causes, deaths occurring under suspicious circumstances (in which foul play cannot be excluded), deaths occurring shortly after anaesthesia or surgery, and deaths of persons who had not been seen by a medical practitioner in the year preceding their death, automatically become coronial cases and are registered by a coroner at the conclusion of an inquiry into the circumstances of the death.

Most non-coronial deaths are registered with the relevant registrar of births, deaths and marriages within 4 weeks of the date of death. However, coronial inquiries can take months, and in some cases years, to conclude. Mortality data are supplied by the ABS by year of registration. Therefore, deaths occurring in the last few weeks of each calendar year (or the last few months for coronial cases) may not be registered until January in the subsequent year.

For deaths registered during or before 1996, a single code for the principal underlying cause of death (based on the information recorded on the death certificate by a medical practitioner or coroner) was selected for each death. For deaths registered since 1997, the ABS has used computer-assisted cause-of-
death coding that yields up to 20 contributing causes of death in addition to the principal underlying cause of death.

For this report, ABS mortality data for deaths of NSW residents registered anywhere in Australia were accessed via HOIST. Deaths are presented by calendar year of death.

At the time of preparation of this report, the most recent mortality data available from ABS included only those deaths registered in 2000. The 2000 numbers were adjusted to include an estimate of the number of deaths due to that cause that occurred in 2000 but were not registered until 2001. These estimates were calculated for each age-sex stratum, by multiplying the number of deaths registered in 2000 by the proportion of deaths from that cause over the period 1997-1999 that were registered in the following year. Where deaths were further categorised by geographical place of residence or country of birth, this imputation procedure was carried out separately for each category, thus accounting for the typically greater delays in registering deaths of people resident in rural areas.

From 1999 onwards, causes of death have been classified according to the 10th revision of the International Classification of Diseases\textsuperscript{38}. Deaths registered before 1999 were coded according to the 9th revision of the International Classification of Diseases\textsuperscript{39}.

The ICD-10 and ICD-9 codes used for each indicator can be found in the Disease and Procedure Codes section of the 2002 NSW Chief Health Officer's Report\textsuperscript{5}.

**NSW Inpatient Statistics Collection (ISC)**

The NSW Inpatient Statistics Collection (ISC) is a census of all services for admitted patients provided by public hospitals, public psychiatric hospitals, public multi-purpose services, private hospitals and private day procedure centres in NSW. The ISC is a financial year collection from 1 July through to 30 June of the following year. The information it contains is provided by patients, health service providers, and the hospital's administration. The information reported includes patient demographics, source of referral to the service, service referred to on separation, diagnoses, procedures, and external causes. The ISC includes data on hospital admissions of NSW residents which occurred in hospitals interstate. The only exception to this is that data from Queensland hospitals for the year 1999-00 are missing. This may affect analyses involving uncommon diagnoses or procedures, particularly in Health Area analyses.
From 1 July 1998, the reason for a hospital admission has been coded at the time of separation (discharge, transfer or death), according to the 10th revision of the International Classification of Diseases, Australian Modification (ICD-10-AM), National Centre for Classification in Health, 2000. Prior to this, it was coded according to the 9th revision of the International Classification of Diseases, Clinical Modification (ICD-9-CM), using the Australian version from July 1995 and the US version prior to that. The numbers of diagnosis and procedure codes recorded, at the time of separation, have varied over time, and are currently as follows:

- principal diagnosis (the principal reason for admission);
- up to 20 other diagnoses;
- up to 20 procedures;
- up to three external cause codes for injury and poisoning.

For this report, the ISC was accessed via HOIST. ISC data on HOIST are for periods of stay in hospital. A period of stay in hospital ends with a discharge, transfer, or death of a patient. Data are presented by financial year.

ICD-9-CM codes were used to classify separations for years up to and including 1997-98 and ICD-10-AM codes were used from 1998-99 onwards. Extensive use of mapping tables between ICD-9-CM and ICD-10-AM disease codes, produced by the National Centre for Classification in Health, was made to obtain the most appropriate match for individual codes between the two classification systems. The ICD-10-AM and ICD-9-CM codes used for each indicator can be found in the Disease and Procedure Codes section of the 2002 NSW Chief Health Officer’s Report.

**New South Wales Midwives Data Collection (MDC)**

The New South Wales Midwives Data Collection (MDC) is a population-based collection covering all births in NSW public and private hospitals, as well as home births. It does not receive notifications of interstate births where the mother is resident in NSW.

The data collection has operated continuously since 1990. It encompasses all livebirths and stillbirths of at least 20 weeks gestation or at least 400 grams birthweight. The MDC relies on the attending midwife to complete a notification form when a birth occurs. The form includes demographic items, and items on maternal health, the pregnancy, labour, delivery, and perinatal outcomes. It has undergone three revisions over the years. The Midwives Data Collection database is compiled in the Information Management and
Support Branch of the NSW Department of Health. For this report, the MDC was accessed via HOIST. Data are presented for calendar years.

**NSW Health Surveys 1997, 1998 and 2002**

In 1997, 1998 and 2002, the NSW Department of Health, in conjunction with the 17 area health services, conducted population health surveys using computer-aided telephone interviews (CATI). The main aims of the surveys were to provide local and statewide information to inform health service planning and policy development. The survey questions focused on the six NSW health priority areas: cardiovascular disease, cancer, mental health, injury, diabetes, and asthma.

The target sample for each year comprised 1000 NSW residents aged 16 years and over from each of the 17 NSW Health Areas (total sample 17,000 people each year). A stratified two-stage cluster sample design was used, with simple random sampling of all potentially active telephone numbers within each NSW health area, and simple random sampling of one household resident for interview. Interviews were conducted in six languages (English, Arabic, Chinese, Greek, Italian, and Vietnamese) by trained interviewers at the NSW Department of Health's CATI facility.

The total sample size was 35,027 respondents (17,531 in 1997; 17,496 in 1998). The overall response rate for both surveys was 70%. For this report, data from the NSW Health Surveys 1997, 1998 and 2002 were accessed via HOIST.

**NSW Older People’s Health Survey 1999**

In 1999, the NSW Department of Health, in conjunction with the 17 area health services, conducted a survey of the health of older people in NSW, using CATI. The survey questionnaire focused on lifestyle; home and social environment; self-reported health status; older people as carers; physical activity and physical functioning; and the health priority areas of diabetes, falls, and mental health. It also included question modules on the use of health and community services, and on oral health. A brief version of the questionnaire was developed for administration to main carers (proxy interviews) of selected respondents who were unable to answer the interview on their own behalf.

The target sample comprised at least 500 NSW residents aged 65 years and over from each of the 17 NSW health areas. Households were sampled using electronic telephone listings, which were geo-coded and assigned to health areas. One eligible respondent was selected from each household, using random numbers generated by the CATI system.
Interviews were conducted in five languages (English, Arabic, Chinese, Greek, Italian) by trained interviewers at the NSW Department of Health's CATI facility. A total of 9418 interviews were completed (including proxy interviews), while 3906 households or selected respondents refused to participate. This yielded a response rate of 70.7 %. For this report, data from the NSW Older People's Health Survey 1999 were accessed via HOIST.

**NSW Child Health Survey 2001**

In 2001, the NSW Department of Health, in conjunction with the 17 area health services, conducted a survey of the health of children in NSW, using CATI. Development of the survey instrument was overseen by a technical reference group. The final questionnaire covered topics including use of health services, nutrition, food security, asthma, oral health, parent support services, social support, sun protection, sight, hearing, speech, family functioning, social capital, smoking, sports and other organised activities, and physical activity.

The target sample comprised at least 500 NSW children aged 0-12 years from each of the 17 NSW health areas. Households were sampled using a method similar to the 1998 NSW Health Survey. One eligible child was selected from each household, using random numbers generated by the CATI system. A parent or carer of the selected child was interviewed.

Interviews were conducted in four languages (English, Arabic, Chinese and Vietnamese) by trained interviewers at the NSW Department of Health's CATI facility. A total of 9933 interviews were completed, while 1770 households or selected respondents refused to participate. This yielded a response rate of 84.9%. For this report, data from the NSW Child Health Survey 2001 were accessed via HOIST.

**NSW Central Cancer Registry Data**

The NSW Central Cancer Registry was established by the NSW Department of Health in 1971 under the *NSW Public Health Act*. It has been administered by the NSW Cancer Council, under contract, since 1986. Notification of all newly-diagnosed cases of and deaths due to malignant neoplasm by hospitals and the Registrar of Births, Deaths and Marriages has been compulsory since the registry began. In 1991 the Act was amended to make notification by pathology laboratories compulsory as well. Notification has traditionally been via a printed notification form, although in recent years electronic notification by hospitals (but not pathology laboratories) has been introduced.
A case of cancer is the occurrence of a malignant neoplasm in one organ of a particular person. Therefore, a case of malignant melanoma in a particular person counts as one case. If the same person subsequently develops leukaemia, the leukaemia counts as a second case.

Incident cases and deaths registered before July 1999 were classified according to the 9th revision of the International Classification of Diseases\textsuperscript{39}. Cases registered from July 1999 onwards have been classified according to the 2nd edition of the International Classification of Diseases for Oncology\textsuperscript{45}. ICD-O-2 codes were translated back to ICD-10 codes by the Registry and used in this report. For this report, cancer incidence data were accessed via HOIST. The cancer mortality data presented come from ABS mortality data.

**Save Our Kids Smiles (SOKS) Data**

The Save Our Kids Smiles (SOKS) program was a school-based oral health risk assessment and managed care program for all NSW children in years Kindergarten, 2, 4, 6, and 8. Dental therapists conducted a short assessment of children's oral health in schools, and coded participating children according to the urgency of their need for oral health care. Caries status of all teeth (whether teeth are decayed, missing, or filled) was also recorded.

SOKS data were collected annually between 1996 and 2000. SOKS was reviewed by the NSW Department of Health in 1999. The review found that the SOKS assessments under field conditions consistently underestimated active decay compared to assessments conducted in clinic conditions. The mean decay scores from SOKS assessments were around 40% lower than those from clinic-based assessments (Oral Health Branch, NSW Department of Health, 2000). SOKS was replaced by a clinic-based risk assessment program from 2001.

For this report, SOKS data were accessed via HOIST. Data reported for 2000 by several health areas were incomplete or unavailable, and were excluded from trend analysis. Records were excluded where the age of the child was more than 4 standard deviations from the mean age for a given school grade. Data were not adjusted for under-reporting of decay. Adjusted figures for the NSW data have been produced by the AIHW Dental Statistics and Research Unit\textsuperscript{46}.

**NSW Notifiable Diseases Database (NDD)**

The NSW Notifiable Diseases Database (NDD), formerly called the NSW Infectious Diseases Surveillance System (IDSS), is a networked database used by 17 public health units (PHUs) located across NSW to
register communicable disease notifications. Under authority of the *NSW Public Health Act 1991*, the NSW Health Department receives notifications of communicable disease via PHUs from general practitioners, hospitals, and pathology laboratories. Data are transferred weekly from PHUs to the Department, for compilation of statewide data. The Department, in turn, transfers a limited dataset to the Communicable Diseases Network of Australia and New Zealand (maintained by the Commonwealth Department of Health and Aging). For this report, the NDD collection was accessed via HOIST.

**Australian Childhood Immunisation Register (ACIR)**

The Australian Childhood Immunisation Register (ACIR), which is managed by the Health Insurance Commission (HIC) and commenced operation on 1 January 1996, is a register of the immunisation status of all children less than seven years of age. A Commonwealth-State cost-shared payment is made to service providers for data. Broadly, the functions of the ACIR are: to collect immunisation information from immunisation providers, and to administer a payments system to providers for reporting information; to provide immunisation status information to parents and providers and to administer a national recall-reminder service to parents; and to provide immunisation coverage data.

ACIR supplies NSW Health with monthly coverage data that identifies children 'overdue' for immunisation, which are forwarded to Public Health Units for follow up, and quarterly coverage data by local government area. These latter data form the basis for the information presented in this report.
Appendix 5: Statistical Methods

This section of the *Northern Rivers Equity Profile* provides some information about the data presented were analysed and has been largely copied from the *2002 NSW Chief Health Officer’s Report*\(^5\). This section will be further reviewed and, if appropriate, edited and expanded in future phases of the *Northern Rivers Equity Profile*.

**Crude Death Rates**

The crude death rate is an estimate of the proportion of a population that dies in a specified period. It is calculated by dividing the number of deaths in a specified period by the number at risk during that period (typically per year). It does not take into account the age structure of the population studied, and can be misleading when long-term trends are examined - or geographic areas are compared - because age structures of populations may vary over time or among areas. Crude death rates presented in this report used ABS estimated resident populations (ERPs) as at 30 June each year, and are expressed per 100,000 population per year.

**Age-adjusted Rates**

Age-adjustment of rates used direct age-standardisation. This method adjusts for effects of differences in the age composition of populations across time or geographic regions. The directly age-standardised rate is the weighted sum of age-specific (five-year age group) rates, where the weighting factor is the corresponding age-specific standard population. For this report, the Australian estimated residential population (persons) as at 30 June 1991 was used as the standard population (this is given in see Appendix 4). The same population was used for males and females to allow valid comparison of age-standardised rates between the sexes.

Ninety-nine per cent confidence limits around the directly standardised rates were calculated using the method described by Dobson et al. (1991)\(^47\). This method gives more accurate confidence limits than the usual normal approximation for rarer conditions. Where the number of events is larger, the limits are equivalent to those calculated in the conventional fashion\(^48\).
Analysis of NSW Health Surveys (1997, 1998 & 2002), NSW Older People’s Health Survey (1999) and NSW Child Health Survey (2001)

The survey samples were weighted to adjust for differences in the probabilities of selection among respondents, according to the number of eligible respondents in the household, and the number of residential telephone connections for the household (except in 1997, where telephone connection information was not collected). Post-stratification weights were used to adjust for differences between the age and sex structure of the survey samples and the relevant ABS mid-year population estimates (adjusted to exclude people resident in institutions)\(^\text{43}\).

The ‘Surveymeans’ procedure in SAS for Windows Version 8.02 was used to calculate point estimates and 95% confidence intervals. This procedure uses the Taylor expansion method to estimate sampling errors of estimators based on a stratified random sample\(^\text{49}\). The ‘Lifetest procedure’ in SAS version 8.02 was used to perform survival analysis on the breastfeeding data from the NSW Child Health Survey 2001. Survival analysis models data that specifies a time between an initial event and a terminating event. The length of time for which babies received any breastfeeding and full breastfeeding was modelled. The time babies were fully breastfed was determined from the date breastfeeding started (initial event) to the introduction of either solids or a milk substitute, or to the date of survey (terminating event). For any breastfeeding, the terminating event was the cessation of breastfeeding or the date of survey. The survival analysis determined the non-parametric estimates of the survival distribution function using the Kaplan-Meier method. The procedure calculated proportions and 95% confidence intervals at time intervals, allowing for the weighting of the dataset.

**Graphical Presentation**

The figure below demonstrates the method used for graphical presentation of point estimates with their 95% confidence intervals. It shows age-adjusted incidence for melanoma for the years 1996 to 2000 for each of the NSW health areas. The standardised rate for NSW as a whole is indicated by the vertical reference line. The standardised rate, with its 95% confidence limits, for each health area, is shown as a horizontal line, with a central box indicating the point estimate.
Avoidable Mortality Analyses

The method used to calculate avoidable mortality was based on that developed by the Ministry of Health in New Zealand\(^5\). Avoidable deaths are those attributed to conditions that are considered preventable or otherwise avoidable through earlier intervention or action. These were sub-categorised into three levels of intervention. Primary level interventions are those that can prevent the condition developing, such as promotions of lifestyle modification. Secondary level interventions are those that detect or respond to the condition early in its progression, such as cancer screening and chronic disease management. Tertiary level interventions are those that treat the condition and prevent premature death. For each condition, the number of deaths that could have been avoided at each level was calculated by applying weights to the total deaths from the condition. These data were summed to determine the rates of primary, secondary and tertiary avoidable mortality.

Tobias and Jackson (2001) defined conditions using ICD-9 codes only\(^5\). The appropriate groupings of ICD-10 codes were developed for this report. The codes used can be found in the Disease and Procedure Codes section of the 2002 *NSW Chief Health Officer’s Report*\(^5\).
**Socioeconomic Group Analyses**

Socioeconomic (SES) groups used in this chapter were constructed using the index of relative socioeconomic disadvantage (IRSD), which is one of the Australian Bureau of Statistics (ABS) socioeconomic indices for areas (SEIFA). Non-overlapping geographical areas covering all of NSW are assigned an IRSD score calculated from ABS census data on various socioeconomic characteristics of the people living in the areas. These characteristics relate to occupation, education, non-English speaking background, indigenous origin, and the economic resources of the household.

Three sets of indices have been released by the ABS using data from the censuses conducted in 1986, 1991, and 1996. The IRSD score is an ordinal measure based on a standard score of 1000 for Australia. Therefore, the areas can be ranked by IRSD score but other arithmetic comparisons using the score are not valid. It also means that only ranks, and not the scores calculated using data from different censuses, can be compared. For instance, the score for NSW was 1006 using 1996 census data, which means that the SES of NSW is slightly better than Australia as a whole. The score for NSW in 1991 was 1002; however that does not mean that NSW in 1996 was better off than NSW in 1991 because the scores were calculated based on a socioeconomically different Australian population.

The NSW population was divided into three groups for the analyses in this chapter. Statistical local areas were sorted by IRSD score and assigned to quintiles, each containing as close as possible to one-fifth of the total population. The data are presented for the lowest SES population quintile, the highest SES population quintile, and a group comprising the remaining three SES quintiles, which is referred to as the 'rest' or 'balance of NSW population'.

**Poisson Regression Models**

Poisson regression models were used to study the effect of time and SES on death rates. The models were used to assess whether there had been an increase over time in the gaps between SES groups. Trends in each indicator by SES group were modelled to obtain fitted values for the relative health gaps and to ascertain the significance of any observed changes in the health gaps over time.

The models included age, SES group, and year. They assessed change in death rates by SES group over time, after adjusting for age differences. A relative change in the health gap was determined by comparing the ratios of the fitted mortality rates of the first year of data to the last year of data. An increase in the rate ratio indicates the relative gap has widened and a decrease indicates the relative gap has narrowed. The significance of the change was assessed by testing the difference between the slopes of the trends.
Psychological Distress Analyses

The K10 was included in the 1997 and 1998 NSW Health Surveys as a relatively short measure of psychological distress that allowed comparison against international survey data and validation against concurrent diagnostic data in the National Survey of Mental Health and Wellbeing (NSMHW).\textsuperscript{33-35, 51} The K10 (and a briefer K6 measure) were specifically designed for use in the 'core' of the annual US National Health Interview Survey (NHIS, N=50,000 aged 15+) when it was redesigned for use from 1997 onwards.

The K10 is currently being used in a series of surveys similar to the Australian NSMHW, in 20 countries, under the auspices of the World Health Organisation (WHO). These surveys have a total sample size of about 200,000. The WHO regions surveyed include North America (Canada and the United States), Latin America (Brazil, Colombia, Mexico and Peru), Europe (Belgium, France, Germany, Italy, The Netherlands, Spain, and The Ukraine), the Middle East (Israel), Africa (South Africa), and Asia (China, India, Indonesia, Japan, and New Zealand).\textsuperscript{52}

The K10 measure is a 10-item self-report questionnaire intended to yield a global measure of 'psychological distress' based on questions about the level of restlessness, anxiety, and depressive symptoms in the most recent 4-week period. It is designed to span the range from few or minimal symptoms through to extreme levels of distress, which is an essential feature of an instrument for use in population studies. Thus the K10 contains both low-threshold items, that many people may endorse, through to high-threshold items that very few will endorse. Overall, the item-response scale is designed to yield most precision around the 90th to 99th percentile of the general population.

For each item there is a 5-level response scale based on the amount of time (from none through to all) during a 4-week period when the person experienced the particular problem. In NSW use, there are also 4 follow-up questions, that aim to quantify the level of disability resulting from the feelings of distress; the health service usage resulting from the distress; and the extent to which the distress is believed to be mainly due to physical health problems.

Scoring of the raw questionnaire assigns between 1 to 5 points to each symptom in the direction of increasing problem frequency. Thus, the raw score range is from 10 (all responses to all questions are 'none of the time') through to 50 (all responses to all questions are 'all of the time'). For presentation, these scores were converted to a 'T-score', calculated for respondents who answered nine or more questions by subtracting the mean score (for all respondents) from the individual total raw score, then dividing by the standard deviation, multiplying by 10 and finally adding 50. The T-score has a mean of 50 and a standard deviation of 10.
Following standard conventions for instruments of this type, we chose a score of one standard deviation above the mean (that is, 60) as a useful level for further comparisons. This should not be regarded as a cut-off score for 'illness', since it is an arbitrary choice. However, it classifies about the same proportion of males and females as having high levels of psychological distress as are found to meet diagnostic criteria for anxiety and depression in other population studies.
Appendix 6: Issues to be Considered Further in Phase 2

The following issues, raised during the review process of this first phase of the Northern Rivers Equity Profile, will be addressed during Phase 2:

- Consider whether to expand the rationales at the beginning of each major determinants section.
- Consider whether to include rationales for each indicator.
- Consider alternative ways of structuring the population health outcomes section to make it easier to look up specific indicators.
- Consider whether to use actual 2001 Census population figures as denominators in calculating rates (would mean recalculating existing rates) or to stick with estimated populations derived from 1996 Census figures (as currently used).
- Ensure full data are included for all NSW Health required indicators – if this is still relevant, as the initial required report was delivered in 2001, as required.
- Prioritise inserting data for NR versus rural NSW and for NR Aboriginal residents versus overall NSW & rural NSW Aboriginal residents.
- Consider restructuring Table 3 if there is consensus that it is difficult to interpret – most seemed happy with it but one person (not a regular user of such data) reported difficulties – see response we get from a wider audience.
- Thérèse to review all figure sources, clarifying which were accessed directly from HOIST and which were downloaded directly from the CHO’s report.
- Thérèse to review Data set and Methods appendices to ensure accurately reflect the methods we used.
- Consider incorporating ABS-style warnings where data may be unreliable – ie: relative standard errors > 25% (interpret with caution) and > 50% (unreliable).
- Consider revising SES comparisons to be in socioeconomic quintiles across whole NRA (by Census CDs) rather than within LGAs – as this is rather repetitive and tends to blur relationships given broad diversity of SES within each LGA.
- Consider if any extra terms need further explanation in Appendices 3 – 5.
- Insert more quotes – so each major section has one.
- Consider how want to word headings and text re:
  - Sex or gender – to describe the sexes;
  - Males and females – or male residents and female residents.