# Applied professional practice in public health: promoting equitable health services delivery through evaluation and research

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# APPLIED PROFESSIONAL PRACTICE IN PUBLIC HEALTH: PROMOTING EQUITABLE HEALTH SERVICES DELIVERY THROUGH EVALUATION AND RESEARCH

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**Thesis for the Degree of Professional Doctorate in Applied Public Health (DrPH)**
**New South Wales Ministry of Health & University of New South Wales**

**2013**

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Research and evaluation studies can be applied to promote equitable health services delivery, through identifying disparities in health services delivery between different population groups, and recommending strategies to address these disparities. This thesis reports on four applied research projects which explore these issues, undertaken through the NSW Public Health Officer Training Program.

The first study is an evaluation of the NSW Early Childhood Oral Health Program, a program designed to improve the oral health of infants and young children in NSW. The evaluation shows that models of shared responsibility for oral health have been established which facilitate prevention and early intervention for early childhood caries, however additional strategies targeting vulnerable populations are required for more equitable access and outcomes.

In the second study eye health services for Aboriginal people in western NSW are reviewed through observational visits, key stakeholder consultation and service provision data analysis. The findings indicate that eye health services are not equitably available and accessible for Aboriginal people in this region. Strategies recommended to address this disparity include improved collaborative practice, improved cultural competence, and routine monitoring of service uptake by Aboriginal people.

The third study involves a component of *"The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012"*, which reports on the performance of mainstream health services at the local level in providing effective, equitable, and culturally competent services to Aboriginal people. Health services achieve differential outcomes in key performance indicators for Aboriginal and non-Aboriginal people, and it is anticipated that enhanced reporting of performance in Aboriginal health may increase awareness and precipitate action at a local level to address this disparity.

The fourth study investigates issues related to influenza vaccination during pregnancy in central and south western Sydney. Influenza during pregnancy poses significant risks to pregnant women, and although the influenza vaccine is safe, effective, and recommended in guidelines, uptake is low and providers do not routinely recommend it. Understanding the perspectives of pregnant women and antenatal care providers towards the vaccine will enable targeted strategies to address their concerns in order to improve uptake of the vaccine and mitigate the risks of influenza during pregnancy.

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My family and friends have provided so much encouragement and support, likely while wondering exactly what it was I was trying to complete and why. Thank-you especially to John, June, Jude, David, Rhonda, and Mary, for always supporting my endeavours. Love to you all!

# Preface

## Publications

Sections of this thesis have been included in the following publications:

- NSW Health. NSW Early Childhood Oral Health Program Evaluation. NSW Health. 2010. http://www0.health.nsw.gov.au/pubs/2010/ecoh_eval.html

- **Maher L,** Phelen C, Lawrence G, Dawson A, Torvaldsen S, Wright C. The Early Childhood Oral Health Program: Promoting Prevention and Timely Intervention of Early Childhood Caries in NSW through Shared Care. *The Health Promotion Journal of Australia.* 2012. 23: 171-176.

- NSW Health. Eye Health Services for Aboriginal People in the Greater Western Region of NSW: A Review. NSW Health. 2011. http://www.health.nsw.gov.au/pubs/2011/review_of_aboriginal_eye_.html

- **Maher L,** Brown A, Torvaldsen S, Dawson A, Patterson J, and Lawrence G. Eye health services for Aboriginal people in the western region of NSW, 2010. *NSW Public Health Bulletin.* 2012. 23(4): 81-86

- NSW Ministry of Health. The health of the people of NSW: Report of the Chief Health Officer 2012. NSW Health. 2012. http://www.health.nsw.gov.au/publications/Pages/aboriginal-cho-report-2012.aspx

Two further manuscripts from this thesis have been submitted for publication:

- Maher L, Hope K, Torvaldsen S, Lawrence G, Dawson A, Wiley K, Thomson D, Hayen A, Conaty S. Influenza vaccination during pregnancy: coverage rates and influencing factors in two urban districts in Sydney. *Vaccine.* 2013. In press.

- Chapter Five Part B: Maher L, Dawson A, Wiley K, Hope K, Torvaldsen S, Lawrence G, Conaty S: Influenza Vaccination during Pregnancy: the attitudes and practices of general practitioners in central and south-western Sydney. Submitted to *BMC Family Practice*

## Conference Proceedings

Sections of this thesis have been presented at the following conferences:

- Australian Health Promotion Association Conference, Cairns, 2011. Oral Presentation:
    - **Maher L** and **Phelen C**. "The Early Childhood Oral Health Program NSW: Prevention and Early Intervention of Early Childhood Caries".

- Australian Population Health Congress, Adelaide, 2012. Oral Presentation:

    - **Maher, L**. “Closing the Gap in NSW: Health performance monitoring and reporting in Aboriginal health”.

- Coalition for Research in Aboriginal Health Conference, Sydney, 2011. Poster:
    - **Maher L**, and Brown A. “Eye Health Services for Aboriginal People within the Greater Western Region of NSW, A Review”

- Communicable Disease Control Conference, Canberra, 2013. Oral presentation:
    - **Maher L**, Hope K, Torvaldsen S. “Influenza vaccination during pregnancy in south western Sydney.”

# Abstract

Research and evaluation studies can be applied to promote equitable health services delivery, through identifying disparities in health services delivery between different population groups, and recommending strategies to address these disparities. This thesis reports on four applied research studies which explore these issues, undertaken through the NSW Public Health Officer Training Program.

The first study is an evaluation of the NSW Early Childhood Oral Health Program, a program designed to improve the oral health of infants and young children in NSW. The evaluation shows that models of shared responsibility for oral health have been established which facilitate prevention and early intervention for early childhood caries, however additional strategies targeting vulnerable populations are required for more equitable access and outcomes.

In the second study eye health services for Aboriginal people in western NSW are reviewed through observational visits, key stakeholder consultation and service provision data analysis. The findings indicate that eye health services are not equitably available and accessible for Aboriginal people in this region. Strategies recommended to address this disparity include improved collaborative practice, improved cultural competence, and routine monitoring of service uptake by Aboriginal people.

The third study involves a component of *"The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012"*, which reports on the performance of mainstream health services at the local level in providing effective, equitable, and culturally competent services to Aboriginal people. Health services achieve differential outcomes in key performance indicators for Aboriginal and non-Aboriginal people, and it is anticipated that enhanced reporting of performance in Aboriginal health may increase awareness and precipitate action at a local level to address this disparity.

The fourth study investigates issues related to influenza vaccination during pregnancy in central and south western Sydney. Influenza during pregnancy poses significant risks to pregnant women, and although the influenza vaccine is safe, effective, and recommended in guidelines, uptake is low and providers do not routinely recommend it. Understanding the perspectives of pregnant women and antenatal care providers towards the vaccine will enable targeted strategies to address their concerns in order to improve uptake of the vaccine and mitigate the risks of influenza during pregnancy.

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# Chapter One: Introduction

## 1.1 The NSW Public Health Officer Training Program

The New South Wales (NSW) Public Health Officer Training Program is a 3-year workplace-based public health training program delivered by the NSW Ministry of Health. The mission of the Program is: "To improve the health of the people of NSW by contributing to the current and emerging needs of public health practice within NSW and Australia through providing leading public health service based higher education grounded in scholarship, collaborative relationships and evidence-based practice." [1] Trainees gain broad experience in public health by rotating through a range of workplaces that allow them to meet the competencies of the Program, and complete a portfolio of evidence demonstrating competency attainment in the following areas: (1) Professional Practice; (2) Management; (3) Epidemiology and Biostatistics; (4) Information Management; (5) Communication; (6) Health Policy; (7) Health Promotion; (8) Health Evaluation; (9) Communicable Diseases; (10) Risk Assessment / Management; and (11) Health Economics.

For the period 2009 – 2012 the NSW Public Health Officer Training Program was delivered in conjunction with the University of New South Wales through an academic partnership, and during this period participants in the training program were eligible to concurrently enrol in a Professional Doctorate in Applied Public Health (DrPH). I joined the NSW Public Health Officer Training Program in 2009, and enrolled as a candidate in the Professional Doctorate in Applied Public Health (DrPH) in 2010. I completed the Training Program in March 2013 and the completion certificate was conferred in September 2013 (Appendix 1).

## 1.2 Placements and Research Studies

I completed four workplace placements while a participant on the NSW Public Health Officer Training Program and undertook a broad range of applied research projects within each placement. There are four main chapters in this thesis, each representing one main study for each workplace placement. Table 1 outlines my work placements and the studies and projects undertaken at each placement, indicating which of those studies are included in this thesis. A description of each placement follows.

**Table 1: Work placements and projects, December 2009 – March 2103**

| WORKPLACE | STUDIES AND PROJECTS | OUTCOMES |
|---|---|---|
| **Centre for Oral Health Strategy, NSW Ministry of Health**<br><br>*November 2009 – May 2010*<br><br>Supervisor:<br>Mr John Skinner | Evaluation of the NSW Early Childhood Oral Health Program | • Final Evaluation Report: Maher L (2010) NSW Early Childhood Oral Health Program Evaluation. Centre for Oral Health Strategy, NSW Health. Available online at www0.health.nsw.gov.au/pubs/2010/pdf/ecoh_eval.pdf **(Thesis Chapter 2)**<br><br>• Published Paper: Maher L, Phelen C, Lawrence G, Dawson A, Torvaldsen S, Wright C. The Early Childhood Oral Health Program: Promoting Prevention and Timely Intervention of Early Childhood Caries in NSW through Shared Care. *The Health Promotion Journal of Australia.* 2012. 23: 171-176. **(Thesis Chapter 2)**<br><br>• Oral Presentation at the Australian Health Promotion Association Conference in Cairns 2011: "The Early Childhood Oral Health Program NSW: Prevention and Early Intervention of Early Childhood Caries". |
| **School of Rural Health (Dubbo), University of Sydney**<br><br>*May – November, 2010*<br><br>Supervisor:<br>Dr Tony Brown | Review of Eye Health Services for Aboriginal People in the Greater Western Area Health Service Region | • Final Review Report: Maher L and Brown A (2011). Eye Health Services for Aboriginal People: A Review within the Greater Western Region of NSW. NSW Ministry of Health. Available online at: www0.health.nsw.gov.au/pubs/2011/pdf/review_of_aboriginal_eye_.pdf **(Thesis Chapter 3)**<br><br>• Published Paper: Maher L, Brown A, Torvaldsen S, Dawson A, Patterson J, and Lawrence G. Eye health services for Aboriginal people in the western region of NSW, 2010. *NSW Public Health Bulletin.* 2012. 23(4): 81-86 **(Thesis Chapter 3)**<br><br>• Poster Presentation to the Coalition for Research to Improve Aboriginal Health (CRIAH) Conference 2011. |
| **Centre for Aboriginal Health, NSW Ministry of Health**<br><br>*December 2010 – June 2012*<br>Supervisor:<br>Ms Jessica Stewart | "The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012" | • Final Report: "The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012", available at www.health.nsw.gov.au/publications/Pages/aboriginal-cho-report-2012.aspx **(Thesis Chapter 4)** |
| | Chronic Care Service Enhancements Program: Evaluation Project | *Enhancements funding was provided to existing chronic care services for Aboriginal people in Aboriginal Community Controlled Health Services and Local Health Districts. An ongoing evaluation and research project was developed for this program:*<br>• Evaluation and research protocols designed and developed<br>• External evaluation organisation procured and managed |
| | NSW Health: Revision of the Policy on Identification of Aboriginal People | • Revised Policy Directive PD2012_042 "Aboriginal and Torres Strait Islander Origin - Recording of Information of Patients and Clients" published and available at http://www0.health.nsw.gov.au/policies/pd/2012/pdf/PD2012_042.pdf |

*(Table 1 continued)*

| WORKPLACE | PROJECT | OUTCOMES |
|---|---|---|
| Centre for Aboriginal Health *continued* | NSW Aboriginal Identification in Hospitals Quality Improvement Project Research Project | *A research project was developed to investigate the effectiveness of applying quality improvement processes to improve the cultural competence of hospitals, evidence by improved identification:*<br>• Evaluation and research protocols designed and developed<br>• External evaluation organisation procured and managed |
| | Centre for Aboriginal Health Strategic Planning for Research and Evaluation | • Final Plan: *NSW Health Centre for Aboriginal Health Research and Evaluation Strategic Plan 2011-2015.*<br>• Published Paper: Stewart J, Parter C, Maher L. Building a strategic approach to improve Aboriginal health research and evaluation in NSW. *NSW Public Health Bulletin.* 2012. 23: 3-4 |
| **South Western Sydney and Sydney Local Health Districts Public Health Unit**<br><br>*June 2012 – March 2013*<br><br>Supervisor:<br>Dr Kirsty Hope | Influenza Vaccination During Pregnancy Project | • Published Paper: Maher et al (2103). Influenza vaccination during pregnancy: coverage rates and influencing factors in two urban districts in Sydney. Submitted to *Vaccine.* In Press.<br>**(Thesis Chapter 5)**<br>• Manuscript: Maher et al (2013) Influenza vaccination during pregnancy: the attitudes and practices of general practitioners in central and south-western Sydney. Submitted to *BMC Family Practice.*<br>**(Thesis Chapter 5)**<br>• Oral presentation to Communicable Disease Control Conference, March 2013: Influenza vaccination during pregnancy in south-western Sydney<br>• Internal Report: "Monitoring rates of influenza vaccination during pregnancy in South Western Sydney and Sydney Local Health Districts: An evaluation of current and prospective surveillance approaches". |
| | Measles Outbreak in South Western Sydney 2012 | *A significant outbreak of measles occurred in South-Western Sydney 2012, and I contributed to the public health response by the Public Health Unit during my placement there.* |
| | Public Health Unit Emergency Risk Management and Emergency Preparedness Project | *This project involved developing and implementing an emergency risk identification, assessment and management project for risks that may require a significant response from the Public Health Unit. The preparedness of the unit to respond was also assessed.*<br>• Three collaborative emergency risk management planning workshops for the Public Health Unit were completed.<br>• Internal Report: Emergency Risk Management Planning Project for the Sydney and South Western Sydney Local Health Districts Public Health Unit. |
| | Epidemiology Review of Tuberculosis in South-Western Sydney | • Internal Report: Epidemiology of Tuberculosis for the Sydney and South Western Sydney Local Health Districts 2001 - 2011. |

**Placement 1: Centre for Oral Health Strategy, NSW Ministry of Health**

This placement was for the period November 2009 – May 2010, under the supervision of Mr John Skinner. The Centre for Oral Health Strategy NSW (COHS) is responsible for co-ordinating oral health policies and programs in NSW that focus on oral health promotion, prevention, early intervention and treatment. During this placement I undertook an evaluation of the NSW Early Childhood Oral Health (ECOH) Program, a program established to promote and improve the oral health and wellbeing of infants and young children through the primary prevention and early intervention of early childhood caries. The aims of the evaluation were to identify the key achievements of the ECOH Program and the factors enabling these, and to determine whether the program was effective in reaching populations with a higher burden of oral disease in NSW. A program evaluation was conducted, and information gathered using a document review, interviews with program implementers and mothers of infants, and analysis of the Information System for Oral Health database for public oral health services activity in NSW. Following the completion of this evaluation, a final report was produced and published online by the NSW Ministry of Health, and a paper reporting the findings was published in the Australian Health Promotion Journal. These two elements are the key components of Chapter 2 of this thesis. Both are included as the report provides a complete overview of the program evaluation while the paper more comprehensively considers the program's achievements in developing a model of shared responsibility for oral health in NSW. I also presented the evaluation findings at the Australian Health Promotion Conference in Cairns in 2011.

**Placement 2: School of Rural Health (Dubbo), University of Sydney**

This placement was for the period May – November 2010, under the supervision of Dr Anthony Brown, during which I completed one major research project: the Review of Eye Health Services for Aboriginal People in the Greater Western Region of NSW. The aim of the review was to assess the availability, accessibility and uptake of eye health services for Aboriginal people in western NSW in 2010. Document review, observational visits, key stakeholder consultation and service data reviews were used to determine regional service availability, accessibility, and use. A final report was published online by the NSW Ministry of Health, and a paper reporting the findings was published in the *NSW Public Health Bulletin*. These two elements are the key components of Chapter 3 of this thesis. Both are included because the report provides a complete overview of the program review, while the paper presents additional information and analysis, particularly in relation to cataract surgery rates. I also presented the findings of this project at the Coalition for Research in Aboriginal Health Conference in Sydney in 2011.

**Placement 3: Centre for Aboriginal Health, NSW Ministry of Health**

This placement was for the period December 2010 – September 2011, which was extended when I was seconded to the position of acting Epidemiologist in the Centre for Aboriginal Health for the period September 2011 – May 2012, all under the supervision of Ms Jessica Stewart. As demonstrated in Table 1, I undertook a considerable number of projects during this placement, all of which related to improving evidence based practice, evaluation, research, and reporting in Aboriginal Health in NSW. One of the key projects I worked on while at the Centre for Aboriginal Health was the production of the major report: "The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012". The report was released in November 2012 and is available online on the NSW Health website. The fifth chapter of that report, of which I was the primary author, entitled 'Health Services', provides information on the performance of mainstream health services in NSW delivering equitable, accessible, and culturally competent health services to Aboriginal people. The chapter of the Chief Health Officer's Report is the key component of Chapter 4 of this thesis. I also presented an overview of transparent reporting on health system performance in Aboriginal health in NSW at the Australian Population Health Congress in Adelaide in September 2012.

**Placement 4: Sydney and South Western Sydney Local Health Districts Public Health Unit**

This placement was for the period June 2012 – February 2013, under the supervision of Dr Kirsty Hope. During this placement I conducted a number of projects, as demonstrated in Table 1, including involvement in an outbreak response for a measles outbreak in south-western Sydney, and an emergency preparedness assessment project for the Public Health Unit. I conducted a research study which investigated issues related to influenza vaccination during pregnancy. The aims were to estimate the coverage of influenza vaccination in pregnant women in central and south-western Sydney during the 2012 influenza season and to identify factors associated with vaccination; and also to investigate the knowledge, attitudes, beliefs, and practices of general practitioners towards influenza vaccination during pregnancy. The study involved two separate studies, which used quantitative and qualitative methods respectively, and two manuscripts were written to report the findings. One paper has published in *Vaccine,* and the other paper is under review with *BMC Family Practice.* These papers form the body of Chapter 5 of this thesis. I also presented the findings of this study to the Communicable Disease Control Conference in Canberra in 2013.

## 1.3 Thesis Overview

There are four main chapters in this thesis, each describing an applied public health research study completed in each of my placements on the NSW Public Health Officer Training Program:

**Chapter 2: Evaluation of the NSW Early Childhood Oral Health Program**

- Part A: Final Evaluation Report. Maher L. NSW Early Childhood Oral Health Program Evaluation. Centre for Oral Health Strategy, NSW Health, 2010.
- Part B: Maher L, Phelen C, Lawrence G, Dawson A, Torvaldsen S, Wright C. The Early Childhood Oral Health Program: Promoting Prevention and Timely Intervention of Early Childhood Caries in NSW through Shared Care. *The Health Promotion Journal of Australia.* 2012. 23: 171-176.

**Chapter 3: The Review of Eye Health Service for Aboriginal People**

- Part A: Final Report. Maher L and Brown A (2011). Eye Health Services for Aboriginal People: A Review within the Greater Western Region of NSW. NSW Ministry of Health.
- Part B: Maher L, Brown A, Torvaldsen S, Dawson A, Patterson J, and Lawrence G. Eye health services for Aboriginal people in the western region of NSW, 2010. *NSW Public Health Bulletin.* 2012. 23(4): 81-86

**Chapter 4: Enhanced reporting of health services delivery for Aboriginal people in NSW**

- The fifth chapter from *The health of the people of NSW: Report of the Chief Health Officer 2012* entitled 'Health Services Delivery.'

**Chapter 5: Influenza vaccination during pregnancy in central and south-western Sydney**

- Part A: Maher L, Hope K, Torvaldsen S, Lawrence G, Dawson A, Wiley K, Thomson D, Hayen A, Conaty S. Influenza vaccination during pregnancy: coverage rates and influencing factors in two urban districts in Sydney. *Vaccine.*In press.
- Part B: Maher L, Dawson A, Wiley K, Hope K, Torvaldsen S, Lawrence G, Conaty S: Influenza Vaccination during Pregnancy: the attitudes and practices of general practitioners in central and south-western Sydney. (Manuscript submitted to *BMC Family Practice*).

## 1.4 Emergent Themes:

This thesis title, '*Applied professional practice in public health: promoting equitable health services delivery through evaluation and research',* contains two key components that reflect the main elements or themes that emerge across the four studies described in the thesis. These are: (a) research and evaluation; and (b) promoting equitable health services delivery. These themes are introduced here and will be considered further throughout the thesis.

### (a) Research and Evaluation:

All four chapters in this thesis represent studies where research and evaluation were applied to promote equitable health services delivery through investigating and identifying disparities in health services delivery and health outcomes between different population groups, and recommending strategies to address these disparities based on the studies' findings. The *Evaluation of the Early Childhood Oral Health Program* (Chapter 2) reports on the evaluation of this program which aims to improve the oral health of young children through promotion of oral health and early identification and intervention for early childhood caries. A mixed-methods process and impact evaluation was conducted in the third year of program delivery, with information gathered through document review, interviews with program implementers and mothers of young children, and analysis of public oral health services activity in NSW. The results provide information on the perspectives of key stakeholders on the achievements and challenges of the program to date, and quantitative data on the impact of the program on referrals to public oral health services for children. The participatory evaluation process enabled program stakeholders to reflect on program implementation thus far, and to identify strategies to address ongoing challenges such as equitable reach, in order to optimise the effectiveness of the program into the future.

The *Review of Eye Health Services for Aboriginal People in Western NSW* (Chapter 3) was an evaluation project, which investigated and reported on the availability, accessibility and uptake of eye health services for Aboriginal people in western NSW. The evaluation methods included document review, observational visits of service delivery, key stakeholder consultation, and analysis of available eye health services data. Through this process, the key eye health service providers in the region were identified and described, the distribution and frequency of available services across the region was mapped, and the uptake of services by Aboriginal

people was assessed. The qualitative elements of the evaluation enabled additional factors which may impact uptake of services by Aboriginal people, such as cultural safety, to be identified.

The 'Health Services' chapter of *"The health of Aboriginal people in NSW: The Chief Health Officers Report 2012"* (Chapter 4) reports on the performance of mainstream health services at the Local Health District level in providing effective, equitable, and culturally competent services to Aboriginal people in NSW. Developing this report chapter firstly required identification of appropriate indicators for inclusion, which required consideration of the policy context and NSW Health's reporting commitments under key agreements. Indicators were included where data were available, reliable, of sufficient quality, and with sufficient numbers to disaggregate by Aboriginality and Local Health District, and only when it was considered that Local Health Districts could feasibly improve performance and health outcomes through making services more accessible, equitable and culturally safe for Aboriginal people. The data were accessed, assessed, and reported for each indicator and health area. For many of these indicators, this was the first time that the information had been reported for Aboriginal and non-Aboriginal people at the Local Health District level.

Finally, the *Influenza Vaccination during Pregnancy Project* (Chapter 5) involves two separate research components that use rigorous qualitative and quantitative methods respectively to reliably estimate the uptake of the influenza vaccine in pregnant women, and the factors influencing uptake. Influenza during pregnancy poses significant risks to pregnant women, and although the influenza vaccine is safe, effective, and recommended, uptake is low and providers do not routinely recommend it. The first study aimed to ascertain the coverage of influenza vaccination in pregnant women in the South Western Sydney and Sydney Local Health Districts during the 2012 influenza season, and to identify factors associated with vaccination, by conducting a telephone survey of 462 women who had delivered a baby in Sydney and South-Western Sydney Local Health Districts' hospitals in the 2012 influenza season. The second component aimed to investigate the knowledge, attitudes, beliefs, and practices of general practitioners towards influenza vaccination during pregnancy, by conducting qualitative interviews with 17 general practitioners working in central and south-western Sydney. These studies investigated why the risks of influenza during pregnancy are not being adequately mitigated, and identified strategies targeting both pregnant women and antenatal care providers that may increase uptake.

## (b) Promoting equitable health services delivery:

The studies reported in this thesis focus on public health issues where there is evidence of significant disparities in health outcomes or access to health services delivery for different population groups. Equity in health is the "absence of systematic disparities in health (or in the major social determinants of health) between groups with underlying social advantage / disadvantage – that is wealth, power, or prestige". [2] Equitable health services need to ensure equal access to and utilisation of health care for those in equal need of health care, and equitable health outcomes [3]. The World Health Organisations Commission on Social Determinants of Health [4] identified the health care system itself as a social determinant of health, which is influenced by and influences other social determinants – for example gender, education, income, ethnicity, and place of residence influence people's access to, experiences of, and benefits from health care. Inequitable access to health care in Australia at the primary, secondary, and tertiary level for people according to socioeconomic status, gender, and ethnicity is well documented [5 – 9]. The first three chapters of this thesis in particular investigate issues of equity for Aboriginal people in NSW in health outcomes and health services access and utilisation.

The *Evaluation of the Early Childhood Oral Health Program* (Chapter 2) investigates the potential effectiveness of this program in the prevention, early identification and early intervention for early childhood caries. The prevalence of dental disease in young children in NSW is significantly higher for Aboriginal children, children living remotely, children of mothers born in non-English speaking countries, and children living in more disadvantaged socio-economic areas [10], and various strategies have been incorporated into the program to target these population groups. The evaluation specifically considered the effectiveness of these interventions, and the reach of the program to these population groups, considering if the reach and impact for these groups was sufficient considering the increased need.

The *Review of Eye Health Services for Aboriginal People in Greater Western NSW* (Chapter 3) investigates the availability and accessibility of eye health services for Aboriginal people in western NSW. Aboriginal people experience a high burden of eye disease and have low rates of access to eye health services [11]. The review focussed on western NSW, which has a high proportion of Aboriginal residents, in order to investigate context specific issues which may create barriers for Aboriginal people in accessing eye health services. The review identified the eye health stakeholders and service providers in the region, and considered issues such as co-

ordination and collaboration between providers, the geographic distribution and frequency of services, and the cultural safety that available services provide for Aboriginal people, in order to identify factors that may impact uptake of services by Aboriginal people.

"*The health of Aboriginal people in NSW: The Chief Health Officers Report 2012*" [12] reports on key population health and health services delivery indicators for Aboriginal and non-Aboriginal people in NSW. Population health indicators are reported in the areas of life expectancy and child mortality, health of mothers, babies, and children, risk and protective factors for health, and burden of ill-health for Aboriginal and non-Aboriginal people, and demonstrate significant disparities and inequity in health outcomes for Aboriginal people in NSW. Chapter 4 of this thesis is comprised of the fifth chapter of the "*The health of Aboriginal people in NSW: The Chief Health Officers Report 2012*", which reports on the performance of mainstream health services at the Local Health District level in providing effective, equitable, and culturally competent services to Aboriginal people in NSW. Mainstream health services achieve differential outcomes in key performance indicators for Aboriginal and non-Aboriginal people in NSW, and it is anticipated that enhanced reporting of performance in Aboriginal health services delivery may increase awareness and precipitate action at a local level to address this disparity.

Finally, the *Influenza Vaccination during Pregnancy Project* (Chapter 5) considers a specific population group, pregnant women, who have an increased level of risk in regard to influenza. This risk may be mitigated through the provision of influenza vaccination during pregnancy; however vaccination uptake is low and antenatal care providers do not routinely recommend it. While this is not specifically an issue of equity, it highlights an issue where health services and providers need to ensure that the specific needs of a particular population group are met.

## 1.5 Summary

The chapters in this thesis are organised in the chronological order that the applied public health research studies were conducted. One chapter is dedicated to each project, and represents one of each of my workplace placements in the NSW Public Health Officer Training Program. The chapters contain both workplace reports and papers, as appropriate to the studies, and to meet the requirements of the workplace, the Public Health Officer Training Program, and the Doctorate.

Each chapter begins with a brief introduction which outlines the context of the placement, a brief overview of the project, ethical considerations, limitations, and the contributions of colleagues. Each chapter introduction also includes my reflection on the project – the challenges and achievements of the project, the potential public health significance, and the contribution of each project to my learning journey in public health professional practice. Letters of approval for ethics applications are included in Appendix 2.

In the conclusion (Chapter 6) I reflect further on the value of the work as a whole, and the achievements of each project in promoting equitable health services delivery for the people of NSW. The emergent themes introduced above are considered in further detail for each study.

## References:

[1] Madden D.L, O'Sullivan B, Maxwell M and Simpson DA . NSW Public Health Officer Training Program - Handbook for Trainee Public Health Officers. 2012; Sydney: NSW Ministry of Health.

[2] Braveman P and Gruskin S. Defining equity in health. *Journal of Epidemiology and Community Health.* 2003. 57: 254-258.

[3] Oliver A and Mossialos E. Equity of access to health care: outlining the foundations for Action. *Journal of Epidemiology and Community Health.* 2004; 58: 655 – 658.

[4] World Health Organisation. Closing the gap in a generation. Health equity through action on the social determinants of health. 2008. Available at: http://www.who.int/social_determinants/thecommission/finalreport/en/index.html.

[5] Young AF, Dobson AJ, Byles JE. Access and equity in the provision of general practitioner services for women in Australia. *Australian and New Zealand Journal of Public Health.* 2000. 24: 474–80.

[6] Harris M and Furler J. How can primary care increase equity in health? *NSW Public Health Bulletin.* 2002. 13: 35-38.

[7] Van Doorslaer, E., Clarke, P., Savage, E., & Hall, J. (2008). Horizontal inequities in Australia's mixed public/private health care system. *Health Policy.* 86(1): 97-108

[8] Randall DA, Jorm LR, Lujic S, O'Laughlin A, Eades S, and Leyland A. Disparities in revascularisation rates after acute myocardial infarction between Aboriginal and non-Aboriginal people in Australia. *Circulation.* 2103. 127: 811 – 819.

[9] Cass A, Anderson I, Bennett C, Brown N, Catford J, Goldfeld S, Grenfell R, Reid P, Richards R, Harris E, McBride E, Nutbeam D, Hyde J and Andrew B. 2005. Inequity and health: addressing health and socioeconomic inequality in Australia. Policy and Communications, Royal Australasian College of Physicians, Sydney, N.S.W.

[10] Phelan C, Byun R, Skinner JC, Blinkhorn AS. Child dental health survey 2007: a snapshot of the oral health status of primary school aged children in NSW. *NSW Public Health Bulletin.* 2009; 20 (3-4): 40-45.

[11] Taylor HR. The prevalence and causes of vision loss in Indigenous Australians: the National Indigenous Eye Health Survey. *Medical Journal of Australia.* 2010; 192(6): 312-8.

[12] NSW Ministry of Health. The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012. NSW Health. www.health.nsw.gov.au/publications/Pages/aboriginal-cho-report-2012.aspx

# Chapter Two: Evaluation of the NSW Early Childhood Oral Health Program

## Introduction

In December 2009, I commenced the NSW Public Health Officer Training Program, and my first placement was with the Centre for Oral Health Strategy (COHS) of the NSW Ministry of Health. COHS was at that time a mandatory placement for the training program, so the organisation had a long history of working with and supporting Public Health Officer Trainees. My placement at COHS was of six months duration. On arrival to this placement, there was some flexibility in identifying an appropriate project to undertake, and there were a number of potential project options for consideration. The Early Childhood Oral Health Program had been underway for three years and COHS had planned to undertake an evaluation of the program in 2010 using external consultants. Through discussions it was determined that I should conduct the Early Childhood Oral Health Program Evaluation for COHS as my core placement project.

### Project Overview:

Early childhood caries (ECC) is a chronic disease with high prevalence and a significant health burden in Australia and globally, despite being preventable. The disease has biological, behavioural and social determinants, [1 – 6] and in NSW higher rates of early childhood caries are observed in Aboriginal children, and in children from low socio-economic backgrounds and culturally and linguistically diverse backgrounds. [7] Early childhood caries has significant consequences in the short term for the child, the child's family, and the health system, and is also associated with poor lifetime oral health status. [8-10].

The NSW Early Childhood Oral Health (ECOH) Program was established by The Centre for Oral Health Strategy, of the NSW Ministry of Health, in June 2007 to promote and improve the oral health and wellbeing of infants and young children through prevention of, and early

intervention for, ECC. [11] The ECOH Program is a community based program focussed on integrated service delivery and the development of effective partnerships between families, child health professionals, and oral health professionals. The first objective is to support child health professionals' capacity to incorporate oral health into regular child health checks, which includes providing oral health information to parents, oral health screening for infants and young children, early identification of ECC, and referral to oral health services for infants and young children with ECC, or at risk of developing ECC. Parents are provided with anticipatory guidance, resources and support to enable positive oral health behaviours in the home, and to encourage parental monitoring of their child's oral health. The second objective is to support oral health professionals to focus on early management of dental disease, and to incorporate promotion and prevention into their services, through working in partnership with parents.

The key objective of my placement at the Centre for Oral Health Strategy was to undertake an evaluation of the Early Childhood Oral Health Program. It was identified by key stakeholders of the ECOH Program that the evaluation should focus on processes, partnerships, equity, and impact. It was envisaged that the key findings of the program evaluation would inform the strategic planning process and development of a new project framework for 2010 – 2015.

The aims of the evaluation were to identify the key achievements of the ECOH Program and the factors enabling these, and to determine whether the program was effective in reaching populations with a higher burden of oral disease in NSW. While the ECOH Program targets children and parents through child health professionals and oral health professionals, this process evaluation focussed particularly on child health professionals, and the degree to which they were incorporating oral health promotion and prevention into their routine care.

The program evaluation was undertaken in early 2010 using mixed methods in order to capture both the perspectives and experiences of service providers and beneficiaries, and any changes in state-wide public oral health services activity for children. I designed, implemented, and reported on this evaluation project, under the supervision of my workplace and academic supervisors. Information was gathered through document review, surveys and interviews with program implementers, interviews with parents of young infants, and analysis of the Information System for Oral Health (ISOH) database for public oral health services activity.

The evaluation identified key achievements and ongoing challenges for the ECOH program, demonstrated that a model of shared care for early childhood oral health had been initiated in NSW (between child health professionals, oral health professionals, and parents), and described the impact of the program on referral rates to public oral health services in NSW. While various strategies had been incorporated into the program to target those population groups who experience a higher burden of early childhood oral health disease, the results indicated that the reach and impact of the programs for these groups did not appear to be sufficient considering the increased need. The evaluation report documents a series of recommendations based on the findings, which focus on issues of reach and equity, collaborative partnerships, and ongoing monitoring and evaluation strategies.

## Project Outputs and Impact:

This project resulted in two main outputs:

1. The final project report, entitled "NSW Early Childhood Oral Health Program Evaluation" was published by the Centre for Oral Health Strategy in 2010. The hard copy of the report was distributed to key stakeholders of the ECOH Program, and an electronic version is available online at http://www0.health.nsw.gov.au/pubs/2010/ecoh_eval.html.

2. A paper reporting on the evaluation findings, entitled "The Early Childhood Oral Health Program: Promoting Prevention and Timely Intervention of Early Childhood Caries in NSW through Shared Care" was published by the Health Promotion Journal of Australia (2012, 23: 171-176).

In addition, an oral presentation on this project, entitled "The Early Childhood Oral Health Program NSW: Prevention and Early Intervention of Early Childhood Caries", was delivered by myself and the Program Manager, Ms Claire Phelen, at the Australian Health Promotion Association Conference in Cairns in April 2011.

The project provided an opportunity for the key stakeholders involved in the oversight, implementation, and monitoring of the Early Childhood Oral Health Program to consider the

key achievements and ongoing challenges for the program, following the first three years of the program. The results of the evaluation were formally presented to:

1. The Early Childhood Oral Health Advisory Committee on 4th May, 2010
2. The Early Childhood Oral Health Program Coordinators Meeting on 2nd July, 2010.

The Advisory Committee and the ECOH Program Co-ordinators used the findings of the evaluation, and the recommendations resulting from the evaluation, to guide the on-going planning, implementation, and monitoring of the ECOH Program in the subsequent phase of the program. This occurred after I concluded my placement.

## Project Reflections:

Undertaking this project was a valuable learning experience for me. This was the first placement and project I undertook while on the NSW Public Health Officer's Training Program. The project required me to consult with a large number of stakeholders involved in a state-wide oral health program, including Area Health Services Directors of Oral Health, Early Childhood Oral Health Program Co-ordinators, child and family health nurses, academics in Oral Public Health, and parents of infants in Blacktown, Auburn, and Dubbo. Through these experiences I developed an understanding of oral health service delivery, child and family health services, and community health services, and an introduction to the issues and challenges associated with ensuring state-wide programs reach vulnerable populations, including Aboriginal people, people from low socio-economic backgrounds, and people from culturally and linguistically diverse backgrounds.

My impression is that the Early Childhood Oral Health Program is a well-designed and implemented program that addresses early childhood oral health from a number of angles and at a number of levels. The first level of the program aims to prevent early childhood caries, providing anticipatory guidance to parents of young infants through information, education and communication materials, and through their interactions with child health professionals, in particular child and family health nurses. The second level of the program addresses early identification of early childhood caries by ensuring child health professionals and parents are regularly checking the teeth of young infants. The third level of the program ensures that infants at risk or with early childhood caries can access preventive and restorative oral health

services in a timely fashion in order to prevent the progression of the disease. The program is supported by an appropriate governance structure, human resources at the local level, and policy and structural guidelines. Three elements of the program emerged as key components contributing to the early success of the program. These were the re-inclusion of oral health information in the NSW Personal Health Record (or Blue Book) which guides child health professionals when providing child health checks, the widespread delivery of training in early childhood oral health to child health professionals to ensure they have the appropriate information and skills required, and the development and distribution of effective early childhood oral health information, education, and communication resources.

The final report for the program evaluation was completed in 2010, while the manuscript which was submitted to the Health Promotion Journal of Australia was completed in late 2011. During this time the authors of the paper further reflected on the key findings of the evaluation, and reached consensus that the most significant finding of the evaluation, and achievement of the ECOH Program in the first three years, was the change in practice of the child and family health nurses to include early childhood oral health promotion, screening, and referral when required as a component of their routine practice. The published paper (Part B of this chapter) primarily focuses on this issue. Oral health has historically been the domain of dentists, however most young infants do not see dentists at an early age [12], and therefore dentists rarely have the opportunity to prevent or treat early childhood caries. Young infants and their parents do however regularly see child health professionals, in particular child and family health nurses, who therefore are well placed to address early childhood caries as a component of their routine care. Mouradian [13] proposed a model of shared responsibility for children's oral health whereby primary care practitioners (such as paediatricians, general practitioners, and child and family health nurses) and dental professionals become more involved in early oral health promotion and prevention activities with parents of infants and young children. In this way, child health services and dental services are reoriented to incorporate oral health promotion in partnership with parents. The ECOH Program specifically targeted child and family health nurses, and in a relatively short period early childhood oral health became a component of their routine care, when it previously had not been. The paper therefore reflects on the achievements of the ECOH Program in implementing a model of shared care, as recommended by Mouradian [13]. Changing the behaviours and professional practices of clinicians is challenging, and it is significant that the ECOH Program achieved this.

The evaluation process identified that in relation to equity, significant work had started in ensuring the program was implemented and delivered equitably to all people; however, that more could be done in reaching some populations. Specific strategies were undertaken to attempt to ensure that the program was accessible and appropriate for specific vulnerable populations - namely Aboriginal families, families from low socio-economic backgrounds, and families from culturally and linguistically diverse backgrounds. These efforts resulted in higher proportions of referrals to public dental services for Aboriginal children and children from low socio-economic backgrounds (but not for children of culturally and linguistically diverse backgrounds) compared to the proportion of these groups in the child population, however this level of response remains inadequate when the increased burden of ECC experienced by these vulnerable population groups is considered. The program is essentially a mainstream program that is then adapted in some ways to specifically target vulnerable populations, however perhaps programs would be more equitable if they were firstly specifically designed to meet the needs of the most vulnerable populations, rather than addressing vulnerable populations as a second phase strategy.

This evaluation study was my first applied public health research project undertaken as a Public Health Officer Trainee. The study required the development and application of both qualitative and quantitative research methods for which I had limited previous experience. The time frames to complete this project were tight, and obtaining ethics approval to commence the study was a lengthy process. Therefore the data collection, analysis, and reporting was conducted within approximately a six week period. My skills in applied public health research developed significantly through each step and component of this study. The evaluation protocol used a number of data collection strategies – on reflection the information from the program implementers was the most informative data for the purposes of the evaluation, and the information from the ISOH database was also highly informative despite concerns regarding data quality (see below). The information garnered from the parents of young children was interesting, but did not provide highly valuable information for the purposes of the evaluation of the program, perhaps due to the relative low intensity of the program intervention from the perspectives of parents. This information was therefore not reported in the published paper.

## Limitations

There were a number of limitations to the methods used to evaluate the program. A state-wide perspective was not achieved for the qualitative data gathered from interviews of program implementers and program beneficiaries. The parents and child and family health nurses who were interviewed were drawn from only three Community Health Centres. As such, the results provide a snap shot of the program in those particular locations, which raise some pertinent insights and reflections on the program only. There was also an inherent bias in the selection of participants. Staff generally volunteered to participate in the evaluation, and may represent nurses who were most interested in the program. Similarly, parents interviewed were those already attending the Community Health Centres for Child Health Checks, and therefore did not represent the general populations' awareness and experiences of oral health, which could be assumed to be lower.

Secondly, the quantitative data gathered through the ISOH system highlighted several limitations using these data to evaluate the program. Data from ISOH were gathered for children referred to public dental services from Community Health and other child health referral sources, however it appears that this item is not routinely or reliably entered during intake into the ISOH system in all Area Health Services, and as such many of the children who may have been referred from these sources were not included in the data analysed. Although not representative of the whole state, the data do provide important information about referral patterns and outcomes. It is also important to consider that the data on utilisation of dental services only reported public oral health services and thus excluded access to private dental service providers.

## Contributions and acknowledgements:

The evaluation design, implementation, and reporting was completed by myself. I am the primary author of the report and the published paper. The data from the Information Systems for Oral Health was extracted by Mr Michael Jacobi at the Centre for Oral Health Strategy, and then analysed and reported by myself.

The following people made the following contributions to this project:

- Ms Claire Phelan, Centre for Oral Health Strategy, NSW Ministry of Health: Guidance on the evaluation design, implementation, and reporting. Key informant on the program implementation. Co-author of the published paper.
- Associate Professor Glenda Lawrence, University of New South Wales: Guidance on the evaluation design, implementation, and reporting. Co-author of the published paper.
- Dr Angela Dawson, University of New South Wales, NSW: Guidance on the evaluation design, implementation, and reporting. Co-author of the published paper.
- Dr Siranda Torvaldsen, University of New South Wales. Co-author of the published paper.
- Dr Clive Wright, Centre for Oral Health Strategy, NSW Ministry of Health: Guidance on the evaluation design, implementation, reporting. Co-author of the published paper.
- Mr Michael Jacobi, Centre for Oral Health Strategy, NSW Ministry of Health: Extracted the data from the Information Systems for Oral Health (ISOH) database.
- Dr Anthony Blinkhorn, University of Sydney: Guidance on the evaluation design
- Ms Jennifer Noller, Centre for Oral Health Strategy, NSW Ministry of Health: Key informant on program implementation. Provided final editing and formatting for the report.
- Mr John Skinner, Centre for Oral Health Strategy, NSW Ministry of Health: Provided support on the administration and co-ordination of my placement at the Centre for Oral Health Strategy and the undertaking of this project.

## Ethics Approval:

This project was approved for implementation as a quality assurance project by the Sydney West Area Health Service Human Research Ethics Committee and as a research project by the Greater Western Area Health Service Human Research Ethics Committee. This approval was ratified by the University of New South Wales Human Research Ethics Committee. Approval letters by ethics committees are included in Appendix 2.

## Chapter Overview:

The body of this chapter comprises the two main components:

- **Chapter 2 Part A** (Page 23): Published Report: "NSW Early Childhood Oral Health Program Evaluation" http://www0.health.nsw.gov.au/pubs/2010/ecoh_eval.html

- **Chapter 2 Part B** (Page 91): Publication: Maher L, Phelen C, Lawrence G, Dawson A, Torvaldsen S, Wright C. The Early Childhood Oral Health Program: Promoting Prevention and Timely Intervention of Early Childhood Caries in NSW through Shared Care. *The Health Promotion Journal of Australia*. 2012. 23: 171-176.

As both of these components have been published, and are available in the public domain, the published versions have been reproduced as published (with revised formatting) in the following sections. In this thesis, all products which have been published and are available in the public domain have been boxed to demonstrate that they are published final pieces of work.

## References (for Introduction):

[1] Featherstone JDB. The Continuum of Dental Caries - Evidence for a Dynamic Disease Process. *Journal of Dental Research 2004;* 83: C39. DOI: 10.1177/154405910408301S08.
[2] Gussy MG, Water EG, Walsh O, and Kilpatrick NM. Early childhood caries: current evidence for aetiology and prevention. *Journal of Paediatrics and Child Health.* 2006; 42(1-2):37-43.
[3] Mouradian WE, Wehr E, and Crall JJ. Disparities in Children's Oral Health and Access to Dental Care. *Journal of the American Medical Association.*2000; 284 (20): 2625-2631.
[4] Vadiakas G. Case definition, aetiology and risk assessment of early childhood caries (ECC): a revisited review. *European archives of paediatric dentistry*. 2008. 9(3): 114-125.
[5] Psoter WJ, Pendrys DG, Morse DE, Zhang H, and Mayne ST. Associations of ethnicity/race and socioeconomic status with early childhood caries patterns. *Journal of public health dentistry.* 2006. 66(1): 23-29
[6] Hallett KB and O'Rourke PK. Social and behavioural determinants of early childhood caries. *Australian dental journal.* 2003. 48(1): 27-33.

[7] Phelan C, Byun R, Skinner JC, Blinkhorn AS. Child dental health survey 2007: a snapshot of the oral health status of primary school aged children in NSW. *NSW Public Health Bulletin.* 2009; 20 (3-4): 40-45.

[8] Douglass JM, Douglass AB, Silk HJ. A practical guide to infant oral health. *American Family Physician*. 2004; 70(11): 2113-20.

[9] Yengopal V, Harnekar S, Patel N, Siegfried N. Dental fillings for the treatment of caries in the primary dentition. *Cochrane Database of Systematic Reviews.* 2009; 15 (2):CD004483.

[10] Li Y, Wang W. Predicting caries in permanent teeth from caries in the primary teeth: an eight year cohort study. *Journal of Dental Research.* 2002; 81(8): 561-6.

[11] Centre for Oral Health Strategy NSW. NSW Early Childhood Oral Health (ECOH) Program Plan. Unpublished, 2007.

[12] Slack-Smith LM. Dental visits by Australian preschool children. *Journal of Paediatrics and Child Health.* 2003; 39(6):442-5.

[13] Mouradian WE, Wehr E, and Crall JJ. Disparities in Children's Oral Health and Access to Dental Care. *Journal of the American Medical Association.*2000; 284 (20): 2625-2631.

# Chapter Two Part A:

# Published Report: "NSW Early Childhood Oral Health Program Evaluation"

Centre for Oral Health Strategy
NEW SOUTH WALES

# NSW Early Childhood Oral Health Program Evaluation


**Centre for Oral Health Strategy NSW**

**August 2010**

SHPN: (COHS) 100 198

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- Mr Michael Jacobi, Centre for Oral Health Strategy, NSW
- Dr Glenda Lawrence, University of New South Wales
- Dr Angela Dawson, University of New South Wales, NSW
- Dr Clive Wright, Centre for Oral Health Strategy, NSW
- Dr Anthony Blinkhorn, University of Sydney
- Mr John Skinner, Centre for Oral Health Strategy, NSW
- Ms Jennifer Noller, Centre for Oral Health Strategy, NSW

# Abbreviations

| | |
|---|---|
| ACCHS | Aboriginal Community Controlled Health Service |
| AHS | Area Health Service |
| AMS | Aboriginal Medical Service |
| DoCS | Department of Community Services |
| ECC | Early Childhood Caries |
| ECOH | Early Childhood Oral Health |
| CALD | Culturally and Linguistically Diverse |
| CFHN | Child and family health nurses |
| COHS | Centre for Oral Health Strategy |
| ISOH | Information System for Oral Health database |

# Table of Contents

# EXECUTIVE SUMMARY

## Background

Early childhood caries (ECC) is a chronic disease with high prevalence and a significant health burden in Australia and globally, despite being preventable. The Centre for Oral Health Strategy (COHS) New South Wales (NSW) developed the Early Childhood Oral Health (ECOH) Program to promote and improve the oral health and wellbeing of infants and young children through prevention of, and early intervention for, ECC. It is a community based early intervention program. The founding principle is integrated service delivery: child health professionals promote oral health, screen and refer for caries while oral health professionals incorporate promotion and prevention into their management strategy for young children. The evaluation project reviews the ECOH program, focussing on process, partnerships, impact, and equity.

## Methods

A mixed-methods evaluation approach gathered qualitative and quantitative information from a number of sources. Information for the evaluation was gathered through:

1. Document review
2. Survey and interviews of program implementers and beneficiaries
3. The Information System for Oral Health (ISOH) database of public dental services activity.

A case study approach was used for the interview component of the evaluation with three localities chosen within NSW as specific cases to be investigated.

## Key Findings

The major achievements of the program (those comprehensively achieved state-wide) include:

- development of *Early Childhood Oral Health Guidelines*, training resources, and information materials for child health professionals and parents
- identification of ECOH program co-ordinators within each Area Health Service (AHS)
- implementation of NSW Health Department Policy Directive for the program
- development of structures and systems which support program development, partnership development, training delivery, referrals, and monitoring and evaluation processes

- roll-out of the program to child and family health nurses, which can be considered complete. This was facilitated by the re-inclusion of oral health into the Blue Book.

The significant achievements of the program (achieved within some AHS only):

- the partnerships developed with general practitioners and practice nurses
- the partnerships developed with local hospitals
- the development of effective partnerships with Aboriginal Medical Services
- resource development for Aboriginal people and Culturally and Linguistically Diverse (CALD) populations
- delivery of early childhood oral health professional development for oral health professionals
- the incorporation of promotion and prevention strategies into public dental service delivery.

## Recommendations

The main recommendations of this evaluation are:

**Program Management:**

1. Implement a collaborative project review and strategic planning process for the ECOH program.
2. Ensure adequate allocated human resources for program co-ordination within each AHS.

**Partnerships:**

3. Maintain the excellent partnerships that have been established with child and family health nurses networks.
4. Ensure that oral health information and risk assessments remain an integral part of the NSW Personal Health Record (Blue Book).
5. Further develop partnerships with GPs and practice nurses across all AHS.
6. Develop further partnerships with hospitals and health services.
7. Clarify and publicise the referral criteria and the recommended age for a child's first dental visit.

**Equity and Reach:**

8. Specifically target improvements in accessibility of the ECOH program to Aboriginal children and families.
9. Improve the accessibility of the program for CALD communities.

**Additional Opportunities:**

10. Consider further developing partnerships with community services, nongovernment organisations (NGOs) and pharmacies.
11. Continue to collaborate with the NSW Oral Health Promotion Network in achieving objectives for the ECOH program in NSW.

**Public Dental Services:**

12. Encourage ongoing incorporation of promotion and prevention strategies into public dental service delivery for young children.

**Program Monitoring and Evaluation**

13. Review the monitoring and evaluation framework for the ECOH program, including the data elements used to monitor some aspects of the program.

# 1. BACKGROUND

## 1.1 Early Childhood Caries

Early childhood caries is a dental decay disease with high prevalence and a significant health burden in Australia, despite being preventable. Early childhood caries is defined as at least one carious (decayed) lesion affecting a maxillary anterior tooth in a preschool-aged child.[1]

Dental caries is a bacterial disease that is modified by diet.[2] Bacteria in dental plaque metabolise sugars and starches producing acids in the mouth that cause loss of minerals from the tooth surface.[3] Dental caries can be prevented through changed bottle feeding practices, limiting behaviours which transmit bacteria from parent to child, dietary modification, fluoride delivery, and tooth brushing.[4]

Early childhood caries has significant consequences. Untreated decay can cause significant pain. It can result in systemic infection and the development of abscesses, which often require hospitalisation and general anaesthesia (GA) to address.[5] Early childhood caries can also adversely affect growth, cognitive development, speech, communication, self image and social functioning.[3] Additionally, children who experience ECC are more likely to experience other dental problems as they grow older.[6]

Caries experience is measured by calculating how many deciduous (baby) teeth have carious lesions, how many have been extracted, and how many have fillings – the dmft measure.[7] The NSW Child Dental Survey 2007 identified the prevalence of dental disease in NSW.[8] In children aged 5–6 years, 40% have experience of dental disease, with a mean dmft of 1.54. The experience of dental disease is significantly higher in certain populations with the mean dmft increasing to 3.04 among Aboriginal children, 2.67 in children living in remote/very remote areas, 2.34 for children of mothers born in non-English speaking countries and 2.11 for children whose parents hold a Centrelink concession card who are among the most disadvantaged socio-economic grouping.

In NSW in 2006–07 [9] the hospitalisation rate for the restoration of teeth only among children aged 0–4 years was 143.2 per 100,000 population; the rate for removal of teeth was 114.7 per 100,000 population. More than one third of all children in that age group who were

hospitalised for restoration or removal of teeth due to dental caries in 2006–07, were admitted for both restoration and removal (138.8 per 100,000).

Experience of ECC in a child is a powerful predictor of future caries in adolescence and adulthood.[6] Interventions need to focus on primary prevention of ECC with research indicating a need for anticipatory advice to be provided to parents before their child's teeth erupt.[10] Only 12% of Australian children at 2 years of age having ever seen a dental professional [11] so it is clear that advice may be best delivered by non-dental health care providers who are more likely to see infants and toddlers before ECC manifests clinically.[4]

As well as prevention, early identification of ECC could also significantly decrease the burden of disease. Hospitalisation and surgery is required for ECC at an advanced stage, at significant financial cost to the health system and heavy burden to both child and family.[5] Identification of ECC at an early stage and appropriate intervention can reverse the disease process, prevent further decay developing, and avoid future surgical interventions.[4]

## 1.2 The Early Childhood Oral Health Program

In 2007, COHS (NSW) developed the ECOH program to promote and improve the oral health and wellbeing of infants and young children through promotion, prevention and early intervention.[12] The program focuses on effective partnerships between families, oral health professionals and general child health professionals to achieve optimal oral health for infants and young children. It is a community based early intervention program that is based on integrated service delivery. The strategy is two-fold: targeting both child health professionals as well as oral health professionals. The goal for the first target group is for child health professionals (e.g. child and family health nurses, GPs, hospital staff, and NGO staff) to include oral health in child health checks. This includes providing oral health information to parents, oral health screening for infants, early identification of ECC, and referral to oral health services for infants at risk of ECC as required. The goal for the second target group is to encourage oral health professionals to focus on early management of dental disease and to incorporate promotion and prevention into their services.

The key elements of the program are:

- development of child health networks and partnerships to enable implementation of the program
- development of resources and training for parents, child health professionals, and oral health professionals
- delivery by child health professionals of oral health promotion and prevention strategies, and early identification and referral processes for ECC, for children aged under 5years and their parents/carers
- facilitation of appropriate early management of dental disease by oral health services and incorporation of prevention and promotion into oral health services.

The initial Program Framework, developed in 2007, is outlined in Table 1.

## 1.3 Evaluation of the Early Childhood Oral Health Program

The ECOH program is intended to be an ongoing program of COHS. The initial Program Framework (Table 1) was designed for a 3 year period and a review of this framework in late 2009 suggested that most strategies and tasks outlined in the framework had been addressed. Component monitoring and evaluation strategies had been implemented during the course of the program; however, a full evaluation of the program had not been completed. The COHS staff, along with other key program stakeholders, developed a plan for this evaluation to be completed in 2010. It was identified that the evaluation should particularly focus on processes, partnerships, equity, and impact. It was envisaged that the key findings of the program evaluation would inform the strategic planning process and development of a new project framework for the 2010–2015 period.

**Table 1: The ECOH Program Framework, 2007**

| Goal | To reduce the incidence of early childhood caries in children 0–5 years |
|---|---|

| Objectives | Strategies | Tasks | Performance Indicators | |
|---|---|---|---|---|
| | | | Process | Impact |
| To improve the awareness of oral health issues for parents and/or child health professionals | Provide appropriate oral health information for parents and child health professionals | Develop a Lift the Lip Resource | # Lift the Lip resources printed & distributed | |
| | | | Satisfaction level | |
| | Provide oral health education and training for child health professionals | Develop Early Childhood Oral Health Guidelines for Child health professionals | # Early Childhood Oral Health Guidelines for Child health professionals printed & distributed | |
| | | Develop and implement an oral health training package for child health professionals | # training sessions held<br># attended<br>% satisfied with training | |
| To increase the early identification and intervention of dental caries for children 0–5 years | Integrate an oral health risk assessment into child health checks, home visits and dental clinics | Implement the Early Childhood OH Guidelines for Child health professionals | # child health professionals who integrate an oral health risk assessment into their core business<br># children who have been assessed<br># children referred from child health professionals | <dmfts at 5 years<br>Reduction in GAs<br>Increase in referrals from child health professionals |
| | Provide early childhood oral health professional development for dentists and dental therapists | Conduct a needs assessment to determine appropriate professional development needs | Professional development needs identified | |
| | | Develop and implement an early childhood oral health professional development package for dentists and dental therapists | # training sessions held<br># attended<br>% satisfied with training | |

# 2. EVALUATION QUESTIONS

The following questions were identified for the evaluation:

1. Has the program been implemented as designed?

2. Has the program had any impact on early identification, referral, and intervention of ECC in NSW?

3. Has the program been equitable in relation to people from low socioeconomic, CALD, regional and remote locations, and Aboriginal populations?

4. Have the partnerships established for integrated service delivery been effective?

5. What are the experiences and recommendations of program co-ordinators and implementers?

6. What are the experiences and recommendations of program beneficiaries (i.e. parents)?

# 3. METHODS

## 3.1 Evaluation Approach

A mixed- methods approach, combining qualitative and quantitative data, was utilised for this evaluation to capture state-wide service utilisation data as well as the perspectives and experiences of service providers and beneficiaries.[13] Mixed-methods approaches are being increasingly used in health care research, particularly for evaluation purposes, for increased comprehensiveness, pragmatism, confirmation, and in recognising the limitations of quantitative data to answer complex questions.[14] Information for the evaluation was gathered through:

1. Document review
2. Survey and interviews of program implementers and beneficiaries
3. The Information System for Oral Health (ISOH) database for public dental services activity.

## 3.2 Evaluation Locations

A case study approach was used for the interview component of the evaluation with three localities within NSW chosen as specific cases to be investigated. Case studies using qualitative methods can be valuable when the intervention is to be investigated in detail, where the focus is on how and why the intervention succeeds or fails, and where the general context will influence the outcome.[15] The case study localities were Doonside, Auburn and Dubbo. These were purposely identified [16] to ensure that the communities examined were diverse and representative of communities with considerable proportions of children known to have increased experience of dental disease.[8] This included children from low socio-economic (all three locations), CALD (Auburn), regional and remote (Dubbo), and Aboriginal populations (Doonside and Dubbo). A matrix system was devised to identify appropriate locations according to these criteria and pragmatic reasons also factored into the final locations chosen.

## 3.3 Study Population

Three different groups formed the study population for the evaluation:

1. All children referred to public dental services through the ECOH program. De-identified state-wide data was available through the ISOH database.
2. Parents/carers of children aged 18 months to 5 years attending a community health centre in one of three study locations (Doonside, Auburn, or Dubbo) for a Child Health Check.
3. Program implementers – responsible for implementing the ECOH program at various levels within the three study locations.

## 3.4 Data Collection Techniques

### 3.4.1 Document Review

An analysis of available program literature, documents and data held at COHS was reviewed to compile a narrative report of program implementation and monitoring to date. Program proposals, reports, published papers, presentations, and the results of component monitoring and evaluation activities that have been completed during the project were analysed. A complete overview of the program was compiled and compared to the original project plans. Implementation data submitted to COHS by AHS ECOH co-ordinators was also reviewed.

### 3.4.2 Survey and Interviews of Program Implementers and Beneficiaries

#### (a) 5x5 Questionnaires

In December 2009, a pre-evaluation "5x5" questionnaire was conducted by COHS to inform the evaluation planning process. ECOH co-ordinators from each AHS were asked to conduct questionnaire interviews with five child and family health nurses, asking them five questions. The questions addressed the frequency with which child and family health nurses conducted oral health promotion and screening within routine child health checks, and the nurses impressions of what impact those interventions may have. Forty child and family health nurses in total were surveyed, from all eight AHS. For completeness, the results of the survey are included in this report. The results of the 5x5 survey were considered in developing the evaluation protocol and interview questions.

#### (b) Interview Questionnaires: Program Implementers

Twenty-six program implementers were interviewed in person. These included one AHS oral health director, five AHS ECOH program co-ordinators, 14 child and family health nurses or

other related staff from community health centres and four staff from the COHS, including the state-wide program co-ordinator. Informed written consent was given by participants. Structured interviews lasted approximately 30 minutes and were short form questions and answers. The questions explored the experiences of the implementers in the development, implementation, and monitoring of the ECOH program, and their understanding of the successes and challenges of the program to date. The interviews were audio-taped to facilitate the completion of the questionnaire form. The Questionnaire Form for child and family health nurses is included in Appendix 1. Other program implementer interviews were less structured in style.

### (c) Interview Questionnaires: Parents/Carers

Up to 6 parents from each locality were interviewed (17 in total) at community health clinics in the case locations, where parents routinely attend for child health checks or clinics. After the usual intervention with the child and family health nurse was completed, parents of children aged between 18 months and 5 years were invited to participate in the evaluation. Written informed consent was provided by participants. Structured interviews of approximately 30 minutes were conducted using short form questions and answers.

The questions addressed the parent's knowledge, attitudes and practices in early childhood oral health, and any experiences with child health and oral health professionals providing oral health promotion, screening, and intervention to their child. The interviews were audio-taped to facilitate the completion of the questionnaire form. The Questionnaire Form for parents is included in Appendix 2.

The qualitative data from the interview questionnaires of program implementers and parents/carers were analysed using content analysis methodology. The interviews were transcribed, then a number of key categories and concepts were identified, and the responses of each person related to each key concept were collated and reported in the results section.

## 3.4.3 Information System for Oral Health (ISOH) Data

ISOH is the database used to manage patient interactions with public oral health services in NSW. The ISOH database is managed by COHS. All people who access public dental services in NSW are entered into the ISOH system and demographic data and information about dental services received is recorded. This database can record if children have been referred by the

ECOH program. An analysis of de-identified data for children referred by the ECOH program to public dental services was undertaken to review the number of referrals, interventions, and outcomes for these children. The demographic data of the children referred under ECOH were analysed to assess the equity aspects of the program.

For children aged 0–5 years who are referred to public dental services through the ECOH program (that is, referred by NGOs, the Department of Community Services, or Community Health), the following data items were retrieved: gender, postcode, whether born in Australia, speaking English in the home, Aboriginal or Torres Strait Islander status, child experiencing pain in the mouth on referral, outcome of referral (appointment/waiting list/voucher), and the type of intervention provided (filling, extraction).

De-identified quantitative data were retrieved from the ISOH database. Descriptive epidemiological analysis of the data was conducted using EpiInfo™ Version 3.5.1. The analysis included calculating frequency distributions and cross tabulations of the number of children referred to public dental services, their demographic indicators, their experience of pain, the outcome of their referral, and the treatment received.

## 3.5 Ethical Considerations

This project was approved for implementation as a quality assurance project by the Sydney West Area Health Service Human Research Ethics Committee and as a research project by the Greater Western Area Health Service Ethics Committee. This approval was ratified by the University of New South Wales Human Research Ethics Committee

# 4. RESULTS (PART 1): Program Implementation

This section collates the results of the document review and overviews the ECOH program achievements for 2007–2009. The Centre for Oral Health Strategy NSW (COHS) developed the ECOH program in 2007. The Program Framework is shown in Table 1.

## 4.1 Governance

An ECOH Program Advisory Committee was formed in July 2006 to provide governance, oversight, and advice to the ECOH program. The role of the ECOH Program Advisory Committee is to:

1. Provide advice on the ECOH program
2. Provide input into the major documents produced
3. Provide input into oral health training initiatives
4. Participate in consultation forums related to the program
5. Provide advice on oral health research to support indicators in strategic oral health plans.

Membership of the Advisory Committee includes representatives from COHS, NSW Health, the University of Sydney, Aboriginal Health, Dental Therapists and Paediatric Dentists from AHS, Dietician, Paediatrician, GP NSW, Clinical Nurse Consultant, Oral Health Promotion Network, Australian Dental Association, and Consumer Organisations.
The Committee meets two times per year. The Advisory Committee reports on the progress made on key ECOH program strategies through the Chief Dental Officer and the State Oral Health Executive to the State Oral Health Strategic Advisory Committee (SOHSAC)

## 4.2 Structure and Responsibilities

The implementation of the ECOH program relies on collaborative partnerships between COHS and the Oral Health Divisions of each AHS. At COHS, the Senior Policy Analyst, Ms Claire Phelan, has been responsible for developing, co-ordinating and implementing the program. In each AHS, an ECOH program co-ordinator was identified to implement the program within their AHS and to collaborate with COHS in the ongoing development of the program. The role

of the ECOH program co-ordinator is most often an additional function for an incumbent staff member working in oral health within the AHS, although a few AHS have dedicated a number of working days (up to 2 per week) to the role for their ECOH co-ordinator.

In partnership with the ECOH Advisory Committee and AHS representatives, COHS has co-ordinated development of the program and policies as well as the development, production and distribution of resources that support the program. Within each AHS, the ECOH co-ordinator provides or co-ordinates training, resources and support to child health professionals within the area, monitors referrals and outcomes for children referred from the program, and participates in broader program development as they are able. The ECOH co-ordinators and COHS have regular meetings to co-ordinate and further develop the ECOH program.

The COHS also co-ordinates a state-wide Oral Health Promotion Network which develops and implements other health promotion activities within NSW, including some that target children under 5 years of age and align with the overall ECOH program aims. Many ECOH co-ordinators are also members of the NSW Oral Health Promotion Network.

## 4.3 Policy

The ECOH program is mandated by the *NSW Health Policy Directive PD2008_020 Early Childhood Oral Health Program: The Role of Public Oral Health Services*,[17] which was published in 2008. This policy is mandatory and describes the procedures and responsibilities for implementing the ECOH program in NSW.

The policy statement says:
"The identification of children at risk of oral disease and the detection of ECC at an early age can prevent widespread destruction of the primary teeth and is critical to good oral health outcomes for children. It is too late to begin oral examinations when children start school as dental disease may already be established." (page 2)

The policy recognises that child health professionals have more opportunities to engage with and influence new parents, and conduct risk assessments, than do oral health professionals. As such, the intended objectives include: providing training to both child health professionals and all members of the child oral health team; developing and making available appropriate

resources; ensuring appropriate referral and feedback processes are in place and supported; and ensuring public policy enables optimisation of cost, quality, satisfaction and health outcomes. The policy then goes on to outline the responsibilities for COHS, AHS managers and clinical directors, ECOH co-ordinators, and child health professionals.

## 4.4 Target child health professionals

Infants and young children under 5 years of age may see a variety of child health professionals including:

- Child and family health nurses
- GPs
- Paediatricians
- General hospital and children's hospital staff (in emergency and paediatric departments)
- Aboriginal health workers.

The ECOH program specifically targeted all the child health professionals listed above during the first 3 years of the program, with a particular emphasis on child and family health nurses and GPs. Community Health Centres, operated by NSW Health through AHS, are located throughout the state and provide a free service for new parents, including an initial health check, regular developmental checks and vaccinations. The centres are staffed predominantly by child and family health nurses. General practitioners also provide the services described above, and in addition, provide a Healthy Kids Check for 4 year olds, which is now a Medicare rebate item. This check, and the Aboriginal and Torres Strait Islander Medicare Health Check, include an oral health check and refer to the Lift the Lip process. The health checks may also be undertaken by a practice nurse or within an Aboriginal Medical Service (AMS).

## 4.5 Resource development

### 4.5.1 Early Childhood Oral Health Guidelines for Child Health Professionals

The *Early Childhood Oral Health Guidelines for Child Health Professionals* [24] was produced in 2007 to support the re-inclusion of oral health in the Blue Book. The guidelines provide appropriate information for child health professionals on prevention of ECC, oral health assessment, and early identification and referral for caries. The target audience of the

guidelines is child health professionals, including paediatricians, child and family health and community health nurses, Aboriginal health workers, GPs and practice nurses.

The guidelines include 13 key recommendations for child health professionals, such as advising pregnant women to visit a dentist, providing preventive interventions to pregnant women and new parents, "Lifting the Lip" of children up to 5 years of age, assessing children's risk for oral disease, providing dietary advice and counselling, providing oral hygiene and fluoride advice, and referring children at risk of ECC to dental services.

An evaluation of the guidelines was completed in 2009 with 173 nurses from across NSW participating in a survey:

- 71% had their own copy of the guidelines and 66% of the remainder knew where to find a copy.
- 76% reported referring to the guidelines "often" or "occasionally", while 20% never referred to them.
- 63% found the guidelines easy to understand and 46% found them useful in their daily practice.
- The main reasons respondents gave for referring to the guidelines included: oral health service phone numbers (53%), referral form (47%), anticipatory guidance advice for parents (46%), and information on ECC (42%).

The evaluation also asked respondents to suggest changes to the first edition of the guidelines and any additional information. Where possible, these suggestions were incorporated into the second edition, which was released in September 2009. Since 2007, 3240 *Early Childhood Oral Health Guidelines* have been distributed in NSW.

### 4.5.2 Early Childhood Oral Health Training Program

An ECOH Training Program [18] was developed to support training for child health professionals in ECOH. It informs participants about how to incorporate oral health into regular Child Health Checks, and the 4 Year Child Health Check. The training package is designed to be delivered by anyone in a dental or oral health team with training or experience in oral health promotion. The training package includes all resources such as PowerPoint presentations and training guidelines. The information complements that provided in the guidelines described above.

### 4.5.3 The "Blue Book"

The NSW Personal Health Record, or Blue Book, is given to all parents of newborn babies in NSW by the Department of Health. It is a tool for child health professionals to use to record details of the child's health, growth and development, immunisations and to provide information and advice to parents.[19]

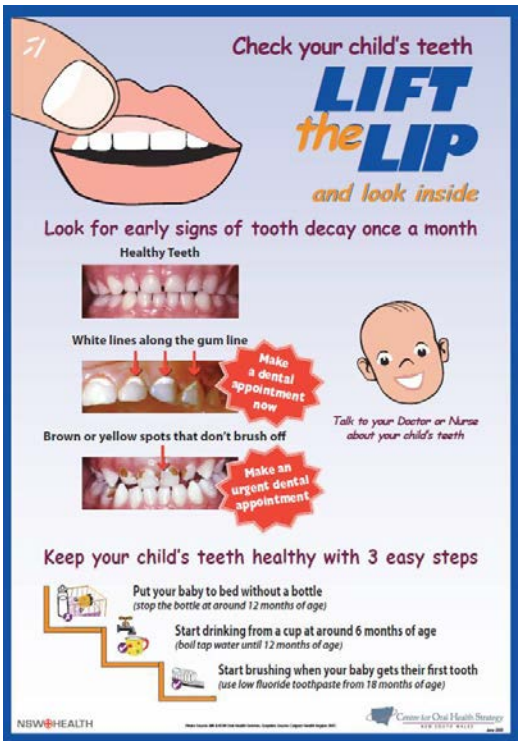
Prior to the commencement of the ECOH program, the Blue Book program[19] was undertaken. This aimed to reinstate accurate and appropriate oral health care information in the Blue Book to provide both parents and child health professionals with information about prevention of dental disease in young children. While oral health information had been included in prior editions, this information was removed in 1997. The program identified appropriate oral health messages and advocated for the re-inclusion in the Blue Book, which was approved by NSW Health in 2005. As well as providing oral health information to parents and child health professionals, the re-issued Blue Book also includes a "Lift the Lip" Oral Health Check at all child health checks from 6 months of age, and encourages parents to complete a dental check before the child starts school

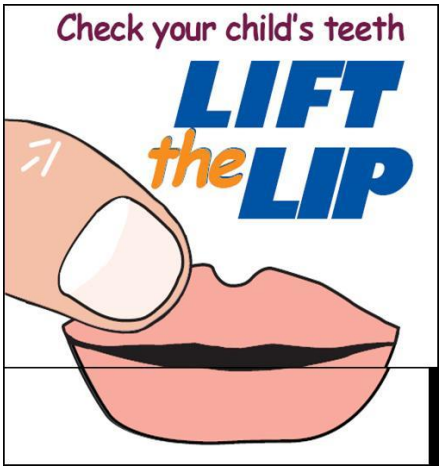
### 4.5.4 "Lift the Lip" Resources

"Lift the Lip" resources were developed to provide appropriate oral health information to parents and child health professionals. The information encourages people to "Check your child's teeth – lift the lip", looking for early signs of tooth decay once a month. A large graphic shows a finger lifting a lip, exposing the teeth below. The information also includes a picture each of healthy teeth, teeth with early stage decay, and teeth with developed decay. It clearly informs that a dental appointment needs to be made if there are any signs of tooth decay. The resource also includes three key messages for early childhood oral health care. The information comes in a poster format (Figure 1) that may be displayed in a community health centre and in a magnetic mini brochure designed to go on a household fridge.

An evaluation of the Lift the Lip resources was completed in 2008, surveying 150 people (93 child health professionals, 22 oral health professionals, 26 parents (five Aboriginal), and nine Aboriginal health workers.[20] Generally the results were positive: 93% thought the information in the brochure was clear and easy to understand, and 37% said they learned something new from the resources. Feedback given through this review, regarding language and graphics, was incorporated into a redesign of the brochure in 2009.

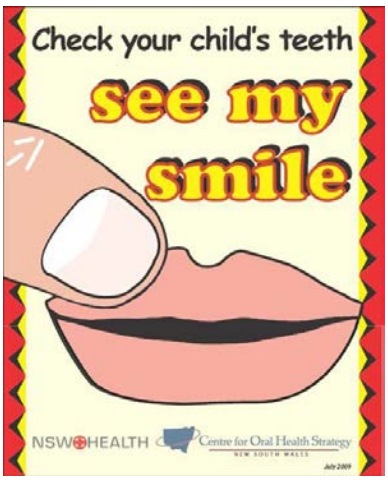
**Figure 1: Lift the Lip Poster and Mini Brochure**




Further consultation with Aboriginal communities regarding the Lift the Lip resource resulted in the development of a new version of the Lift the Lip magnet brochure for Aboriginal health workers and families. The "Lift the Lip" slogan was changed to "See my Smile", the colours of the brochure were changed to red, black and yellow, and the key oral health messages and illustrations were clarified (Figure 2). Between mid-2007 and end-2009, 217,251 Lift the Lip magnets and 27,000 See My Smile brochures were distributed – approximately 81,400 per year. Approximately 85,000 babies are born in NSW each year.

**Figure 2: See My Smile magnet brochure**




Lift the Lip resources have also been formatted and translated into 15 languages and are available through the NSW Health Multicultural Health Communication website.[21] In 2008, COHS completed an evaluation of the "Lift the Lip" brochure to assess appropriateness for CALD communities".[22] This recommended some changes to the brochures to assist CALD users, such as using more pictures, simpler terminology, and changing some wording. The changes were incorporated into the updated English Lift the Lip brochure; however, the translations available are for the older version. The evaluation also suggested points for distribution to CALD communities (pharmacies, intensive English centres, migrant resource centres), and identified opportunities to include oral health information into adult English education programs.

### 4.5.5 Other Resources for Early Childhood Oral Health

There are a number of other ECOH information resources available to child health professionals and parents, including brochures, flip charts, CD ROMs. In addition, the Little Smiles Program is currently being delivered for child care centres. It includes a number of resources including an information session for child care workers, parent information sheets, and activities with children in child care centres.

### 4.5.6 Distribution and Availability of Resources

The ECOH co-ordinators generally distribute examples of ECOH resources to all child health professionals who participate in ECOH training and many send packs with examples of resources to others who enquire about the ECOH program. Copies of all resources for reference and distribution can be ordered through The Better Health Centre Publications Warehouse, and are available free of charge.

## 4.6 Providing Oral Health Training to Child Health Professionals

### 4.6.1 Child and Family Health Nurses

The primary target audience for the ECOH program child health professional training has been child and family health nurses based at community or child health centres. The ECOH co-ordinators have also established working relationships with clinical nurse consultants and community health and centre managers to develop collaborative and context-specific partnerships to roll out the ECOH program in these areas.

An evaluation of the ECOH training (and guidelines as described above) of 179 nurses in 2009 identified that:

- 89% had attended an ECOH training session.
- 63% experienced no barriers in applying what they had learned in the program and 23% cited time or staffing issues as difficulties in applying the knowledge gained.
- 68% found the sessions informative and 64% found the sessions useful in daily practice.
- 63% of those who had attended training felt they did not require further training in order to conduct an oral risk assessment or provide parental oral health education, while 20% wanted further education.
- 80% of respondents felt that periodic in-person seminars would be the preferred method of any future training sessions, over online learning (30%), tele-health presentations (7%), or practical hands on workshops (41%).

### 4.6.2 General Practitioners and Practice Nurses

In some AHS, ECOH co-ordinators have also delivered ECOH training to GPs and practice nurses at local Divisions of General Practice. In addition Karitane has developed a Healthy Kids Check education package that includes the ECOH oral health information, which is being delivered to Divisions of GPs in 2009 under contract with NSW Health.

In 2009 COHS and the Royal Australian College of General Practice (RACGP) entered into partnership to redevelop the ECOH training materials into online education for GPs and practice nurses. The online education activity, “Early childhood oral health: case studies from general practice”, was researched and written by the RACGP’s online education service (*gplearning)* team, in collaboration with COHS. It became available online in May 2010. All RACGP members, including nurse affiliate members, will have free access to the activity and completion of the activity can earn ongoing professional development credits. A comparison of the number of referrals from general practices to NSW oral health services prior to release of this activity in May 2010 and after its release will be conducted.

### 4.6.3 Other Partnerships

Early Childhood Oral Health co-ordinators have developed many local partnerships with different groups, including AMS, hospital-based child health professionals, refugee health

professionals, paediatricians, NGOs. These are generally formally documented formally, and will be described in the Evaluation Results section.

### 4.6.4 Workforce Training

As well as addressing training of current child health professionals, COHS has been working to ensure that oral health information and training is included in the curriculum of training programs for child health professionals, such as doctors, nurses, allied health professionals, Aboriginal health workers, and child care workers.

### 4.6.5 Oral Health Assessment in Child Health Setting

The aims of the ECOH program are for child health professionals to integrate preventive interventions and an oral health assessment into their core business and to refer children at risk of, or showing signs of, ECC. In the evaluation of the *Early Childhood Oral Health Guidelines and Training Package* [20], 70% of 173 child and family health nurses surveyed said that they always include an oral health assessment as part of the scheduled Child Health Checks. [20] While some AHS use community health data to monitor oral health interventions in the community setting, this is not entered or collated reliably state-wide.

A referral system has been developed for children identified through the oral health assessment process as being at risk of, or showing signs of, ECC. An Oral Health Advice (ECOH referral) Form is completed if children require a review by an oral health professional (Appendix 3). The ECOH co-ordinator or intake system then arranges an appointment by public dental services in the AHS and priority is given to referrals made through the ECOH program. The number of referrals received, and the outcomes for children referred, are monitored by ECOH co-ordinators. Data collected by ECOH co-ordinators suggests the overwhelming majority of referrals to public dental services come from community health services (predominantly child and family health nurses).

### 4.6.6 Training of Oral Health Professionals

The ECOH program also undertakes to educate and train all members of the child oral health team to address the issues of children aged 0–5 years. This recognises that dental services have primarily been provided for school aged children in the past and that the dental treatment, and management, of younger children requires different skills and techniques.

In 2008, four professional development seminars for oral health professionals were conducted in NSW. The aim was to complement existing knowledge in identifying and managing oral health conditions common to the 0–5 year age group, to review issues related to undertaking dietary risk assessment and providing effective dietary advice to parents, and provide practical tips for easing the anxiety of younger children and parents in the dental environment. Evaluations from these training days gave positive feedback about the content and clinical usefulness of the information presented.

In 2009 training for oral health professionals focused on motivational interviewing. There is an emerging body of research demonstrating that brief motivational interviewing can be an effective method for changing dental professionals' counselling techniques and for motivating parents to improve the care of their children's oral health.[23] A pilot training program for oral health staff in Newcastle occurred in December 2009. Positive feedback was received and the training program is being rolled out across other areas in 2010.

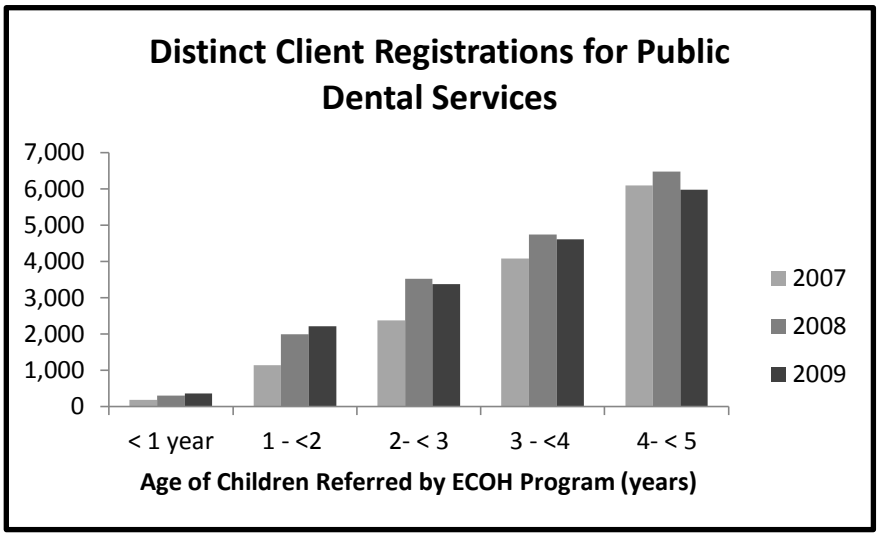
A number of dental clinics have actively started to routinely include prevention and promotion into their regular management of young children referred to dental services, as will be described in the Results Section 6D.

## 4.7 Monitoring and Evaluation

A data monitoring system was developed for the ECOH program and, until December 2009, each AHS ECOH co-ordinator was completing paper forms manually and reporting them to COHS on a quarterly basis for collation. Information collected included a record of the number of children for whom a child health professional had returned an Oral Health Advice form (whether referring to public dental services or reporting that they had referred to private dentist), the number of feedback letters sent to referring agencies, the patient outcomes, and information about local ECOH program initiatives, projects and partnerships.

The manual reporting system for the ECOH program was replaced recently with ISOH reporting. The first review in November 2009 showed the number of distinct client registrations to public dental services for all children under 5 years of age has increased since the ECOH program began. (Figure 3).

**Figure 3: Distinct client registrations to public dental services for all children aged 0 to 5 years from June 2007 to October 2009.**



# 5. RESULTS (PART 2): Evaluation Findings

## 5.1 ECOH Program Co-ordinators and COHS Staff

Six ECOH co-ordinators (five current) from five AHS were interviewed. Four staff from COHS were interviewed, including the state-wide co-ordinator of the ECOH program.

### 5.1.1 Implementation of Program at an Area Health Service Level

Each ECOH co-ordinator has developed a location and context specific approach to the implementation of the ECOH program within their AHS.

The ECOH co-ordinators have very different amounts of time allocated to implementing the program in their region, varying from 2 full dedicated days per week, to 2 hours per week. Some AHS have a dedicated ECOH co-ordinator role, others have an oral health promotion co-ordinator who also has responsibility for implementing the program, while others have a dental clinician co-ordinating the program in a few dedicated hours per week. Obviously, the time allocated to co-ordination of the program within the AHS greatly impacts the results that can be achieved – and co-ordinators with less time are frustrated by this limitation. Most co-ordinators reported the initial roll out of the program in 2007-2008 as an extremely time intensive process but report that the ongoing maintenance requires less time, with most identifying 1–2 days per week as an appropriate time allocation.

Rural AHS Co-ordinators have significant challenges due to the geographical distance that needs to be covered. One rural AHS has divided the area into two regions, with one co-ordinator but two people responsible for delivering training and developing networks. Another reported developing a network of 18 ECOH co-ordinators within the area, one from each of the public dental service facilities in the region. Each of those regional co-ordinators received Train-the-Trainer training for the program and all associated resources. They were then responsible for developing working partnerships, delivering training, and managing referrals within their region. A third rural AHS continues to rely on one co-ordinator to roll out the program, across vast distances, with videoconferencing an essential tool to deliver training.

A number of co-ordinators discussed the support of both COHS and oral health management within their AHS as integral aspects for the success of the program. While a few reported that

the initial roll out of the program was highly stressful and the role of co-ordination was much larger than they expected, nearly all were happy with the collaborative process of program development and implementation and the level of support from COHS. All were satisfied with the resources developed and found that the training package was an excellent tool that they could adapt for most situations.

Some highly praised their area management as forward thinking and visionary regarding oral health promotion strategies; while others felt that it did not appear to be a key priority within their AHS.

### 5.1.2 Partnerships

Developing, and maintaining effective working relationships and key partnerships, including the roll out of training to those groups, is the key priority of the ECOH co-ordinators.

**Child and family health nurses:** All of the ECOH co-ordinators reported successful partnerships with child and family health nurses networks within their AHS. The nurses were the primary target group for the implementation of the program. The roll out of training and the development of effective working relationships with these nurses has been achieved in all areas according to the co-ordinators and COHS staff. A number of co-ordinators have provided ongoing updates and training to the nurses and a number of AHS have included the ECOH training in the AHS Learning and Development Calendar so it is available to new staff or to those who feel they need follow up. The ECOH co-ordinators report being available to all nurses for questions and queries, and ensure prompt reporting to nurses on the outcomes of children they have referred to public dental services.

Several co-ordinators expressed concern that it is usually a small proportion of nurses within their areas who refer children to public dental services and that not all nurses who participated in training are actively referring children. Generally, the co-ordinators are unable to monitor whether the nurses are screening and providing oral health advice but are concerned that the lack of referrals from some nurses may indicate that they are not incorporating oral health into their routine management of children.

**Aboriginal Medical Services:** All ECOH co-ordinators were asked to contact the AMSs within their AHS, and while this has not been universally rolled out, a number of the co-ordinators

report significant achievements in this area, leading to development of robust relationships with the AMSs in their region, and provision of regular training sessions to their staff. One AHS is working specifically with an Aboriginal Community Controlled Health Service (ACCHS) in their area to develop an Aboriginal oral health training package, which will support Aboriginal health workers in promoting oral health in their communities. One rural AHS combined with a Regional Aboriginal Medical Service Grouping to fund an Aboriginal health promotion co-ordinator, who was involved in delivering ECOH Training to AMS, although unfortunately this position is currently vacant. Another AHS has received Demonstration Grant funding with an AMS to develop a training package for Aboriginal health workers to complete oral health assessments when testing for otitis media. Other ECOH co-ordinators have not approached the AMS in their region, and expressed some hesitation in doing so, feeling that they were not fully resourced or skilled to work specifically with Aboriginal services.

The co-ordinators felt that the See My Smile brochure for Aboriginal children was a useful resource, but felt that more specific resources for Aboriginal health workers and families would be helpful.

COHS supports 16 AMS in NSW to deliver dental services, and has completed a mail-out to all 52 AMS in NSW with information on the ECOH program and the See My Smile resource. COHS hosts an annual oral health workshop for the 16 AMS, in which the ECOH program is always on the agenda. Also, COHS has presented an overview of the ECOH program at Aboriginal health conferences, including the 2008 and 2010 AH&MRC conferences.

In 2009, COHS provided training on oral health to the Primary Health Certificate 3 and 4 students at the Aboriginal Health College in La Perouse. COHS has since engaged a consultancy company to develop an early childhood oral health curriculum for the College.

**General Practitioners:** A number of ECOH co-ordinators have developed partnerships with GPs and practice nurses in their area through GP Divisions and have comprehensively delivered training and developed networks across their AHS. Others have only addressed this partially, and some not at all. One AHS has worked with a GP Division in their Area to link an ECOH referral form with the GP's electronic patient management system, which enables GPs to generate referrals more quickly. Many feel that inclusion of an oral health check into the

Medicare item for the 4 Year Child Check was a significant achievement, and resulted in GPs and practice nurses actively seeking out further information about early childhood oral health.

**Paediatric and Emergency Departments in Hospitals:** Several ECOH co-ordinators have specifically targeted the ECOH program towards staff working in paediatric and emergency departments in hospitals within their area. One AHS received specific funding to roll out the program in a number of paediatric departments and emergency departments in hospitals within their area, focusing on training nurses and doctors working in those areas, which has since generated referrals to public dental services. In other AHS hospitals have not been specifically targeted as yet.

**Other Partnerships:** Many of the ECOH co-ordinators interviewed have developed opportunistic partnerships wherever possible to further spread the impact of the ECOH program. These partnerships include links with refugee health nurses, multi-cultural health centres, foster care agencies, local libraries, local council health initiatives, and child care centres. Other potential organisations mentioned where partnerships could be further developed included DoCS, and other mainstream (non-health) community service organisations, and non-government organisations. Some ECOH co-ordinators are also involved in providing training about oral health to post graduate nursing courses.

### 5.1.3 Oral Health Promotion in the Public Dental Health Setting

In general, the ECOH co-ordinators have focussed more on child health professionals than oral health professionals in their roll out of the ECOH program.

The co-ordinators reported that while some dental therapists are very motivated to include oral health promotion into their patient management plans, in other AHS dental therapists are overwhelmed by the number people requiring treatment and are less able to spend time on preventive strategies.

Two AHS have developed models of care and treatment guidelines for oral health interventions for children (and adults) that have a heavy emphasis on promotion and prevention strategies, including instruction on tooth brushing, dietary advice, delivery of fluoride for all clients, and shorter recall periods for those with decay. Clinicians are supported in this through regular in servicing and updates. Another AHS introduced the Tooth Smart

Prevention Program to deliver regular preventive interventions to children (and their siblings) who are on the waiting list to have teeth extracted and/or filled under general anaesthesia.

**5.1.4 Monitoring and Evaluation**

Most of the ECOH co-ordinators who were interviewed expressed concerns about the monitoring and evaluation strategies of the program. Many felt that the main outcome used to monitor and measure the success of the program was the number of referrals to dental services, however they felt that this measure was not reliable as many referrals to private dentists are not recorded, or was an inaccurate reflection of the work they were doing (which is predominantly promotion and prevention). Some co-ordinators reported feeling disheartened when referral numbers are low, even though they believe that significant promotion and screening is occurring. The recording of manual statistics was a cumbersome process and most co-ordinators are unclear about why they are still collecting this data when it is no longer collated by COHS, however most also recognise that the ISOH data is also not an entirely comprehensive data source. Many of the co-ordinators felt that they wanted more information about what the child and family health nurses are doing, and more information about the type of children who are being referred to public dentals services. Some were considering developing new forms within their area to try and garner this information.

**5.1.5 Program Aims and Boundaries**

There was some variation between the ECOH co-ordinators in their understanding about the main priorities and aims of the program, and their impression of the program scope. Some saw the ECOH program as being predominantly about encouraging promotion and screening by child health professionals, while others place a stronger emphasis on the early identification and referral of children with decay to public dental services, while a few were focussed mainly on the management of young children by public dental services.

There was also a disparity between the co-ordinators regarding which children should be referred to dental services (i.e. all children, only those at risk, or only those with problems already) and when they should be referred. This reflects the fact that each AHS has different demands and resources placed on their public dental services, and therefore different capacities to respond to referrals.

## 5.2 Community Health Centre Staff

### 5.2.1 5x5 Questionnaire Quantitative Responses

The quantitative results of the 5x5 questionnaires are reproduced below. The additional comments received in the 5x5 questionnaire will be incorporated into the collated interview responses which follow.

1. Do you show parents / caregivers how to lift the lip at every developmental check from 6 months onwards?

| Almost Always | Some of the Time | Almost Never | Never |
|---|---|---|---|
| 34 | 4 | 1 | 1 |
| 85% | 10% | 2.5% | 2.5% |

2. Do you talk to parents / caregivers about other areas of oral health (eg stopping the bottle, introducing fluoride toothpaste, avoiding sugary snacks and drinks)?

| Almost Always | Some of the Time | Almost Never | Never |
|---|---|---|---|
| 37 | 3 | 0 | 0 |
| 93% | 7% | 0% | 0% |

3. Do you feel that lifting the lip or talking to parents and caregivers about oral health is a valuable use of your time?

| Definitely | Probably | Probably Not | Definitely Not |
|---|---|---|---|
| 35 | 5 | 0 | 0 |
| 88% | 12% | 0% | 0% |

4. Do you think parents / caregivers understand why they should look at their child's teeth?

| Definitely | Probably | Probably Not | Definitely Not |
|---|---|---|---|
| 12 | 21 | 6 | 1 |
| 30% | 52% | 15% | 3% |

5. Do you think that showing parents / caregivers how to lift the lip will reduce the risk of early childhood caries?

| Definitely | Probably | Probably Not | Definitely Not | Unsure | No response |
|---|---|---|---|---|---|
| 14 | 23 | 1 | 0 | 1 | 1 |
| 35% | 46% | 3% | 0% | 3% | 3% |

### 5.2.1 Experiences of ECOH Training

All of the child and family health nurses who were interviewed had completed the training, mostly in 2007. Community Health Centre managers interviewed had ensured that all their staff had completed the training, and that it was seen as a priority within their Learning and Development Calendar. The one Allied Health staff member interviewed had not completed the training program as yet, but expressed a desire to do so.

> *"They gave us the training, and gave us all the pamphlets, and it is written in the blue book, so we have to track mothers from day 1 to do oral care". (H5)*
>
> *"I did the initial training…. It was interesting, useful, informative. It changed my practice". (H7)*
>
> *"I would have known most of the oral health information before the training, but it was a trigger to remind us of particular times to do it". (H4)*

The majority of nurses interviewed said that although they had completed the training, they felt it was a long time ago, and although they only had a vague recollection of the training, they felt they did remember the basic tenets of it and were incorporating the recommendations into their daily work.

> *"I did the training, which I can vaguely remember; it was about three years ago". (H6).*
>
> *"I can't remember the training…. The gist I can remember, what it is all about. And we do that." (H8).*

The majority of nurses interviewed requested follow-up training sessions, or refreshers. They felt that they would like to hear if there had been updates or changes to protocols or recommendations. They also felt that training updates or a follow up session could increase awareness or improve motivation.

> *"We need more support and follow-up. We just need a refresher. Because it has been a few years now." (H6).*
>
> *"I would like a training update, to give more motivation". (H7).*
>
> *"We have not been given feedback about the program. I want to see how many people are coming to the dentist who have decay. I want to hear the big total numbers". (H5).*

While most nurses interviewed said they felt confident about implementing the ECOH recommendations, individuals expressed different aspects of the recommendations, which they would like to clarify further. This included the concept of the oral health risk assessment

and how to complete it, the referral processes to public and private dentists, the age young children should first see a dental professional, and the degree of tooth change required to refer the child.

*"I think we are confused about what is urgent, so maybe we do need updates". (H7).*

A number of nurses also felt unclear about what services are provided through public dental services, and two in particular asked if they could go to a dental clinic to observe the structure and service.

*"I would like to see what they do at the clinic. A lot of mothers say to me "Well what do they do at the clinic?" So I really need to know." (H9).*

### 5.2.3 Oral Health Promotion and Oral Health Risk Assessments

All the nurses interviewed reported that they almost always "Lift the Lip" to check the oral health of the children they see, and almost always give anticipatory advice to parents about early childhood oral health.

*"Starting at the first home visit I tell them when they are new borns. Because we only do one home visit I tell them then, then I keep telling them when they come into the clinic". (H5).*

*"I talk to mothers about diet and appropriate diet for the child, and try to encourage them to drink water rather than juices". (H9).*

*"I am quite adamant about them not putting the baby to bed with a bottle." (H3).*

*"I say the parents must brush (the child's teeth) to eight years, because they don't have the dexterity."(H5)*

Nearly all the nurses interviewed mentioned the inclusion of oral health checks in the Blue Book as an important factor guiding their practice. They follow the Blue Book check components when seeing a child, and complete the oral health checks because they are one of the components.

*"Yes I always do (Lift the Lip), on every health check. There is a reminder in the Blue Book which is very helpful. We all follow the Blue Book". (H6).*

*"Yes, it would be very unusual if I didn't (do the check) because it is there (in the Blue Book), and you have to tick if you have done it". (H7)*

*"It is in the Blue Book now, which is a good trigger. Bing in the Blue Book reminds us. If it wasn't in the Blue Book that would be difficult because there is so much for us to do at the 6 month check". (H4).*

Most nurses felt that the resources were an important aspect of the program, and generally were happy with the quality of the resources.

*"We have access to all the literature and the brochures, there is lots of good info in there". (H4)*

*"Having the actual visual of the damaged teeth is good for parents because they can look at that". (H3).*

*"I always show them the Lift the Lip brochure, with the decay and the three tips on the back". (H6).*

*"I do use them and show them and show the instructions. I like the new instructions- three simple things". (H7)*.

Most nurses reported giving out the Lift the Lip magnet to parents, and using that resource to provide anticipatory guidance to parents about oral health promotion and prevention of decay. The other early childhood oral health promotion resources were mentioned very infrequently by the nurses interviewed, though they did encourage parents to use the Blue Book as a source of information, including oral health information.

*"I always give the resources to everybody - the Lift the Lip and the Drinking from a Cup Brochure" (H5).*

*"I really encourage (parents) to sit down and read the information (in the Blue Book), and tell them that the Blue Book is not just for recording the weight of the baby". (H8).*

*"I give out the flip chart at 6 months, because that is in the Blue Book at 6 months. Also the drinking from a cup one- I give that out at 6 months too. I think doing it at the 6-12 month period is really good". (H3).*

The nurses interviewed all felt that they have an important role to play in health promotion, and most felt that their input was changing parents' knowledge and behaviour. The nurses felt that some parents are already aware of the information, other parents hear the information and implement the desired behaviours, while a third group are less receptive to the information and are unable to implement the changes. Nurses generally felt that they were changing oral health practices in the home, but many nurses expressed frustration with being

unable to really change the attitudes, knowledge and practices of some parents. The nurses also expressed a need for caution with parents - their role is to support, but not to overtly tell parents what to do, and it is easy to upset or alienate some parents with an overly directive approach.

> *"It is a really valuable program, because parents are thinking they don't need to work (on oral health) until (the child) starts school, but getting that message out that they need to start sooner is important". (H6).*
>
> *I think it changes behaviour, makes the parents more aware. They make a concerted effort to change. But they are all very conscious of not upsetting the child". (H8)*

### 5.2.4 Translated Versions

Only three of the nurses interviewed were aware there were translated versions of the Lift the Lip resource. One of the nurses had saved the translated versions on a USB drive, and if she is at a clinic with a computer she shows the translated version to parents on the computer. She had previously formatted and printed the translated version for distribution, but this also relied on having a colour printer. As an alternative, another nurse had printed and laminated all the translated versions and bound them on a ring, so that they could be available for demonstrating to parents in other languages, but not available for distribution.

When informed of the resources online, many nurses thought it would be helpful to be able to give out the translated resources but they said that they often worked from clinics without computers, internet, or printers, and also do not have time to print a resource for a client within an appointment time. Nurses reported they often give out the Lift the Lip resource in English to CALD clients.

### 5.2.5 Early Identification and Screening and Referral

Most of the nurses had some experience of identifying and referring children with early signs of tooth decay. However, generally they felt that these situations were quite rare and could describe the details of each occurrence. They felt that they did not see many children with decay because predominantly they saw children up to 12-18 months of age, after which their clinic attendance declined.

A number of the nurses reported making judgements about the seriousness of the oral health problem in individual children. If they felt the problem was not severe they would recommend

that the parent take the child to a dentist and sometimes provide details of the public dental service. Then, if they felt the problem was more serious, they would ensure an ECOH referral form was completed.

The nurses said that if a child needed to be referred, they would ask the parent whether they would prefer a public or private dentist, or sometimes they made an assumption based on impressions of socio-economic status. None of the nurses reported returning an ECOH referral form when a parent chose private dental services.

For public referrals, nurses reported that they did not always complete the ECOH referral form. Some nurses felt that if the referral was arranged for the parent, that this would take the responsibility away from the parent and they would be less compliant with adhering to the appointment. As such, some nurses were giving out the information for public dental services for the parent to arrange an appointment, but were not actually referring them.

Approximately half the nurses interviewed were unclear about when and how to refer to public dental services. Many were not aware that public dental services are available for all children under 18 years of age, or that children under 5 years of age are prioritised. Other nurses were extremely confident about the process of referrals. A number reported a very good relationship with the ECOH co-ordinator, who managed the referrals they had made, arranged appointments for the children, and gave feedback on the outcome of the child's appointment and treatment. These nurses were extremely satisfied with this process.

Most nurses were unclear about the guidelines for the age of a first dental visit. Some felt that only those with problems should be referred to dental services, while others felt that all children should go to the dentist at 2, or 5 years of age. They reported that private dentists often recommend this approach.

### 5.2.6 Access and Equity

The nurses report that they see children regularly up to the age of 12-18 months, but that after the parents are less compliant with the child health checks as per the Blue Book schedule. They also felt that parents were more compliant with the checks with their first child than with subsequent children.

The nurses felt that there was a proportion of the population who does not access child health services. In one Community Health Centre, in a particularly low socio-economic area, the nurses reported that they often were unable to contact parents, or that parents refused the service.

> *"They are the ones we need to see, but they aren't always interested. You can't force the service on people". (H3)*

The nurses in the two urban environments reported that they rarely or never saw Aboriginal children in their clinics despite one of the centres being in a location with a proportionally large Aboriginal population. In the rural town, the nurses reported seeing many Aboriginal families, particularly in one clinic. The nurses in the urban areas reported seeing many children from CALD backgrounds, especially at one centre based in an area of high diversity.

## 5.3 Parents and Carers

Seventeen parents were interviewed, from the three case locations. Of these:

- 12 were living in urban Sydney and 5 were living in a rural town
- 6 were concession card holders
- 8 were born in countries outside Australia and 9 spoke languages other than English in the home
- 1 identified as Aboriginal
- The age range of the children was 18 months to 3 years.

### 5.3.1 Early Childhood Oral Health Behaviours, Knowledge and Practices

All parents interviewed identified tooth brushing as an important way to care for their child's teeth and all reported that tooth brushing was included in their child's routine every day. Most of the parents interviewed were brushing their child's teeth for them, however many of reported that they found it quite difficult and their child often would not let them do it. About half of the parents were only brushing their child's teeth once a day, often in the morning. A number of parents expressed confusion about when they should be starting with toothpaste and the type of toothpaste to use

> *"I clean his teeth in the morning and before he sleeps. He cleans first then I do it after". (P6)*
>
> *"We are trying but she (the child) does not allow". (P9).*

*"He is not doing well. He always bite me…. He always eat the brush. I just want to let him know you have to do this". (P7)*

*"We are brushing in the morning before her breakfast. Not in the night time. We are using normal toothpaste" (P11)*

*"Is it recommended to use toothpaste at his age?" (P10).*

Most parents could report that water is the most appropriate drink for good oral health for children, and also identified milk and juice as appropriate drinks. The majority of the parents interviewed were giving their children juice or cordial daily, and a number of these were not aware that regular juice consumption could be detrimental to teeth. Many reported fizzy drinks as being bad for teeth and none reported giving their child fizzy soft drinks.

*"He drinks a lot of water. Because it is healthier. And cheaper". (P2)*

*"He loves juice. He drinks a lot of juice, more so than water". (P10)*

*"He drinks milk and juice. He drinks juice everyday. I don't know if it is good for his teeth". (P6)*

*"Some juice is probably bad because it has added sugar, but we bought this juice which is actually water and juice diluted". (P10).*

While most parents reported that they knew and understood the message about not putting their baby to bed with a bottle, approximately one third of those interviewed were still putting the child to bed with a bottle of milk.

*"He never went to bed with a bottle, none of my kids did" (P1)*

*"He takes the bottle to bed with him, it has milk in it. I know not good for him but I don't know what I can do…..When he has milk in the bottle he sleeps". (P6).*

*"This child he drinks from the bottle but I don't put him to bed with the bottle. The other son went to sleep with the bottle in his mouth, but I think they affect the teeth- he had his teeth affected. Even my daughter she had two teeth that got rotten. That's why for this son I didn't practice this one". (P4)*

Only one third of the parents interviewed had completely finished bottle use for their child and moved onto using a cup.

*"Yes I tried the cup but he doesn't like it".(P6)*

*"We stopped the bottle at one year and use a little cup now". (P8)*

When asked about which dietary practices are good for oral health, most parents focussed on appropriate drinks as described above and avoiding lollies.

*"He has a lot of vegetables, he generally has a better diet than I do". (P2)*

*"He loves his sweets. I try to limit them to when he has been a good boy as a treat." (P1)*

*"I don't give him sweet things and sticky-like lollies in the evening. He can eat in the daytime but in the evening I don't give him". (P4)*

*"We don't know what foods are good for her teeth. Maybe calcium is good for her teeth…. When she goes to the shop she always has lollies and chocolate- maybe it is also beneficial because it has dairy". (P11).*

A number of parents considered the effects of food and drink remaining in the mouth and reported rinsing the mouth after food as a positive oral health behaviour.

*"When he finishes (chocolate and sweet things) we have to give water to clean the mouth and the teeth" (P6).*

*"The only thing he has at night after I brush his teeth is a glass of milk". (P10).*

*"I try to get her to drink her milk before bed time and just go to bed with a bottle of water, because I don't want her to have all that milk swilling around in her mouth". (P5)*

*"Before he goes to sleep and he finishes his milk I give him some water". (P7)*

Interestingly, in all the discussion and interviews about oral health knowledge and practices and prevention of decay, no parents raised the topic of fluoride in water.

**5.3.2 "Lifting the Lip"**

More than half the parents interviewed reported regularly looking into their child's mouth to check their teeth, although many of them reported that it was difficult to see the back teeth as their child was not always compliant with the mouth checks. Mostly, the parents reported that they felt they would know decay if they saw it, expecting that there would be brown or black spots, but most had not seen it before.

*"I look in her mouth every now and then and have a look. I look at her teeth and see how they look" (P5)*

*"I do regularly, especially since his teeth started to go yellow". (P9).*

*"I try to but she tends to bite down. I don't even know how many teeth she has at the moment". (P3)*

*"If I saw decay I would know it. I know because I have decay". (P2)*

*"I really haven't seen (decay) before. I imagine it would start to look like little black spots". ((P5)*

*"Sometimes (I check the teeth). I don't really know what I am looking for. I don't know what decay looks like. …. Maybe it would look yellow". (P11)*

### 5.3.3 Experiences with Child Health Professionals

As parents were interviewed in the Community Health Centres, nearly all those interviewed had predominantly attended the Community Health Centre for the child health checks outlined in the Blue Book. All parents interviewed had their child's Blue Book with them for the appointment. Most reported being vigilant about attending the checks until their child was 18 months, but then missing some checks after that age. One parent had stopped coming to the Community Health Centre for Child Health checks, and started going to see a nurse based at the local pharmacy, who was completing the Blue Book checks, while another had been seeing her GP and a paediatrician for her child's health checks, due to other concurrent medical issues. Most saw the Child Health Checks as important and helpful, and most reported that they liked seeing the same nurse each time if possible, with a few changing location of the visits to follow a particular nurse.

*"We did all the checks, and always here. It is easy to stick with the checks and to come along. The checks were helpful" (P11).*

*"Up until 18 months old (we came to the checks). I didn't realise there was another one between then and school." (P1)*

*"She has a blue book. I followed all the checks until the lady actually had to start telling me to stop coming. That's the nurse at the chemist." (P5)*

As well as seeing child health professionals at the Community Health Centre, most parents reported their child also attended a GP regularly, mostly when sick. One person saw a nurse based at the local Pharmacy.

Half of the parents interviewed could recall having a child health professional (child and family health nurse or GP) looking inside their child's mouth, but most of them were not sure if that was to look at teeth or to look at tonsils.

*"The GP has looked in the mouth but I don't know if she looked at the teeth" (P11).*

*"They have checked the baby to see if they are teething, but that's not looking for decay". (P1).*

*"Yes, (the nurse) had a look in his mouth, but it is still difficult to open". (P6).*

*"Sometimes they are looking in the mouth. I don't know if they are checking the teeth?" (P5).*

Only a few parents could recall a child health professional giving them advice about their child's oral health.

*"When (my child) got her first teeth, she was asking me if I was brushing them and things like that. So she was checking up to make sure I was doing things like that". (P5)*

*"I don't remember anyone ever mentioning his teeth or anything". (P10).*

### 5.3.4 Access to Oral Health Information and Resources

Only five of the parents interviewed could recall having seen the Lift the Lip brochure before, and one reported having a Don't Put your Baby to Bed with a Bottle brochure on her fridge. None of the parents from CALD Background had seen any of the resources in their own language.

Half of the parents interviewed reporting using the Blue Book for health information, and regularly completed the checklists before each age specific Child Health Check. Most of the parents reported using the internet.

*"I use the Blue Book. Every now and then I have a check to see if she is OK. And I read the questionnaire before each visit".*

*"Sometimes I would use the Blue Book and have a look as a guide, and if I didn't find what I needed there I would go online and have a look there". (P5).*

### 5.3.5 Experiences with Oral Health Services

Most of the parents interviewed reported that they would take their child to see a dentist if they felt there was a problem with their child's teeth or if they saw any problems when looking into their child's mouth. A few said they would first take the child to the doctor or would tell their child and family health nurse if any problem arose.

Two of the parents interviewed had accessed public dental services for review of their child's teeth problems. Another two parents reported that their private dentist had looked at their child's teeth when they (the parent) was having their teeth checked. Another two parents interviewed reported recognising problems with their child's teeth (yellow teeth and a black spot), but had not yet seen an oral health professional for review. One was waiting to see a private dentist suggested by her GP, who was currently unavailable, while the other thought that it would be too difficult getting her child to co-operate with the dentist. One other mother had experienced seeking dental treatment for her two older children who had both had dental caries.

> *"He has a black part since he was one year old. The doctor said he needs to go to the dentist. I did not go yet because my husband has no time to drive us". (P6)*
>
> *"I wouldn't dare take him to the dentist right now. Because when he is shy he doesn't want anyone to touch him….. so I think we would have very big difficulties". (P8).*

Parents reported receiving varied advice about when their child should first see a dental professional. Some parents reported a private dentist checking their child's teeth, while others reported their private dentist saying they don't need to see the child properly until the adult teeth come through, or until the age of four.

Only five of the parents interviewed were aware that public dental services were available for all children under eighteen years of age. The mother of two older children with dental caries was not aware of public dental service, and was not following a private dentist's recommendation for tooth extraction for her older daughter because she was unable to afford the cost.

> *"I know there is a free dentist at Westmead, but anything else I don't know". (P2)*
>
> *"We can pay for a dentist but I don't know how expensive it is. Can I use my Medicare card?" (P6).*
>
> *"For my older son, the (private) dentist said we need to pay $1000 for two teeth. I cannot pay. Already I wait half year on the list at Westmead for him".*

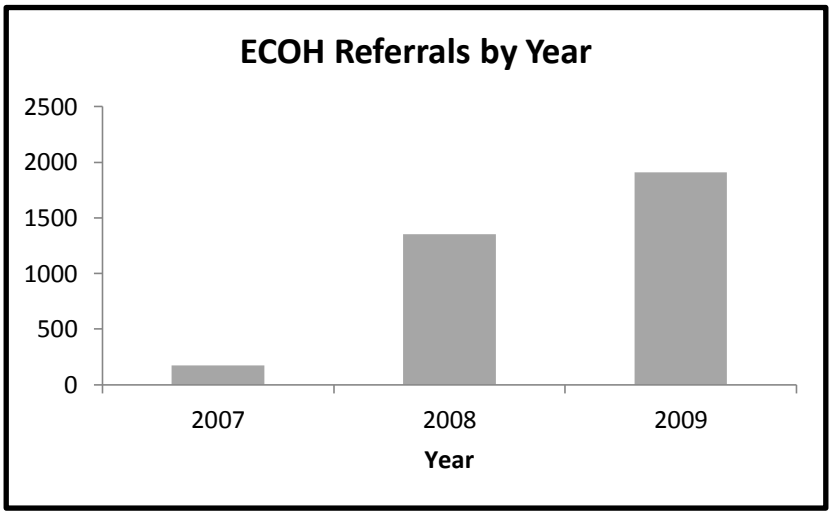
## 5.4 Public Dental Services Data

Data were extracted from the ISOH database for children referred from June 2007 to December 2009 to public dental services by the ECOH Program referral sources of Community Health (child and family health nurses, Aboriginal health workers, GPs), NGOs, and DoCs.

### 5.4.1 Referral Sources and Numbers

A total of 3440 referrals were made to public dental services by ECOH referral sources in this time period, with 176 in 2007, 1353 in 2008, and 1911 in 2009 (Figure 4). The program roll out began in 2007 with the first referral recorded by the program in June 2007. While these figures represent referrals to the program, rather than individual children, there were only 46 children who had two referrals and one child who had three referrals.

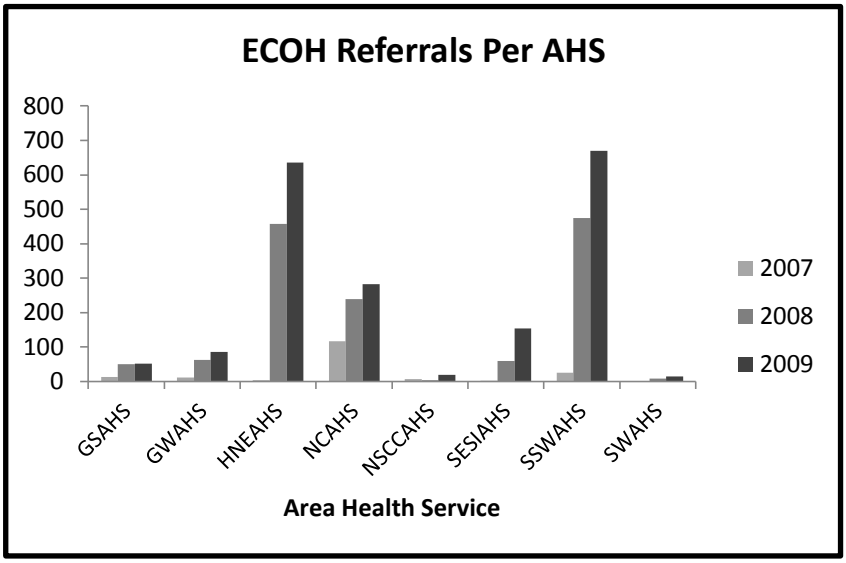
**Figure 4: Referrals to Public Dental Services by ECOH Program Referral Sources**




The referrals from the ECOH program to Public Dental Services were not evenly distributed across the AHS (Figure 5), and were predominantly from three AHS: Sydney South West (34%), Hunter New England (31.8%), and North Coast AHS (18.5%). As will be discussed, this represents data entry disparities rather than low rates of referrals.

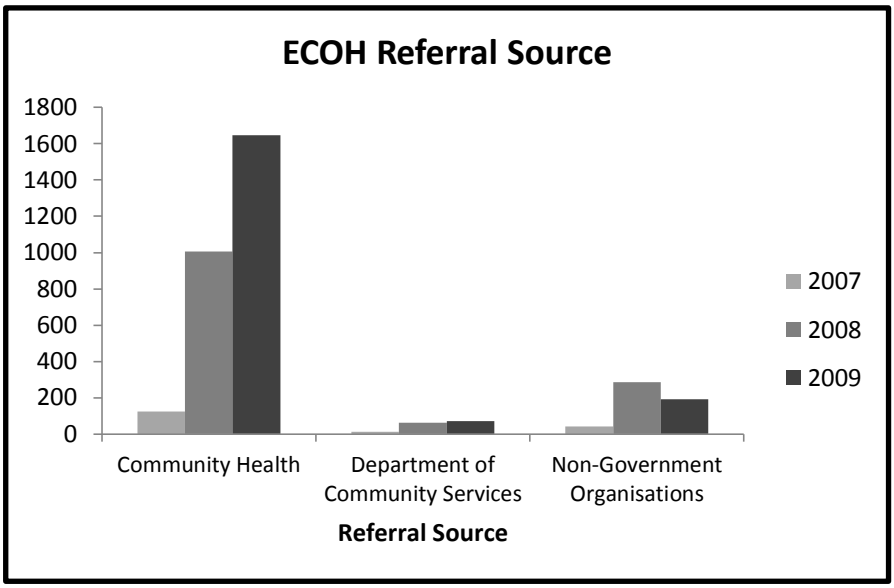
The majority of referrals (80.7%) in the ECOH program over the three years (June 2007-December 2009) came from Community Health sources (child and family health nurses, GPs, and Aboriginal health workers) (Figure 6). A total of 15.1% came from Non Government Organisations (NGOs), and 4.2% came from Department of Community Services (DoCs). These were the only three categories of referral available in ISOH under the program referral sources.

**Figure 5: ECOH referrals to Public Dental Services by AHS**




*(GSAHS= Greater Southern AHS, GWAHS= Greater Western AHS, HNEAHS= Hunter New England AHS, NCAHS= North Coast AHS, NSCCAHS= North Sydney Central Coast AHS, SESIAHS= South Eastern Sydney Illawarra AHS, SSWAH= Sydney South West AHS, SWAHS= Sydney West AHS).*

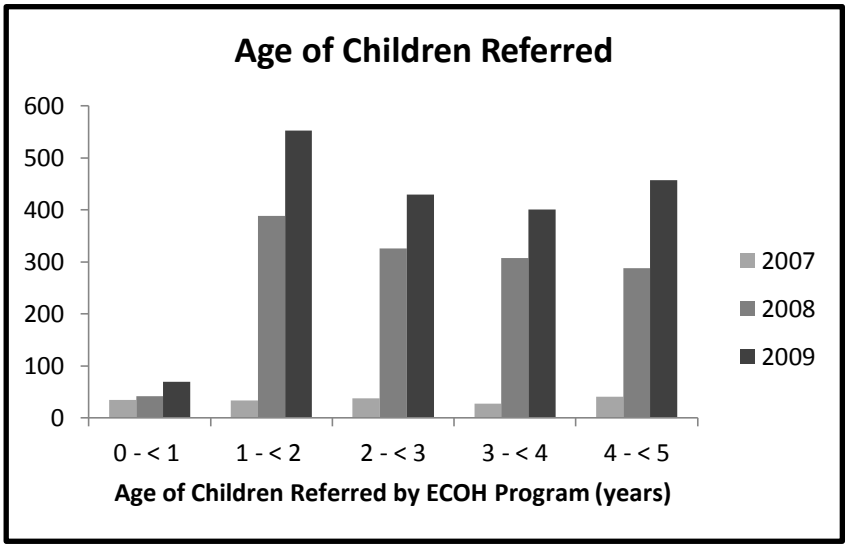
**Figure 6: ECOH Referrals to Public Dental Services by Referral Source**




## 5.4.2 Children Referred

Referrals to public dental services by the ECOH program were the same for male and female children. For children aged less than 5 years referred to the program, the age group most represented were 1 to <2 years old (27.5%). The remainder of the referrals were evenly distributed across the age ranges 2 to <3 years (23%), 3 to <4 years (21%), and 4 to <5 years (23%). Figure 7 shows the distribution of referrals within each age group by year.

**Figure 7: Age distribution of children referred to Public Dental Services ECOH Referrals to Public Dental Services by Referral Source**




Approximately 10% of referrals from the ECOH program in 2008 and 2009 were for Aboriginal children. While the percentage was higher in 2007, there was a marked increase in the total number of referrals in 2007 and 2008 for all children, including Aboriginal children, and a decrease in the number children recorded as “unknown” indigenous status. Table 2 shows the referral numbers from the ECOH program for Aboriginal and non Aboriginal children.

The majority of the children referred to public dental services by the ECOH program were born in Australia (84.20%) (Table 3). Two percent were born in non-English speaking countries. This represents the country of birth of the child (aged 0-5 years) referred, and does not indicate where their parents were born. In all, 82.1% of the children referred by the program were from households where English was the main language spoken in the home, while 6% were from households where a language other than English is spoken in the home (Table 3).

In relation to Socio-Economic Disadvantage, 70.1% of children referred came from postcodes in the lowest half of the Index of Relative Social Disadvantage Scale (IRSD). Table 4 shows the number and cumulative percentage of referrals for each IRSD decile, and Figure 8 shows the distribution of referrals across each IRSD decile by postcode, including cumulative percentages.

**Table 2: Number and percentage of referrals by the ECOH Program for Aboriginal and non-Aboriginal children**

| | 2007 | 2008 | 2009 | TOTAL |
|---|---|---|---|---|
| Aboriginal | 29 (16.0%) | 127 (9.3%) | 189 (9.9%) | 345 (10.0%) |
| Torres Strait Islander | 0 (0.0%) | 0 (0.0%) | 2 (0.1%) | 2 (0.0%) |
| Non- Aboriginal | 103 (59%) | 1025 (76%) | 1458 (76%) | 2586 (75.2%) |
| Unknown | 44 (25.0%) | 201 (14.9%) | 262 (13.7%) | 507 (14.7%) |
| TOTAL | 176 | 1353 | 1911 | 3440 |

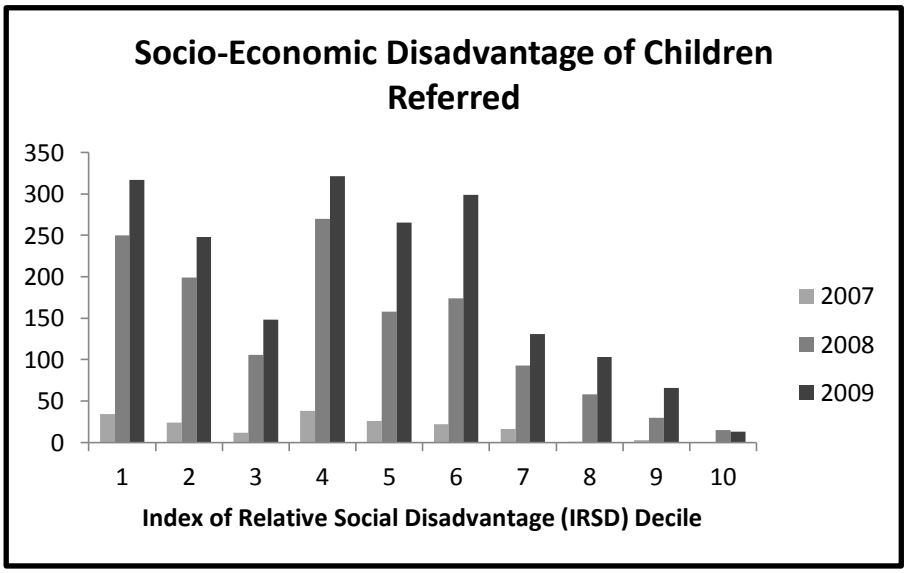
**Table 3: Country of birth and language spoken at home for children referred to public dental services by ECOH Program**

| Country of Birth: | Number | Percentage |
|---|---|---|
| Australia | 2897 | 84.2% |
| English Speaking Countries | 29 | 1% |
| Non-English Speaking Countries | 78 | 2% |
| Not Stated | 436 | 13% |
| TOTAL | 3440 | 100% |
| **Language Spoken at Home:** | **Number** | **Percentage** |
| English | 2825 | 82% |
| Language other than English | 195 | 6% |
| Not Stated | 420 | 12% |
| TOTAL | 3440 | 100% |

**Table 4: Cumulative Percentages of referrals to Public Dental Services from the ECOH Program across Index of Relative Social Disadvantage (IRSD) Deciles**

| SEIFA IRSD Decile | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 1 | 601 | 17.5% | 17.5% |
| 2 | 471 | 13.7% | 31.2% |
| 3 | 266 | 7.7% | 38.9% |
| 4 | 629 | 18.3% | 57.2% |
| 5 | 449 | 13.1% | 70.2% |
| 6 | 495 | 14.4% | 84.6% |
| 7 | 240 | 7.0% | 91.6% |
| 8 | 162 | 4.7% | 96.3% |
| 9 | 99 | 2.9% | 99.2% |
| 10 | 28 | 0.8% | 100% |
| TOTAL | 3440 | 100% | 100% |

**Figure 8: Distribution of referrals to Public Dental Services from the ECOH Program across Index of Relative Social Disadvantage (IRSD) Deciles. (**Note a lower score indicates greater disadvantage).



### 5.4.2 Dental Problems and Treatment Received of Children Referred

When the public dental service is registering the child, the referring person (parent, health professional) is asked if the child has pain their mouth, which is an indicator of the severity of the dental problem. For 2008 and 2009 4% and 5% of referred children respectively were reported to have pain in the mouth on referral (Table 5). Note that "Not Stated" could indicate that the person did not answer the question, or answered no to the question.

**Table 5: Number of Referrals by the ECOH Program where children report Pain in the Mouth.**

| Pain in Mouth Reported | 2007 | 2008 | 2009 | Total |
|---|---|---|---|---|
| Yes | 44 (33%) | 47 (4%) | 88 (5%) | 179 (5%) |
| Not Stated | 132 (67%) | 1306 (96%) | 1823 (95%) | 3261 (95%) |

Eighteen percent of referrals to public dental services did not result in any treatment delivered by the end of 2009. However, some of the children referred in 2009 may be on a waiting list for assessment or treatment. Some referrals resulted in only one treatment, while others resulted in a series of treatments, sometimes over a number of years. The treatments delivered to children referred by the program were categorised into one of ten categories. Table 6 shows the types of treatment received. Note that these are not mutually exclusive and each referral may have resulted in a number of different treatments delivered over time, all of which have been recorded.

**Table 6: Treatments resulting from ECOH referrals**

| Treatment | Number | % |
|---|---|---|
| No Treatment | 617 | 18% |
| Diagnostic Service | 2785 | 81% |
| Preventive Prophylactic | 2393 | 70% |
| Restorative Service | 545 | 16% |
| General Services | 255 | 7% |
| Oral Surgery | 233 | 7% |
| Endodontics | 63 | 2% |
| Orthodontics | 3 | 0% |
| Prosthodontics | 10 | 0% |

# 6. DISCUSSION

## 6.1 Limitations

There are a number of limitations to this program evaluation methodology. For the qualitative data gathered from interviews of program implementers and program beneficiaries, a state-wide perspective has not been achieved. Parents and child and family health nurses interviewed represented only three Community Health Centres, from within two AHS, while only four of the eight AHS were represented in the ECOH co-ordinators interviewed. As such, the results give a snap shot of the program in those particular locations, which raises some pertinent insights and reflections on the program only. Many aspects of program implementation achieved in other AHS may not have been considered here. There is also some inherent bias in the selection of participants. Staff generally volunteered to participate in the evaluation, and may represent those nurses most interested in the program. Similarly, parents interviewed were those already attending the Community Health Centres for Child Health Checks, and therefore do not represent the general populations' awareness and experiences of oral health, which could be assumed to be lower.

Secondly, the quantitative data gathered through the ISOH system highlights several limitations using this data to evaluate the program. Data from ISOH were gathered for children referred to public dental services from Community Health, DOCS and NGOs, however it appears that this item is not routinely or reliably entered during intake into the ISOH system in all AHS, and as such many of the children who may have been referred from these sources were not included in the data analysed. Although not representative of the whole state, the data do provide important information about referral patterns and outcomes.

## 6.2 Major Findings

The Major Achievements of the program (those comprehensively achieved state-wide) include:

- The development of Early Childhood Oral Health Guidelines, training resources, and information / education materials for child health professionals and parents.
- The development of the role of ECOH program co-ordinator within each AHS, responsible for implementing the program with a context and location specific approach.

- The development and implementation of Policy Directive for the program, which supports and mandates the program at an AHS level, and clearly identifies roles and responsibilities for most key players.
- The development of structures and systems within COHS and within each AHS, which supports program development, partnership development, training delivery, referrals, and monitoring and evaluation processes
- The roll-out of the program to child and family health nurses, which can be considered complete. Various evaluation techniques, including this one, have revealed that nearly all of these nurses have completed the training, and most incorporate oral health promotion, screening, and early referral into child health checks. This has been greatly facilitated by the re-inclusion of oral health into the Blue Book.

The significant achievements of the ECOH program (those that have been achieved within some AHS but not comprehensively across the state) include:

- The partnerships developed with GPs and practice nurses. This should be facilitated by the roll-out of the online *gplearning* module, however effective partnerships between oral health staff and GPs within each AHS will also be required to support ongoing professional development, resource provision, and referral processes for GPs.
- The partnerships developed with local hospitals, particularly with staff in Emergency and Paediatric Departments. The three Children's Hospitals in NSW were not considered in this evaluation; however they are significant players in child health services, with good potential for oral health promotion, screening, and early identification and referral for early childhood caries, and it should be ensured that they are included.
- The development of effective partnerships with AMS has only been achieved within some AHS, as well as through the networks COHS has developed with AMS where dental services are funded. Some ECOH co-ordinators do not feel confident to develop partnerships with AMS, and also do not feel they have sufficient resources.
- The development of appropriate and accessible resources for Aboriginal people, and CALD populations.
- Comprehensive delivery of early childhood oral health professional development for dentists and dental therapists
- The incorporation of promotion and prevention strategies into public dental service delivery, and the development of appropriate models of care for children under five.

## 6.3 Considering the Evaluation Questions

The first four questions of the evaluation will be considered. The last two questions, the experiences and recommendations of implementers and parents, have been adequately covered in the results section.

### 1. Has the program been implemented as designed?

The ECOH program has been running for three years and the majority of the original goals and activities planned for the first three years (Table 1) have been achieved. All staff involved in the design and implementation of the program should be pleased and proud of the achievements thus far.

The major and significant achievements are obviously due to an enormous amount of work, energy, commitment and enthusiasm from those responsible for program implementation, most notably the state-wide program coordinator at COHS, and the ECOH co-ordinators from the eight AHS. They all should be commended on their success with the program thus far.

The organisation of the program, with co-ordination and support from COHS and implementation at an AHS level by the ECOH co-ordinators, has enabled the development of effective multi-disciplinary relationships and context-specific approaches to program implementation. This structure also decentralised responsibility and ownership of the program and, as a result, significant achievements, successes and creativity have occurred across the different AHS. A major achievement in one AHS may be a specific challenge or difficulty in another. Opportunities to share success stories and lessons learned between the co-ordinators, and a commitment to adopt successful approaches in other areas where appropriate, would help to further spread the success of the program. The challenge with this structure, as identified above in the significant achievements list, is that there are varied priorities and focus in implementation of the program across the state, and many important aspects of the program are not yet achieved state-wide.

The strength of the program within each AHS appears to be dependent on a number of key factors. The human resources dedicated to oral health promotion and prevention, including the ECOH program, greatly impacts how much can be done. It would be optimum for all AHS have a 0.2-0.4 FTE position for the ECOH program co-ordination. The commitment of AHS

managers to oral health promotion and prevention was also identified as a key factor. Thirdly, regional AHS have specific challenges due to geography, which also challenges the roll-out of the program. Some AHS have adopted a system with regional co-ordinators within the AHS which appears to be working well. The development of Regional Hospital Networks through the Federal Health Reforms in 2010 may require a review of the ECOH co-ordinator numbers.

The ECOH program required significant energy to develop and implement, and major and significant achievements have been realised. For some elements of the program, including the partnerships with child and family health nurses, the program is in somewhat of a maintenance stage and attention needs to be directed to ensure that these partnerships continue to be active and effective. Many nurses indicated an interest in follow-up training and updates on a regular basis.
The ECOH program has enjoyed considerable success in achieving the majority of the plans in the program framework and can now focus comprehensively on the more challenging areas of the program, predominantly the focus on Aboriginal people, CALD populations, GPs and practice nurses, hospitals, oral health practitioners, and community services partnerships.

It is recommended that a collaborative review and planning process be undertaken with all ECOH co-ordinators in partnership with the ECOH Advisory Committee to develop a new program framework and strategic plan for the next three years. This process could help prioritise the aspects of the program that should be achieved comprehensively state-wide, and address ways to support all AHS.

## 2. Has the program had an impact on early identification, referral, and intervention of early childhood caries in NSW?

The program has raised significant awareness of oral health issues among many child health professionals, and indications suggest that child and family health nurses in particular have routinely incorporated oral health promotion, screening, early identification and referral into their routine work practices. The re-inclusion of oral health issues in the Blue Book, and the roll-out of training and resources to all nurses through the ECOH program, appear to be the two most significant factors in facilitating this change. The adoption of oral health promotion and screening as a routine practice for child and family health nurses in such a short time frame is a significant achievement in changing professional behaviour.

The evidence available suggests that referrals to public dental services for children under 5 years of age have increased significantly since the program began for all children in general, and for those referred specifically by ECOH program referrers (i.e. Community Health, DOCs, and NGOs). The largest number of referrals was for children aged 1-2 years (Figure 7), which shows that children are being referred early, and also reflects that child and family health nurses predominantly see children until 2 years of age, after which contact decreases significantly.

The criteria for referral to dental services are not clear to all child and family health nurses, and indeed a number of ECOH co-ordinators have varied opinions about the timing of a child's first dental review. It is recommended that advice about the age by which children should see a dental professional be more widely publicised and promoted.

Referral data for public dental services data indicate that only a small proportion of children (5.2%) are recorded as having pain in the mouth at the time of referral. This measure could indicate that children are referred early to public dental services before pain occurs. However the fact that a large proportion of respondents did not answer the question suggests that the data may be unreliable.

It is not possible to have a state-wide picture of referrals to dental services unless private dental services are considered, which they have not been in this evaluation. The ECOH program monitoring system attempted to capture this information by asking that child health professionals fax the ECOH referral form even if the child will be seen by a private practitioner. However, the information provided by program implementers suggests that this is not uniformly adhered to and that the data would therefore be incomplete. It does not appear to be feasible for the program to capture this information at the AHS level and, if this was deemed an evaluation priority, state-wide dental data sources need to be considered.

Within the scope of this evaluation, it is not possible to comprehensively determine whether the ECOH program has had significant impact on the management of ECC by oral health services. However the reported scope of activities implemented by the program to date would be unlikely to have changed these interventions on a significant scale.

A number of AHS have adopted significant changes in their management strategies for children under 5 years of age, with an increased focus on promotion, prevention, and more frequent recall, and it is recommended that these approaches be considered for adoption by other AHS. The data for treatments delivered to children referred by the program indicate that 70% of referred children received some form of preventive prophylactic treatment.

The monitoring and evaluation strategy of the ECOH program requires review. The number of referrals to public dental services is not necessarily the most appropriate measure of the program's success, and this evaluation has highlighted limitations in the use of ISOH data to measure this. There is only partial compliance with entering data in all ISOH database fields capturing demographic and intervention data, which results in incomplete data for each AHS. Until data entry compliance improves, it is recommended that the ECOH program evaluation considers all client registrations for children under 5 years of age, and not only those referred by the ECOH referral group categories of Community Health, GPs and DoCS. The quantitative data retrieved from ISOH for the purpose of this evaluation was cumbersome to collate and clean for analysis, particularly the demographic and intervention data, and it is recommended that an analysis system or program be developed to meet the evaluation needs of the program and allow routine analysis of the data.

Monitoring the degree to which child health professionals are promoting and screening for oral health has been attempted in some AHS through various databases. However, this depends on reliable data entry from a broad range of professionals through various systems, and the value of the final information gathered may not warrant the effort required. It may be more feasible to gather information about the promotion and preventive interventions of public oral health professionals through ISOH, and it is recommended that this does remain a part of the monitoring and evaluation system of the ECOH program.

Ultimately, the aim of the program is to decrease the dmft rate and the need for oral surgery with general anaesthesia in children under 5 years of age in NSW. The 2007 Child Health Survey was undertaken before the ECOH program began, and while it does not specifically measure dmft in children under 5 years of age, improved results in dmft for children aged 5-6 years in the next child dental survey could reflect positively on the ECOH program and other strategies undertaken in NSW. Data for general anaesthetic procedures in NSW for children

could also be monitored over time. As a separate measure, the knowledge, attitudes and practices of parents could be assessed using the NSW Health telephone surveying systems.

### 3. Has the program been equitable in relation to people from low socioeconomic, CALD, and Aboriginal populations?

Significant work has started in ensuring the program is implemented equitably to all people; however, more could be done in reaching some populations.

It does not appear that the program has comprehensively reached Aboriginal populations. Urban based Aboriginal families do not appear to be routinely accessing services through mainstream community health centres. Improved partnerships with all AMS and other agencies that provide services to Aboriginal people could improve the exposure of Aboriginal people to oral health promotion and screening. In relation to public dental service referrals for children under 5 years of age, the data demonstrated that a significant proportion (10%) of referrals were for Aboriginal children although this does not include children referred for treatment at an AMS dental service. However the overall number of referrals of Aboriginal children (345 over 3 years) is not high considering there is an estimated 18,000 Aboriginal children under the 5 years of age in NSW, and the Child Dental Survey estimated that 65% of Aboriginal children aged 5–6 years have had some experience of decay.[8] It is recommended that the program takes a more specific focus on Aboriginal populations in the next project phase. An Aboriginal oral health promotion co-ordinator based within COHS may facilitate this process, as may the identification of oral health promotion contact persons within each of the 52 AMS.

For CALD populations, these groups do appear to be accessing community centres and therefore are seeing child and family health nurses. Some Refugee and Migrant Resource Centres have also been specifically given ECOH training – this could be further rolled out state-wide. The translated ECOH resources are not easily accessible and are yet to be updated to the new versions. It is recommended that these be printed in target languages and made available to community health centres to order directly. As there are many languages, it may be more feasible to print tear off brochures in each language on thinner paper so that they can be available more easily within health centres. Only 6% of referrals from the ECOH program are for children from homes where languages other than English are spoken in the home, while 18.9% of the NSW population speaks languages other than English in the home. This suggests

that CALD populations are not equally accessing public dental services for children under 5 years. A stronger focus on CALD populations is recommended for the next project phase.

For lower socioeconomic populations, it appears that these groups are accessing community health centres for regular Child Health Checks. Seventy percent of referrals to public dental services come from the lower socio-economic half of the population. However, there is potentially a proportion of the population who have low health care seeking behaviour and do not frequently access services through community health centres or their GPs. Increasing partnerships with community services and NGOs could potentially increase the reach to these populations; however, the effort required in developing these partnerships for the additional reach that would be achieved may be deemed excessive or inefficient by the program implementers

### 4. Have the partnerships developed for integrated service delivery been effective?

As discussed in Evaluation Question 1 above, the partnerships developed with child and family health nurse networks have been strong and effective and are the major achievement of the program thus far. The partnerships developed with GPs and practice nurses, local hospitals, and AMS are well developed within some AHS but this has not been achieved comprehensively state-wide. It is recommended that the program takes a more specific focus on these partnerships within the next project phase, while also maintaining the current partnerships with child and family health nurses. Partnerships with community services, NGOs and pharmacies could be considered for future project development but may require considerable effort for the additional program reach that would be achieved. The Little Smiles program, which will develop partnerships with child care centres for oral health promotion, will complement other partnerships and achieve more reach of oral health promotion to young children, especially those aged 2–5 years who may no longer be attending community health centres. A final potential partnership is with the Department of Education to achieve a stronger focus on oral health promotion in the curriculum for children in kindergarten and through primary school, which may not only improve their oral health but could also bring more oral health information into the home and positively affect oral health behaviours for younger siblings.

# 7. RECOMMENDATIONS

## Program Management

1. Implement a collaborative Project Review and Strategic Planning Process, involving all ECOH co-ordinators and the ECOH Advisory Committee to develop a new Program Framework and 3 year Strategic Plan. Prioritise which aspects of the program should be achieved comprehensively state-wide.

2. Ensure the program has adequate allocated human resources for program co-ordination within each AHS. It is recommended that all AHS have a 0.2–0.4 FTE position for the ECOH program co-ordination within their area. Identify additional Regional Co-ordinator roles in AHS with large distances to cover, which may also be required with the development of Regional Hospital Networks in 2010.

## Partnerships

3. Maintain the excellent partnerships developed with child and family health nurse networks. It is recommended that regular training and updates are provided to all nurses, communication channels and regular feedback to nurses is maintained, and that clinics that are not routinely referring children are targeted for specific attention.

4. Ensure that oral health information and risk assessments remain an integral part of the NSW Personal Health Record (Blue Book).

5. Further develop partnerships with GPs and practice nurses across all AHS. Explore opportunities to include ECOH referral forms within GPs electronic patient records systems. Monitor the impact of the new *gplearning* module in improving referrals.

6. Develop further partnerships with hospitals and health services, particularly the paediatric and emergency departments, following the model developed and trialled successfully within one AHS.

7. Clarify the referral criteria for the ECOH program, and the recommended age for a child's first dental visit, and publicise and promote this information widely.

## Equity and Reach

8. Specifically target improving the accessibility of the ECOH program to Aboriginal children and families. An Aboriginal oral health promotion co-ordinator based within COHS may facilitate this process, as may the identification of oral health promotion contact persons within each of the 52 AMS in NSW. Develop specific ECOH resources appropriate for Aboriginal families and specific ECOH training packages for Aboriginal health workers. Develop effective working partnerships with Aboriginal services.

9. Improve the accessibility of the program for CALD communities. Revise the translated version of Lift the Lip and make them more readily available to child health professionals. Review the recommendations of the recent review for the Lift the Lip resources for CALD communities and implement where possible. Develop further partnerships with migrant and refugee health and community services.

## Additional Opportunities

10. Consider further developing partnerships with community services, NGOs, and pharmacies – determine if the additional program reach that would be achieved through these partnerships would warrant the effort required.

11. Continue to collaborate with the NSW Oral Health Promotion Network in achieving objectives for Early Childhood Oral Health in NSW.

## Public Dental Services

12. Encourage all AHS to review the public dental services management strategies for children under 5 years of age, developing an increased focus on promotion, prevention, and more frequent recall, as has been implemented already within some AHS. Continue addressing professional development of oral health professionals in ECOH management.

## Program Monitoring and Evaluation

13. Review the Monitoring and Evaluation framework for the ECOH program and the indicators used to measure the success of the program. Develop effective and efficient data collection strategies to implement the strategy.

14. Review the ISOH data elements that can be used to monitor some aspects of the ECOH program, namely referrals to public dental services and treatment received. Develop an analysis system that enables this data to be collected and analysed efficiently. Consider the impact that poor data entry adherence has on the quality of the data and review referrals for all children under 5 years of age (not just those from the ECOH referrers) to review impact of the program until adherence improves.

# 8. APPENDICES

## Appendix 1: Questionnaire Interview: Program Implementers

1. What is your role in the Early Childhood Oral Health program?

2. How would you define the ECOH program? What do you think it is?

3. What do you perceive as the successes and challenges for this program?

4. What are your experiences of participating in or delivering training associated with the ECOH program? Do you have recommendations for the training aspect of the program?

5. Do you feel confident in delivering oral health promotion to parents and carers, and in early identification and referral for ECC?

6. Do you show parents / caregivers how to "Lift the Lip" from 6 months onwards? Do you think parents become more informed and aware about oral health through this program?

7. Do you think this program is an effective way to promote oral health in infants and young children? What else do you think could be done to improve oral health in young children?

8. Do you feel the program has had an impact on early identification, referral and management of early childhood caries in your area?

9. Do you feel this program is equally available, accessible, and acceptable, to different demographic groups in your population? (eg low socio-economic, CALD, Aboriginal, rural populations). Do you have ideas on how this could be improved further?

10. What other support or resources could help you or your centre be more effective in promoting oral health?

11. Do you have any recommendations for the program?

# Appendix 2: Questionnaire Interview: Parents

1. How many children do you have, and what are their ages?

2. How do you feel about the oral health of your child?

3. Do you feel confident you know how to keep your child's teeth healthy? Can you explain what things you think are good for oral health care?

4. Do you ever check your child's teeth for signs of tooth decay? Yes ☐ No ☐

If you saw signs of tooth decay, what would you do?

5. The Personal Health Record ("Blue Book") recommends child health checks at 6, 12, and 18 months and 2,3 and 4 years. Has your child had all these health checks so far? What makes it easy or difficult for you to adhere to this schedule? Do you always go the same place for your child's health checks?

6. When your child has had a child health check:

a. Did you receive information about how to look after your child's teeth? Yes ☐ No ☐

b. Did a health professional check your child's teeth, and show you how to check your child's teeth for early signs of tooth decay? Yes ☐ No ☐

c. Has your child ever been referred to a dental service, or been to see a dental health professional? Yes ☐ No ☐

d. If yes, can you tell me about the treatment / service they received there?

7. Has any other health professionals (eg your GP, hospital staff etc) ever checked your child's teeth? Yes ☐ No ☐

8. Has any other health professional or non health professional (eg community worker, child care worker etc) ever given you information on how to care for your child's teeth? Please explain who.

9. Have you heard of "Lift the Lip" or "See my Smile" slogan? Yes ☐ No ☐

If yes, what do you think that is about?

10. Have you ever received a brochure on "Lift the Lip" or "See my Smile"?

Yes ☐ No ☐

Have you read about oral health care in the Personal Health Record ("Blue Book")?

Yes ☐ No ☐

If yes, did you find this information helpful and easy to understand? Yes ☐ No ☐

(show the information if they have not seen it before)

Can you explain what you liked / did not like, or what more you would like to know?

Yes ☐ No ☐

11. Where do you seek health information? What would be the best way for you to receive more information about keeping your child's teeth healthy?

12. Do you have contact with any other services who you feel could help you to understand more about your child's oral health? (eg Community Workers, Case Workers, etc).

13. I would like to ask you come questions about your situation, however these questions are not essential if you would prefer not to answer them:

a. Were you born in Australia? Yes ☐ No ☐

b. Do you speak English at home? Yes ☐ No ☐

c. Is your child of Aboriginal or Torres Strait Islander origin? Yes ☐ No ☐

d. Do you live rurally or remotely? Yes ☐ No ☐

e. Do you hold a Centrelink Concession card? Yes ☐ No ☐

# Appendix 3: Oral Health Advice Form

## Oral Health Advice Form
## Fax No:

ECOH
NSW Early Childhood Oral Health

MRN:

**CHILD'S DETAILS**

Family Name: ……. First Name: ……..

Address: ……

Child's Medicare No: …… Date of Birth: .....

Interpreter required: ☐ Yes ☐ No If yes, which language: ……..……..……

**PARENT/GUARDIAN DETAILS**

Name: ……

Relationship to child: ……

Mobile Phone No: …….. Hm/Wk Phone No: ……..

***I give consent for the Public Oral Health Service to use this information.***

**Signature:** …… **Date:** ……

| **ORAL HEALTH ASSESSMENT***(tick boxes)* | **ACTION** ***(tick one box)*** |
|---|---|
| ☐ Trauma or facial swelling | ☐ Immediate transfer to Dental Call Centre <call centre phone number> and FAX advice form to oral health |
| ☐ White spot demineralisation | ☐ FAX advice form to oral health |
| ☐ Cavitated lesions (holes) | |
| ☐ Family requires oral health support | ☐ Will attend own dentist FAX advice form to oral health |
| ☐ Frequent snacking (especially high sugar intake) | ☐ Discuss with parent and record findings<br>Re-assess at next scheduled health check |
| ☐ Child takes a bottle to bed (or uses at will by day) | |
| ☐ Special health needs / frequent medications | |
| ☐ Visible plaque | |
| ☐ No oral health issues noted | |

**REFERRED BY:** Name ……... Clinic

……..……..……..

Phone No: ……..Email

……..……

Notes: ……

……

| **Phone advice for nurses & health professionals** | **ECOH Coordinator Ph: xxxxxxxxxxxxxxx** |
|---|---|

# 9. REFERENCES

[1] Milnes AR. Description and epidemiology of nursing caries. J Public Health Dent 1996 Winter; 56(1):38-50.

[2] Featherstone JDB (2004) The Continuum of Dental Caries - Evidence for a Dynamic Disease Process. *Journal of Dental Research.* 83: C39. DOI: 10.1177/154405910408301S08

[3] Douglass JM, Douglass AB, Silk HJ. A practical guide to infant oral health. Am Fam Physician. 2004 Dec 1; 70(11):2113-20.

[4] Gussy MG, Water EG, Walsh O, and Kilpatrick NM. Early childhood caries: current evidence for aetiology and prevention. J Paediatr Child Health 2006 Jan-Feb;42(1-2):37-43.

[5] Yengopal V, Harnekar S, Patel N, Siegfried N. Dental fillings for the treatment of caries in the primary dentition. Cochrane Database Syst Rev. 2009 Apr 15; (2):CD004483. <www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD004483/frame.html>.

[6] Li Y, Wang W. Predicting caries in permanent teeth from caries in the primary teeth: an eight year cohort study. J Dent Res. 2002 Aug;81(8):561-6.

[7] World Health Organisation. <http://www.whocollab.od.mah.se/expl/orhdmft.html>.

[8] NSW Department of Health. The New South Wales Child Dental Health Survey 2007. Sydney: NSW Department of Health, Centre for Oral Health Strategy, 2009. <www.health.nsw.gov.au/cohs>.

[9] NSW Department of Health. The health of the people of NSW report of the Chief Health Officer 2008. Sydney: NSW Health Department, 2008.

[10] Yost J, Li Y. Promoting oral health from birth through childhood: prevention of early childhood caries. MCN Am J Matern Child Nurs 2008 Jan-Feb;33(1):17-23; quiz 24-5.

[11] Slack-Smith LM. Dental visits by Australian preschool children. J Paediatr Child Health 2003 Aug;39(6):442-5.

[12] Centre for Oral Health Strategy NSW. NSW Early Childhood Oral Health (ECOH) Program Plan. Unpublished, 2007.

[13] Lingard L, Albert M, Levinson W. Grounded theory, mixed methods, and action research. BMJ 2008 Aug 7;337:a567. doi: 10.1136/bmj.39602.690162.47.

[14] O'Cathain A, Murphy E, Nicholl J. Why, and how, mixed methods research is undertaken in health services research in England: a mixed methods study. BMC Health Serv Res 2007 Jun 14;7:85. < http://www.biomedcentral.com/1472-6963/7/85>.

[15] Keen J, Packwood T. Case study evaluation. BMJ 1995 Aug 12;311(7002):444-6.

[16] Carter SM, Ritchie JE, Sainsbury P. Doing qualitative research in public health: not as easy as it looks. N S W Public Health Bull 2009 Jul-Aug;20(7-8):105-11.

[17] NSW Department of Health. Early Childhood Oral Health Program: The Role of Public Oral Health Services. Policy Directive PD 2008_020, 2008. <http://www.health.nsw.gov.au/policies/pd/2008/pdf/PD2008_020.pdf

[18] Centre for Oral Health Strategy NSW. Early Childhood Oral Health Training Manual. Unpublished, 2009.

[19] Phelan C. The Blue Book Oral Health Program: a collaborative partnership with state-wide implications. HPJA 2006;17(2):109-13.

[20] Centre for Oral Health Strategy NSW. Lift the Lip Evaluation. Unpublished, 2008.

[21] http://www.mhcs.health.nsw.gov.au/publication_details/8310.asp

[22] Centre for Oral Health Strategy NSW. Evaluation of 'Lift the Lip' brochure to assess appropriateness for cultural and linguistically diverse communities. Unpublished, 2008.

[23] Weinstein P, Harrison R, Benton T. Motivating parents to prevent caries in their young children: one year findings. J Am Dent Assoc 2004 Jun;135(6):731-8.

[24] NSW Department of Health. Early Childhood Oral Health Guidelines for Child Health Professionals. 2009. Centre for Oral Health Strategy. Available at: http://www0.health.nsw.gov.au/policies/gl/2009/pdf/GL2009_017.pdf

# Chapter Two Part B:

# Publication: "The Early Childhood Oral Health Program: Promoting Prevention and Timely Intervention of Early Childhood Caries in NSW through Shared Care"

**The Early Childhood Oral Health Program: Promoting Prevention and Timely Intervention of Early Childhood Caries in NSW through Shared Care**

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**ABSTRACT:**

**Issue Addressed:** Early childhood caries (ECC) continues to have high prevalence worldwide, despite being largely preventable. The Early Childhood Oral Health (ECOH) Program was established in New South Wales (NSW) using a model of shared responsibility for oral health, which involves a partnership between child health professionals, oral health professionals and parents of young children, to facilitate the primary prevention, early identification and early intervention of ECC.

**Methods:** An evaluation of the ECOH program was conducted, using mixed methods. Data were obtained through document review, surveys and interviews with program implementers, and analysis of the Information System for Oral Health (ISOH) database for public oral health services activity in NSW.

**Results:** Key achievements of the ECOH program include the establishment of governance mechanisms, policy, structures and responsibilities for implementation, support mechanisms for child health professionals, referral processes, communications resources, and the delivery of training. Parents receive oral health information, education, and support through written resources and contact with child health professionals. Child and family health nurses interviewed report routinely incorporating oral health promotion and early identification for ECC into their practices. The referral rate to public oral health services for children under five years of age by community health professionals has increased steadily since the program began, with the rate in 2009 five times higher than in 2007.

**Conclusions and Implications:** Models of shared responsibility for oral health between parents, child health professionals, and oral health professionals can facilitate primary prevention and early intervention for ECC.

**So What?** Child health professionals are well placed to positively influence parental knowledge and behaviour to achieve oral health outcomes in young children. Child oral health services can be re-oriented towards empowering parents in early childhood oral health promotion, which facilitates primary prevention, early identification and intervention for early childhood caries.

**INTRODUCTION:**

Early childhood caries (ECC) continues to have a high prevalence and constitutes a significant health burden in Australia, despite being largely preventable. Poor oral health in young children can cause significant pain and can affect growth, cognitive development, communication, and social functioning [1]. Treatment often requires general anaesthesia, which is traumatic for the child and costly for the health system [2]. Furthermore, children with ECC are more likely to experience future dental problems [3].

Forty percent of five to six-year-old children in New South Wales (NSW) have experience of dental disease [4]. The prevalence of dental disease in NSW is significantly higher for Aboriginal children, children living remotely, children of mothers born in non-English speaking countries, and children living in disadvantaged socio-economic areas [4].

The risk factors for ECC include biological, behavioural, and social determinants. ECC is a bacterial disease modifiable by diet [5] and can be largely prevented through appropriate bottle feeding practices, dietary modification, tooth-brushing, and fluoride [6]. There are also significant cultural and social determinants of ECC, with children from specific cultural groups and with lower socio-economic status experiencing higher prevalence and severity of decay, and less access to treatment [7]. The first 18 months of life is the opportune time to influence long-term oral health [8]. Interventions need to focus on primary prevention of ECC, and anticipatory advice should be provided to pregnant women and to parents before their child's teeth erupt [9]. Early identification and intervention of ECC can reverse the disease process, prevent further decay developing, and avoid the need for surgical intervention [6].

Few Australian infants and young children ever see a dental professional before 5 years of age [10], thus oral health promotion for parents of infants and young children is best delivered by non-dental health care providers [6]. Mouradian [11] proposed a model of shared responsibility for children's oral health whereby primary care practitioners (such as paediatricians, general practitioners, and child and family health nurses) and dental professionals become more involved in early oral health promotion and prevention activities with parents of infants and young children. In this way, child health services and dental services are reoriented to incorporate oral health promotion in partnership with parents.

Frameworks for prevention such as these need to not only strengthen individual knowledge of parents, but also to shift attention from the individual to a wider systems approach [12].

The NSW Early Childhood Oral Health (ECOH) Program was established by NSW Health in June 2007 to address ECC using a model of shared responsibility [13]. The program aims to promote and improve the oral health of infants and young children through promotion, prevention, and early intervention, using both universal and targeted approaches.

The program was developed to support the achievements of the Blue Book Program[14], in which oral health information was reincorporated into the NSW Personal Health Record (or Blue Book), ensuring new parents and child health professionals have increased access to oral health information. The universal provision of information empowers parents with the knowledge and skills required to minimise the impact of dental disease within their families.

The ECOH Program is a community based program focussed on integrated service delivery and the development of effective partnerships between families, child health professionals, and oral health professionals. The first objective is to support child health professionals' capacity to incorporate oral health into regular child health checks, which includes providing oral health information to parents, oral health screening for infants and young children, early identification of ECC, and referral to oral health services for infants and young children with ECC, or at risk of developing ECC. Parents are provided with anticipatory guidance, resources and support to enable positive oral health behaviours in the home, and to encourage parental monitoring of their child's oral health. The second objective is to support oral health professionals to focus on early management of dental disease, and to incorporate promotion and prevention into their services, through working in partnership with parents and families.

The ECOH Program uses both a universal approach, providing all parents and child health professionals with oral health information, and a targeted approach for children at high risk of developing ECC through creating referral pathways to, and appropriate management by, oral health professionals. The ECOH Program encompasses a stages of change approach for oral health promotion, whereby child and oral health professionals are trained to provide motivational interviewing to parents in order to encourage positive oral health behaviours in

the home [15]. The theory of organisational change is also utilised, with systems, processes, and policies developed state-wide in order to support the implementation of the program.

An evaluation of the ECOH program was conducted in 2010 to determine if a model of shared responsibility for early childhood oral health has been implemented in NSW, to identify the key achievements of the ECOH Program and the factors enabling these, and to determine whether the program was effective in reaching populations with a higher burden of oral disease in NSW. While the ECOH Program targets children and parents through child health professionals and oral health professionals, this process evaluation focussed particularly on the child health professionals component, and the degree to which child health professionals were incorporating oral health promotion and prevention into their routine care. The evaluation findings are reported in this paper, and the implications of these findings for this program and similar programs are considered.

## METHODS:

A program evaluation using mixed methods was conducted to capture both the perspectives and experiences of service providers and beneficiaries, and any changes to state-wide public oral health services activity for children. Information was gathered through document review, surveys and interviews with program implementers, and analysis of the Information System for Oral Health (ISOH) database for public oral health services activity in NSW.

**Document Review:** An analysis of program documents and data was conducted to compile a narrative report of the ECOH Program implementation and monitoring. The program documents included published clinical guidelines, policies, and training manuals, and unpublished documents such as the program proposal, reports, presentations, and the results of monitoring activities.

**Survey:** A preliminary survey was completed, in which 40 child and family health nurses from across NSW selected by their local program co-ordinator were interviewed by the telephone. They completed a five-item questionnaire, using a Likert-type scale, which addressed the frequency with which the nurses conducted oral health promotion and screening within routine child health checks, and the participation of the nurses in oral health professional development activities of the ECOH Program. For each question, the scores for each response were calculated.

**Semi-Structured Interviews:** Twenty-six health professionals involved in ECOH program implementation in three settings in NSW where there are higher proportions of children known to have increased experience of dental disease (children of Aboriginal, culturally and linguistically diverse, rural and remote, and lower socio- economic backgrounds), were purposively selected in order to capture experiences of staff working in areas of higher need. These settings were selected without prior knowledge or consideration of the coverage or success of the program in those areas. The semi-structured interviews were guided by open-ended questions that aimed to explore the participants experiences of developing, implementing, and monitoring the program, and their perception of associated successes and challenges. All interviews were conducted face-to-face by the first author (LM) and lasted approximately 60 minutes. The interviews were audio-taped, transcribed verbatim and analysed using a qualitative template approach to content analysis [16]. Units of meaning were identified in the interview text concerning participants ECOH program experience and perceptions of success. Sub-categories, categories, and themes were then identified. Each new piece of data was compared with subsequent ones allowing key patterns to emerge, as per the procedure for content analysis outlined by Graneheim at al [17]. The coding was discussed between three authors (LM, AD, CP) to improve the veracity of the analysis, and consensus reached.

**Public Oral Health Services Data:** The Information System for Oral Health (ISOH) database records public oral health services patient activity in NSW. An analysis of de-identified data for children under the age of 5 years referred by the ECOH program to public oral health services from 1 July 2007 to 31 December 2009 was undertaken to review the demographic status of children referred, as well as the number of referrals. The Index of Relative Socio-economic Disadvantage (IRSD) for areas was used to determine socio-economic status of children based on their postcode of residence, and language other than English spoken at home was used to identify children from culturally and linguistically diverse backgrounds. De-identified data were retrieved from the ISOH database and descriptive analysis was conducted using EpiInfo™ V3.5.1.

**Ethical Considerations:** This project was approved by the Greater Western Area Health Service (NSW) Human Research Ethics Committee, and ratified by the University of New South Wales Human Research Ethics Committee.

**RESULTS:**

**Document Review Results - Program Milestones and Achievements:** The key achievements for the ECOH Program in the first three years of implementation, as identified through the document review process and interviews with the program implementers, are outlined in Table 1. These include the establishment of a governance system for the program, the development of a clear structure for program implementation with clear roles and responsibilities outlined, the development of resources including guidelines, the delivery of training to key child health professionals, and the establishment of referral processes to oral health services for children identified as at risk for ECC.

**Results of Survey and Interviews - Experiences of Key Stakeholders:** Forty child and family health nurses completed the preliminary survey. Twenty-six health professionals involved in the ECOH program implementation participated in the semi-structured interviews. This comprised five ECOH Program Co-ordinators, 14 child and family health nurses from the three higher risk settings, and five staff from the Centre for Oral Health Strategy NSW Health (COHS). The key themes and concepts which emerged were related to program development, partnerships, working with parents, process, impact, barriers, enablers, and future recommendations.

*COHS Staff:* In the interviews, these staff outlined the key program milestones and achievements as outlined in Table 1. They identified that establishing program co-ordinators across the state and supporting these positions was a key component of the role of COHS. The COHS staff considered that the roll out to the child and family health network through the ECOH Co-ordinators had been comprehensive and successful, and were now enhancing the program focus to increase its reach to target population groups, providing more training to other child health professionals, further supporting oral health professionals, and further expanding strategic partnerships such as with the Aboriginal Community Controlled Health Sector.

**Table 1: Key achievements of the ECOH program in the initial three year phase**

| ECOH Program Key Achievements: | |
|---|---|
| **Governance** | • An Advisory Committee for the ECOH program was formed, with representation from NSW Health, oral health services, and the academic sector<br>• The Advisory Committee reports to the Chief Dental Officer (NSW) |
| **Structure** | • A clear structure for program implementation was established, with designated roles and responsibilities identified<br>• The Centre for Oral Health Strategy NSW Health (COHS) developed and co-ordinated the program, developed policy, and produced resources<br>• Eight ECOH Co-ordinators across the state were identified from the oral health workforce to implement and co-ordinate the program within their area<br>• ECOH Co-ordinators deliver training, resources and support to child health professionals, and co-ordinate referrals to oral health services<br>• Regular co-ordination and collaboration between COHS and the ECOH Co-ordinators<br>• This structure resulted in state-wide coverage of the program. |
| **Policy** | • A NSW Health Policy Directive, describing the procedures and responsibilities for implementing the ECOH Program across NSW, was mandated |
| **Resource Development And Distribution** | • Oral health information was re-incorporated into the NSW Personal Health Record (Blue Book) to inform parents and child health professionals about oral health<br>• The *Early Childhood Oral Health Guidelines for Child Health Professionals* were produced and distributed to child health professionals across the state<br>• An *Early Childhood Oral Health Training Package* was developed for ECOH Co-ordinators and others to deliver to child health professionals<br>• The online learning activity *Early childhood oral health: case studies for general practice* was developed (in partnership with the Royal Australian College of General Practitioners)<br>• *Lift the Lip* resources (posters and brochures) were developed to provide oral health information to parents. Translated versions (15 languages) available online<br>• *See My Smile* resources (posters and brochures) were designed to provide Aboriginal families with appropriate oral health information<br>• 81,400 brochures were distributed each year, which indicates that most parents of children born each year receive the brochure (approximately 85,000 births in NSW annually) |
| **Training** | • ECOH Co-ordinators provided a two hour training package to child and family health nurses on early childhood oral health, encouraging oral health screening, oral health promotion, and early identification and referral for children identified at risk of ECC.<br>• Over 85% of child and family health nurses in NSW have participated in the ECOH training.<br>• Other child health professionals, including general practitioners, hospital staff, Aboriginal health workers, and non-government organisation staff, received training through partnerships developed locally by the ECOH Co-ordinators.<br>• General practitioners and other clinicians access ECOH training through the online learning package<br>• Training provided to public oral health service professionals in the management of early childhood oral health. |
| **Support** | • ECOH Co-ordinators provide regular support and co-ordination to child health professionals in their area. |
| **Referral Co-ordination** | • Referral systems were established locally, so children identified at risk of ECC are referred to oral health professionals and receive priority for appointments in the public dental system |

*ECOH co-ordinators:* The interviews revealed that each ECOH Co-ordinator had developed a location and context specific approach to the implementation of the ECOH Program within their region. The amount of time available for each co-ordinator to dedicate to the program varied, and most identified the role as requiring at least two days per week. The co-ordinators all reported rolling out the program comprehensively to the child and family health nurse network in their region. They reported variable success in rolling out the program to other child health professionals, including general practitioners, Aboriginal health workers, and paediatric and emergency department hospital staff. The co-ordinators cited their available time and confidence to approach these groups, as well as the willingness of those professionals to receive that information and develop partnerships, as significant factors influencing the degree to which these other child health professionals were reached within their region.

*Child and family health nurses:* In the preliminary survey and the interviews, the majority of the child and family health nurses reported that they almost always included oral health promotion and screening in regular child health checks. In the preliminary survey, 85% of the child and family health nurses surveyed reported they "almost always" showed parents how to "Lift the Lip" at every developmental check from 6 months onwards and 93% reported they "almost always" talked to parents about other areas of oral health.

In the interviews, the child and family health nurses reported that oral health promotion had become a regular part of their practice since the ECOH program was introduced three years earlier. The nurses identified a number of factors that had enabled them to assume responsibility for oral health, particularly the inclusion of oral health checks in the NSW Personal Health Record. The nurses reported that they follow this record during the regular child health checks, and the inclusion of oral health checks in the record guided their professional practice. The nurses also credited the training they had received, as well as the guidelines document, as important in helping them develop confidence in their oral health anticipatory guidance and screening practice. Many nurses reported that they had developed an effective working relationship with their regional ECOH Co-ordinator and that this was helpful, particularly when arranging referrals to oral health services for children identified as being at risk of ECC. The nurses were also satisfied with the *Lift the Lip* and *See my Smile* oral health promotion resources, which they distributed to parents and used as educational aids.

Many nurses reported that they did not access the versions of the resources in other languages which are available online, either because they were unaware they were available, or the process of accessing and printing the resources was difficult. A number of nurses discussed that they perceived considerable variation in the willingness of parents to receive the information, and reported exercising caution when providing anticipatory guidance to avoid alienating parents who may perceive that they were being told what to do.

**Public oral health services activity:** The analysis of the ISOH data revealed that there were a total of 3440 referrals to public oral health services by the ECOH referral sources during the period 1 July 2007 – 31 December 2009, and the majority of these referrals (81%) were from community health sources, which includes child and family health nurses. The number of referrals increased annually across all age groups (Figure 1) since the program began, with the referral rate in 2009 being five times higher than that in 2007. The largest proportion of referrals across the time period (27.5%) was for children in the 1 year old age group. Referrals to public oral health services by the ECOH program were the same for male and female children. The demographic profile of those referred to public oral health services by ECOH Program referral sources (Table 2) indicates that 10% of referrals were for children who are Aboriginal, 6% for children from homes where a language other than English is spoken, and 70% were from more socio-economically disadvantaged areas.

**Figure 1: Number of children aged 0-4 years referred to public oral health services in NSW by the Early Childhood Oral Health Program Referral Sources, by age and year of referral** (note 2007 figures are for the July-December period only).

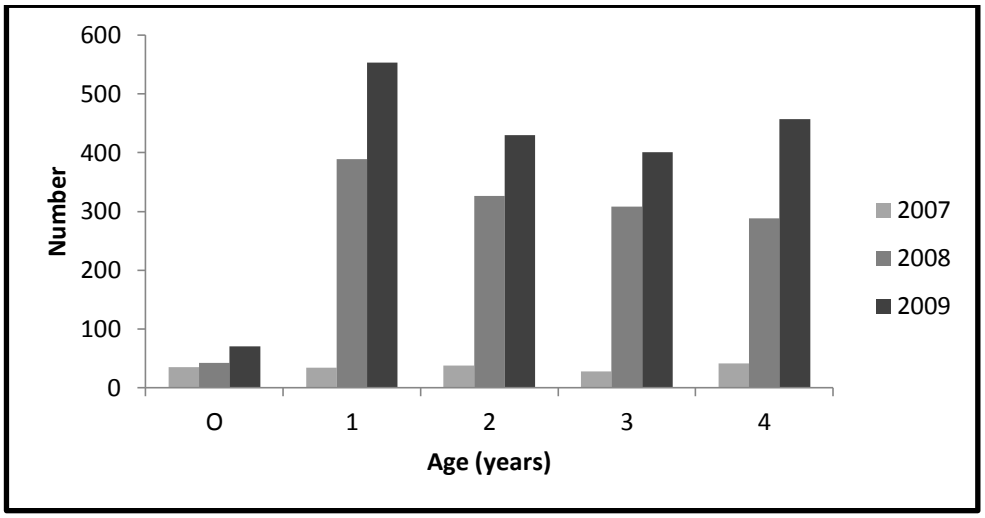

**Table 2: Demographic profile of children under 5 years of age referred to public oral health services from the Early Childhood Oral Health Program referral sources, 1 July 2007 – 31 December 2009**

| | Number | Percentage |
|---|---|---|
| **Country of Birth:** | | |
| Australia | 2897 | 84% |
| English Speaking Countries | 29 | 1% |
| Non-English Speaking Countries | 78 | 2% |
| Not Stated | 436 | 13% |
| **Language Spoken at Home:** | | |
| English | 2825 | 82% |
| Language other than English | 195 | 6% |
| Not Stated | 420 | 12% |
| **Aboriginal Status:** | | |
| Aboriginal or Torres Strait Islander | 347 | 10% |
| Non- Aboriginal | 2586 | 75% |
| Unknown | 507 | 15% |
| **Socio-Economic Disadvantage:*** | | |
| 1 (most disadvantaged areas) | 601 | 17% |
| 2 | 471 | 14% |
| 3 | 266 | 8% |
| 4 | 629 | 18% |
| 5 | 449 | 13% |
| 6 | 495 | 14% |
| 7 | 240 | 7% |
| 8 | 162 | 5% |
| 9 | 99 | 3% |
| 10 (least disadvantaged areas) | 28 | 1% |
| TOTAL | 3440 | 100% |

** Socioeconomic disadvantage determined using the Index of Relative Socio-economic Disadvantage (IRSD) for areas, based on the postcode of residence.*

## DISCUSSION:

This evaluation identified key achievements of the ECOH program, demonstrated that a model of shared care for early childhood oral health has been initiated in NSW, and described the impact of the program on referral rates to public oral health services in NSW. The evaluation methodology enabled the experiences and perspectives of program implementers in a number of settings to be considered. The limitations of the methodology were that changes in professional behaviour of the child health professional depended on self-report, there was potential for bias in the selection of survey participants, and that the data on utilisation of

dental services only reported public oral health services and thus excluded access to private dental service providers.

The ECOH program in NSW initiated a model of shared responsibility for early childhood oral health services. The initial phase of the program particularly targeted child and family health nurses, as they are the primary providers of child health checks, and the program has made significant achievements in supporting and encouraging these nurses to integrate oral health into their routine practices. All child and family health professionals have great potential to be effective in improving oral health referral pathways, oral health literacy and access to prevention and care, as they have regular contact with children who are unlikely to access oral health care [18]. The evaluation particularly considered partnerships with child and family health nurses; however the ECOH Program is also developing partnerships with other child health professionals, including GPs, hospital staff, and Aboriginal Health Workers.

Identified barriers to implementing a model of shared care include child health professionals lacking knowledge about oral health, not feeling confident to deliver oral health promotion messages, and feeling it may cross professional boundaries to do so [7, 19, 20]. The ECOH Program addressed these barriers in turn, providing clear and consistent oral health information through a guidelines document and training, and legitimising the role of the child and family health nurses as oral health promoters by the re-inclusion of oral health information in the NSW Personal Health Record. In a survey of primary care clinicians in the United States, the referral environment was identified as an important factor determining whether child health professionals refer children at risk of developing ECC [20]. Through developing clear referral processes, referral follow-up by the ECOH Co-ordinators, a priority system for referrals to public oral health services for children aged under five years, and feedback mechanisms, the ECOH Program also ensured that referral pathways were well developed and partnerships between child and oral health professionals were strengthened.

The organisation of the ECOH program, with central co-ordination and regional implementation by identified co-ordinators, has enabled the development of effective multi-disciplinary relationships locally, and context-specific approaches to implementation. This structure decentralised responsibility and ownership of the program, which has fostered significant achievements, successes and creativity across the different regions. However, this

approach has also resulted in non-uniform program implementation across the state. While all regions have achieved comprehensive roll-out of the ECOH Program to the network of child and family health nurses, the roll out to other child health professionals and targeted sub-populations varies. Further development of systems, structures, governance, and policy, will contribute to the sustainability of the program.

Referrals to public oral health services from the ECOH Program provide some indication of the reach of the program to populations that have a higher prevalence of ECC. The high proportion of "not-stated" or "unknown" for each category in Table 2 reflects the level of reporting in the ISOH system, and limits the reliability of this data. The proportion of all referrals to public oral health services for children under five years for Aboriginal children (10%) was higher than their proportion in the total population (6.2%) [21]. Seventy percent of the referrals came from the lower socio-economic half of the population. While 19% of the NSW population speak a language other than English in the home [22], only 6% of referrals were for children from these households. Considering the increased burden of ECC these three populations experience, the reach of the program to these populations may not yet be sufficient. Continuing to develop stronger partnerships with other child health professional networks, including Aboriginal Controlled Community Health Services, general practitioners and practice nurses, hospitals and community services partnerships, as well as fostering shared responsibility for oral health in these practitioners as has been achieved in the child and family health network, will strengthen the reach and impact of the program.

This evaluation identified two main outcomes of the ECOH Program to date. Firstly, parents have increased access to oral health information, education, and support. Parents are receiving written information from two sources (the NSW Personal Health Record and the Lift the Lip or See My Smile brochures), and anticipatory guidance and support from child health professionals, to encourage improved oral health behaviours in the home. The second main outcome is in relation to child and family health nurses, who report changing their routine practice since the program began to now incorporate oral health anticipatory guidance, screening, early identification, and referral.

Two randomised controlled trials conducted in Australia and the United Kingdom have demonstrated that oral health promotion programs delivered by child health professionals can

have a significant impact on reducing ECC [23,24], however it was beyond the scope of this evaluation to assess the impact of the ECOH program on oral health outcomes in young children. Evaluation of oral health promotion is complex and identifying appropriate high quality outcomes measures is challenging [25]. Appropriate measures for the ongoing monitoring and evaluation of the ECOH Program need to be identified. Referrals to public oral health services, as used in this evaluation, is one measure of the success of the program, as an increased rate of referrals represents enhanced early identification and intervention for ECC. Ultimately, the aim of the program is to decrease the rate of decay in children aged under five years in NSW, which will continue to be measured through regular NSW Child Dental Surveys, the next of which will be conducted in 2012-2013. The 2007 Child Dental Survey provides an accurate baseline for the ECOH Program, and while this data will be compared with the results of future surveys, it could not be assumed that any observed changes are solely due to the ECOH Program.

The main recommendations resulting from this evaluation were to: develop a strategic plan for the next phase of the project; ensure adequate allocated human resources for ongoing program implementation; maintain the partnerships with child and family health nurses networks; further develop partnerships with other child health professionals; specifically target improvements in accessibility of the ECOH program to Aboriginal families, and culturally and linguistically diverse communities; encourage ongoing incorporation of promotion and prevention strategies into public oral health service delivery for young children; and review the monitoring and evaluation framework for the ECOH program.

**CONCLUSION:**

The ECOH Program has established models of shared responsibility for early childhood oral health in NSW. Parents are targeted to facilitate positive oral health behaviours in the home. Through appropriate program planning, governance, resource development, delivery of training, and development of referral pathways, the ECOH program has resulted in child health professionals in NSW incorporating oral health anticipatory guidance, screening, early identification and referral into their routine practice, evidenced by increased referrals to public oral health services for children aged under five years in NSW.

**REFERENCES:**

[1] Douglass JM, Douglass AB, Silk HJ. A practical guide to infant oral health. *American Family Physician*. 2004; 70(11): 2113-20.

[2] Yengopal V, Harnekar S, Patel N, Siegfried N. Dental fillings for the treatment of caries in the primary dentition. *Cochrane Database of Systematic Reviews.* 2009; 15 (2):CD004483.

[3] Li Y, Wang W. Predicting caries in permanent teeth from caries in the primary teeth: an eight year cohort study. *Journal of Dental Research.* 2002; 81(8): 561-6.

[4] Phelan C, Byun R, Skinner JC, Blinkhorn AS. Child dental health survey 2007: a snapshot of the oral health status of primary school aged children in NSW. *NSW Public Health Bulletin.* 2009; 20 (3-4): 40-45.

[5] Featherstone JDB. The Continuum of Dental Caries - Evidence for a Dynamic Disease Process. *Journal of Dental Research 2004;* 83: C39. DOI: 10.1177/154405910408301S08.

[6] Gussy MG, Water EG, Walsh O, and Kilpatrick NM. Early childhood caries: current evidence for aetiology and prevention. *Journal of Paediatrics and Child Health.* 2006; 42(1-2):37-43.

[7] Mouradian WE, Wehr E, and Crall JJ. Disparities in Children's Oral Health and Access to Dental Care. *Journal of the American Medical Association.*2000; 284 (20): 2625-2631.

[8] Gussy MG, Waters E, Kilpatrick MN. A qualitative study exploring barriers to a model of shared care for pre-school children's oral health. *British Dental Journal.* 2006; 201(3): 165-170

[9] Yost J, Li Y. Promoting oral health from birth through childhood: prevention of early childhood caries. *MCN The American Journal of Maternal and Child Nursing.* 2008; 33(1):17-23.

[10] Slack-Smith LM. Dental visits by Australian preschool children. *Journal of Paediatrics and Child Health.* 2003; 39(6):442-5.

[11] Mouradian WE. The face of a child: children's oral health and dental education. *Journal of Dental Education.* 2001; 65: 821-831.

[12] Cohen L and Swift S. The spectrum of prevention: developing a comprehensive approach to injury prevention. *Injury Prevention.* 1999; *5: 203-207.*

[13] Petersen PE. The World Oral Health Report 2003: Continuous improvement in Oral health in the 21st Century. *Community Dentistry and Oral Epidemiology.* 2003; 31 (Suppl 1): 3-24

[14] Phelan C. The Blue Book Oral Health Program: a collaborative partnership with statewide implications. *Health Promotion Journal of Australia.* 2006 ; 17 (2)

[15] Yevlahova D and Satur J. Models for individual oral health promotion and their effectiveness: a systematic review. *Australian Dental Journal.* 2009; 54 (3), 190–197.

[16] Crabtree, B., Miller, W. (1992). A template approach to text analysis: Developing and using codebooks in Crabtree, B., Miller, W. *Doing Qualitative Research*. Newberry Park, Sage Publications.

[17] Graneheim UH, Lundham B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*. 2004; 27(7): 105.

[18] Satur JG, Gussy MG, Morgan MV, Calache H, and Wright C. Review of the evidence for oral health promotion effectiveness. *Health Education Journal.* 2010; 69 (3): 257-266.

[19] Close K, Rozier RG,Zeldin L, Gilbert A (2010). Barriers to the adoption and implementation of preventive dental services in primary medical care. *Pediatrics.* 125(3): 509-517

[20] dela Cruz GG., Rozier RG, Slade G. Dental screening and referral of young children by pediatric primary care providers. *Pediatrics,* 2004. 114(5): p. e642-52.

[21] NSW Health. NSW population by Aboriginality and age. *Health Statistics New South Wales*. http://www.healthstats.nsw.gov.au/Indicator/atsi_pop_agesex_atsi (Accessed 10/03/2012).

[22] Australian Bureau of Statistics. Population Composition: Languages spoken in Australia. http://www.abs.gov.au/ausstats/abs@.nsf/2f762f95845417aeca25706c00834efa/d67b7c95e0e8a733ca2570ec001117a2!OpenDocument. Accessed 10/03/2012.

[23] Davies GM, Duxbury JT, Boothm,an NJ, Davies RM, and Blinkhorn AS. A staged intervention dental health promotion programme to reduce early childhood caries. *Community Dental Health*, 2005. **22**(2): p. 118-22.

[24] Plutzer K and Spencer AJ. Efficacy of an oral health promotion intervention in the prevention of early childhood caries. *Community Dentistry & Oral Epidemiology,* 2008. 36(4): p. 335-46.

[25] Watt RG, Harnett R, Daly B, Fuller SS, Kay E, Morgam A, Munday P, Nowjack-Ramer R, Treasure ET. Evaluation oral health promotion: need for quality outcomes measures. *Community Dentistry and Oral Epidemiology.* 2006. 34: 11-7.

# Chapter Three: The Review of Eye Health Services for Aboriginal People in Western NSW

## Introduction

In 2010 the Chief Health Officer of NSW requested The Centre for Aboriginal Health at the NSW Ministry of Health to co-ordinate a review of eye health services for Aboriginal people in the Greater Western Area Health Service (now the Western and Far West Local Health Districts). The results of the National Indigenous Eye Health Survey had been published in 2009 [1], demonstrating a high prevalence of avoidable blindness and low vision in Aboriginal people, and low rates of access to eye health services for Aboriginal people. In response, the Chief Health Officer requested that a review of eye health services be conducted in western NSW, which has a high proportion of residents who are Aboriginal, in order to assess if eye health services in this region were available, accessible, and affordable for Aboriginal people.

The Centre for Aboriginal Health contracted Associate Professor Tony Brown from the University of Sydney's School of Rural Health in Dubbo to oversee and co-ordinate the review, and approached the NSW Public Health Officer Training Program to provide a Public Health Officer Trainee to conduct the review. Trainees were invited to submit an Expression of Interest if they were interested in conducting this project. Following this process, I was selected to undertake this project.

My interest in conducting this project stemmed from my previous experience in 2009 working for the Fred Hollows Foundation New Zealand in Fiji to manage and undertake the National Fiji Eye Health Survey. In Fiji we conducted a population-based cross-sectional survey, in order to identify the prevalence and causes of blindness and low vision [2], and the usage of and barriers to access to eye care services [3]. This survey in Fiji was similar to the National Indigenous Eye Health Survey conducted in Australia [1], and both identified a high prevalence

of avoidable vision problems and low rates of access to eye health services for the population of interest. Following such a survey it is logical to then investigate the issues in service availability, co-ordination, and accessibility that may be contributing to the low rates of access to services. This project provided me with an opportunity to investigate these issues in regard to Aboriginal people in western NSW.

To conduct this study, I commenced a six month placement with the University of Sydney's School of Rural Health in Dubbo in May 2010.

## Overview:

Aboriginal people experience a higher burden of eye disease than the general population in Australia. The prevalence of blindness in Aboriginal and Torres Strait Islander adults nationally is 1.9% (6.2 times the prevalence for non-Aboriginal people) and the prevalence of low vision is 9.4% (2.8 times the prevalence for non-Aboriginal people). [4] The major causes of blindness in Aboriginal and Torres Strait Islander adults are cataract, optic atrophy, refractive error, diabetic eye disease, and trachoma. [4]

Eye health services in Australia are delivered at the primary care level by general practitioners, community health nurse, and Aboriginal health workers, and involve promotion, screening, treatment of minor problems, and referral to eye health professionals as appropriate. Secondary eye health services are delivered by optometrists and ophthalmologists and include diagnosis and treatment of major eye problems, excluding major procedures requiring surgery. Tertiary eye health services are delivered by ophthalmologists and involve surgical interventions in the hospital setting.

The Terms of Reference for the Review of Eye Health Services for Aboriginal people in the Greater Western Region of NSW were agreed between the Centre for Aboriginal Health and the School of Rural Health. The Objectives, as per the Terms of Reference, were to: (1) Map existing eye health services / programs; (2) Collect and analyse data on existing eye health services; (3) Estimate accessibility of eye health services to Aboriginal people; (4) Describe gaps in access to service; and (5) Make recommendations for improving access to, and co-ordination of, services.

The review was undertaken in the period from May to November 2010. A mixed methods approach, combining qualitative and quantitative data, was used for this review, to capture regional service utilisation data as well as the perspectives and experiences of key stakeholders and service providers. I designed, implemented, and reported on this review, under the supervision of my workplace and academic supervisors. The review collected information through document and data review, observational visits, and stakeholder consultation.

The review identified issues in the availability and accessibility of eye health services for Aboriginal people in primary, secondary, and tertiary eye health care services, and also identified issues in the co-ordination and collaboration, cultural competence, and monitoring and evaluation of eye health services for Aboriginal people in the region. The main recommendations resulting from this review were to: (1) Enhance eye health screening, referral, co-ordination and promotion at the primary health care level; (2) Improve and further develop secondary eye health services in the region; (3) Maintain availability of tertiary ophthalmology services in current locations, and plan for increased demand; (4) Improve the co-ordination and collaboration of eye health services and eye care stakeholders in the region; (5) Improve the cultural competence of eye health service delivery in the region; and (6) Develop a system to monitor and evaluate eye health services in the region, at all levels.

## Outputs and Impact:

This project resulted in two main project outputs:

1. The final project report, entitled "Eye Health Services for Aboriginal People. A review within the Greater Western Region of NSW." was published by the NSW Department of Health in 2011. The hard copy of the report was distributed to key stakeholders of the eye health and Aboriginal health in NSW, and an electronic version is available online at http://www0.health.nsw.gov.au/pubs/2011/review_of_aboriginal_eye_.html

2. A paper reporting on the review findings, entitled "Eye health services for Aboriginal people in western NSW, 2010" was published in the NSW Public Health Bulletin (2012: 23 (4): 81-86).

In addition, I delivered a poster presentation on this project, entitled "Eye Health Services for Aboriginal People within the Greater Western Region of NSW, A Review" at the Coalition for Research in Aboriginal Health Conference in Sydney in May 2011, and at the Rural Health Research Colloquium in Dubbo in November 2011.

I presented the findings and recommendations of the review to the following stakeholders: The Chief Health Officer of NSW; The Executive Committee of the Greater Western Area Health Service; the Aboriginal health workforce of the Greater Western Area Health Service; the staff of the School of Rural Health (Dubbo), The University of Sydney; the staff of the Centre for Aboriginal Health, Ministry of Health; The Minister for Healthy Lifestyles, Mental Health, and Western New South Wales, the Hon Kevin Humphries.

A number of the recommendations made in the review were implemented during 2011:

- Aboriginal Eye Health Co-ordinator positions were established in Western NSW and Far West Local Health Districts, funded by the Centre for Aboriginal Health.
- An eye health clinic for Aboriginal people was established in Dubbo using a public-private partnership model.

## Reflections:

This project required me to live in Dubbo for six months, and being based in a regional location enabled me to develop an understanding of the impact of distance and remoteness on the accessibility of health services for all people. I travelled throughout the region for the observational visits, to Orange, Bathurst, Bourke, Brewarrina, Lightning Ridge, Walgett, Cobar, and Broken Hill. These trips facilitated an understanding of how the services are delivered and used, and it was interesting and enjoyable to travel to new locations in NSW. For me the most valuable component to being based in Dubbo and travelling to these other locations was the opportunity to meet with many Aboriginal people, and people involved in health services delivery to Aboriginal people. I had no previous experience working in Aboriginal health or with Aboriginal people, and these experiences informed my subsequent work in this area.

The review findings demonstrate that while some eye health services are available throughout western NSW, there is limited availability to all residents of western NSW. The main issue is one of equity – the services that are available are not equally available to people in lower

socio-economic circumstances as the majority of the services are private and therefore incur a cost. Secondly, with the exception of some eye health services designed and delivered specifically for Aboriginal people, the majority of available eye health services are mainstream services that do not always provide a culturally secure environment for Aboriginal people. In some towns, such as Bathurst and Orange, the only avenue to access cataract surgery in a public hospital requires seeing a private ophthalmologist in private rooms which is likely to incur a significant cost and unlikely to be a culturally secure experience for Aboriginal people. The third issue is that the lack of co-ordination between the existing eye health service providers results in many Aboriginal people not completing the multi-staged eye health service pathway from the primary health care level to treatment at the tertiary level when required.

Following my placement in Dubbo, my next placement was at the Centre for Aboriginal Health at the Ministry of Health. The Centre for Aboriginal Health was responsible for the co-ordination of the eye health services review, and for responding generally to issues arising for eye health services for Aboriginal people. Working in the Centre for Aboriginal Health following the completion of this project enabled me to continue to be involved in issues related to eye health for Aboriginal people. I was able to facilitate publication of the report, and be involved in the implementation of a number of recommendations from the report, including establishing the eye health co-ordinator positions in the two Local Health Districts in western NSW, and supporting the establishment of an eye health clinic for Aboriginal people in Dubbo through a public-private partnership. I was involved in meetings between the Chief Health Officer and the Centre for Aboriginal Health to plan appropriate strategies to address eye health services for Aboriginal people in NSW, and prepared a number of data reports, analyses, and proposals for these meetings. In addition, I attended a meeting with the Minister for Healthy Lifestyles, Western NSW, and Mental Health, the Hon Kevin Humphries, and Professor Hugh Taylor, the Harold Mitchell Chair of Indigenous Eye Health from the University of Melbourne regarding a proposed Roadmap to Close the Gap in Vision for Aboriginal People [5]. I also prepared the response from the Minister to the Royal Australian and New Zealand College of Ophthalmologists regarding the Roadmap.

A number of actions aimed to improve eye health services for Aboriginal people in NSW were undertaken in 2011 / 12. As mentioned, the eye health co-ordinator positions were created, and the new eye health clinic in Dubbo was established. Funding for retinal cameras in seven Aboriginal Community Controlled Health Services was approved, and funding for training staff

to use these cameras was provided. The Centre for Health Protection established a survey in western NSW to ascertain the prevalence of trachoma in that region. Rates of access to cataract surgery for Aboriginal and non-Aboriginal people were reported in the Chief Health Officer's Report 2012 (see Chapter 4). While these actions are significant, a more co-ordinated and concerted response is required to improve eye health outcomes for Aboriginal people in NSW. The Roadmap to Close the Gap in Vision [5] describes the components and level of action required to improve eye health outcomes for Aboriginal people, and additional action is required to comprehensively implement such a response in NSW.

## Limitations

This review provides an overview of eye health services in western NSW for Aboriginal people. The focus was on secondary and tertiary services, and therefore service delivery at the primary health care level was not considered in depth. The review was also limited by the quality and availability of routinely collected service delivery data. The review process collated available information in order to provide a situation overview – this approach was sufficient to meet the requirements of the Terms of Reference, and enabled the project to be completed within the allocated time frame and within budgetary constraints. The perspectives of Aboriginal people who require or use eye health services in the region were not captured through this review.

## Contributions and acknowledgements:

I completed the design of the review, its implementation, and reporting. I am the first author of the report and the published paper.

The following people made the following contributions to this project:

- Associate Professor Tony Brown , University of Sydney: Project leader – oversight on the project design, implementation, and reporting. Co-ordinated meetings with key stakeholders in GWAHS. Liaison with the Centre for Aboriginal Health and the Chief Health Officer. Workplace supervisor. Co-author of the published paper.
- Dr Siranda Torvaldsen, University of New South Wales, NSW: Guidance on the project design, implementation, and reporting. Co-author of the published paper.
- Dr Angela Dawson, University of New South Wales, NSW: Guidance on the evaluation design, implementation, and reporting. Co-author of the published paper.

- The Project Reference Group: Monitoring and advising on the review process
    - Ms Lou-Anne Blunden, Director Population Health, Planning and Performance, Greater Western AHS.
    - Ms Linda Williams, Area Manager for Aboriginal Health, Greater Western AHS.
    - Dr Therese Jones, Area Manager Population Health, Greater Western AHS
    - Ms Sian Rudge, Acting Manager Evaluation, Monitoring and Reporting, Centre for Aboriginal Health, NSW Health
    - Mr Rod Cook, Senior Policy Analyst, Centre for Aboriginal Health, NSW Health
- Ms Jillian Patterson, NSW Ministry of Health: Assistance with revised analysis of cataract surgery data in 2011.
- Ms Anne Lea and Ms Michelle Davies, Population Health, Planning and Performance: provided the background data on Greater Western AHS, and the ophthalmology service utilisation data in the main report.
- Mr Nick Rose, Centre for Epidemiology and Research, NSW Health: prepared the maps in the main report and the published paper.

The participation in the review by all key stakeholders is also gratefully acknowledged, particularly those who hosted observational visits.


## Ethics Approval:

Ethics approval for this project was not required, as advised by the NSW Ministry of Health, and the University of NSW Human Research Ethics Committee.

## Chapter Overview:

The body of this chapter is comprised of two main pieces of work:

- **Chapter Three Part A** (Page 115) Final Report. Maher L and Brown A (2011). Eye Health Services for Aboriginal People: A Review within the Greater Western Region of NSW. NSW Ministry of Health. http://www0.health.nsw.gov.au/pubs/2011/review_of_aboriginal_eye_.html
- **Chapter Three Part B** (Page 204): Maher L, Brown A, Torvaldsen S, Dawson A, Patterson J, and Lawrence G. Eye health services for Aboriginal people in the western region of NSW, 2010. NSW Public Health Bulletin. 2012. 23(4): 81-86

As both of these components have been published and are available in the public domain, the published versions have been reproduced as published (with revised formatting only) in the following sections. In this thesis, all previously published reports or papers have been boxed to demonstrate that they are final pieces of work.

## References:

[1] University of Melbourne and the Centre for Eye Research Australia (2009). National Indigenous Eye Health Survey. Minum Barreng (Tracking Eyes). Full Report.

[2] Ramke J, Brian G, Maher L, Qalo Qoqonokana M, Szetu J. Prevalence and causes of blindness and low vision among adults in Fiji. *Clinical and experimental ophthalmology*. 2012 Jul; 40(5):490-6. DOI: 10.1111/j.1442-9071.2011.02749.x

[3] Brian G, Maher L, Ramke J, Palagyi A. Eye care in Fiji: a population-based study of use and barriers. *Ophthalmic Epidemiology.* 2012. 19(2): 43-51.

[4] Taylor HR. The prevalence and causes of vision loss in Indigenous Australians: the National Indigenous Eye Health Survey. Med J Aust 2010; 192(6): 312-8.

[5] Indigenous Eye Health Unit, The University of Melbourne. The Road Map to Close the Gap in Vision. Full Report. 2012. The University of Melbourne, Melbourne, Australia

# Chapter Three: Part A:

# Published Report: "Eye Health Services for Aboriginal People: A Review within Greater Western NSW".

# Eye Health Services for Aboriginal People

## A Review within the Greater Western Region of NSW

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November 2011

# Contents

# Acknowledgements

The Review of Eye Health Services for Aboriginal People within the Greater Western Area Health Service Region was undertaken by the School of Rural Health (Dubbo), University of Sydney, for the NSW Department of Health. The review was led by Associate Professor Tony Brown, and the review and report was completed by Ms Louise Maher (NSW Public Health Officer Trainee, NSW Health).

The Project Reference Group which monitored the review process consisted of:

- Ms Lou-Anne Blunden, Director Population Health, Planning and Performance, Greater Western AHS.
- Ms Linda Williams, Area Manager for Aboriginal Health, Greater Western AHS.
- Dr Therese Jones, Area Manager Population Health, Greater Western AHS
- Ms Sian Rudge, Acting Manager Evaluation, Monitoring and Reporting, Centre for Aboriginal Health, NSW Health
- Mr Rod Cook, Senior Policy Analyst, Centre for Aboriginal Health, NSW Health

The contributions of the following people to the review process are gratefully acknowledged:

- Ms Anne Lea and Ms Michelle Davies, Population Health, Planning and Performance, who provided the background data on Greater Western AHS, and the ophthalmology service utilisation data.
- Mr Nick Rose, Centre for Epidemiology and Research, NSW Health, who prepared the maps in Figures 4-6.
- Dr Angela Dawson and Dr Siranda Torvaldsen, UNSW, who provided input on methodology and reporting.

The participation in the review by all key stakeholders is gratefully acknowledged, particularly those who hosted observational visits.

# Acronyms

| | |
|---|---|
| AHS | Area Health Service |
| ACCHS | Aboriginal Community Controlled Health Services |
| AHMRC | Aboriginal health and Medical Research Council |
| AMD | Age Related Macular Degeneration |
| AMS | Aboriginal Medical Service |
| CSR | Cataract Surgery rate |
| DR | Diabetic retinopathy |
| GP | General Practitioner |
| ICEE | International Centre for Eyecare Education |
| LGA | Local Government Area |
| MSOAP | Medical Specialist Outreach Assistance Program |
| NIEHS | National Indigenous Eye Health Survey |
| POW | Prince of Wales Hospital, Sydney |
| OES | Outback Eye Service |
| QALY | Quality Adjusted Life Years |
| RANZCO | Royal Australian and New Zealand College of Ophthalmologists |
| REHC | Regional Eye Health Co-ordinator |
| SESIAHS | South Eastern Sydney Illawarra Area Health Service |
| VOS | Visiting Optometry Scheme |
| VMO | Visiting Medical Officer |

# EXECUTIVE SUMMARY

## Background:

Eye problems are one of the most common health problems experienced by the Australian population, and Aboriginal people experience a higher burden of eye disease than the general population. The National Indigenous Eye Health Survey 2009 found blindness rates in Indigenous adults (1.9%) to be 6.2 times the mainstream rate and low vision rates in Indigenous adults (9.4%) to be 2.8 times the mainstream rate. The survey found the major causes of blindness in Indigenous Australians to be cataract (32%), optic atrophy (14%), refractive error (14%), diabetic eye disease (9%) and trachoma (9%). Although 94% of vision loss in Indigenous Australians is preventable or treatable, 35% of adults have never had an eye exam.

Eye health services in Australia are delivered at the primary level by primary health care providers such as general practitioners, community health nurse, and Aboriginal health workers, and involve promotion, screening, treatment of minor problems, and referral to eye health professionals as appropriate. Secondary eye health services are delivered by optometrists and ophthalmologists and include diagnosis and treatment of major eye problems, excluding major procedures requiring surgery. Tertiary eye health services are delivered by ophthalmologists and involve surgical interventions in the hospital setting.

This review was conducted in 2010 in the Greater Western Area Health Service (AHS) in NSW, which is now the Western NSW Local Health District and the Far West Local Health District. This area will be referred to as the Greater Western region throughout this report. The Greater Western region has a population of 301,999 people, of which 8.9% are Aboriginal (NSW average 2.3%). Eye health services in the Greater Western region are delivered by a number of key providers, including the Greater Western AHS, the Outback Eye Service (OES- an outreach service from Prince of Wales Hospital), Aboriginal Community Controlled Health Services (ACCHS), the International Centre for Eye Care Education (ICEE), the Royal Flying Doctor Service (RFDS) and private optometrists and ophthalmologists.

## Methods:

The Objectives of the Review, as per the Terms of Reference were to:

1. Map existing eye health services / programs.

2. Collect and analyse data on existing eye health services
3. Estimate accessibility of eye health services to Aboriginal people.
4. Describe gaps in access to service.
5. Make recommendations for improving access to, and co-ordination of, services.

A mixed methods approach, combining qualitative and quantitative data, was used for this review, to capture regional service utilisation data as well as the perspectives and experiences of key stakeholders and service providers. The review used the following data collection strategies:

**1. Document Review:** Relevant published and grey literature was reviewed in relation to the epidemiology of eye health in Australia, national and state frameworks for eye health service issues, and information related to the key eye health service providers in the region.

**2. Data Review:** Each service provider was asked to provide information on the type and number of services provided, the number of people using those services, and the proportion of those who are Aboriginal. This information was collated to describe an overall picture of eye health services delivery and uptake in the GWAHS region. The data were examined for a relationship between the availability of services at a local level and the utilisation of tertiary eye care services by Aboriginal people across the region.

**3. Observational Visits:** Observational visits of the clinics implemented by key service providers were conducted in Bourke, Broken Hill, Cobar, Dubbo, Walgett, and Lightning Ridge.

**4. Stakeholder Consultation:** Key service providers and stakeholders in eye health services and the Greater Western AHS were interviewed.

## Key Findings:

1. **Primary eye health care services:**
   - Primary eye health care services are available to the Aboriginal people of Greater Western AHS through ACCHS, Health Service facilities, GPs, and RFDS.
   - The degree to which eye health screening and referral occurs at the primary health care level was not comprehensively explored as part of this review.

- Retinal photography is not being used routinely to screen for diabetic retinopathy at the primary health care level.

**2. Secondary eye health care services:**

- Outreach optometry services implemented by ACCHS with ICEE are delivered at present in 36 locations in the Greater Western region.
- Regional Eye Health Coordinator positions based in Wellington and Walgett are actively involved in coordinating outreach optometry services for Aboriginal people.
- The OES provides comprehensive ophthalmology services (optometry, eye health nursing, ophthalmology, and surgery) for Bourke, Brewarrina, Walgett, Lightning Ridge, and Cobar, as well as in Menindee and Wilcannia in conjunction with Maari Ma Health Aboriginal Corporation in Broken Hill (Marai Ma).
- Broken Hill Base Hospital delivers a regular public ophthalmology clinic, which delivers free ophthalmology secondary services. The clinic has a waiting list of over one year.
- Maari Ma delivers registrar only ophthalmology clinics in a number of locations in the Broken Hill region, and comprehensive clinics in Wilcannia and Menindee with the OES.
- Secondary eye health services are not consistently available to Aboriginal people in the Greater Western AHS Region. In particular, there is a lack of public ophthalmology clinics in areas with high numbers of Aboriginal people.
- There is a relationship between the availability of free public ophthalmology clinics and the rates of access to tertiary eye health services for Aboriginal people in the Greater Western AHS region.

**3. Tertiary eye health care services:**

- Tertiary ophthalmology services are available in eight locations in Greater Western AHS
- Tertiary services are demand driven, and the supply of surgery by Greater Western AHS responds to fluctuations in demand, to ensure all people access surgery within the 12 month waiting list benchmark.
- While tertiary services are available and affordable, they are underutilised by Aboriginal people in the region, which is related to the limited availability of accessible secondary services in some areas.

**4. Co-ordination and collaboration**

- There is no comprehensive service delivery plan for eye health services in the Greater Western AHS.
- The key service providers implement eye health services in the region from their organisational base.
- Some co-ordination between providers exists for collaborative service delivery, particularly between OES and Greater Western AHS, ACCHS and ICEE, and ACCHS and OES.
- There is no regional co-ordination of eye health services in the Greater Western region, or a structure which encourages comprehensive collaboration between all the service providers.

**5. Cultural competence**

- The ACCHS deliver primary eye health services and secondary eye health services in partnership with ICEE and OES, and this brings culturally competent eye health services to Aboriginal people in the Greater Western region.
- The Aboriginal health workforce of the Greater Western AHS are not routinely involved in eye health services at the primary level, or in liaising to support Aboriginal people access secondary and tertiary services as appropriate.
- The key service providers have made some achievements in improving the cultural competence of their services, particularly the Outback Eye Service, however this is not overtly the case at the private ophthalmology level.

**6. Monitoring and evaluation**

- Key eye health service providers monitor their services using different monitoring and evaluation tools, and varied reporting strategies.
- The data available cannot be combined to give an accurate picture of primary and secondary eye health services across the region, due to variations in data collated.
- There are no systems in place to monitor and evaluate eye health services delivery for primary or secondary level services across the region.
- Tertiary level data is available from Greater Western AHS, which is routinely monitored to ensure waiting list benchmarks for surgery are being met, but is not routinely analysed to ensure demand and supply is equitable.

## Recommendations:

**1. Enhance eye health screening, referral, co-ordination and promotion at the primary health care level.**

a. Deliver eye health promotion and education regarding prevention and management of eye disease to Aboriginal communities within the region.
b. Encourage and develop strategies that enhance the inclusion of eye health screening and referral at the primary health care level
c. Incorporate management of eye health into current chronic care management strategies where possible, particularly those for diabetes.
d. Incorporate retinal photography screening for diabetic retinopathy into primary health care facilities

**2. Improve and further develop secondary eye health services in the region.**

a. The ACCHS / ICEE continue to deliver outreach optometry services in current locations, and increase frequency and reliability of service where possible.
b. Develop outreach optometry services for Aboriginal people in the Broken Hill region.
c. The OES continues to deliver outreach ophthalmology services in the current locations, always seeking to increase accessibility for Aboriginal people to their services, and possibilities for expansion to new locations as explored.
d. The REHC in Wellington and Walgett are continued to be supported in delivering outreach optometry services, and the positions in Bourke and Broken Hill are reviewed to ensure maximum efficiency and effectiveness.
e. The service model and efficiency of the public ophthalmology clinic at Broken Hill Base Hospital is reviewed and strategies to improve the efficiency of the service (to decrease the waiting list) are implemented.
f. Establish public ophthalmology clinics at Dubbo, Bathurst, Orange, and Parkes.
g. Establish outreach secondary ophthalmology services in Coonamble, Condobolin, Cowra, Coonabarabran, and Mudgee.

**3. Maintain availability of tertiary ophthalmology services in current locations, and plan for increased demand.**

a. Maintain the availability of tertiary eye health services in existing locations.

b. Plan for an increased demand for tertiary eye health services should the availability of secondary eye health services be improved

**4. Improve the co-ordination and collaboration of eye health services and eye care stakeholders in the region.**

a. Develop an eye health services strategic plan or service delivery plan for the Greater Western AHS.
b. Establish eye health co-ordinator positions in Broken Hill and Dubbo.
c. Establish an eye health service providers working group or partnership committee
d. Develop partnership or working agreements between key service providers in the region.

**5. Improve the cultural competence of eye health service delivery in the region.**

a. Engage Aboriginal staff in the delivery of eye health services where available.
b. Provide case management to Aboriginal people to assist them in negotiating the eye health services pathway.
c. Develop culturally appropriate environments for delivering services.
d. Ensure all staff involved in eye health services delivery have participated in cultural competency training.
e. Develop a strategy for engaging and informing Aboriginal communities about services available.
f. Promote inter-sectoral collaboration.

**6. Develop a system to monitor and evaluate eye health services in the region, at all levels.**

a. Develop a monitoring and evaluation system.
b. Align a monitoring and evaluation system with a regional eye health services strategic plan.

# 1. INTRODUCTION

Eye problems are one of the most common health problems experienced by the Australian population, with ten million Australians (more than half the population) reporting a long term eye problem.[1] It is estimated that over 50,000 people in Australia (0.2%) are blind, with a further 430,000 (2%) having low vision which impacts their ability to live independently. Refractive error, cataract, glaucoma, and macular degeneration are the most commonly reported conditions causing eye problems.[1]

The health costs of treating eye disease in Australia are large, estimated to be $1.8 billion in 2004.[2] Eyecare has a range of proven, low risk, high success and cost effective interventions, including cataract surgery, regular retinal photographic screening for diabetic retinopathy, laser therapies and vitrectomy. Half of visual impairment is correctable, and one quarter is preventable, with prevention often being more cost effective than treatment.

Aboriginal people experience a higher burden of eye disease than the general population in Australia. The National Indigenous Eye Health Survey 2009 [3] found blindness rates in Indigenous adults (1.9%) to be 6.2 times the mainstream rate and low vision rates in Indigenous adults (9.4%) to be 2.8 times the mainstream rate. The survey found the major causes of blindness in Indigenous Australians to be cataract (32%), optic atrophy (14%), refractive error (14%), diabetic eye disease (9%) and trachoma (9%). Although 94% of vision loss in Indigenous Australians is preventable or treatable, 35% of adults have never had an eye exam.

This review was conducted in 2010 in the Greater Western Area Health Service (AHS) in NSW. In 2011 this AHS became the Western NSW Local Health District and the Far West Local Health District. This region has a population of 301,999 people [4], and geographically comprises an area of 444,586 square kilometres, which is 55 % of the land mass of NSW.[5] 8.9% of the Greater Western region population (26,797 people) are Aboriginal, which is significantly higher than the NSW average of 2.3%.[4]

Eye health services in the Greater Western region are delivered by a number of key providers, including the Greater Western AHS, The Outback Eye Service (OES) - an outreach service from

Prince of Wales Hospital (POW), Aboriginal Community Controlled Health Services (ACCHS) with the International Centre for Eyecare Education (ICEE), and private ophthalmologists and optometrists. While a number of eye health services are specifically designed for and delivered to Aboriginal people, the majority of eye health services in the region are mainstream services for all, including Aboriginal people.

The Close the Gap Indigenous Health Equality Summit Statement of Intent from 2008 [6] demonstrates a commitment to ensure that health services for Aboriginal people are "available, appropriate, accessible, affordable, and good quality", that access to mainstream services is improved for Aboriginal people, and that appropriate measuring, monitoring, and reporting occurs to ensure these objectives are achieved.

The objective for this project was to review eye health services for Aboriginal people in the Greater Western region of NSW. This review considered eye health services for Aboriginal people in the region in terms of availability, appropriateness, accessibility, affordability, and monitoring and evaluation. Recommendations for improving eye health services for Aboriginal people in the region are outlined.

In keeping with NSW Health Guidelines, "Aboriginal people" is used to refer to all Indigenous people in NSW, in recognition that Aboriginal people are the original inhabitants of NSW. The term Indigenous is used when referencing national literature that incorporates both Aboriginal and Torres Strait Islander people.

# 2. OBJECTIVES

The Objectives of the Review, as per the Terms of Reference are to:

1. Map existing eye health services / programs for Aboriginal people in the region
2. Collect and analyse data on existing eye health services
3. Estimate accessibility of eye health services to Aboriginal people
4. Describe gaps in access to service
5. Make recommendations for improving access to, and co-ordination of, services

More specific details for each objective as per the Terms of Reference can be viewed in the Terms of Reference Document in Appendix One.

# 3. METHODS

A mixed methods approach, combining qualitative and quantitative data, was used for this review, to capture regional service utilisation data as well as the perspectives and experiences of key stakeholders and service providers. The review used the following data collection strategies:

**1. Document Review**

Relevant published and grey literature was reviewed in the following areas:

- Epidemiology of eye health in Australia, particularly for Aboriginal people
- Federal and state frameworks and reports for eye health service issues
- Reports, reviews, publications, and evaluations for the key eye health service providers in the Greater Western region

**2. Data Review**

Relevant data sets of service implementation data were collated where available:

- Greater Western AHS ophthalmology inpatient service data: the demographic, service utilisation and trends analysis of Greater Western AHS residents who access public ophthalmology services was prepared by Greater Western AHS using Flow Info Version 10. This is NSW Health Department supplied software which provides comparative demographic and service utilisation data from 2000, extracted from the admitted patient data set in the NSW Health Information Exchange (HIE).
- Service provision data of other service providers: all service providers were invited to provide data on eye health services delivered in the Greater Western region, including if possible demographic information on clients accessing services, quantity of services delivered, and outcome data. Data were provided by OES, ICEE, Maari Ma, and the RFDS.
- The number of cataract operations received by residents of western NSW for the period July 2007 - June 2010 were identified from the NSW Health Admitted Patient Data Collection. The International Classification of Diseases procedure code blocks 195-200 were used to identify a cataract procedure. Cataract surgery data was disaggregated for Aboriginal and non-Aboriginal people.

**3. Observational Visits**

Observational visits to the clinics implemented by key service providers were conducted in Bourke, Broken Hill, Cobar, Dubbo, Walgett, and Lightning Ridge. The regional visits allowed in-depth analysis on the current implementation in selected regions, observation of service delivery in practice, and facilitated face-to-face survey / interviewing with key stakeholders.

**4. Stakeholder Consultation**

Stakeholder consultation was comprehensive with representatives from the following groups interviewed:

- Greater Western AHS
- Local health service staff including managers, clinical staff, and admin staff
- Outback Eye Service (OES)
- International Centre for Eyecare Education (ICEE)
- Aboriginal Community Controlled Health Services (ACCHS)
- Royal Flying Doctor Service (RFDS)
- Private ophthalmologists and optometrists working in Greater Western region.

A full list of stakeholders consulted is provided in Appendix 2. Interviews were semi-structured, and written notes taken during the interviews were later collated and sorted under relevant subject headings.

An Aboriginal Health Impact Statement was completed, and the signed declaration in included in Appendix 3.

# 4. CONTEXT SETTING

## 4.1 The Greater Western Region of NSW

The population of the Greater Western region is 301,999 people, 4.2 % of the NSW population. This population is spread across a large geographical area of 444,586 square kilometres, an area representing 55% of the landmass of NSW. There are 28 local governments in the area, and nine of these are classified as remote or very remote.
The region's population is expected to grow by only 0.3% between 2006 and 2026 but significant shifts in the age profile and population distribution are expected. There will be an 85% increase in the number of people aged over 65 years between 2006 and 2026 and an 18% decline in the 0-44 age groups across the region. Population ageing will increase demand for health services overall, especially for chronic, complex and aged care services, including eye health services.

Life expectancy at age 65 years for men and women in Greater Western region from 1999 - 2003 was 81.4 years and 85.3 years respectively. This is lower than any other health area in NSW, with the life expectancy of both sexes being approximately one year less than the State average. Men and women living in the Greater Western region have the highest age-adjusted death rates in NSW. The main reasons for premature death are neoplasms (tumours) (35%), diseases of the circulatory system (28%), injury and poisoning (11.3%) and diseases of the respiratory system (8.7%).

**Aboriginal people in Greater Western Region:** Aboriginal people represent 8.3 per cent of the Greater Western region population compared to 2.1 per cent for the whole of NSW. In NSW approximately 20% of the total Aboriginal population live within Greater Western region. Aboriginal people are 3.4 per cent of the population in Bathurst, 6 per cent in Cowra, 10.3 per cent in Dubbo, 29.4 per cent in Bourke and 59.5 in Brewarrina. However, the largest numbers of Aboriginal people are in Dubbo. Approximately 57 per cent of the Aboriginal population in Greater Western region are 24 or younger. Table 1 compares the distribution of the Greater Western region population by age group for Aboriginal and non-Aboriginal populations. Table 2 shows the Aboriginal population within the Greater Western region by Local Government Area.

**Table 1: Aboriginal and non-Aboriginal population in Greater Western Region by age** [7]

| Age Group | Aboriginal | | | Non-Aboriginal | | |
|---|---|---|---|---|---|---|
| | Males | Females | Persons | Males | Females | Persons |
| 0-4 years | 1284 | 1,296 | 2,580 | 8,464 | 9,040 | 17,504 |
| 5-14 years | 3,100 | 3,339 | 6,439 | 16,906 | 18,173 | 35,079 |
| 15-24 years | 2,690 | 2,752 | 5,442 | 15,397 | 16,778 | 32,176 |
| 25-44 years | 3,459 | 3,329 | 6,787 | 32,560 | 32,966 | 65,535 |
| 45-64 years | 2,266 | 2,128 | 4,394 | 37,697 | 38,968 | 76,665 |
| 65 years and over | 641 | 514 | 1,155 | 25,812 | 22,438 | 48,250 |
| **Total Persons** | **13,440** | **13,357** | **26,797** | **136,835** | **138,363** | **275,199** |

**Table 2: Aboriginal Population in Greater Western region by LGA (2006)** [4]

| LGA of Residence | Aboriginal Residents | Total Population | Proportion of Population who are Aboriginal |
|---|---|---|---|
| Balranald | 197 | 2,530 | 7.8 |
| Bathurst Regional | 1,418 | 39,122 | 3.6 |
| Blayney | 174 | 7,003 | 2.5 |
| Bogan | 366 | 2,816 | 13 |
| Bourke | 1,018 | 3,095 | 32.9 |
| Brewarrina | 1,287 | 1,926 | 66.8 |
| Broken Hill | 1,288 | 19,018 | 6.8 |
| Cabonne | 309 | 13,046 | 2.4 |
| Central Darling | 784 | 1,868 | 42 |
| Cobar | 565 | 4,934 | 11.5 |
| Coonamble | 1,144 | 4,095 | 27.9 |
| Cowra | 836 | 13,123 | 6.4 |
| Dubbo | 4,492 | 41,187 | 10.9 |
| Forbes | 705 | 9,465 | 7.4 |
| Gilgandra | 636 | 4,559 | 13.9 |
| Lachlan | 1,137 | 6,748 | 16.8 |
| Mid-Western Regional | 653 | 22,280 | 2.9 |
| Narromine | 1,173 | 6,720 | 17.5 |
| Oberon | 131 | 5,389 | 2.4 |
| Orange | 1,739 | 38,288 | 4.5 |
| Parkes | 1,130 | 14,836 | 7.6 |
| Walgett | 2,164 | 7,010 | 30.9 |
| Warren | 371 | 2,665 | 13.9 |
| Warrumbungle | 833 | 9,868 | 8.4 |
| Weddin | 73 | 3,670 | 2 |
| Wellington | 1,422 | 8,626 | 16.5 |
| Wentworth | 722 | 7,072 | 10.2 |
| Unincorporated NSW | 30 | 1,040 | 2.9 |
| **Total Greater Western Region** | **26797** | **301999** | **8.9** |
| **NSW Total** | **165916** | **7207653** | **2.3** |

Aboriginal people in NSW have poorer health status than the rest of the population, demonstrated by the following health inequalities: [8]

- Aboriginal people have a lower life expectancy
- Chronic disease risk factors are higher in Aboriginal people
- Aboriginal people are twice as likely as non-Aboriginal people to die as a result of diabetes or injuries
- There is a higher prevalence and earlier onset of chronic illnesses in Aboriginal people, in particular respiratory illness, diabetes and renal disease
- Hospitalisation rates for Aboriginal people in NSW (compared to non-Aboriginal people) are:
    - 210% higher for diabetes
    - 40% higher for cardiovascular disease
    - 230% higher for chronic respiratory diseases
    - 50% higher for injury and poisoning
- Aboriginal adults have double the reported smoking rates across all age groups, while reported rates of risk drinking are around 1.4 times the general population rates
- Aboriginal adults experience 10 times the level of blindness from preventable eye disease and attend eye care practitioners in lower numbers

## 4.2 Eye Health and Services in Australia

### 4.2.1 An Overview of Eye Health Problems in Australia

Eye health problems are commonly experienced by Australian people. It is estimated that 575,000 (5.8%) Australians over 40 years of age have vision loss, and of these 66,500 people are blind.[9] Refractive error, cataract, macular degeneration, glaucoma, and diabetic retinopathy are the most common causes of loss of vision in Australia. Low vision is associated with higher mortality because it is correlated with a higher risk of falls, motor vehicle accidents and depression.[2]

Aboriginal people experience a higher burden of eye disease than the general population in Australia. The National Indigenous Eye Health Survey 2009 [3] found the national blindness rate in Indigenous adults to be 1.9%, which is 6.2 times the mainstream rate, and the low vision rate to be 9.4% which is 2.8 times the mainstream rate. The major causes of blindness in

Indigenous Australians are cataract (32%), optic atrophy (14%), refractive error (14%), diabetic eye disease (9%) and trachoma (9%). Figure 1 shows the main causes of vision loss in Indigenous adults, and Figure 2 shows the main causes of blindness in Indigenous adults. While 94% of vision loss in Indigenous Australians is preventable or treatable, 35% of Indigenous adults have never had an eye examination.

The health costs of treating eye disease in Australia are large, estimated to be $2.98 billion in 2009.[9] Eyecare has a range of proven, low risk, high success and cost effective interventions, including cataract surgery, retinal photographic screening, laser therapies and vitrectomy.[2] Half of visual impairment is correctable, and one quarter is preventable, with prevention more cost effective than treatment. [9]

Visual impairment can be defined as a limitation of one or more functions of the eye or visual system, and most commonly includes impairment of visual acuity, visual fields, and colour vision. [9] Normal vision is recorded as 6/6 (able to see at 6 metres what a person with normal vision can see at 6 metres), legal blindness is recorded as less than 6/60 in the better eye with glasses or contact lenses correction (unable to see at 6m what a person with normal vision can see at 60 metres), and visual impairment is recorded as less than driving vision 6/12 (unable to see at 6 metres what a person with normal vision can see at 12 metres). [9]

**Figure 1: Causes of vision impairment in Indigenous Australians (Source: National Indigenous Eye Health Survey, 2009)** [3]

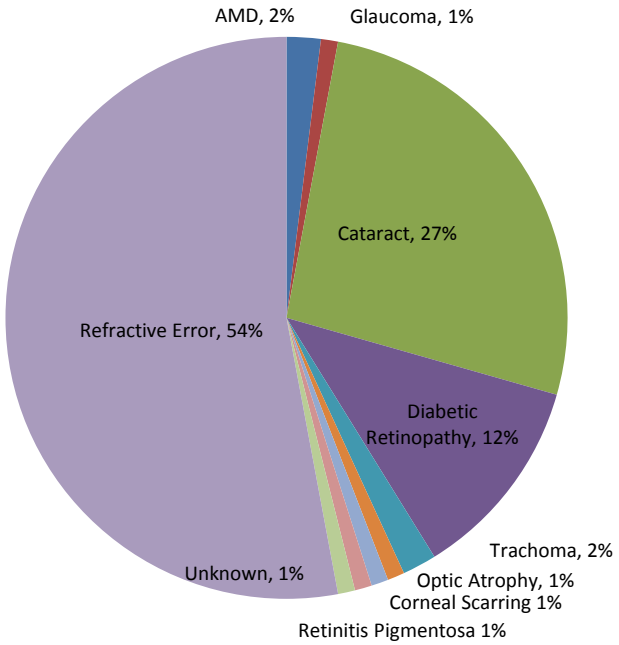
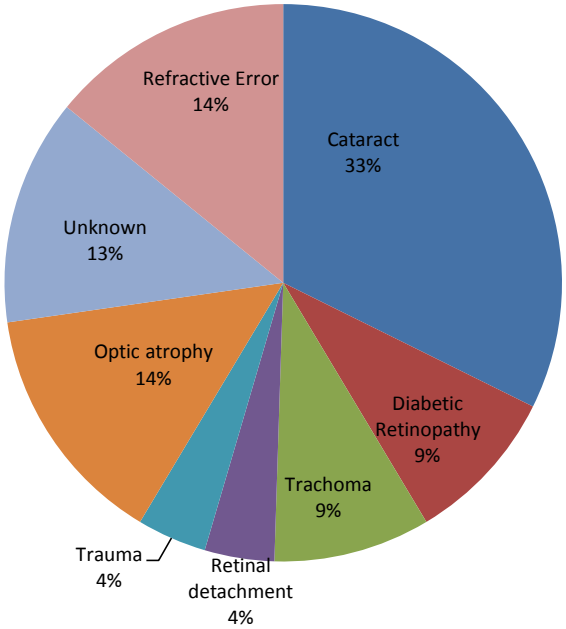


**Figure 2: Causes of blindness in Indigenous Australians (Source: National Indigenous Eye Health Survey, 2009)** [3]




The following summarises the five main causes of vision impairment in Australia, and also considers trachoma, a cause of visual impairment experienced predominantly by Aboriginal people.

## (a) Cataract:

A cataract is a clouding in the lens of the eye, which is normally clear. The most common symptoms of cataract are blurred vision, sensitivity to light and glare, faded colours, and double vision. Age, smoking, diabetes, use of corticosteroids, and ultraviolet exposure increase the risk of cataract. Detection is through a visual acuity test and examination by an eyecare professional after pupil dilation.[9]

**Prevalence:** Prevalence rates for vision loss and blindness due to cataract are 0.1% in the 60-69 year age group and 15% in the population aged over 90.[9] In 2009, 84 960 people had vision loss from cataract, of whom 7,700 were blind. In 2004 9% of Australians aged over 55 years had had cataract surgery.[10] In Indigenous Australian adults, blinding cataract is 12 times more common than in the general population.[3] Cataract causes 32% of blindness and

27% of low vision in Indigenous adults (aged over 40 years), with only 65% of those with vision loss from cataract having received surgery.

**Interventions:** In the early stages of cataract, visual aids can improve vision. Once the condition is serious a surgical procedure becomes necessary to restore vision, in which the cloudy lens is removed and replaced with a substitute lens.[8] The surgery is safe and effective, with almost all people having better vision and improved quality of life afterwards. Cataract surgery is a cost effective surgery, at less than $3000 per Quality Adjusted Life year (QALY).[9] Taylor [11] predicts the need for cataract surgery will double over the next twenty years, although addressing smoking and high risk behaviour would halve the need for cataract surgery. Strategic interventions to reduce visual impairment from cataract [9] include:

- Promote protective behaviour: stop smoking and reduce ocular UV exposure
- Detect those with unoperated cataract with simple aged-care vision tests
- Improve efficiency and capacity of cataract surgery services
- Have all Australians test their vision on a regular basis (every 4-5 years).

The National Indigenous Eye Health Survey [12] recommendations for further action to improve cataracts in Indigenous Australians include ensuring that cataract surgery is readily available for all Australians, providing adequate and sustainable funding for visiting specialist services, ensuring proper funding for patient travel to regional hospitals for surgery, and committing adequate resources for cataract surgery.

## (b) Diabetic Retinopathy

Diabetic Retinopathy is a significant cause of visual impairment, and a common diabetes complication which affects the small blood vessels of the retina. Diabetic retinopathy often has no early symptoms, but regular eye examination is required, as the earlier treatment commences the more likely it is to be effective. Diabetic retinopathy can result in vision loss through proliferative retinopathy, where blocked blood vessels to the retina result in the development of new fragile blood vessels that leak blood into the centre of the eye, and through macular oedema where fluid leaks into the macula causing swelling. Everyone with diabetes is at risk of developing diabetic retinopathy, and those with diabetes for many years, poorly controlled diabetes, kidney damage, high blood pressure or high cholesterol are at most

risk.[13] Detection of diabetic retinopathy is through a visual acuity test and retinal examination, or through a retinal photograph.

**Prevalence:** The prevalence of diabetic retinopathy is dependent on the prevalence of diabetes mellitus. There are over 500,000 Australians over 40 with diabetes mellitus, and an additional 400,000 undiagnosed. Between 25% and 44% of people with diabetes have diabetic retinopathy.[9] Only half the Australians with diabetes have a regular eye examination, and one third have never been checked.[9] It is estimated that 2.8% of Australians over 55 have diabetic retinopathy, which is 16.6% of people with diabetes.[9]

In the National Indigenous Eye Health Survey [3] 37.4% of Indigenous adults over 40 years reported diabetes, of which only 20% had had an eye exam within the last year. Diabetes was the cause of 13% of low vision and 9% of blindness in Indigenous Australians. Only 37% of those with diabetic retinopathy requiring laser treatment had received some treatment.

**Interventions:** People with diabetes can prevent the early onset of diabetic retinopathy by controlling blood sugar levels, blood pressure, and blood cholesterol. Regular eye health screening for people with diabetes can ensure early detection and intervention, which will prevent vision loss and blindness.[14] Regular retinal photographic screening at the primary health care level is one systematic way that more regular diabetic retinopathy screening for people at risk can be achieved, and it has been successfully used in Indigenous primary health care settings in both remote and urban settings.[15]

Treatment of macular oedema is with focal laser surgery, which stabilises vision, and reduces the risk of vision loss by 50%. Proliferative retinopathy is treated with scatter laser surgery, which can save vision. If bleeding is severe and persistent, a vitrectomy may be necessary, where blood and gel are removed from the centre of the eye and replaced with a salt solution. Laser treatment and vitrectomy are both very effective in reducing vision loss, reducing the risk of blindness by 98%. Laser therapies generally cost under US$20,000 per QALY, vitrectomy at US$2000 / QALY, and regular retinal photographic screening for diabetic retinopathy costs only US $15000 / QALY. [9]

Suggested strategic interventions to improve vision problems caused by diabetic retinopathy [12] include:

- Promote awareness amongst those with diabetes of the need for regular eye examinations
- Involve all members of the diabetes management team in promoting eye examinations every two years
- Develop, evaluate, and report sustainable local and regional models of screening.

The National Indigenous Eye Health Survey [12] recommendations for further action to address diabetic retinopathy in Indigenous Australians include ensuring that all Indigenous people with diabetes have an annual eye exam and access to better education, ensuring the annual eye exam includes visual acuity and retinal examinations, using retinal photography as a screening tool for diabetic retinopathy, arranging prompt referral for those with diabetic eye disease, and making laser surgery available regionally.

## (c) Refractive Error

Refractive error occurs when the image viewed is not focussed properly onto the retina. Refractive error includes myopia, hyperopia, astigmatism, and presbyopia. Symptoms include blurred vision, eye strain, tiredness, headaches, and reduced concentration. Refractive error is diagnosed through a visual acuity test, and managed through glasses, contact lenses, or laser refractive surgery. Suggested strategic interventions to improve vision problems caused by refractive error include having all Australians have an eye examination on a regular basis, having all elderly Australians vision-tested as part of aged care assessments, establishing appropriate referral pathways for those with impaired vision, and improving access to spectacle programs.

**Prevalence:** Uncorrected refractive error occurs when a person with refractive error does not have glasses, or their glasses are not appropriate. The prevalence of vision loss due to uncorrected refractive error is 4% in the 60-69 years age group, 8% in the 70-79 age group, and 13% in the 80-89 age group. In 2009 uncorrected refracted error caused vision loss in 341,200 Australians and blindness in 2200 Australians. Uncorrected refractive error causes 54% of the low vision and 14% of the blindness experienced by Indigenous adults in Australia.[3] 20% of Indigenous adults wore glasses for distance vision, compared to 56% in the mainstream.

The National Indigenous Eye Health Survey [12] recommendations for improving the correction of refractive errors in Indigenous Australians include ensuring that readymade and prescription glasses are readily available, and providing easy access to appropriate eye examination services for Indigenous Australians.

## (d) Age Related Macular Degeneration

Age related macular degeneration (AMD) is a progressive eye disease affecting the central part of the retina, the macula. If the disease progresses, irreversible loss of central vision occurs. The risk factors for AMD are increasing age and family history, and lifestyle risk factors of smoking, alcohol consumption and obesity.[16]

**Prevalence:** The prevalence rates for vision loss and blindness from AMD are 0.9% and 0.3% in the 70-79 years group respectively, and 4.6% and 2.4 % in the 80-89 years group.[12] Approximately 60,350 Australians have vision loss from AMD, and of these 33,000 are blind.

**Interventions:** There is currently no effective treatment for AMD, so prevention is the only approach. Control of the modifiable risk factors of smoking, alcohol consumption and obesity can reduce the risk of developing AMD by half, and delay progression of the disease. [17] A medical therapy, Ranibizumab can slow the progression of neovascular AMD. It requires a bi-monthly injection by an ophthalmologist.[8]

## (e) Glaucoma

Glaucoma is damage to the optic nerve due to an increase in intraocular pressure related to a failure in the drainage system of the eye.[10] Glaucoma causes vision loss or blindness. Symptoms include tunnel vision, headache, blurred vision, and light sensitivity. Risk factors include advancing age, a family history, and glaucoma, as well as hypertension and cardiovascular disease. Glaucoma is identified through an eye examination including visual acuity, visual field, tonometry (pressure) and optic nerve examination.

**Prevalence:** Glaucoma related vision loss is age related, with a prevalence of 0.1% of people in the 60-69 years age bracket, 0.5% for those aged 70-79 years, and 1.5% for those aged 80-89 years.[9]

**Interventions:** There is no cure for glaucoma, however early diagnosis and treatment are important to control it and protect sight, with treatments including medication, laser surgery, and conventional surgery. Glaucoma treatments can save remaining vision, but cannot improve sight. Strategic interventions to reduce visual impairment from glaucoma include promoting community awareness about glaucoma, and promoting regular eye examinations for those with a family history of glaucoma and those aged over 50.

### (f) Trachoma

Trachoma is an infective conjunctivitis caused by ocular infection with the bacterium *Chlamydia trachomatis.* [18] Repeated or persistent infection causes scarring to the upper conjunctiva, which alters the architecture of the eyelid, causing the eyelashes to rub on the eye (trichiasis), which results in corneal scarring and loss of vision. The disease is closely associated with poverty, poor environmental health, and poor personal hygiene. Trachoma is managed through the SAFE strategy- surgery for trichiasis, antibiotics for active infection, facial cleanliness, and environmental health improvements.

**Prevalence:** In Australia, trachoma is rare and exists mostly in remote Aboriginal communities. The National Indigenous Eye Survey found trachoma infection in 3.8% of Indigenous children, and trachoma scarring in 15.7% of Indigenous adults.[9]

The National Indigenous Eye Health Survey [12] recommendations for further action to improve trachoma in Indigenous Australians include clearly mapping the extent of trachoma, applying the SAFE strategy in Aboriginal communities, regularly checking all children at risk and ensuring follow up treatment, and ensuring elderly people are checked for trichiasis as part of the healthy adult check and referred as required.

## 4.2.2 The Delivery of Eye Health Programs and Services in Australia

Australia has well-developed eyecare systems, with the responsibility for programs and services spread across government, private sector health care professionals, and non government organisations. A number of programs and schemes specifically focus on improving eyecare services for Aboriginal people.

The *National Framework for Action to Promote Eye Health and Prevent Avoidable Blindness and Vision Loss* [20] has an overall goal to promote eye health and reduce the incidence of avoidable blindness and vision loss in Australia, and identifies five key areas for action:

1. Reducing the risk of eye disease and injury
2. Increasing early detection of eye disease
3. Improving access to eye health care workers
4. Improving the systems and quality of care for eye health services
5. Improving the underlying evidence base in eye health care

## Workforce

The specialist eye health care workforce includes ophthalmologists, optometrists, orthoptists, ophthalmic nurses, and optical dispensers. [13] Traditionally there is a close working relationship between ophthalmologists, orthoptists, and ophthalmic nurses, while optometrists tend to work more independently in primary care settings. Ophthalmologists are able to perform surgery, glasses can be prescribed by ophthalmologists, optometrists and orthoptists, while ophthalmologists, general practitioners and some optometrists can prescribe medications.

- Ophthalmologists are medical practitioners specialised in eye health and vision, who practise both medicine and surgery. They are the only profession able to provide eye surgery, and able to prescribe all eyecare medication.
- Optometrists examine the eye and visual system, diagnose refractive disorders and the presence of ocular disease, and prescribe and dispense corrective and preventative devices. Optometrists refer to a GP or an ophthalmologist when they identify visual conditions which may require treatment.
- Ophthalmic nurses care for patients with disorders and diseases relating to the eye, and work closely with ophthalmologists.
- Orthoptists are allied health professionals who specialise in the diagnosis and management of disorders of eye movements and associated vision problems
- Optical dispensers make spectacles as prescribed by optometrists and ophthalmologists.

General practitioners play an important role in eye health care, in early identification and appropriate referral of eye problems, in the removal of foreign bodies from the eye, and

through providing co-ordinated care for patients whose conditions affect eye health, particularly diabetes. The general primary health care workforce is also involved in eyecare, particularly in referring to specialist eyecare services as appropriate. This includes nurses, Aboriginal Health Workers, ambulance workers, pharmacists, and other allied health professionals.

## Referral Pathways

GPs, optometrists and ophthalmologists do not require a referral for a consultation, however Medicare benefits are only payable for an ophthalmologist consultation with an appropriate referral. GPs, optometrists, and other specialists can refer to ophthalmologists, and all health professionals can refer to GP or optometrist. The eye health care pathway can be difficult to navigate for some patients, and co-ordinated services, liaison and support from the primary and secondary level can assist patients, particularly Aboriginal people, to ensure they access all services and negotiate their way through the pathway as required.

## Levels and Co-ordination of Eyecare Services

Eyecare services occur at three levels, as described in the *Provision of Indigenous Eye Health Services Report*: [19]

### (a) Primary Eyecare

Primary eyecare services are provided by community clinics, which may include community health centres, ACCHS, and GPs. Staffing includes GPs, nurses, and Aboriginal health workers. Eyecare at this level includes:

- Screening for eye health and vision
- Diagnosis and treatment of conjunctivitis, corneal foreign bodies, minor ocular trauma
- Diagnosis and referral of complex cases, and referral of patients with diabetes
- Eye health promotion
- Follow up, post operative management, and ongoing treatment

### (b) Secondary Eyecare (Eye Clinic / Visiting Eye Team)

Secondary eye care is provided at an eye clinic or through a visiting eye team, and staff may include optometrists, ophthalmologists, and support staff. Eyecare at this level includes:

- Diagnosis and treatment of uncorrected refractive error
- Diagnosis and surgical referral for cataracts

- Diagnosis and referral or treatment of diabetic retinopathy
- Referral for more complex cases requiring investigation

**(c) Tertiary Eyecare (Regional Hospital):**

Tertiary eye care is provided at a regional hospital, and staff include ophthalmologists, theatre and clinic staff. Eyecare at this level includes:

- Delivery of cataract surgery, laser treatment and other eye surgery

## Co-ordination

Provision of comprehensive eye health care services requires significant levels of co-ordination and organisation within and across the various levels. Aspects of co-ordination required at each level include: [21]

- Community level: community liaison is required to provide a link between individual community members, their families, the clinic, and the services. This includes identification, transport, interpretation, and moral support.
- Primary Eyecare level: this requires staff in the clinic to be skilled in primary eyecare, appropriate referral pathways to eye clinics to be in place, and scheduling of visits for visiting eye teams.
- Secondary eyecare level: this requires co-ordination of the visit with the clinic and the community, communication and co-ordination between visiting optometrists and ophthalmologists, the development of waiting lists, ensuring appropriate equipment is available, assistance with community liaison, clerical support, and appropriate referral systems for further management and surgery.
- Tertiary Level: this requires organisation of the clinic space, theatre staff, admin support, surgical supplies and equipment, travel arrangements for the visiting team, and community liaison.
- Regional or State Level: this requires oversight of co-ordination provided at the different levels, including recruitment, training and support, and oversight of the distribution of the visiting eye teams, including the ratio of optometric and ophthalmic visits and frequency of visits.

## Costs to Patients

The Medicare Benefits Schedule provides for a comprehensive optometric consultation every two years, and review by general practitioners and ophthalmologists as required (the scheme

may partially or fully fund these reviews, depending on the provider's fees). All states and territories have subsidised spectacle schemes for eligible people. In-patient surgery, medication and other services are free of charge to people treated in public hospitals in NSW. Eligible clients are therefore eligible for free eyecare services across all levels of the eyecare pathway, if these services are available.

## Specific Eye Health Programs and Initiatives

The National Aboriginal and Torres Strait Islander Eye Health Program began in 1998 through the Office of Aboriginal and Torres Strait Islander Health (OATSIH). The program aims were to address eye health problems experienced by Aboriginal and Torres Strait Islander people through regional eye health services co-ordination, access to specialised equipment, and training assistance.[22] The program aimed to improve access to specialist eye services, both optometry and ophthalmology. Specialised eye health clinics were established in ACCHS, including seven in NSW.

Through this program came the establishment of the Regional Eye Health Co-ordinator (REHC) positions within ACCHS. The responsibility of the REHC is to ensure access to eye services and to work towards embedding eye health into primary care practice. The stated role includes eye health awareness and education, co-ordination of eye health care providers, eye health screening, referrals to specialists, and eye health research.[23] There are 27 REHC positions in Australia, seven of which are based in NSW.

Each state and territory in Australia has a spectacle provision scheme. In NSW, the NSW Government Spectacle Program [24] provides assistance to eligible people with access to free glasses, contact lenses and low vision aids. Eligibility is means tested. The program is administered by VisionCare NSW. There are 650 participating providers' practices throughout NSW, 50 of whom specifically service more than 80 rural and remote Aboriginal communities.[25]

## Rural and Remote Workforce Schemes

A number of schemes have been developed to attract the specialist eye health care workforce to rural and remote areas. The Medical Specialist Outreach Assistance Program (MSOAP) forms part of the Australian Government's Rural Health Strategy, aiming to improve the access of rural and remote communities to medical specialist outreach services, by providing funds that

reduce the financial disincentive incurred by medical specialists in providing outreach services.[26] Ophthalmologists are one of the specialist medical groups that can be supported under the scheme.

The Visiting Optometrist Scheme (VOS) helps to improve the access to optometry services for people in remote communities, whereby optometrists providing outreach services can access funding support for travel, accommodation, meals, equipment, and costs related to being absent from their practice.[27]

## Outreach Eye Services

Specialist outreach clinics in primary care and rural hospital settings in general improve access to care, quality of care, health outcomes, patient satisfaction, and the use of hospital services, especially when delivered as part of a multi-faceted intervention.[28]

Eye healthcare has a number of key players who can be involved in outreach services. Primary healthcare may be provided by both GPs and optometrists, and secondary eyecare can be provided by optometrists or ophthalmologists (but optometrists cannot provide all levels of secondary eyecare services).

Service models for outreach eye health services in Australia vary significantly. Service outcomes and costs per attendance vary significantly depending on the funding model, co-ordination between eyecare professions, proportion of Indigenous patients, and continuity of leadership provided by different consultants.[29] Better services see more patients, perform more surgery, and have shorter waiting times for both clinical consultations and surgery. [29] The main drivers of good services are a funding model that provides appropriate incentives, and effective co-ordination of services. Service integration (especially good communication between optometrists and ophthalmologists) is associated with reduced waiting times, and has little bearing on overall cost.[29] Conducting surgery in regional hospitals in outreach locations is generally regarded as an important part of an outreach eye service, and attempts to address the lower cataract surgery rates observed in rural and remote Australian locations.[29]

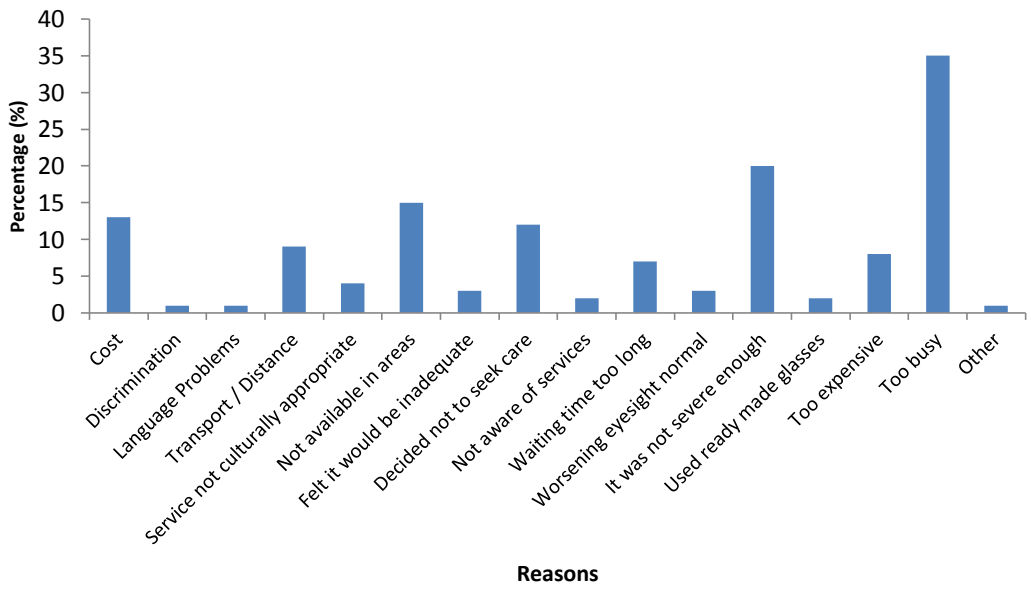
Significant barriers to delivery of outreach eye health services include cross cultural factors, poor patient understanding regarding preventative eyecare, high non attendance rates, and unpredictable fluxes of patient populations relating to community events or weather.[29]

## Access to eye health services by Aboriginal people

In Australia, eyecare services in general are less available in areas with more Indigenous people, with the supply of optometrists and ophthalmologists decreasing as the proportion of Indigenous people living in a community increased.[30] This is partially explained by remoteness and overall socioeconomic disadvantage. In general, the rates of eye exams by ophthalmologists, optometrists, and in total are significantly lower in areas with more indigenous people, as are the rates of cataract surgery.

Even in areas with sufficient availability of services, Aboriginal people are not always using the services that are available. The National Indigenous Eye Health Survey [30] identified some of the barriers reported that limit access to care when there was an eye problem, and these are shown in Figure 2. The main reasons stated are related to cost, availability and accessibility of services, perceptions around the severity of problems, and people having other priorities.

**Figure 2: Reasons given by Aboriginal people for not seeking eye health care services when there was a problem** (Source: National Indigenous Eye Health Survey 2009 [30]).



Services need to be available, affordable, and accessible for Aboriginal people, but also need to be appropriate. Appropriateness of service can be related to cultural competence, and culturally competent services are likely to have more uptake and access by Aboriginal people, and better impact on health. Reported barriers to uptake of services by Aboriginal people (Figure 2) include issues such as discrimination, language, and service not being culturally appropriate. A culturally competent health care system is one that "acknowledges and incorporates the importance of culture, assessment of cross cultural relations, vigilance towards the dynamics that result from cultural differences, expansion of cultural knowledge, and adaptation of services to meet culturally unique needs".[31] Interventions to improve cultural competence can occur at the organisational, structural, and individual provider level, and have been shown to improve Indigenous patients' access to mainstream services at the primary health care level.[31]

Limited awareness of eye health problems and available treatments, a willingness to accept the problem, and competing priorities, are other reasons stated by Aboriginal people with eye health problems for not seeking care (Figure 2). Taylor et al (2010) [30] suggests that as well as improving availability and access to eye health services, community education around the importance of eye health and the effectiveness of treatment may improve health care seeking behaviour among Aboriginal people.

# 5. FINDINGS

## 5.1 Key Service Providers in Greater Western Region

### 5.1.1 Greater Western AHS

**Eye Health Services:** The (former) Greater Western AHS delivers eye care services at the primary, secondary, and tertiary level:

- **Primary Services:** All primary health care facilities and community health care centres operated by Greater Western AHS have a role to play as primary health care providers in the eye health care system, in promotion, screening, and referral. Diabetes and chronic care programs have developed specific links with local secondary eye health care services. Greater Western AHS also co-ordinates the State-wide Eyesight Preschooler Screening Program (StEPS) in the region, an initiative of NSW Health to ensure all 4 year old children receive vision screening. Vision screening occurs through child care centres, community health centres, and preschools, and if problems are identified children are referred to eye health professionals.
- **Secondary Services:** The Health Services within Greater Western AHS generally do not deliver specialist outpatient eye clinics at the secondary eye health care level, with two exceptions. Broken Hill Health Service implements an outpatient eye clinic in partnership with visiting ophthalmologists and POW hospital which places an ophthalmology registrar in Broken Hill on rotation. The clinic is run 3 days per week, three weeks per month, and is staffed by an ophthalmologist, ophthalmology registrar, and an allocated hospital nurse. The Health Services in Bourke, Brewarrina, Walgett, and Lightning Ridge support and co-ordinate with the OES in delivering eye health clinics at the Health Services (see 4.3.2).
- **Tertiary Services:** Greater Western AHS co-ordinates and delivers public ophthalmology surgical services in Bathurst, Orange, Mudgee, Dubbo, Bourke, Broken Hill, and Forbes, and is soon to commence a service in Cowra. The service in Bourke is implemented by the OES (see 4.3.2). Ophthalmologists performing surgery generally have a Visiting Medical Officer (VMO) contract with Greater Western AHS.

**Service Model:** There is no existing eye health services strategic or service plan for the Greater Western AHS. A draft service plan was commenced in 2008 but was neither finalised

nor implemented. Eye health services are not comprehensively co-ordinated by the AHS according to an identified service model. The existing model is:

- **Secondary Services:** The Broken Hill clinic is a public outpatient specialist clinic providing free ophthalmology secondary services to clients.
- **Tertiary Services:** People requiring public ophthalmology surgical services in Greater Western AHS are placed on a waiting list which is managed by the AHS. The majority of ophthalmology surgery, such as cataract surgery, is given a Clinical Priority of 3 (where admission within 365 days is acceptable as the condition is unlikely to deteriorate quickly and has little potential to become an emergency). Quotas for surgery are set to ensure that the waiting list benchmark is achieved, and are adjusted during the year according to fluctuations in the number of people on the waiting list. Episode funding from NSW Health allows the AHS to respond to increased demand for elective surgery by increasing services, to ensure activity targets and waiting list benchmarks are achieved. However, a variety of factors such as availability of ophthalmologists and other surgical staff and the availability of operating theatre time can affect the flexibility of the system to respond.

**Throughput:** Table 3 shows the number of ophthalmology services delivered to Greater Western AHS residents and treated within Greater Western AHS, and represents only patients admitted to hospitals (and therefore does not cover outpatient clinics or emergency department reviews). The majority of ophthalmology services are planned cases for glaucoma and lens (cataract) procedures, and the absolute numbers for these procedures has been decreasing slightly over the last three years. Non procedural ophthalmology would predominantly represent services related to eye trauma and infection.

**Table 3: Hospital separations for ophthalmology services received by Greater Western AHS residents in Greater Western AHS facilities 2006-2009** (Source: FlowInfo V10)

| | 2006/07 | | 2007/08 | | 2008/09 | |
|---|---|---|---|---|---|---|
| | Total | Aboriginal | Total | Aboriginal | Total | Aboriginal |
| Glaucoma and lens procedures | 1,183 | 48 (4%) | 1,130 | 35 (3%) | 1,107 | 32 (3%) |
| Non-procedural Ophthalmology | 203 | 46 (23%) | 239 | 40 (22%) | 196 | 45 (23%) |
| Other eye procedures | 155 | 10 (6%) | 179 | 6 (3%) | 155 | 10 (7%) |
| **Total** | **1,541** | **104** | **1,548** | **81** | **1,485** | **87** |

**Staffing:** Ophthalmologists providing public and private surgical services through Greater Western AHS have VMO contracts with Greater Western AHS. Two ophthalmology registrar positions from POW Hospital are based in the Greater Western region on rotation, one placed at Broken Hill, and one on a rural term with the OES. There is one co-ordinator for the StEPS Program based in Greater Western AHS. Other than this there is no specific ophthalmology department or eye health services co-ordination roles within Greater Western AHS.

**Partnerships:** The Greater Western AHS has collaborative working partnerships with the key eye health service providers in the region. The AHS has formal Memoranda of Understanding with the ACCHS, though these are not specifically in relation to eye health care services. The AHS has specific employment contracts with the ophthalmologist VMOs. The is no formal agreement between the Greater Western AHS and the OES detailing the partnership between the two for eye health services delivered in Bourke, Brewarrina, Walgett, and Lightning Ridge.

**Access for Aboriginal clients:** The eye health services provided by Greater Western AHS do not specifically target Aboriginal people, although there is some involvement of the Aboriginal health workforce in the delivery of services. The Aboriginal health workforce in Greater Western AHS provides primary health care and liaison to Aboriginal clients in the Greater Western region, and are based in local health services. They help to screen, refer, and support clients in attending eye health services. Uptake of tertiary eye health service procedures by Aboriginal people in the region is low, and has declined in the last three years (Table 3). Tertiary service delivery is demand driven, so lower uptake means less Aboriginal people are being placed on the list for tertiary services, which occurs at the secondary level. So issues at the secondary eye health service level in the region may be affecting demand for tertiary services.

### 5.1.2 Outback Eye Service

The Outback Eye Service (OES) is an outreach eye service delivered to regional areas within NSW by the Department of Ophthalmology at Prince of Wales Hospital (POW) (South Eastern Sydney Illawarra Area Health Service). The service has a long history in the region, which commenced with the work of Professor Fred Hollows in Bourke in the 1970s. The OES delivers secondary and tertiary eyecare services.

**Service:** The OES delivers regular eye clinics in seven locations, attended by an ophthalmologist, ophthalmology registrar, optometrist, and one or two ophthalmic nurses. The clinics are generally held at the local Health Service Hospital or Community Health Centre (excepting Cobar where it is held at the Allied Health Centre of the Outback Division of General Practice). The clinics provide a comprehensive optometry / ophthalmology service, and is available free of charge to clients who are bulk-billed through Medicare.

The OES delivers ophthalmology surgical services in Bourke four times a year, in partnership with the Bourke Health Service and Greater Western AHS to clients from the clinic locations (excluding Menindee and Wilcannia who attend Broken Hill Base Hospital for surgery). The OES also co-ordinates referral and follow up for more complex cases to the Department of Ophthalmology at POW.

The services thus provided by the OES includes: Advice and education to health service workers, clients, and communities, vision and eye health screening, prescription of relevant medications, visual field testing, retinal imaging, laser treatment, surgical intervention, post-operative care, prescription and dispensing of glasses, monitoring and follow-up.

**Locations and Frequency:** The OES implements secondary services in to Bourke, Brewarrina, Walgett, Lightning Ridge, Cobar, Wilcannia (in partnership with Maari Ma), and Menindee (in partnership with Maari Ma). Full clinics (ophthalmology, optometry, and ophthalmic nurse) are held with the following frequency:

- Bourke- 2 days every month
- Brewarrina- 1 day every 3 months
- Walgett- 1 day every second month (optometry only clinics held in all other months)
- Lightning Ridge- 1 day every second month (optometry only clinics in all other months)
- Cobar- 2 days every 2 months (with optometry only clinics held in all other months)
- Wilcannia- 2 days once per year (optometry only clinics held one other time per year)
- Menindee- 2 days once per year (optometry only clinics held one other time per year)

The OES delivers tertiary ophthalmic surgery to clients from these locations (excepting Wilcannia and Menindee) in Bourke. Surgery in Bourke is implemented quarterly (2 days per session), and for these surgery blocks pre-operative and post-operative clinics are conducted.

**Service Model:** The OES provide a comprehensive ophthalmic service to their clients, which includes optometry, ophthalmology, surgery, and referral to POW Hospital for complex cases. Clinical services and case / client management is co-ordinated by the staff of OES, namely the two ophthalmic nurses.

Generally clients from one town location (excluding Wilcannia and Menindee) all receive their surgery in the same block, which enables co-ordinated pre-operative and post-operative care for the clients. The pre-operative and post-operative clinics are held in the town, transport is co-ordinated for all clients together, and the ophthalmology registrar stays in the town for the week after surgery, available to address any post-operative complications that may arise for clients.

In Bourke and Cobar ophthalmologists connected with OES and POW Hospital are recruited to deliver the clinics and surgery as required. In contrast, three ophthalmologists have been providing a long term consistent service to the towns of Walgett, Brewarrina, and Lightning Ridge respectively. Two of these (in Brewarrina and Walgett) provide surgery to their clients from that town during their surgical block.

In the OES the ophthalmologist and the optometrist work in close partnership, co-located and collaborative on patient management. The optometrist screens clients, addresses refractive error with glasses as required, and ensures that only those clients requiring ophthalmological review are seen by the ophthalmologist. This increases the efficiency of the clinic, and the convenience for the client.

**Throughput:** The following table shows the throughput of the OES for the last three years for the towns of Bourke, Brewarrina, Walgett, Lightning Ridge, and Cobar. These data show the number of occasions of service in a given year. (Note an occasion of service reflects a client attending the clinic on a given day, and may include one or all of review by ophthalmologist, registrar, optometrist, or eye health nurse, or surgery). The OES performs 60 operations per year, which are also included in the data below. The number of surgeries performed by the OES is capped at 60 per year by Greater Western AHS. To date, this cap has been sufficient to enable most clients to receive surgery within the benchmark of less than 12 months on the waiting list.

**Table 4: Occasions of service of the OES combined for Bourke, Brewarrina, Walgett, Lightning Ridge, and Cobar for 2007-2009.** (Source: OES)

| | 2007 | 2008 | 2009 |
|---|---|---|---|
| Aboriginal Clients | 359 | 302 | 339 |
| Non-Aboriginal Clients | 765 | 776 | 1243 |
| TOTAL | 1134 | 1075 | 1582 |
| (New Clients) | 152 | 154 | 198 |

**Funding:** The OES is principally funded by the Rural Primary Health Service Program at the Department of Health and Ageing. A new contract for $840K over three years was signed in 2010. Funding from MSOAP and VOS assists with costs associated with travel for the ophthalmologist and optometrist to some towns only. The OES also receives funding in kind from Greater Western AHS (travel) and SESIAHS (administration and consumables). Bourke surgery costs are shared between the AHS and the OES. Equipment funding has come from various sources. Most clinics are well equipped, with some items shared and transported between clinic locations.

**Staffing:** The OES has two permanent positions, Manager and Clinical Co-ordinator, which are based at POW Hospital. Both these positions are filled by ophthalmic nurses, who co-ordinate clinical services, case manage clients, and attend all outreach clinics and surgeries.

The ophthalmologists working with the OES are predominantly private ophthalmologists who work with the OES on a semi-regular basis. The financial incentive for providing this outreach service is minimal for the ophthalmologists, where they receive only the Medicare item allowances for the consultation completed in clinics, and a fee for service from Greater Western AHS for surgeries completed. Despite this, the OES has a number of committed ophthalmologists who have been providing these services long term, and a steady supply of ophthalmologists available to deliver the service as required. There is a culture of altruism within some circles of ophthalmology, perhaps related to that initially developed by Fred Hollows, and the experiences in rural and Aboriginal eye health that all NSW ophthalmology registrars receive may also contribute to this willingness to participate.

The OES has a dedicated RANZCO-accredited ophthalmology registrar position placed with the service, which is funded through OES funds. This registrar attends all outreach clinics and

surgeries, and after a surgery block stays in the town from which clients received surgery for a one week period to address complications.

A private optometrist works in close partnership, and attends most clinics implemented by the OES. The optometrist provides a full optometry service, and provides glasses through the VisionCare service to eligible clients, or for sale to other clients. The optometrist also conducts optometry only clinics in the locations between the full clinics. The optometrists receives VOS funding for some towns attended, and also receives the Medicare item allowance for optometry-only clients, and income from any glasses sold.

For surgery, the ophthalmologist, registrar, and ophthalmic nurses from the OES staff attend and deliver the services in Bourke. The OES also supplies a surgical scrub nurse from POW for surgeries. A local GP acts as the anaesthetist for the surgery, and local staff in Bourke act as technician (steriliser) and surgical scout.

**Partnerships:** The OES works collaboratively with the Greater Western AHS to deliver eye health services within the region including surgery to clients in Bourke. There is no formal arrangement between the OES (or SESIAHS) and the Greater Western AHS, and the partnership relies on ongoing collaboration and communication.

The OES works closely with the Bourke AMS, which provides a number of the equipment items for use at the eye clinics, and assists with co-ordination, liaison, and transport for AMS clients to the clinic. Similarly, the Walgett and Brewarrina AMS also co-ordinate with the OES to ensure their clients access the service. A new partnership between OES and Maari Ma has developed OES clinics in Wilcannia and Menindee.

The OES developed a partnership with the Outback Division of General Practice to secure funding and establish the OES in Cobar. An outreach clinic is held at the Allied Health Centre of the Division. The OES and the Division also work closely in enhancing eye health elements of primary health care within the region.

**Access for Aboriginal Clients:** For 2007-2009, the annual proportions of services delivered by the OES in the five main towns that were to Aboriginal people were 31%, 28% and 21%

respectively. (26% of total residents in these towns are Aboriginal). While the OES is a rural eye health service (as distinct from an Aboriginal eye health service), a number of aspects of the program do make it more accessible to Aboriginal people. The eye clinics and surgery are provided in rural towns with high Aboriginal populations. The service has close partnerships with the ACCHS, whose staff assist with ensuring their clients access the OES. The Greater Western AHS Aboriginal health workforce at the hospitals are involved in promotion and liaison for the service, which improves access. The service, both eye clinic and surgery, is available free of charge.

The decrease in proportion of Aboriginal people receiving OES services in 2009 may be due to two factors. The REHC position in Bourke AMS was not filled in 2009, and this position has been vital in promotion and case management for the OES in Bourke. It was filled in September 2010. Secondly, the Cobar service has not yet had a high uptake by Aboriginal clients, perhaps due the absence of an AMS in Cobar, or the fact that no Aboriginal specific promotion or liaison for the service has yet been undertaken.

### 5.1.3 ICEE with AMS - Outreach Optometry Clinics for Aboriginal People

The International Centre for Eyecare Education (ICEE), with AHMRC and OATSIH, in partnership with VisionCare NSW, established the Aboriginal Eye and Vision Care Program in 1999, setting up eyecare clinics in ACCHS around NSW. With OATSIH funding, seven eye clinics and seven REHC positions were established in ACCHS in NSW, with four of each located within the Greater Western region (Wellington, Walgett, Bourke, and Broken Hill). The Aboriginal Eye and Vision Care program is actively implemented through two of these locations in the Greater Western region- Wellington and Walgett. From these locations clinic and outreach optometry services are delivered to Aboriginal communities in the region, within ACCHS facilities.

**Service:** The Aboriginal Eye and Vision Care Program is essentially an optometry service, primarily focussed on addressing uncorrected refractive error and examining for the presence of other ocular disease. The program offers Medicare -funded optometry eye examinations and spectacles under the NSW Government spectacle program. Clinics are held at the eye clinics established in Walgett and Wellington AMS, and outreach optometry clinics are held in 36 locations presently. All clinics are co-ordinated by the REHC and are conducted within

ACCHS or at a Land Council facility. The program targets Aboriginal people, but will also service non-Aboriginal people. Clients to the service can self refer, or be referred by primary health care practitioners. Referrals also come from vision screening conducted by the REHC in schools and other community locations.

**Locations, frequency, and through-put:** The ICEE estimates that 1264 clients were seen in the Greater Western region in 2009-10. The number of clinic days in a certain location depends on the observed need in the community and the availability of an optometrist, and is co-ordinated by the REHC and ICEE. The number of clinic days and number of spectacles issued are outlined in Table 5 . The number of spectacles delivered was the only throughput data provided, and is an indicator of the number of clients seen.

**Table 5: Locations of ACCHS outreach optometry clinics, frequency and throughput.** (Source: ICEE)

| Location | Number of Clinic days 1 July 09 - 30 June 10 | Spectacles Issued 1 July 09 - 30 June 10 |
|---|---|---|
| Balranald | 2 | 32 |
| Baradine | 1 | 8 |
| Bathurst | 4 | 61 |
| Billow Downs | 1 | 14 |
| Brewarrina | 3 | 30 |
| Cobar | 3 | 18 |
| Collarenebri | 2 | 18 |
| Condobolin | 4 | 20 |
| Coonabarabran | 3 | 25 |
| Coonamble | 4 | 66 |
| Cowra | 2 | 16 |
| Dubbo | 8 | 32 |
| Forbes | 8 | 61 |
| Gilgandra | 2 | 16 |
| Goodooga | 4 | 16 |
| Ivanhoe | 2 | 13 |
| Lightning Ridge | 3 | 34 |
| Murrin Bridge | 4 | 26 |
| Narromine | 6 | 55 |
| Orange | 6 | 47 |
| Parkes | 7 | 59 |
| Peak Hill | 3 | 32 |
| Tibooburra | 1 | 10 |
| Toolybuc | 1 | 9 |
| Walgett | 16 | 172 |
| Wanaaring | 1 | 21 |
| Warren | 4 | 13 |
| Wellington | 39 | 214 |
| TOTAL | 144 | 1138 |

**Funding:** Funding for the set up of the eye clinics and the ongoing funding for the REHC positions and the costs to the AMS for implementing the program comes from OATSIH. ICEE is a not for profit NGO and funding from the program comes from the Brien Holden Vision Institute, organisational fund raising, and specific grants for training and resources. Many optometrists associated with the program receive funding through VOS.
Greater Western AHS provides air travel for the program staff through flights contracted to the RFDS.

The eye clinics in Walgett and Wellington are well equipped, and both have a slit lamp (enabling a more thorough eye health exam) and a digital retinal camera. Walgett has a portable slit lamp for outreach clinics, but Wellington does not, although most optometrists are able to provide one.

**Staffing:** There are two dedicated REHC positions working on the program, based in Wellington and Walgett. One AHW in Walgett AMS is also working full-time on the eye program with the REHC. The REHC positions in Broken Hill and Bourke are not involved in this program (see Section 5.3.2).

Optometrists working on the program mostly come from relatively close towns (within 2-3 hours) and generally provide continuity of care. If local optometrists are not available, ICEE recruits Sydney-based optometrists to work on a locum basis. In the past ICEE had a full-time optometrist position placed with the program, which avoided the challenge of accessing private optometrists, however there are currently no funds for this position. Clinics are sometimes cancelled due to no available optometrist.

**Partnerships:** The program is implemented through the successful partnership between ICEE, AHMRC, Walgett and Wellington AMS, the REHC, and VisionCare NSW. Each REHC maintains strong links with all AMS and land councils within their region, and establishes links with local primary health care providers to receive referrals, and ophthalmologists for ongoing referrals. There is no obvious collaboration between this program and Greater Western AHS or the OES. The ICEE provides ongoing training, professional development, and support to the REHC, and also to any other ACCHS staff (such as Aboriginal Health Workers) interested in eye health training.

**Access for Aboriginal Clients:** This service is targeted for Aboriginal people, is delivered through ACCHS, and is co-ordinated by the REHCs (who are both Aboriginal women). The ACCHS or Land Council are generally responsible for client liaison and arranging appointments and transport for the clinics, while the REHC co-ordinates the clinic, and arranges delivery of glasses and ongoing follow-up for any clients from the clinic as required.

### 5.1.4 Aboriginal Community Controlled Health Services

### 5.1.4 (a) Maari Ma

Maari Ma Health Aboriginal Corporation is an ACCHS based in Broken Hill that manages the health services in the Far Western Region, in close partnership with the Greater Western AHS. Maari Ma delivers primary health care services, and specialist eye health services in some locations. POW has one ophthalmology registrar position placed full time in Broken Hill (on 6 month rotations), and this registrar is available one day per week for working with Maari Ma. In addition, Maari Ma has entered into partnership with the OES to deliver comprehensive ophthalmology clinics in Wilcannia and Menindee annually. Maari Ma also helps to co-ordinate the local arrangements for the annual RFDS ophthalmology fly around clinic (see 4.3.5). Maari Ma services are specifically designed and delivered for Aboriginal people in the region.

**Service, Locations and Frequency:** Maari Ma runs eye clinics with the ophthalmology registrar, which provide a screening and diagnostic service. These clinics are run as follows: Broken Hill (1x / fortnight), Wilcannia (6x / year), Menindee (4x / year), Ivanhoe (1x / year), Tibooburra (1x / year), and White Cliffs (1x / year). The clinics delivered in partnership with the OES provide a comprehensive ophthalmology and optometry service. These are held annually in Wilcannia and Menindee (2 days each per year). OES optometry only clinics are held in these locations one other time per year. This service commenced in 2009.

**Throughput:** Table 6 shows the throughput is for the registrar clinics and OES clinics combined. The increased numbers in 2009 are due to the commencement of the OES / Maari Ma ophthalmology clinic days. This does not include the RFDS which are seen as separate clinics and described below.

**Table 6: Number of clients seen at outreach ophthalmology clinics conducted by Maari Ma (Source: Maari Ma).**

| | Jan-Jun 08 | Jul – Dec 08 | Jan-Jun 09 | Jul –Dec 09 |
|---|---|---|---|---|
| | Total (Aboriginal) | Total (Aboriginal) | Data not available | Total (Aboriginal) |
| Broken Hill | 36 (36) | 35 (35) | | 44 (42) |
| Wilcannia | 25 (23) | 22 (16) | | 115 (71) |
| Menindee | 15 (3) | 36 (18) | | 88 (40) |
| Ivanhoe | 0 | 8 (4) | | 8 (4) |
| Tibooburra | 0 | 4 (0) | | 11 (1) |
| White Cliffs | 0 | 14 (0) | | 15 (0) |
| **TOTAL** | **76 (62)** | **119 (73)** | | **281 (158)** |

**Funding:** Maari Ma receives OATSIH funding for the REHC positions and the implementation of the chronic care and eye health services. OES receives funding through MSOAP and VOS specifically for the Wilcannia and Menindee locations.

**Staffing:** POW has one RANZCO accredited registrar position placed full time in Broken Hill (on 6 month rotations), and this Registrar is available one day per week for working with Maari Ma. Maari Ma has funding for one of the seven REHC positions in NSW, however they have incorporated this position into their chronic disease strategy team, so that all team members are involved in eye health promotion, vision screening, and referral.

### 5.1.4 (b) Thubbo

A General Practitioner in Dubbo who specialises in ophthalmology delivers an outreach public eye health clinic at Thubbo, the ACCHS in Dubbo, for one half day per month. Referrals are then made to ophthalmologists for tertiary services as required. This service is provided free of charge to Aboriginal people, as services are bulk billed to Medicare.

### 5.1.5 Royal Flying Doctor Service

The RFDS in Broken Hill operates a one week ophthalmology outreach service to remote areas in the Broken Hill region once per year. This has been a long standing service of the RFDS, which was previously run three times per year, but has become an annual service only for the last five years.

**Service:** The service is a fly-around clinic, and includes an ophthalmologist and optical dispenser. It is essentially a screening service for eye disease, and provides an optical service.

**Locations:** The locations selected for the clinics each year depends on logistical issues including plane schedule. The (NSW) locations for the last three years were:

- 2008: Menindee, Tibooburra, White Cliffs, Ivanhoe,
- 2009: Menindee, Tibooburra, White Cliffs, Ivanhoe, Maripina, Monolon (Properties)
- 2010: Wanaaring, Tibooburra, White Cliffs, Monolon.

Clinics are held in a Greater Western AHS Health service facility, or in a community location such as a property or local pub.

**Service Model:** The RFDS runs three specialty clinics annually- in ophthalmology, ear/nose/throat, and dermatology. More routinely they run regular outreach clinics to these regions, which are general practice and primary health care, and clients identified through these clinics are referred internally to the annual ophthalmology fly around clinic. The RFDS advertises its services to the remote locations, and people are also able to self-refer to the service. Clients requiring tertiary eye health services would be referred to Broken Hill.

**Throughput:** In 2010 eighty-six clients were seen by the ophthalmologist in the fly around ophthalmology clinic. There are no data available for the previous years. There is no information available on what proportion of those clients seen were Aboriginal.

**Funding:** The RFDS funds the service, funding all running costs and paying for the specialist and optical dispenser. RFDS receives DOHA and private funding for service implementation.

**Staffing:** A Sydney ophthalmologist and optical dispenser are recruited by the RFDS to implement the service annually. An RFDS doctor also attends the clinic.

### 5.1.6 Private Optometry and Ophthalmology Services

**Service:** Private ophthalmology and optometry services are available through private practice, stores, and clinics, throughout the Greater Western region, but particularly in the south eastern area of the region.

**Locations:** Private ophthalmology practices or services are available in the following towns: Bathurst, Orange, Mudgee, Parkes, Forbes, Cowra, and Dubbo. These are either staffed by full-time resident ophthalmologists, ophthalmologists visiting from Sydney, or a combination of these. Those ophthalmologists working in clinics within the Greater Western region perform surgery on public and private clients in Greater Western AHS facilities. Private optometry practices and services are available in Bathurst, Orange, Mudgee, Wellington, Dubbo, Forbes, Parkes, Cowra, Coonabarabran, Coonamble, Nyngan, Cobar, Lightning Ridge, Gilgandra, Condobolin, Gulgong, Goodooga, Brewarrina, Walgett, and Broken Hill.

**Funding:** Ophthalmology practices run as small businesses generally owned by one ophthalmologist. The set up for a private ophthalmology clinic in terms of equipment required is estimated to be approximately $300-500K. Other costs in running the clinics include staff (receptionist, orthoptists, eye nurse), equipment maintenance, and overheads (such as rent and utilities).

**Access for Aboriginal clients:** All people are able to attend private clinics. The cost for optometry consultation is generally fully covered by Medicare (98% of optometry consultations are bulk billed and as a result there is no gap payment) and glasses must be paid for unless clients are eligible for the NSW Government Spectacle Program. Consultations with an ophthalmologist privately will generally not be fully covered by Medicare, unless an ophthalmologist agrees to bulk-bill. Many ophthalmologists in the Greater Western region will agree to bulk bill on a case by case basis, and some have a standing policy to bulk bill all Aboriginal clients.

Besides funding arrangements, no private optometrists or ophthalmologists in the region appear to be actively modifying their services to improve accessibility for Aboriginal clients. The private ophthalmologists interviewed were not able to provide data on the uptake of their services by Aboriginal people, but in general they felt that uptake was quite low.
The REHCs reported a number of occasions where negotiating affordable services for Aboriginal clients in private practices was quite challenging, and had encountered some negative cultural attitudes. As a result they organised referrals to practices in the region they know to be more welcoming and affordable for Aboriginal people. This results in some clients from Bathurst often attending a private practice in Dubbo for review.

### 5.1.7 Eye health service provider summary

Table 7 gives a summary overview of the key services providers in Greater Western region, and the services they provide.

**Table 7: Summary table of the key eye health service providers in Greater Western region.**

| Level | Who | What | Locations |
|---|---|---|---|
| PRIMARY EYECARE | ACCHS<br>GPs<br>Community Clinics<br>RFDS | Primary Health Care | All |
| SECONDARY EYECARE | ACCHS with ICEE | ICEE Optometry Clinics (outreach) held at AMS or other locations, co-ordinated by Regional Eye Health Co-ordinators, and staffed by visiting optometrists. | REHC in Wellington and Walgett co-ordinate outreach clinics to 36 locations in Greater Western region.<br>(4-12x / year per location) |
| | Greater Western AHS (Broken Hill Hospital) | Public Ophthalmology Clinic (nurse, registrar, Ophthalmologist) | Broken Hill Base Hospital (6 days / month). |
| | Outback Eye Service | Public Ophthalmology Clinics (Eye Nurse, Optometrist, Optical Dispenser, Registrar, Ophthalmologist). | Bourke, Brewarrina, Walgett, Lightning Ridge, Cobar, (every 1-3 months)<br>Wilcannia and Menindee (2 x/ year with Maari Ma). |
| | Maari Ma | Eye Clinics with Registrar | Maari Ma PHC Clinic (BH), Wilcannia, Menindee, Ivanhoe, Tibooburra, White Cliffs. (1-6 x / year). |
| | | Public Clinics (optometry, ophthalmology, eye nurse)- with OES. | Wilcannia and Menindee (1x / year) |
| | RFDS | Ophthalmology Outreach Clinics (ophthalmologist and optical dispenser). | Menindee, Tibooburra, White Cliffs, Ivanhoe.<br>(1x / year). |
| | Private Optometrists | Located in optometry practices (most have access to NSW Government Spectacle Program). | Bathurst, Dubbo, Orange, Forbes, Mudgee, Parkes, Broken Hill, Cowra, Coonabarabran, Coonamble, Nyngan, Cobar, lightning Ridge, Gilgandra, Condobolin, Gulgong, Goodooga, Brewarrina, Walgett. |
| | Private Ophthalmologists | Private Ophthalmologists in Rooms (some may provide bulk billing services). | Bathurst, Dubbo, Orange, Forbes, Mudgee, Gulgong, Parkes, Cowra. |
| TERTIARY EYECARE | Greater Western AHS | Surgery | Bathurst, Forbes, Broken Hill, Dubbo, Orange, Cowra, Wellington, Broken Hill. |
| | Greater Western AHS with OES | Surgery | Bourke |

## 5.2 Ophthalmology service mapping

### 5.2.1 Service availability by local government area

Primary health care services are available in all LGAs through public health services, primary health care centres, GPs, ACCHS, and RFDS. The degree to which each of these includes eye health services into their service delivery was not reviewed.

Table 8 shows an overview of the availability of secondary and tertiary eye health services by local government area, in relation to the population of Aboriginal residents by LGA (where the LGA with the largest number of Aboriginal residents listed first). For secondary services the optometry clinics run through ICEE/ ACCHS or OES are available in most of the LGAs with larger Aboriginal populations, with the exception of Broken Hill, Wentworth, and Mid-Western regional (Mudgee). Public ophthalmology is available in 6 LGA areas, and not always in those with considerably larger Aboriginal resident populations. Private ophthalmology is available in seven LGAs, some of those with a larger number of Aboriginal residents. Tertiary ophthalmology services including surgery are available in seven locations in Greater Western region.

**Primary Services:** Primary health services are available in all Greater Western AHS Health Service facilities, and through ACCHS and GPs. The degree to which each of these includes eye health services into their service delivery was not reviewed.

**Secondary Services:** Outreach optometry clinics are held in a larger number of locations, as demonstrated on a map of the Greater Western region in Figure 4.

Public ophthalmology clinics are available in Bourke, Brewarrina, Walgett, Lightning Ridge, Broken Hill, Wilcannia, and Menindee. Private ophthalmology clinics are available in Bathurst, Orange, Mudgee, Parkes, Forbes, Cowra, and Dubbo. Figure 5 shows these locations on a map of Greater Western region.

**Tertiary Services:** Public surgery is available in the Greater Western region in Bathurst, Orange, Mudgee, Dubbo, Bourke, Broken Hill, and Forbes, and is soon to commence a service in Cowra, and these locations are shown on a map of the Greater Western region in Figure 6.

**Table 8: Availability of secondary and tertiary eye health services by local government area in Greater Western region, in relation to the proportion of Aboriginal residents in each LGA.**

| LGA of Residence | Aboriginal Residents | Total Popn | % Popn who are Aboriginal | Optometry (Clinics / ACCHS) | Public Ophthalmology | Private Ophthalmology | Public Surgery |
|---|---|---|---|---|---|---|---|
| Dubbo | 4,492 | 41,187 | 10.9 | Yes | | Yes | Yes |
| Walgett | 2,164 | 7,010 | 30.9 | Yes | Yes | | |
| Orange | 1,739 | 38,288 | 4.5 | Yes | | Yes | Yes |
| Wellington | 1,422 | 8,626 | 16.5 | Yes | | | |
| Bathurst | 1,418 | 39,122 | 3.6 | Yes | | Yes | Yes |
| Broken Hill | 1,288 | 19,018 | 6.8 | | Yes | | Yes |
| Brewarrina | 1,287 | 1,926 | 66.8 | Yes | Yes | | |
| Narromine | 1,173 | 6,720 | 17.5 | Yes | | | |
| Coonamble | 1,144 | 4,095 | 27.9 | Yes | | | |
| Lachlan | 1,137 | 6,748 | 16.8 | Yes | | | |
| Parkes | 1,130 | 14,836 | 7.6 | Yes | | Yes | |
| Bourke | 1,018 | 3,095 | 32.9 | Yes | Yes | | Yes |
| Cowra | 836 | 13,123 | 6.4 | Yes | | Yes | Yes |
| Warrumbungle | 833 | 9,868 | 8.4 | Yes | | | |
| Central Darling | 784 | 1,868 | 42 | Yes | Yes | | |
| Wentworth | 722 | 7,072 | 10.2 | Yes | | Yes | Yes |
| Forbes | 705 | 9,465 | 7.4 | | | | |
| Mid-Western Regional | 653 | 22,280 | 2.9 | | | Yes | |
| Gilgandra | 636 | 4,559 | 13.9 | Yes | | | |
| Cobar | 565 | 4,934 | 11.5 | Yes | Yes | | |
| Warren | 371 | 2,665 | 13.9 | Yes | | | |
| Bogan | 366 | 2,816 | 13 | Yes | | | |
| Cabonne | 309 | 13,046 | 2.4 | Yes | | | |
| Balranald | 197 | 2,530 | 7.8 | | | | |
| Blayney | 174 | 7,003 | 2.5 | | | | |
| Oberon | 131 | 5,389 | 2.4 | | | | |
| Weddin | 73 | 3,670 | 2 | | | | |
| Unincorporated NSW | 30 | 1,040 | 2.9 | | | | |
| **Total Greater Western Region** | **26797** | **301999** | **8.9** | | | | |
| **NSW Total** | **165916** | **7207653** | **2.3** | | | | |

**Figure 4: Locations in the Greater Western region where outreach optometry clinics are conducted, through ICEE/ ACCHS or OES**. (Source: ICEE)

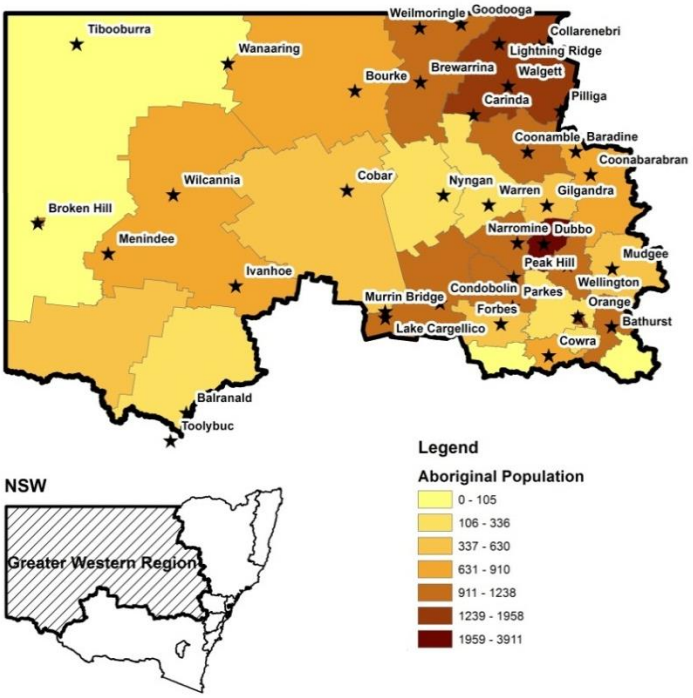



**Figure 5: Locations in Greater Western region where ophthalmology services are available.**
Key: ★ = Public Clinics • = Private ophthalmology clinics

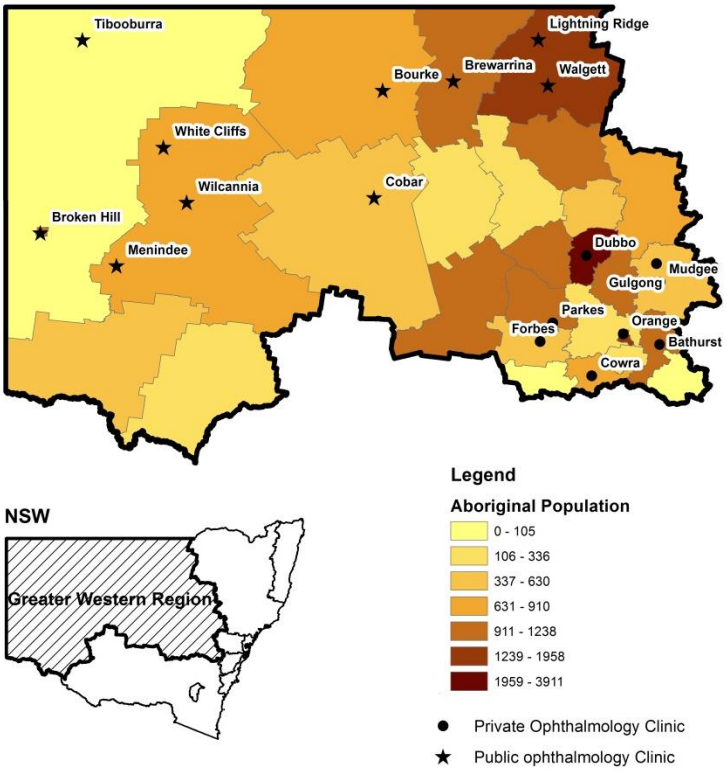
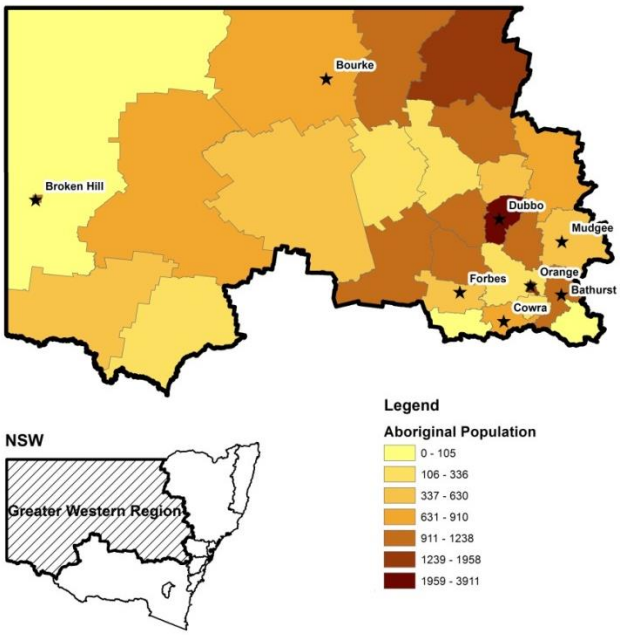


**Figure 6: Locations in Greater Western region where tertiary ophthalmology services are available.**




## 5.2.2 Access to tertiary ophthalmology services

There are only limited and incomplete data on the uptake of secondary eye health services by Greater Western region residents in general and Aboriginal people in specific. Secondary eye health services are provided by a number of eye health service providers, who use different and incomplete systems for data gathering. The information available on service delivery to Aboriginal people by each service providers is included in Section 5.1. However, uptake of tertiary ophthalmology services is available.

This information provides demographic, service utilisation and trends data for Greater Western region Aboriginal residents who access ophthalmology services. The information was prepared by Greater Western AHS, using Flow Info Version 10, a NSW Health Department supplied software which extracts information from the admitted patient data set in the NSW Health Information Exchange. The information relates only to patients admitted to hospitals, and not those treated in an outpatient setting. Ophthalmology services are defined as patients who have been categorised with a service related group (SRG) of 50 ophthalmology services assigned at the time of clinical coding to the patient's record. All ophthalmology services may include planned cases such as all eye procedures, and unplanned cases such as trauma and injury.

Table 8 shows the demographic data of Greater Western AHS patients accessing ophthalmology services in 2006/7 and 2008/9. Of all people using ophthalmology services, the proportion of Aboriginal people using services has decreased slightly. While 44% of Greater Western region residents accessing ophthalmology services accessed public services as private patients, only 6% of Aboriginal Greater Western region residents using ophthalmology services were private (in 2008/9).

Table 9 shows the number of hospital separations of Greater Western region residents treated in Greater Western AHS facilities. This demonstrates an overall decrease in the total number of separations for Aboriginal residents over the last three years, particularly for glaucoma and lens procedures. Table 10 shows total hospital separations for ophthalmology services for Aboriginal and non-Aboriginal residents of Greater Western region treated within Greater Western AHS facilities.

In 2008/09 thirty-six (36) Greater Western region Aboriginal residents accessed ophthalmology tertiary services outside Greater Western AHS facilities (20 for 2006/7). The locations were these separations occurred is shown in Table 11.

**Table 8: Demographic profile of Greater Western region residents accessing ophthalmology services** (Source: Greater Western AHS using FlowInfo V10).

| | 2006/07 | 2008/09 |
|---|---|---|
| Male | 47% | 48% |
| Female | 53% | 52% |
| Average Age | 75 Years | 75-79 Years |
| Aboriginal | 7% | 6% |
| Non-Aboriginal | 93% | 94% |
| Public patient | 44% | 44% |
| Private/Other patient | 55% | 56% |

**Table 9: Hospital separations for ophthalmology services delivered to Greater Western region residents treated in Greater Western AHS 2006-2009.** (Source: Greater Western AHS using FlowInfo V10).

| | 2006/07 | | 2007/08 | | 2008/09 | |
|---|---|---|---|---|---|---|
| | Total | Aboriginal | Total | Aboriginal | Total | Aboriginal |
| Glaucoma and lens procedures | 1,183 | 48 (4%) | 1,130 | 35 (3%) | 1,107 | 32 (3%) |
| Non-procedural Ophthalmology | 203 | 46 (23%) | 239 | 40 (22%) | 196 | 45 (23%) |
| Other eye procedures | 155 | 10 (6%) | 179 | 6 (3%) | 155 | 10 (7%) |
| **Total** | **1,541** | **104 (7%)** | **1,548** | **81 (5%)** | **1,485** | **87(6%)** |

**Table 10: LGA of residence of Greater Western region residents accessing Greater Western AHS ophthalmology services** (Source: Greater Western AHS using FlowInfo V10).

| | 2006/07 | | | 2007/08 | | | 2008/09 | | |
|---|---|---|---|---|---|---|---|---|---|
| LGA | Non-Aboriginal | Aboriginal | Total | Non-Aboriginal | Aboriginal | Total | Non-Aboriginal | Aboriginal | Total |
| Balranald | 0 | 1 | 1 | 2 | 0 | 2 | 1 | 0 | 1 |
| Bathurst Regional | 175 | 2 | 177 | 206 | 3 | 209 | 176 | 5 | 181 |
| Blayney | 27 | 1 | 28 | 40 | 1 | 41 | 39 | 0 | 39 |
| Bogan | 16 | 3 | 19 | 19 | 4 | 23 | 14 | 3 | 17 |
| Bourke | 10 | 17 | 27 | 21 | 5 | 26 | 20 | 8 | 28 |
| Brewarrina | 5 | 8 | 13 | 2 | 7 | 9 | 3 | 5 | 8 |
| Broken Hill | 204 | 2 | 206 | 231 | 5 | 236 | 169 | 3 | 172 |
| Cabonne | 54 | 0 | 54 | 44 | 1 | 45 | 49 | 0 | 49 |
| Central Darling | 11 | 3 | 14 | 6 | 5 | 11 | 4 | 13 | 17 |
| Cobar | 13 | 4 | 17 | 10 | 1 | 11 | 9 | 1 | 10 |
| Coonamble | 19 | 4 | 23 | 9 | 5 | 14 | 24 | 8 | 32 |
| Cowra | 71 | 4 | 75 | 63 | 0 | 63 | 53 | 4 | 57 |
| Dubbo | 132 | 11 | 143 | 131 | 13 | 144 | 111 | 5 | 116 |
| Forbes | 67 | 1 | 68 | 63 | 2 | 65 | 75 | 6 | 81 |
| Gilgandra | 16 | 5 | 21 | 20 | 1 | 21 | 18 | 0 | 18 |
| Lachlan | 26 | 7 | 33 | 22 | 5 | 27 | 25 | 5 | 30 |
| Mid-Western | 178 | 1 | 179 | 177 | 0 | 177 | 150 | 1 | 151 |
| Narromine | 17 | 5 | 22 | 19 | 2 | 21 | 19 | 3 | 22 |
| Oberon | 25 | 0 | 25 | 21 | 2 | 23 | 25 | 0 | 25 |
| Orange | 146 | 3 | 149 | 159 | 3 | 162 | 147 | 2 | 149 |
| Parkes | 79 | 4 | 83 | 61 | 2 | 63 | 74 | 1 | 75 |
| Unincorp. Far West | 1 | 0 | 1 | 2 | 0 | 2 | 1 | 0 | 1 |
| Walgett | 27 | 10 | 37 | 27 | 8 | 35 | 36 | 12 | 48 |
| Warren | 6 | 0 | 6 | 6 | 2 | 8 | 9 | 1 | 10 |
| Warrumbungle | 45 | 0 | 45 | 44 | 2 | 46 | 61 | 1 | 62 |
| Weddin | 26 | 0 | 26 | 24 | 0 | 24 | 24 | 0 | 24 |
| Wellington | 31 | 8 | 39 | 25 | 2 | 27 | 28 | 0 | 28 |
| Wentworth | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| **Total** | **1,427** | **104** | **1531** | **1,454** | **81** | **1535** | **1,366** | **87** | **1453** |

**Table 11: Hospital locations where Greater Western region Aboriginal residents accessed ophthalmology tertiary services outside Greater Western AHS facilities for 2008/9.** (Source: GWAHS using FlowInfo V10).

| Hospital | Separations |
|---|---|
| Sydney Eye Hospital | 10 |
| Prince of Wales Hospital | 10 |
| Children's Hospital Westmead | 5 |
| Sydney Children's Hospital | 3 |
| Moree Hospital | 3 |
| Royal Prince Alfred Hospital | 1 |
| Springwood Hospital | 1 |
| Westmead Hospital | 1 |
| Private hospitals | 2 |

### 5.2.3 Rates of access to ophthalmology services

**Rate of service uptake by LGA:** In 2008/9 in Greater Western AHS there was an average of 5.1 ophthalmological inpatient separations in Greater Western AHS per 1,000 population. This rate is 3.6 for Aboriginal people. (Note this is a crude rate not adjusted for age). This rate was only for those accessing services in Greater Western AHS. As more non-Aboriginal people than Aboriginal people are utilising private ophthalmology services, the difference between the overall ophthalmology (public and private) uptake rate between Aboriginal and non-Aboriginal people in the Greater Western region would be significantly greater. Interestingly, these rates vary across LGAs. Figure 7 shows the rate of public tertiary ophthalmology separations per 1000 population for Aboriginal and non-Aboriginal people in the Greater Western region at the LGA level.

For Aboriginal residents of Greater Western region, there is a relationship between the availability of a public ophthalmology clinic in their LGA of residence and the uptake of tertiary ophthalmology services in the eight available locations in Greater Western AHS (Figure 8). There is a significant difference in the proportional uptake of tertiary ophthalmology services for Aboriginal people from LGAs with public ophthalmology clinics, LGAs with private ophthalmology clinics, and LGAs with no ophthalmology clinics ($\chi^2$ test, $p<0.001$). While the cataract surgery rate for Aboriginal people is significantly higher in those LGAs with public ophthalmology services, it is still much lower than rates for non-Aboriginal people in NSW.

**Figure 7: Crude ophthalmology public hospital service uptake rate for Greater Western region residents 2008/9.**

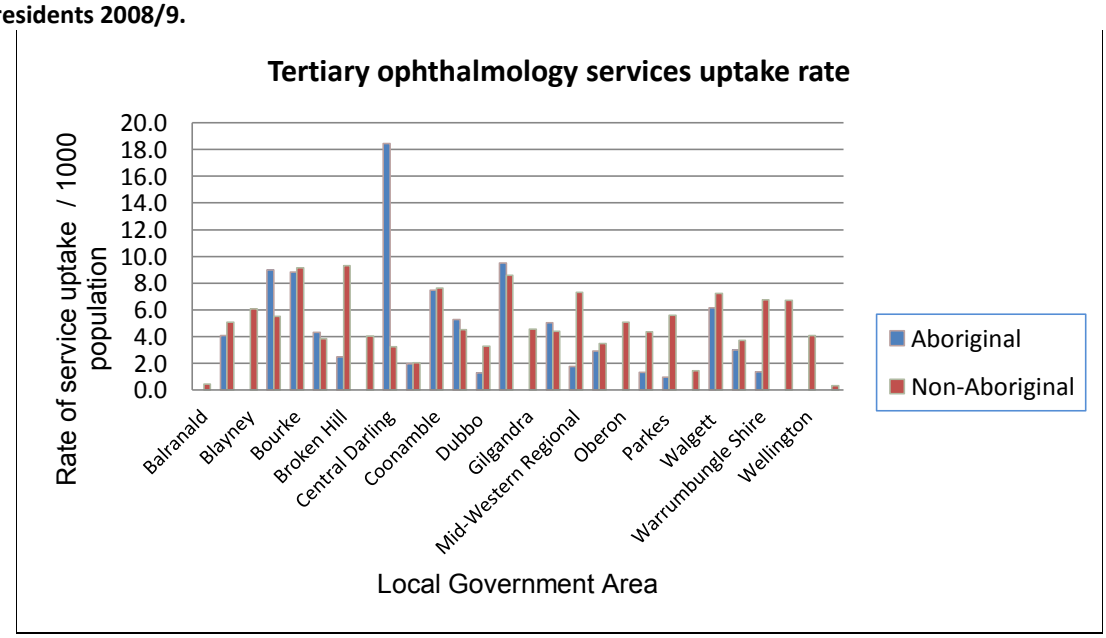
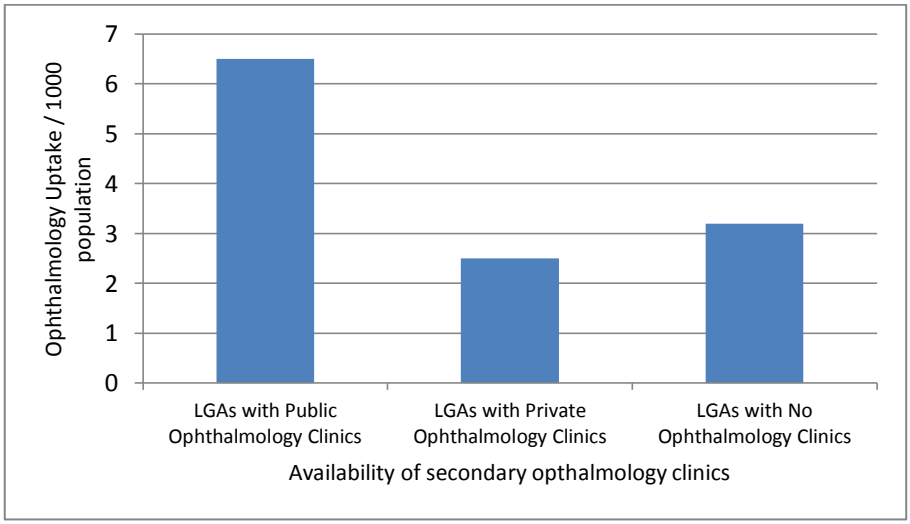
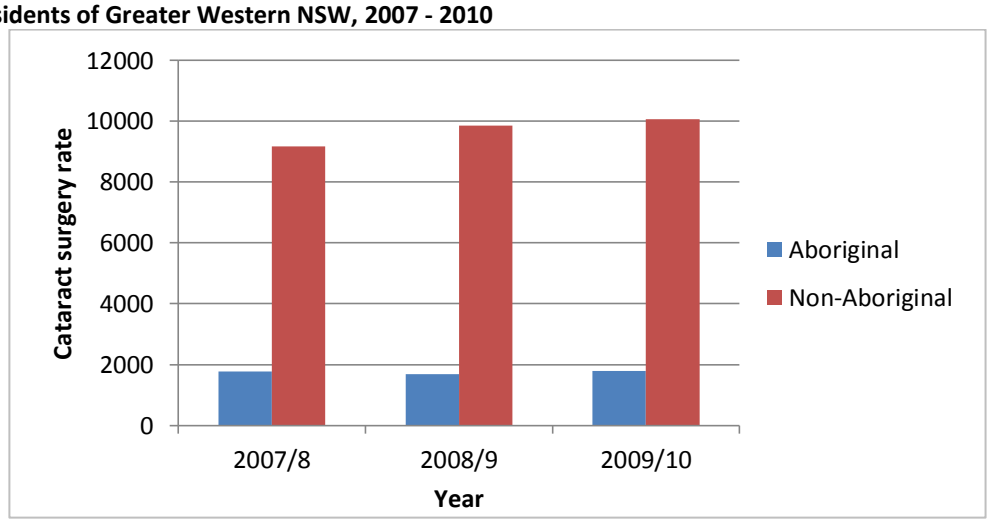


**Figure 8: Crude ophthalmology service uptake rate for Aboriginal Greater Western AHS residents for LGA groupings dependent on availability of public, private or no ophthalmology clinics.**




**Cataract Surgery Rate**: Cataract surgery rate (CSR) is a standard measure for the number of cataract operations performed / million population / year. For 2007/08, the national average CSR for all Australians was 9453, and for Indigenous Australians was 2239. The average CSR for NSW for 2007-2010 was 9136, and for Aboriginal people in NSW the rate was 1885. The cataract surgery rate in the Greater Western region for 2007-2010 was 1750 for Aboriginal people and 9702 for non-Aboriginal people. Figure 9 shows the CSR for Aboriginal and non-Aboriginal people in the Greater Western region of NSW. For 2007 -2010, an average of 46 Aboriginal people received cataract surgery annually in the Greater Western region of NSW. On average an additional 202 annual cataract operations for Aboriginal people would have been required in this period for the Aboriginal CSR in this LHD to equal the Australian CSR.

**Figure 9: Cataract surgery rate (number of cataract operations performed / million population/ year) for residents of Greater Western NSW, 2007 - 2010**



## 5.3 Service Delivery and Co-ordination in Greater Western region

### 5.3.1 Primary Eyecare:

Eye health services at the primary level were not the major focus of this review, with only a small number of primary health care professionals consulted (Appendix 2), however the following issues were noted.

**Community education and eye health promotion:** There are no specific eye health care promotion campaigns or programs implemented within the region through the key providers. Some primary health care providers report including eye health promotion elements into other community health education and promotion programs.

**Screening at the primary health care level:** Eye health screening should be incorporated into diabetes and chronic care management at the primary health care level, by GPs, Greater Western AHS primary health care providers, and in ACCHS. The degree to which this actually occurs and the resultant referrals to eye health care professionals was not able to be comprehensively covered in this review.

**Retinal photography:** At least four ACCHS have digital retinal cameras (Dubbo, Walgett, Wellington, and Broken Hill) as does Bourke Hospital, however none report using retinal photography for screening at the primary health care level. According to the stakeholders interviewed, there are a number of barriers to using retinal photography as a screening tool. There are no clear procedures developed in relation to retinal photography, and it is not clear which primary health care workers would be involved in retinal photography. Staff are unclear how to use the cameras, and would like additional training. They feel it may be difficult to establish regionally as the type of camera is not uniform. Finally, there is no system established whereby photographs would be screened by an eye health specialist to determine if a retinopathy requiring follow-up was present.

A number of stakeholders were interested in further developing the use of retinal photography at the primary health care level in the region. The REHC interviewed feel this should be the role of primary health care practitioners involved in regular management of people with chronic care, but that as REHC they would be able to ensure the photos were reviewed by an

appropriately trained person, and clients followed up as appropriate. ICEE stated they would be able to provide training to staff as required. The Centre for Eye Health (at University of New South Wales) and the OES stated they could screen the photographic images.

There were no reports of primary health care centres within Greater Western AHS or GPs owning or using retinal cameras for screening.

**Referral pathways:** The eye health care pathways for referral to secondary and tertiary eye health services are different in each location, and mostly appear to function well at the local level where secondary and tertiary eye health services are available. Not all primary health care providers were aware which ophthalmologists would bulk bill in locations where no public clinics were available. The referral choice between optometry and ophthalmology where both are available appears to be based on availability and cultural specificity of services rather than any clinic delineation.

### 5.3.2 Secondary Eyecare

**Regional Eye Health Care Co-ordinators:** There are 4 Regional Eye Health Co-ordinator (REHC) positions in the Greater Western region, funded by OATSIH, and based at the ACCHS in Walgett, Wellington, Bourke, and Broken Hill. In Walgett and Wellington the REHC co-ordinate and implement outreach optometry services and facilitate spectacle delivery, in partnership with ICEE, as well as facilitating referrals to ophthalmology. In Bourke the REHC works with the OES to ensure increased accessibility to the OES clinics for Aboriginal people in Bourke. In Broken Hill this position has been incorporated into a number of Chronic Care Health Worker positions, so that all health care workers are involved in eye health screening and co-ordination. The REHC positions are co-ordinating eye health services for Aboriginal people in their region. OATSIH provides funding and regular training to the REHC positions.

**Optometry Outreach Services**: For the purpose of this review, only outreach and Aboriginal-specific optometry clinics have been considered, assuming that only a small proportion of Aboriginal people access private optometry practices.

The outreach optometry clinics co-ordinated through the ACCHS in Walgett and Wellington are servicing many locations, and seeing significant numbers of Aboriginal people. The REHC in

these locations work tirelessly in the delivery of these services, and are very appreciative of the supportive partnership with ICEE. The frequency of these clinics, and the reliability that they will occur when planned, is somewhat limited by the availability of optometrists, VOS criteria, and the capacity of the REHC position to expand services (they are working at full capacity). The outreach optometrists refer clients for ophthalmology review when required. These follow-up appointments are usually arranged by the REHC. There are no figures available on the number for referrals generated from optometry clinics, however the number may be affected by:

- Some outreach optometry clinics (from Wellington ACCHS) do not have access to a portable slit lamp, which may make the screening for eye disease difficult.
- Some referrals to ophthalmology from Walgett and the north east corner of Greater Western AHS go to the Eye Clinic based at Moree ACCHS.
- From Wellington, there are no public ophthalmology clinics available in the south eastern corner of Greater Western AHS. The REHC refers most clients (including those in Bathurst) to a private ophthalmologist in Dubbo who is known to bulk bill Aboriginal clients.

The OES model integrates optometry and ophthalmology services, where the services are delivered on the same day or sequenced. This appears to increase the efficiency of the service, ensures the ophthalmologist receives only referrals requiring ophthalmology review (rather than screening), enables the patient to have all eyecare needs managed simultaneously, and prevents patients being lost to ophthalmology follow-up.

There is a notable lack of outreach optometry services available to Aboriginal people in Broken Hill. ICEE is negotiating with Maari Ma with the view to establish a 6 weekly service to Broken Hill in 2011.

**Public ophthalmology clinics:** There are three main models of public ophthalmology clinics occurring in the Greater Western region- those of the OES, Broken Hill Health Service, and Maari Ma with OES.

The OES provides a comprehensive eye health service, and supports clients across the eye health care pathway including tertiary services. The OES has strong links with the ACCHS, Health Service, and Outback Division GPs in the towns where they work, and works closely

with Aboriginal Health Workers and Aboriginal Liaison Officers to increase uptake for Aboriginal people. Proportional uptake of their services by Aboriginal people has decreased over the last three years. Waiting list data on the outpatient clinics were not available, but reports at the local level suggest that an increased frequency of the clinics would be indicated in some locations.

The Broken Hill Health Service outpatient specialist clinic provides free ophthalmology services, and is held on a regular basis. Details on patient throughput and the proportional uptake by Aboriginal people were not provided for the review. The clinic has an extremely long waiting list, with clients referred to the ophthalmologist waiting over 12 months for an appointment. (This effectively doubles the waiting list time for surgery, where a person referred to an ophthalmologist for a condition requiring surgery first waits for 12 months to see the ophthalmologist, and then waits for up to a further 12 months for surgery). Maari Ma arrange transport and liaison to Aboriginal people to attend the clinic at Broken Hill, however in general the Aboriginal Liaison Officers in Broken Hill are not overly involved in the ophthalmology clinics.

The Maari Ma clinics implemented in conjunction with the OES are comprehensive eye health clinics, and have significantly increased the number of people seen in Maari Ma clinics in 2010. Maari Ma report they are hoping to run these clinics two times per year from 2011. The registrar only clinics appear to have somewhat less uptake, and are limited by what the registrar is able to do independently.

**Private ophthalmology clinics:** Private ophthalmology clinics are available within Greater Western AHS as described in 4.4.1. These are generally held in the rooms of the ophthalmologist, and have no specific links with the ACCHS or Greater Western AHS. While some of the private ophthalmologists will bulk-bill all referrals from an ACCHS or some referrals on a case by case basis, this information is not widely advertised or known. Data on the proportion of Aboriginal people seen in these clinics is not available, but general reports are that it is quite low, and not equal to the proportion of Aboriginal residents in those locations. Other than some clinics bulk billing, there does not appear to be any other specific strategies used by the private clinics to increase the cultural competence of their services for Aboriginal people.

### 5.3.3 Tertiary Eyecare:

Tertiary (surgical) ophthalmology services are available in seven locations in Greater Western region, as described in Section 5.2.1. Surgical services are demand driven, and the supply of surgery responds to fluctuations in demand.

The uptake of surgery for Aboriginal people is low, as demonstrated in Section 5.2.3, reflecting that demand is low. The demand observed for Aboriginal people may be masked by issues at the secondary eyecare level highlighted above (long waiting lists at public clinics, or lack of public clinics in some areas).

For ophthalmology surgery, supply by Greater Western AHS is meeting current demand within waiting list objectives. Improved access to secondary ophthalmology services in Wilcannia, Menindee, and Cobar in the last 12 months is likely to cause increased demand for surgical services, which will require increased surgery numbers to meet demand within waiting list criteria.

While the system of surgical planning allows for flexibility in response to demand, a number of ophthalmologists who provide surgery within Greater Western AHS facilities report that they encounter significant challenges in responding to requests at short notice to cancel or increase surgical sessions.

The OES implements the surgical service in Bourke, in partnership with the Greater Western AHS. There is no formal agreement between OES and the Greater Western AHS in terms of the implementation of this service, and it is implemented through co-operation between OES, Bourke Health Service, and Greater Western AHS.

In relation to strategies employed specifically to address uptake for Aboriginal people, the OES provides significant case management and support to clients, as well as working closely with both the AMS and Greater Western AHS Aboriginal Liaison Officers in supporting Aboriginal people to access surgery in Bourke. There are no other co-ordinated case management and support systems for Aboriginal people accessing surgery in the other Greater Western AHS locations.

### 5.3.4 General

**Co-ordination:** Eye health services in Greater Western AHS do not have a central focus point for co-ordination, collaboration, and oversight of eye health care services at all levels. There are no ophthalmology departments in the region, and no ophthalmology or eye health service plans for the region.

At the local level, there are varied experiences of co-ordination between key services providers in the Greater Western region locations. There are some examples of effective co-ordination between Greater Western AHS, OES, ACCHS, ICEE, GP Divisions, and private ophthalmologists and optometrists that appear to deliver more appropriate services for Aboriginal people. In other locations limited communication and co-ordination between key eye health providers seems to be limit potential partnerships and developments.

**Formal Collaboration:** There are few formally developed arrangements between the key eye health providers in the Greater Western region. Notably, there is no formal agreement between the OES (SESIAHS) and Greater Western AHS regarding the delivery of public eye clinics and ophthalmology surgery in Bourke, all held in Greater Western AHS facilities. The following formal collaborations / working agreements are in place:

- Between Greater Western AHS and individual ACCHS in the region
- Between Greater Western AHS and private ophthalmologists working as VMOs
- Between the OES and Bourke AMS
- Between ICEE and AHMRC in relation to outreach optometry services
- Between ACCHS and OATSIH in relation to REHC positions and outreach eye services.

### Data Management

There are limited data available on secondary eyecare services delivered in the Greater Western region. There are a number of key providers all using different data systems, and independently monitoring their services. There is no system whereby this information can be combined to provide an overall picture of access to secondary ophthalmology services in the region. Likewise, there are no clear indicators or objectives developed for secondary ophthalmology services in the region. Greater Western AHS inpatient data for inpatient tertiary ophthalmology services is more readily available.

Similarly, management of information regarding individual clients is not always well shared between the different eye health service providers. Files are held by the individual providers, and there is varied level of reporting and feedback across the providers, which could be improved in some cases.

**Cultural competence:** The ACCHS are actively involved in delivering primary eye health services and secondary eye health services in partnership with ICEE and OES, and this brings culturally competent eye health services to Aboriginal people in the Greater Western region. ICEE conducts cultural competence training for ICEE optometrists and other staff. The Aboriginal health workforce of the Greater Western AHS are not routinely involved in eye health services at the primary level, or in liaising to support Aboriginal people access secondary and tertiary services as appropriate. There are notable exceptions in some locations which greatly enhances the cultural competence of eye health services delivered. The key service providers have made some achievements in improving the cultural competence of their services, particularly the OES and ICEE, however this is not the case at the private ophthalmology level.

# 6. DISCUSSION

Through this Review of Eye Health Services for Aboriginal People in the GWAHS Region, six main areas of issue have been identified, which will be discussed in turn, and form the basis for the recommendations. These are:

1. Primary eye health service delivery
2. Secondary eye health service delivery
3. Tertiary eye health service delivery
4. Co-ordination and collaboration of eye health services in the region
5. Cultural competence of eye health services in the region
6. Monitoring and evaluation of eye health services in the region

A significant number of key stakeholders were consulted for this review, however the list is not exhaustive, and as such this review only provides a snap shot of available data and information. In particular, service delivery at the primary health care level was not thoroughly reviewed, and more investigation at this level is recommended. Similarly, observational visits were not conducted to all locations in Greater Western AHS (particularly locations in the southern area), and therefore information from these locations may be lacking. Pragmatic issues and time constraints prevented further consultation than that reported.

## 6.1 Primary Eye Health Services

### Summary of Findings

- Primary eye health care services are available to the Aboriginal people of Greater Western AHS through ACCHS, Health Service facilities, GPs, and RFDS.
- The degree to which eye health screening and referral occurs at the primary health care level was not comprehensively explored as part of this review.
- In some regions eye health care is well integrated into primary health care and chronic care management for Aboriginal people, and regular eye health screening for Aboriginal people with diabetes with subsequent referral occurs. This is not consistent in all areas.
- In some cases, primary health care professionals liaise with clients to assist in navigating the eye health care pathway, and ensure access to secondary and tertiary services.
- While some ACCHS have digital retinal cameras, there are no instances where retinal photography is used to routinely screen for diabetic retinopathy in primary health care.

## Arising Issues

Ninety-four percent of vision loss in Australian Indigenous people is preventable or treatable [11], and primary health care services have a significant role in the promotion, prevention, screening, and referral of eye disease, to address this issue. The NIEHS found that some of the barriers for Aboriginal seeking eyecare for an existing problem were related to Aboriginal people accepting the problem, not being aware of services, or deciding not to access services.[28] Routinely incorporating screening and referral for eye disease at the primary health care level, and supporting clients to access secondary and tertiary level care as appropriate, will assist in addressing some of these barriers.

The eye health care pathway has a number of key players, and negotiating the pathway can be challenging. Improving liaison, support, and co-ordination for clients from the primary health care level would ensure clients navigate through the pathway appropriately, and access secondary and tertiary services as required.

Diabetic retinopathy screening using retinal photography at the primary health care level can improve access to screening for Aboriginal clients, and reduce the burden on other services, such as outpatient departments [41] (and presumably secondary eye health services). Taylor (2010) [21] suggests that sustainable funding sources are required for successfully introducing retinal photography systems.

## Recommendations

1. **Enhance eye health screening, referral, co-ordination and promotion at the primary health care level.**

a. **Deliver eye health promotion and education regarding prevention and management of eye disease to Aboriginal communities within the region.**
   Education regarding prevention and management of eye diseases (including when and how to seek care) could improve eye health care in Aboriginal populations, and it is recommended that eye health promotion is delivered to Aboriginal communities where appropriate.

b. **Encourage and develop strategies that enhance the inclusion of eye health screening and referral at the primary health care level**

Primary health care is the frontline for eye health services, and all strategies that increase the degree to which eye health screening is incorporated into the primary health care model, and that ensures appropriate referral and follow-up to secondary and tertiary eye health services, will improve eye health services delivery to Aboriginal people in the region.

c. **Incorporate management of eye health into current chronic care management strategies where possible, particularly those for diabetes.**

Further investigation of the degree to which this is currently occurring is recommended, as this was the not the major focus of this review. This would help to identify ways in which eye health care can be better incorporated into chronic care management strategies at the primary health care level.

d. **Incorporate retinal photography screening for diabetic retinopathy into primary health care facilities** There are no examples of retinal photography being used for diabetic retinopathy screening in the Greater Western region, and it is recommended that opportunities to incorporate retinal photography into primary health care practices are explored. This could occur through ACCHS and community health centres where diabetic programs are implemented. Issues to consider in the development of retinal photography are:

- The availability and locations of cameras and the need for additional cameras
- Workforce training will be required, and ICEE has stated they would be available to provide this training. (This would also be an opportunity to increase awareness of eye health issues in general for the primary health care workforce).
- There would need to be a co-ordinated approach to gathering photos for review and ensuring appropriate follow up is provided to clients. The REHC, or other identified staff within the primary health care clinic, could co-ordinate this aspect.
- The photos would need to be reviewed by an appropriately trained person. The OES or the Centre for Eye Health could be available to review photographs for diabetic retinopathy, and advise on the follow up required, and that this process could be conducted via email.

## 6.2 Secondary Eye Health Services

### Summary of Findings

- Outreach optometry services implemented by ACCHS with ICEE are delivered in 36 locations in the Greater Western region.
- REHC positions based in Wellington and Walgett are actively involved in coordinating outreach optometry services for Aboriginal people. The REHC position in Bourke co-ordinates services with the OES, while in Broken Hill the position has been incorporated into chronic care positions.
- The OES provides comprehensive ophthalmology services (optometry, eye health nursing, ophthalmology, and surgery) for Bourke, Brewarrina, Walgett, Lightning Ridge, and Cobar, as well as in Menindee and Wilcannia in conjunction with Maari Ma Broken Hill.
- Broken Hill Base Hospital delivers a regular public ophthalmology clinic, which delivers free ophthalmology secondary services. The clinic has a waiting list of over one year.
- Maari Ma delivers registrar only ophthalmology clinics in some locations in the Broken Hill region, and comprehensive clinics in Wilcannia and Menindee in conjunction with the OES.
- Secondary eye health services are not consistently available to Aboriginal people in the Greater Western AHS Region. In particular, there is a lack of public ophthalmology clinics in areas with high numbers of Aboriginal people.
- There is a relationship between the availability of free public ophthalmology clinics and the rates of access to tertiary eye health services for Aboriginal people in the region.

### Arising Issues

Outreach specialist services appear to be an appropriate way to deliver optometry and ophthalmology services to rural and remote Aboriginal residents in the Greater Western region. In general, outreach services overcome some of the barriers related to distance, communication, and cultural appropriateness of services and enables an increase in the number of consultations.[28] This appears to be the case with both the optometry outreach services by ACCHS / ICEE, and also the outreach services of the OES. The comprehensive approach of the OES, which brings optometry, ophthalmology, and access to surgery together under the one service, appears to improve efficiency and effectiveness of the service. Expansion of outreach services in the region, with a strategic approach to identifying appropriate locations, could improve uptake of eye health services by Aboriginal people in the Greater Western region.

The NIEHS showed that the main reasons stated by Aboriginal people for not attending eye services when they had an eye problem were related to cost, availability and accessibility of services, perceptions around the severity of the problem, and having other priorities.[30] Twenty-four percent of respondents reported that lack of availability of the service, or transport and distance to the services, were the reasons they had not sought care, and a further 7% reported the long waiting list as the barrier to attending services. Improving availability and frequency of free services at a local level should greatly improve accessibility to services by Aboriginal people in Greater Western region.

In the NIEHS 21% of Aboriginal people who had not sought care for an existing eye problem reported cost of the service as the barrier to attending care. [30] Providing eye health services at the primary, secondary, and tertiary level to Aboriginal people free of charge will improve uptake of services by Aboriginal people. The current gap in affordable eye health services in Greater Western AHS is at the secondary level, where free public ophthalmology clinics are not available in many locations within Greater Western AHS.

Secondary services are available in many locations through private ophthalmology clinics, and while data is not available, ophthalmologists anecdotally report limited uptake by Aboriginal people. The reasons for this may include cost, as information regarding which practices will bulk bill is not widely advertised or always consistent, and also cultural appropriateness of the service, where Aboriginal people may not feel comfortable in the private clinic environment. A number of reports indicate that some Aboriginal people have experienced racist attitudes in negotiating appointments in some private clinics.

Secondary eye health services are not consistently available to Aboriginal people in Greater Western region. Optometry clinics are widely available throughout the region, but are notably absent in Broken Hill (although there are plans to address this in 2011 between Maari Ma and ICEE). Of significant note is the absence of public ophthalmology clinics and services in a number of areas within the Greater Western region with high numbers of Aboriginal people. Public ophthalmology clinics have generally been well established in locations with a high proportion of Aboriginal people - four of the five LGAs in Greater Western region with a proportion of Aboriginal residents greater than 25% have public ophthalmology services (Brewarrina, Central Darling, Bourke, Walgett, but not Coonamble). However, LGAs with larger absolute numbers of Aboriginal residents do not have public ophthalmology clinics available –

of the ten LGAs in Greater Western region with greater than 1000 Aboriginal residents, only 3 have public ophthalmology clinics established (Walgett, Broken Hill, and Brewarrina- see Table 8). The limited availability of public ophthalmology services at a local level impacts the access to tertiary eye health services by Aboriginal residents of Greater Western region (as demonstrated in Section 5.2.3).

The specific areas lacking access to public ophthalmology services can be grouped into three categories:

(i) Regional Centres, which have greater than 1000 Aboriginal residents, have public ophthalmology surgery available at the regional hospital, and have private ophthalmologists running clinics within the towns. These towns are Dubbo, Bathurst, Orange, and Parkes (in the case of Parkes, surgery is available close by in Forbes). To address availability in these areas, public clinics could be established through the hospital, ACCHS, or through private –public partnerships with local ophthalmologists. Dubbo is a main priority in improving availability to public clinics- with the feeder populations of Narromine, Gilgandra, and Wellington, the total Aboriginal populations that could access this service is 6750 (30% of the Aboriginal population in Greater Western AHS region).

(ii) Towns without outreach ophthalmology services that are considerable distances (> 100 km) from existing or potential services and have considerable Aboriginal populations (> 500 people). These towns are Coonamble, Condobolin, Cowra, Coonabarabran, and Mudgee. To address availability in these towns outreach clinics could be developed.

(iii) Towns that are less than 100km from existing / potential services but have considerable Aboriginal populations are Wellington, Narromine, Gilgandra and Wentworth. Aboriginal residents from these first three towns could access services in Dubbo if they were developed, while residents in Wentworth can access services in Mildura Victoria.

## Recommendations:

**2. Improve and further develop secondary eye health services in the region:**

**a. The ACCHS / ICEE continue to deliver outreach optometry services in current locations, and increase frequency and reliability of service where possible.**

The outreach optometry clinics through ACCHS in partnership with ICEE should be commended for implementing an effective optometry outreach service which is culturally

specific for Aboriginal people. The regularity and reliability of this service could be improved by:

- Providing additional support to the REHC in Wellington, as has occurred in Walgett, as the number of clinics co-ordinated from Wellington is at maximum capacity for a single position.
- Increased availability of optometry personnel to staff the clinics. The options are:
  - ICEE are funded to employ one full time optometrist available for outreach clinic
  - Increase co-ordination with regional optometrists for staffing outreach clinics, and using VOS funding where available.
- Review equipment needs of the ACCHS. In particular, Wellington ACHS could benefit from a portable slit lamp.

**b. Develop outreach optometry services for Aboriginal people in the Broken Hill region.**

Outreach optometry clinics in Broken Hill are not currently available. It is recommended that optometry clinics for Aboriginal people are established in Broken Hill, either through Maari Ma, or through an integrated service at the Broken Hill Base Hospital ophthalmology clinic.

**c. The OES continues to deliver outreach ophthalmology services in the current locations, always seeking to increase accessibility for Aboriginal people to their services, and possibilities for expansion to new locations is explored.**

The OES should be commended for a high level of service delivery, and continued to be supported for implementing secondary eye health services in the current locations (Bourke, Brewarrina, Walgett, Lightning Ridge, Cobar, Wilcannia and Menindee). The frequency of OES clinics, and the strategies employed to increase uptake by Aboriginal people, should be frequently reviewed to ensure appropriate availability and accessibility of the service for Aboriginal people.

**d. The REHC in Wellington and Walgett are continued to be supported in delivering outreach optometry services, and the positions in Bourke and Broken Hill are reviewed to ensure maximum efficiency and effectiveness.**

The REHC positions in Walgett and Wellington should be commended for working extremely effectively in co-ordinating outreach optometry clinics, and linking these

services with primary health care, and secondary and tertiary ophthalmology services. The Bourke REHC position has been recently re-filled with a revised job description. It is recommended that Maari Ma in Broken Hill reconsider the incorporation of the REHC position into their general chronic care program, in order to maintain an active and visible focus and co-ordination for eye health services in their region. The REHC positions should be viewed as Aboriginal Eye Health Co-ordinators, in recognising the need for a broader regional eye health services co-ordination in the region.

e. **The service model and efficiency of the public ophthalmology clinic at Broken Hill Base Hospital is reviewed and strategies to improve the efficiency of the service (to decrease the waiting list) are implemented.**

The availability of a public eye clinic at Broken Hill Base Hospital is extremely important, and those involved in the maintenance and delivery of this service should be commended. Unfortunately the clinic has an extremely long waiting list. Suggestions on improving the efficiency of the clinic included:

- Create a dedicated eye health services co-ordinator for the Broken Hill region, whose role includes co-ordinating the clinic, outreach, tertiary services liaison, and management of equipment.
- Increasing the frequency of the clinic.
- Integrating the clinic with optometry services, to increase screening, and address refractive error.
- Ensuring a dedicated eye health nurse is attached to the clinic. Since this year the clinic has had a nurse working on the clinic; however she is not always fully available for the eye clinic. (The co-ordinator position could also fill this eye health nursing role).

f. **Establish public ophthalmology clinics at Dubbo, Bathurst, Orange, and Parkes.**

To address availability in these areas, public clinics could be established through the hospital, ACCHS, or through private –public partnerships with local ophthalmologists. Of these options, the public-private partnerships are likely to be the most cost-efficient, as these towns already have established and equipped private ophthalmology clinics. In Dubbo, a number of key stakeholders are open to exploring opportunities related to establishing a public eye clinic for Aboriginal people, and have considered the following issues:

- As a newly established clinic for Aboriginal people, the clinic may be eligible for MSOAP funding, which would cover costs of visiting staff and specialists .
- An existing private ophthalmology clinic could be available for the service, however additional equipment may be required, and negotiations to ensure that the costs of the clinic were cost neutral for the practice would be required .
- The clinic could possibly be established as an integrated service with optometry and ophthalmology services, however all optometrists in Dubbo would need to have equal opportunity to be involved.
- The OES could assist in the co-ordination of the clinic, and provide an eye health nurse or orthoptist for assisting at the clinic. The OES also can provide links to available ophthalmologists to staff the clinic.
- The REHC from Wellington could assist in the co-ordination, liaison, and implementation of the clinic, to ensure the clinic is appropriate, available, and accessible for Aboriginal people.
- The Aboriginal health workforce of Greater Western AHS could also be involved in running the clinic, to assist in liaison and co-ordination for Aboriginal people.
- Strong links with primary health care services in Narromine, Wellington, and Gilgandra should be established to ensure the clinic was equally accessible to Aboriginal residents from these locations who would feed into the clinic.

**g. Establish outreach secondary ophthalmology services in Coonamble, Condobolin, Cowra, Coonabarabran, and Mudgee.**

Establish outreach ophthalmology clinics for the towns of Coonamble, Condobolin, Cowra, Coonabarabran, and Mudgee. Establishing clinics in the model of the OES, or considering alternative solution such as an eye health services outreach bus, could be considered as possible options, both of which would require considerable funds in establishing and maintaining the services.

## 6.3 Tertiary Eye Health Services

### Summary of Findings

- Tertiary ophthalmology services are available in eight locations in Greater Western AHS

- Tertiary services are demand driven, and the supply of surgery by Greater Western AHS responds to fluctuations in demand, to ensure all people access surgery within the 12 month waiting list benchmark.
- While tertiary services are available and affordable, they are underutilised by Aboriginal people in the region, which is related to the limited availability of accessible secondary services in some areas.

## Arising Issues

Transport, distance, and cost are significant barriers to Aboriginal people in accessing eye health services [28], so it is important to maintain affordable tertiary services closer to where Aboriginal people live. Transferring to large towns or cities for surgical services can be challenging and overwhelming for Aboriginal people.[33] The current geographical distribution and availability of tertiary services appears to be appropriate, and do not appear to require expansion. It is important to maintain the availability of ophthalmology surgical services in the current locations, and most particularly the services in Bourke and Broken Hill, which enhance the accessibility of surgical services for more remote Aboriginal people in those areas.

## Recommendations

**3. Maintain availability of tertiary ophthalmology services in current locations, and plan for increased demand.**

**a. Maintain the availability of tertiary eye health services in existing locations.**

Tertiary eye health services are available in appropriate locations in the GWAHS region, and are supplied according to demand within waiting list benchmarks. It is recommended to maintain the availability of surgery in all these locations.

**b. Plan for an increased demand for tertiary eye health services should the availability of secondary eye health services be improved**

If the availability of secondary eye health services is improved, then an increased demand for tertiary ophthalmology services should be expected and planned for. This has been demonstrated by the development of outreach services in Cobar by the OES, which has resulted in an increased demand for surgery at Bourke.

## 6.4 Co-ordination and Collaboration

### Summary of Findings

- There is no comprehensive service delivery plan for eye health services in the Greater Western AHS.
- The key service providers implement eye health services in the region from their organisational base.
- Some co-ordination between providers exists for collaborative service delivery, particularly between OES and Greater Western AHS, ACCHS and ICEE, and ACCHS and OES.
- There is no regional co-ordination of eye health services in the Greater Western region, or a structure which encourages comprehensive collaboration between all the service providers.

### Arising Issues

A strategic vision or plan for eye health services in the region is lacking, and eye health services co-ordination across the pathway is not planned for. Components of the pathway are delivered by various service providers, but planning and co-ordination of all eye health services and their providers does not occur.

Co-ordination and collaboration between key service providers is important in the delivery of eye health services, especially those for Aboriginal people.[19] Effective eye health service co-ordination requires co-ordination between optometrists and ophthalmologists, primary health care providers and visiting teams, and between secondary and tertiary service providers. There is currently limited co-ordination between eye health service providers in the Greater Western region.

Although the REHC have the title of regional eye health co-ordinators, in practice they function as Aboriginal Eye Health Co-ordinators, co-ordinating services for Aboriginal clients from the ACCHS base, focussing on delivering and linking primary and secondary eye health services, and referring to ophthalmology secondary and tertiary services as required. The issues related to limited co-ordination of eye health services at a regional level could be addressed by developing regional eye health service co-ordinator positions, which take a broad overview of eye health services development, co-ordination and implementation.

Through speaking with key service providers, it became evident that a number of opportunities exist that could be realised through improved collaboration. Firstly, collaboration between key service providers (GWAHS, ACCHS, OES, and ICEE) could result in the implementation of retinal photography screening in the region. Secondly, a similar collaboration (between GWAHS, ACCHS, OES, and private ophthalmologists) could see the development of public-private partnerships in key locations (Dubbo in particular) to establish public ophthalmology clinics for Aboriginal people. Key stakeholders are willing to co-ordinate and are committed to improving eye health services, but structured opportunities for co-ordination and collaboration are currently limited. An eye health services partnership or working group committee could create a forum whereby such opportunities could be explored and developed.

The lack of formal agreements between some key service providers can create ambiguity in relation to the working relationship and partnership. This is particularly the case between the OES and the Greater Western AHS, and it is recommended that a formal working agreement is developed.

## Recommendations

**4. Improve the co-ordination and collaboration of eye health services and eye care stakeholders in the region**

**a. Develop an eye health services strategic plan or service delivery plan for the Greater Western AHS.**

An eye health services strategic plan or service delivery plan is required for the region, and should be developed for eye health services in general, while maintaining a specific focus on ensuring the services are available, accessible and appropriate for Aboriginal people. Recruiting a consultant who specialises in eye health services to develop this strategy could ensure that it is developed in a timely fashion, as it is not immediately clear who within Greater Western AHS has the expertise or time available to develop such a strategy.

**b. Establish eye health co-ordinator positions in Broken Hill and Dubbo.**

These positions would be responsible for:

- Establishing links with all primary health care providers in the Greater Western region to improve promotion, screening, and referral of eye health disease at the primary health care level.

- Facilitating the development of outreach or regional based secondary eye clinics in key locations, or maintaining current clinics, to ensure efficient and effective services
- Case managing ophthalmology surgery in the region, particularly for Aboriginal people.
- Focus on improving access to eye health services for Aboriginal people in the region.
- Facilitate an Eye Health Services Co-ordination Group

  The appropriate placement of these positions within the health reform restructuring would need to considered.

c. **Establish an eye health service providers working group or partnership committee**

   Establish an eye health service providers working group or committee where key players (public, private, NGO) gather to discuss and address key issues, with the aim to improve eye health service delivery in the region, particularly for Aboriginal people.

d. **Develop partnership or working agreements between key service providers in the region.**

   In particular, a working agreement between Greater Western AHS and the OES would clarify the nature of their working partnership. Furthermore, an agreement between all key service providers in developing a strategy to improve eye health services for Aboriginal people in the region could improve collaboration through the process of developing and implementing the strategy.

## 6.5 Cultural Competence

### Summary of Findings

- The ACCHS are actively involved in delivering primary eye health services and secondary eye health services in partnership with ICEE and OES, and this brings culturally competent eye health services to Aboriginal people in the Greater Western region.
- The Aboriginal health workforce of the Greater Western AHS are not routinely involved in eye health services at the primary level, or in liaising to support Aboriginal people access secondary and tertiary services as appropriate. There are notable exceptions in some locations which greatly enhances the cultural competence of eye health services delivered.

- The key service providers have made some achievements in improving the cultural competence of their services, particularly the OES, however this is not overtly the case at the private ophthalmology level.

## Arising Issues

Services need to be available for Aboriginal people but also need to be appropriate, and culturally competent services are likely to have more uptake and access by Aboriginal people, and better impact on health. A culturally competent health care system is one that "acknowledges and incorporates the importance of culture, assessment of cross cultural relations, vigilance towards the dynamics that result from cultural differences, expansion of cultural knowledge, and adaptation of services to meet culturally unique needs".[31]

In relation to eye health services available in the Greater Western region, the services delivered through the ACCHS, or in partnership with the ACCHS, are likely to be the most culturally competent services delivered. The OES works in close partnership with both the ACCHS and the Greater Western AHS Aboriginal workforce in delivering outreach eye clinics and surgery, which enhances the cultural competence of this service, and increases uptake of service, however the figures for the OES show a decreasing uptake by Aboriginal people proportionally, and the OES should consider why this pattern is emerging.

Eye health services delivered through Greater Western AHS have not particularly addressed the cultural competence to any greater degree than other Greater Western AHS mainstream services, and the Greater Western AHS Aboriginal workforce do not appear to be overly involved in supporting Aboriginal people through the eye health pathway. Private ophthalmology clinics do not appear to have actively addressed cultural competence issues within their services, other than the few clinics who have agreed to bulk bill referrals from the ACCHS. Actively considering and improving the cultural competence of eye health services within the Greater Western region could increase the uptake for Aboriginal people.

## Recommendation:

5. **Improve the cultural competence of eye health service delivery in the region**
   A number of strategies could improve cultural competence of services, as recommended by Hayman et al (2009) [34] are:

a. **Engage Aboriginal staff in the delivery of eye health services where available.** This would include liaising with and engaging the Greater Western AHS Aboriginal health workforce, and working closely with the REHC and the ACCHS in delivery of services.

b. **Provide case management to Aboriginal people to assist them in negotiating the eye health services pathway**. This would include case managing access, particularly at the secondary and tertiary level, and addressing identified barriers to uptake of service for individual clients which may include transport, accommodation, associated costs, and fear.

c. **Develop culturally appropriate environments for delivering services.** This is particularly an issue for outreach clinics and the potential private – public partnership clinics that could be held in private ophthalmology clinics. Ideas include having culturally appropriate health posters or artefacts at the clinic, or streaming Aboriginal radio stations through the waiting room.

d. **Ensure all staff involved in eye health services delivery have completed cultural competency training.** This includes ophthalmologists and optometrists, eye health nurses and orthoptists, and administration staff including private practice receptionists.

e. **Develop a strategy for engaging and informing Aboriginal communities about services available**. This strategy through ACCHS, community groups, Aboriginal health workforce, land councils, local media, and any other appropriate forums.

f. **Promote inter-sectoral collaboration.** Improved co-ordination between ACCHS, Greater Western AHS, OES, ICEE and private practitioners would enable them to work together to improve accessibility to eye health services for Aboriginal people.

## 6.6 Monitoring and Evaluation

### Summary of Findings

- Key eye health service providers monitor their services using different monitoring and evaluation tools, and varied reporting strategies.
- The data available cannot be combined to give an accurate picture of primary and secondary eye health services across the region, due to variations in data collated.

- There are no systems in place to monitor and evaluate eye health services delivery for primary or secondary level services across the region.
- Tertiary level data is available from Greater Western AHS, which is routinely monitored to ensure waiting list benchmarks for surgery are being met, but is not routinely analysed to ensure demand and supply is equitable.

## Arising Issues

The lack of a routine data collection system for primary and secondary eye health services in the region renders it difficult to "measure, monitor, and report on our joint efforts, in accordance with benchmarks and targets, to ensure that we are progressively realising our shared ambitions" [6], in keeping with the Close the Gap commitment. Under-reporting of Aboriginal people in the service providers' data collections may also be contributing to poor monitoring and evaluation of eye health service delivery in the region. It is not possible to develop a clear picture of eye health service delivery to ensure that demand and supply is equitable under the current system.

## Recommendation:

**6. Develop a system to monitor and evaluate eye health services in the region, at all levels.**

**a. Develop a monitoring and evaluation system for eye health services.**

It is recommended that a system be developed whereby eye health services at the primary, secondary and tertiary level can be monitored and evaluated collaboratively by key service providers, to achieve a regional perspective of eye health service delivery and gaps in accessibility and uptake. The establishment of an eye health services co-ordinating group, and the development of eye health service co-ordinator roles in Dubbo and Broken Hill, could assist in the collaboration required to develop a shared eye health services minimum data set, and monitoring and evaluation system.

**b. Align a monitoring and evaluation system with a regional eye health services strategic plan.**

The strategic plan for eye health services (Recommendation 4a) should include how to develop the monitoring and evaluation system, and consider what elements should be

included in the system, how monitoring will occur, and who is responsible for managing the system.

## 6.7 Further Investigation

A number of aspects of eye health services in the Greater Western AHS region require further attention and investigation following this review, in order to develop an appropriate plan for eye health service delivery in the region. These are:

**1. Primary health care**

A full review of eye health services at the primary health care level would be recommended to inform the development of a regional strategic plan for eye health service delivery and co-ordination. In particular, the degree to which eye health is incorporated into chronic care management plans, particularly for diabetes, should be reviewed.

**2. Trachoma**

This review did not focus specifically on issues related to trachoma. The National Indigenous Eye Health Survey [3] identified active trachoma in NSW, however the current prevalence of trachoma in NSW is unclear.[35] Further work is required to determine the best surveillance methods for detecting and managing this disease, in keeping with a global commitment to the elimination of trachoma by 2020.

# 7. RECOMMENDATIONS- Summary

**1. Enhance eye health screening, referral, co-ordination and promotion at the primary health care level.**

a. Deliver eye health promotion and education regarding prevention and management of eye disease to Aboriginal communities within the region.

b. Encourage and develop strategies that enhance the inclusion of eye health screening and referral at the primary health care level

c. Incorporate management of eye health into current chronic care management strategies where possible, particularly those for diabetes.

d. Incorporate retinal photography screening for diabetic retinopathy into primary health care facilities

**2. Improve and further develop secondary eye health services in the region.**

a. The ACCHS / ICEE continue to deliver outreach optometry services in current locations, and increase frequency and reliability of service where possible.

b. Develop outreach optometry services for Aboriginal people in the Broken Hill region.

c. The OES continues to deliver outreach ophthalmology services in the current locations, always seeking to increase accessibility for Aboriginal people to their services, and possibilities for expansion to new locations as explored.

d. The REHC in Wellington and Walgett are continued to be supported in delivering outreach optometry services, and the positions in Bourke and Broken Hill are reviewed to ensure maximum efficiency and effectiveness.

e. The service model and efficiency of the public ophthalmology clinic at Broken Hill Base Hospital is reviewed and strategies to improve the efficiency of the service (to decrease the waiting list) are implemented.

f. Establish public ophthalmology clinics at Dubbo, Bathurst, Orange, and Parkes.

g. Establish outreach secondary ophthalmology services in Coonamble, Condobolin, Cowra, Coonabarabran, and Mudgee.

**3. Maintain availability of tertiary ophthalmology services in current locations, and plan for increased demand.**

a. Maintain the availability of tertiary eye health services in existing locations.

b. Plan for an increased demand for tertiary eye health services should the availability of secondary eye health services be improved

**4. Improve the co-ordination and collaboration of eye health services and eye care stakeholders in the region.**

a. Develop an eye health services strategic plan or service delivery plan for the Greater Western AHS.

b. Establish eye health co-ordinator positions in Broken Hill and Dubbo.

c. Establish an eye health service providers working group or partnership committee

d. Develop partnership or working agreements between key service providers in the region.

**5. Improve the cultural competence of eye health service delivery in the region.**

a. Engage Aboriginal staff in the delivery of eye health services where available.

b. Provide case management to Aboriginal people to assist them in negotiating the eye health services pathway.

c. Develop culturally appropriate environments for delivering services.

d. Ensure all staff involved in eye health services delivery have participated in cultural competency training.

e. Develop a strategy for engaging and informing Aboriginal communities about services available.

f. Promote inter-sectoral collaboration.

**6. Develop a system to monitor and evaluate eye health services in the region, at all levels.**

a. Develop a monitoring and evaluation system.

b. Align a monitoring and evaluation system with a regional eye health services strategic plan.

# 8. REFERENCES

[1] Australian Institute of Health and Welfare (2010). Eye Health Overview. Downloaded from www.aihw.gov.au/eyehealth/overview.cfm on 13/05/2010.

[2]Taylor HR, Keeffe JE, Mitchell P (2004). Clear Insight: The Economic Impact and Cost of Vision Loss in Australia. Melbourne: Eye Research Australia.

[3] University of Melbourne and the Centre for Eye Research Australia (2009). National Indigenous Eye Health Survey. Minum Barreng (Tracking Eyes). Full Report.

[4] The Centre for Epidemiology and Research (2011) Health Statistics New South Wales. Sydney: NSW Ministry of Health. www.healthstats.doh.nsw.gov.au. Accessed 17/11/2011.

[5] Greater Western Area Health Service (2010). Greater Western Area Health Service. Downloaded from www.gwahs.gov.au on 30/05/2012.

[6] Close the Gap (2008). Statement of Intent. Downloaded on 30/05/2012 from http://www.hreoc.gov.au/Social_Justice/health/statement_intent.pdf

[7] Centre for Epidemiology and Research 92011). ABS Population Estimates (HOIST). Sydney: NSW Ministry of Health.

[8] NSW Health (2010). The health of the people of NSW – Report of the Chief Health Officer. Sydney: NSW Department of Health. Available at: www.health.nsw.gov.au/publichealth/chorep/. Accessed 13/05/2010.

[9] Access Economics (2010). Clear Focus: The Economic Impact of Vision Loss in 2009.Melbourne: Access Economics.

[10] Australian Institute of Health and Welfare (2005). Vision problems among older Australians. Canberra: Australian Institute of Health and Welfare

[11] Taylor HR (2003). Eyecare for the Future: The Weisenfeld Lecture". *Investigative Ophthalmology and Visual Science.* 44: 1413-1418.

[12] University of Melbourne and the Centre for Eye Research Australia (2009). National Indigenous Eye Health Survey. Minum Barreng (Tracking Eyes). Summary report. Melbourne: University of Melbourne.

[13] Commonwealth of Australia (2005). Eye Health in Australia- a Background Paper to the National Framework for Action to Promote Eye Health and Prevent Avoidable Blindness and Vision Loss. Cenberra: Department of Health and Aging.

[14] Spurling GK, Askew DA, Hayman NE, Hansar N, Cooney AM, and Jackson CL. (2010). Retinal photography for diabetic retinopathy screening in Indigenous primary health care: the Inala experience. *Australian and New Zealand Journal of Public Health.* 34 (S1): S30-S33.

[15] Hayman NE, White NE, Spurling GK (2009). Improving Indigenous patients' access to mainstream health services: the Inala experience. *Medical Journal of Australia.* 190 (10): 604-606.

[16] Smith W, Mitchell P, Leeder SR (1996) Smoking and age related maculopathy. *Archives Ophthalmology.* 114: 1518-23.

[17] Tomany S, Wang J, Van Leeuwen R, Klein R, Mitchell P, Vingerling JR, Klein BE, Smith W, and De Jong PR (2004). Risk factors for incident age-related macular degeneration: pooled findings from 3 continents. O*phthalmology*, 111(7): 1280-7.

[18] Wright H, Turner A, and Taylor H (2008). Trachoma. *Lancet.* 371: 1945-54.

[19] Taylor HR, Fox SS, Xie J, Dunn RA, Arbold AMR, Keefe JE (2010). The prevalence of trachoma in Australia: the National indigenous Eye Health Survey. *Medical Journal of Australia.* 192(5):248-53

[20]Department of Health and Aging (2005). National Framework for Action to Promote Eye Health and Prevent Avoidable Blindness and Vision Loss: Progress Report to the Australian Health Ministers Conference. Canberra: Department of Health and Aging.

[21] University of Melbourne (2010). Provision of Indigenous Eye Health Services. Melbourne: University of Melbourne.

[22] Taylor V, Ewald D, Liddle H, and Warchivker I (2003). Review of the Implementation of the National Aboriginal and Torres Strait Islander Health Program. Canberra: Centre for Remote Health.

[23] Siggins Miller (2010). An options paper on the current and future role of the Regional Eye Health Coordinator. A Report to the Department of Health and Ageing. Brisbane: Siggins Miller.

[24] Department of Aging, Disability and Homecare (2010). NSW Government Spectacle Program. Accessed 30/05/2010 from http://www.dadhc.nsw.gov.au/dadhc/Older+People/Older+People+Concessions.htm

[25] Vision Care (2010). NSW Government Spectacle Scheme. Accessed 30/05/2010. www.visioncarensw.com.au

[26] Department of Health and Aging (2010> Medical Specialist Outreach Program. Downloaded on 30/06/2010 from www.health.gov.au/internet/main/publishing.nsf/Content/ruralhealth-services-msoap

[27] Department of Health and Aging (2009). Visiting Optometrist Scheme. Guidelines for Participating Optometrists. Downloaded 30/06/2010. http://www.health.gov.au/internet/main/publishing.nsf/content/ruralhealth-vos

[28] Gruen RL, Weeramanthri TS, Knight SS, Bailie RS. (2003). Specialist outreach clinics in primary care and rural hospital settings. *Cochrane Database of Systematic Reviews.* Issue 4. Art. No.: CD003798. DOI: 10.1002/14651858.CD003798.pub2.

[29] The University of Melbourne (2009). Outreach Eye Services in Australia. Melbourne: University of Melbourne.

[30] University of Melbourne (2010). Access to eye health services among Indigenous Australians. Melbourne: University of Melbourne.

[31] Betancourt JR, Green AR, Carrillo JE, and Ananeh-Firempong II O (2003). Defining cultural competence: a practical framework for addressing racial / ethnic disparities in health and health care. *Public Health Reports.* 118: 293-302.

[32] Gruen RL, Weeramanthri TS, Bailie RS (2002). Outreach and improved access to specialist services for indigenous people in remote Australia: the requirements for sustainability.*Journal of Epidemiology and Community Health.* 56:517-521. Doi:10.1136/jech.56.7.517

[33] Stamp G, Miller D, Coleman H, Milera A, and Taylor J. ( 2006). 'They get a bit funny about going' – transfer issues for rural and remote Australian Aboriginal people. *Rural and Renote Health,* 6: 536

[34] Hayman NE, White NE, Spurling GK (2009). Improving Indigenous patients' access to mainstream health services: the Inala experience. *Medical Journal of Australia.* 190 (10): 604-606.

[35] Maher L, Taylor HR, and Barton J (2010). Bug Breakfast in the Bulletin- Trachoma. In press.

# APPENDIX 1: Terms of Reference

## Terms of Reference: The Review of Eye Health Services for Aboriginal people within the Greater Western Area Health Service Region

### Project Description and Background

The Review of Eye Health Services within the Greater Western Area Health Service Region (the Review) has been instigated by the NSW Department of Health after consideration of the National Indigenous Eye Health Survey 2009 and the Evaluation of the Outback Eye Service (final report 15 May 2007) to describe existing availability and accessibility of eye health services for Aboriginal people within the Greater Western Area Health Service region (Greater Western region).

The Review is intended to inform policy and services for Aboriginal eye health in the Greater Western region. Access to, and utilisation of, screening and treatment services will be addressed in the Review. A limited review of epidemiology will also be conducted. Determination of prevalence of eye disease beyond this is not part of this Review.

The Review for which these Terms of Reference have been developed is anticipated to be carried out over a seven month period, and may form the basis for further investigation of the issues identified.

### Review Team and Governance Structure

The *Sydney University School of Rural Health* (the School) has been engaged by the NSW Department of Health to undertake the Review. Associate Professor Tony Brown will lead the Review and be assisted by a NSW Health Public Health Officer Trainee (PHOT). Associate Professor Brown, the PHOT and other members of the School appointed by Associate Professor Tony Brown in consultation with the Manager, *Evaluation Monitoring and Reporting* (EMR), *Centre for Aboriginal Health* (CAH) constitute the Review Team and will be responsible for the day-to-day running of the project. The Review Team will develop a project plan which will include a project timeline, key deliverables/schedule of short-term action items, details of personnel to be used, resource commitments/needs and stakeholder identification, and evaluation methodology.

The Review Team will also be required to report to the Manager, EMR, against milestones, short-term action items and key deliverables.
A Project Reference Group (PRG) will be established to guide the review process and act as an advisory committee to the School. The PRG will also be responsible for making any necessary amendments to the project terms of reference in consultation with Associate Professor Tony Brown. The PRG is anticipated to include two representatives from the CAH and one representative from Greater Western AHS. The meetings should be chaired by a senior representative from the CAH and should occur every two months.

Reports will be circulated to the PRG by the Manager, EMR. Reporting should be identified in the planning process.

**Project Objectives**

| Objective | Details |
|---|---|
| Map existing eye health services/ programs | This may include description of:<br>• all eye health service providers servicing the area including private practitioners/services, Area Health Services, outreach programs, Aboriginal Community Controlled Health Services<br>• services provided by each organisation including preventative, screening, and treatment services. |
| Collect and analyse data on existing eye health services | This may include the collection and analysis of the following:<br>• quantitative data on the amount of preventative, screening and treatment service provision to Aboriginal people or in general where more specific data is unavailable<br>• catchment areas for services<br>• waiting times<br>• nearest referral for necessary services not provided by the service, who do they refer to, travel distances/times, availability of assisted transport<br>• qualitative data as to why certain services are not provided by particular services<br>• qualitative data as to whether supply is adequate to satisfy demand<br>• any additional value-added qualitative information |
| Estimate accessibility of eye health services to Aboriginal communities | This may include the collection and analysis of the following:<br>• data on eye health workforce/ Aboriginal eye health workforce including local optometrists, ophthalmologists, nurses and support staff able to assist in eye-health procedures<br>• opportunities for local staff development in the area of eye health<br>• data on service utilisation by Aboriginal people and cultural appropriateness (community consultation is not appropriate for this Review) |
| Describe gaps in access to services | This may include the collection and analysis of the following:<br>• data from stakeholders on gaps in access and anomalies in service provision<br>• collation and analysis of information collected |
| Make recommendations for improving access to, and coordination of, services | This may include the identification of:<br>• opportunities to improve services and outcomes<br>• areas of good service delivery and factors contributing to success<br>• areas of service delivery requiring improvement<br>• means to reduce or eliminate gaps in access<br>• barriers to performance improvement<br>• recommendations in relation to service provision<br>• recommendations for further review and evaluation of services |

**Key Deliverables**

Key deliverables are:

- a detailed project plan, including proposed methodology and timelines for action
- regular reporting to the PRG
- completed Aboriginal Health Impact Statement
- final report and presentation of recommendations from final report

# APPENDIX 2: List of People Consulted

| | |
|---|---|
| Greater Western AHS | Ms Lynne Weir, Director of Clinical Services<br>Ms Lou-Anne Blunden, Director Population Health, Policy and Planning<br>Ms Linda Williams, Manager Aboriginal Health<br>Ms Anne Lea, Population Health, Planning and Performance<br>Ms Michelle Davies, Population Health, Planning and Performance<br>Dr Therese Jones, Manager Population Health<br>Ms Deborah Davis, Manager StEPS Program<br>Aboriginal Management Team |
| Local Health Services | Ms Sally Torr, Bourke HSM<br>Matthew Crawford, Diabetes Education Co-ordinator<br>Andrew Carroll, Aboriginal Health Worker, Walgett<br>Beth Mills, HSM Lightning Ridge<br>Zoe Rose, manager Community health, Lightning Ridge<br>Maryanne Webb, Admin Co-ordinator, Lightning Ridge.<br>Mr Rod Wyber Hughes, GM Western Cluster<br>Dr Louis Christie, Director Medical Services, Orange.<br>Mr Alby Ryan, Aboriginal Health Worker, Orange |
| Outback Eye Service | Ms Joanna Barton, Manager<br>Ms Elyssa Brennan, Clinical Co-ordinator<br>Mr Kyriacos Mavrolefteros, Optomoetrist<br>Ms Lee Kennedy, Orthoptist |
| ACCHS / AMS | Ms Judy Johnson, CEO, Bourke AMS<br>Ms Christine Corby, CEO, Walgett AMS<br>Ms Cathy Dyer, Manager Primary Health Programs, Maari Ma Broken Hill.<br>Ms Margaret Ann Cook, Health Service Manager, Maari Ma, Broken Hill.<br>Ms Angie Priest, Clinical Programs Manager, Orange AMS<br>Ms Phyllis Tighe, REHC, Walgett AMS<br>Ms Pauline Wicks, REHC, Wellington Aboriginal Corporation Health Service<br>Mr Bruce Turner, Visiting Optometrist, Walgett |
| International Centre for Eyecare Education | Professor Brian Layland, Director of Aboriginal Eye Care Programs, ICEE<br>Ms Trisha Keys, Program Manager, Asia Pacific, ICEE<br>Ms Colina Waddell, Project Development Officer Aboriginal Vision, ICEE |
| Ophthalmologists | Dr Chris Brown, OES<br>Dr Richard Rawson, OES and RFDS<br>Dr Alan Bank, Dubbo<br>Dr Tom Atkins, Dubbo<br>Dr Ashish Agar, Dubbo and Cobar<br>Dr Glen Fernando, Bathurst<br>Dr KC Tang, Orange<br>Dr Basil Crayford, Orange<br>Dr Kwan Tang, Broken Hill |
| GP Division | Dr Stuart Gordon, CEO, NSW Outback Division of General Practice |
| RFDS | Mr Mike Hill, Senior Medical Officer, RFDS Broken Hill |

# APPENDIX 3: Aboriginal Health Impact Statement Declaration

## Aboriginal Health Impact Statement Declaration

An Aboriginal Health Impact Statement Declaration (and a completed Checklist where necessary) will accompany new policies and proposals for major health strategies and programs submitted for Executive or Ministerial approval. This will ensure that the health needs and interests of Aboriginal people have been considered, and where relevant, appropriately incorporated into health policies.

### THE ABORIGINAL HEALTH IMPACT STATEMENT DECLARATION

**Title of the policy/initiative:** Review of Eye Health Services for Aboriginal People in the GWAHS Region

Please complete the Declaration below and the Checklist **if required**.

**Please tick relevant boxes:**

- [x] The health* needs and interests of Aboriginal people have been considered, and appropriately addressed in the development of this initiative.
- [x] Appropriate engagement and collaboration with Aboriginal people has occurred in the development and implementation of this initiative.
- [x] Completed Checklist attached.

**OR**

- [ ] The health* needs and interests of Aboriginal people have been considered, in the development of this initiative.
- [ ] The Aboriginal Health Impact Statement Checklist does not require completion because there is no direct or indirect impact on Aboriginal people. (Please provide explanation.)

Head of Unit Name and Title: Sian Rudge, A/Manager

Unit Name: Evaluation Monitoring and Reporting

Area Health Service/NSW Health Branch: Centre for Aboriginal Health

Signature: Sian Rudge Date: 10 / 11 / 10

Contact phone no: 02 9391 9950 Email address: sian.rudge@doh.health.nsw.gov.au

*For Aboriginal people, health is defined as not just the physical well-being of the individual but the social, emotional and cultural well-being of the whole community.

NSW Health | Aboriginal Health Impact Statement Declaration

# Chapter Three: Part B:

# Publication: "Eye Health Services for Aboriginal people in the western region of NSW, 2010"

## Eye health services for Aboriginal people in western NSW, 2010

Maher L, Torvaldsen S, Dawson AJ, Patterson JA, Lawrence G, and Brown AM.

New South Wales Public Health Bulletin. 2012. 23(4): 81-86

**ABSTRACT**:

**Aim:** To assess the availability, accessibility and uptake of eye health services for Aboriginal people in western NSW in 2010.

**Methods:** Document review, observational visits, key stakeholder consultation and service data reviews including number of cataract operations performed were used to determine regional service availability and use.

**Results:** Aboriginal people in western NSW have a lower uptake of tertiary eye health services, with cataract surgery rates of 1750 per million for Aboriginal people and 9702 per million for non-Aboriginal people. Public ophthalmology clinics increase access to tertiary services for Aboriginal people.

**Conclusion:** Eye health services are not equally available and accessible for Aboriginal people in western NSW. Increasing the availability of culturally competent public ophthalmology clinics may increase access to tertiary ophthalmology services for Aboriginal people.

### INTRODUCTION:

Aboriginal people experience a higher burden of eye disease than the general population in Australia. The National Indigenous Eye Health Survey found the rates of blindness in Aboriginal and Torres Strait Islander adults to be 1.9% which is 6.2 times the rate for non-Aboriginal Australian adults, and low vision prevalence to be 9.4%, 2.8 times the rate for non-Aboriginal Australian adults.[1] The major causes of blindness in Aboriginal people are cataract, optic atrophy, refractive error, diabetes and trachoma. [1] Although 94% of vision loss in Aboriginal people is preventable or treatable, 35% of adults have never had an eye examination.[1]

Eye health services at the primary health-care level involve health promotion, screening, treatment of minor problems and referral to eye health professionals. Secondary eye health services are delivered by optometrists and ophthalmologists and include diagnosis and

treatment of major eye problems, excluding surgery. Tertiary eye health services are delivered by ophthalmologists and involve surgical interventions in the hospital setting.

The western region of New South Wales (NSW) comprises two Local Health Districts, Western NSW and Far West, and has the highest proportion of Aboriginal residents in the state (8.9%; 26 797 people).[2] Aboriginal people in the region are significantly disadvantaged over a range of social and economic indicators including unemployment, household income and educational attainment.[3]

NSW Health commissioned a review of eye health services for Aboriginal people in western NSW in 2010.[4] The aims of the review were to describe and map existing eye health services, to estimate the accessibility of eye health services for Aboriginal people and to make recommendations for improving access to services. A mixed methods approach was used to capture regional service utilisation data, as well as the perspectives and experiences of key service providers.

**METHODS:**

**Data collection:** Relevant peer-reviewed and grey literature was analysed to determine the epidemiology of eye health, national and state frameworks for eye health service issues and information related to eye health service providers. Non participant observation was undertaken in six eye clinics. Forty-three key eye health service providers, including program coordinators, optometrists, ophthalmologists and health services managers, were interviewed using standard questions and asked to provide information on services provided.

Cataract surgery rates were used as an indicator of access and uptake of eye health services, as people who have received cataract surgery must have successfully navigated the eye health-care pathway at the primary, secondary and tertiary level. The number of cataract operations received by residents of western NSW for the period July 2007 - June 2010 was identified from the NSW Health Admitted Patient Data Collection. The International Classification of Diseases procedure code blocks 195-200 were used to identify a cataract procedure. Cataract surgery data were disaggregated for Aboriginal and non-Aboriginal people, and also by Local Health District.

**Data analysis:** Cataract surgery rates (the number of cataract operations per million population per year) were calculated for Aboriginal and non-Aboriginal people in the region, using population data from Australian Bureau of Statistics residential population estimates for each year.[2] Crude cataract surgery rates are reported, as the routine method for measuring and reporting cataract surgery coverage in published literature. [5] The number of additional cataract surgeries required for Aboriginal people each year in order for the cataract surgery rates for Aboriginal people to equal the cataract surgery rates for non-Aboriginal people within each Local Health District was also calculated.

Cataract surgery rates were also calculated for three sub-populations in the region: the five local government areas where public ophthalmology clinics are available; the seven local government areas where private ophthalmology clinics are available; and the ten local government areas where no ophthalmology clinics are available. The difference of proportions for cataract surgery rates for these three sub-populations was calculated with a chi-square test using SAS statistical software.

The information retrieved through the document review was synthesised and a thematic analysis was undertaken of the service provider interviews and observations collected during the clinic visits. These were examined according to predetermined themes concerning service availability, accessibility, coordination and uptake in the region.

As a routine review of services within NSW Health, using existing and non-identifiable data, this project did not require review by a Human Research Ethics Committee.

**RESULTS:**

**Availability and mapping of eye health services:** An overview of the services, locations and throughput for these service providers is outlined in Table 1.

*Outreach eye clinics:* The Outback Eye Service conducts integrated outreach eye services in seven locations in the region, delivering public eye clinics with optometry and ophthalmology. The Service also conducts eye surgery in Bourke four times a year, with case coordination and local post-operative follow-up.

*Optometry:* Aboriginal Community Controlled Health Services (ACCHS), together with the International Centre for Eye Care Education, provide outreach optometry clinics in 36 locations across the region, held in local Aboriginal facilities. Regional Eye Health Coordinators based in the ACCHS in Wellington and Walgett manage these clinics and provide case coordination, with optometrists sourced from the region and coordinated by the International Centre for Eye Care Education. Optometry in private clinics is also available across the region, where services are predominantly bulk billed under Medicare, and glasses can be accessed for free through the NSW Government Spectacle Program.

*Ophthalmology:* Ophthalmology clinics are run by the Outback Eye Service as described above. Broken Hill base hospital provides a regular public ophthalmology clinic. The Royal Flying Doctor Service conducts an annual ophthalmology outreach clinic in four locations. Ophthalmologists run private clinics in eight locations in the region, all in larger towns in the south east, and some will bulk bill clients on request. The availability of ophthalmology services is shown in Figure 1. Some areas with large numbers of Aboriginal people have no ophthalmology clinics available, or only have private clinics where clients would mostly incur an up-front cost for the service.

*Surgery:* Public ophthalmology surgery is available at seven hospitals in the region.

**Access to services:** There are limited data available on the use of eye health services for Aboriginal people at the primary and secondary level. At the tertiary level, the cataract surgery rate in western NSW for 2007-2010 was 1750 per million population for Aboriginal people and 9702 per million population for non-Aboriginal people. The cataract surgery rate for Aboriginal people in the Far West Local Health District was 2338 per million population, and 1673 per million population in Western NSW Local Health District (Figure 2).

For 2007 -2010, an average of 39 Aboriginal people received cataract surgery annually in Western NSW Local Health District. An additional 197 cataract operations for Aboriginal people would have been required annually on average in this period for the Aboriginal cataract surgery rate to equal the non-Aboriginal rate. In Far West Local Health District seven Aboriginal people received cataract surgery annually on average for the 2007-2010 period, and an additional 10 surgeries would have been required annually to close the gap in cataract surgery rates (Table 1). For Aboriginal residents of Western NSW, there is a relationship between the availability of

a public ophthalmology clinic in their local government area of residence and the rate of access to cataract surgery (Figure 3). There is a significant difference in the cataract surgery rate for Aboriginal people from local government areas with public ophthalmology clinics, compared to local government areas with no clinics or private ophthalmology clinics ($\chi^2$ test, $p < 0.001$).

**Coordination of services:** The key stakeholders interviewed reported that there is limited coordination between the key service providers in the region. In some locations there is strong cooperation between primary, secondary and tertiary providers to coordinate eye care services and the patient journey, however in other locations primary providers are unable to facilitate access to secondary and tertiary services. There is no regional coordination of eye health services, or a structure which facilitates collaboration between service providers. The Local Health Districts have no comprehensive eye health-service delivery plans in place.

**Monitoring and evaluation of services:** Key eye health-service providers monitor their services using different monitoring and evaluation tools and varied reporting strategies. The data available cannot be combined to give an accurate picture of primary and secondary eye health services across the region, due to variations in indicators and data collection systems, as demonstrated in Table 1. There are no systems in place to monitor and evaluate eye health-services delivery for primary or secondary level services across the region. Tertiary level data are available from the Local Health Districts and are routinely monitored to ensure waiting-list benchmarks for surgery are being met, but these data are not analysed to ensure services are equitable.

**Targeting services for Aboriginal people:** A culturally competent health-care system acknowledges and incorporates the importance of culture, and adapts services to meet culturally unique needs.[6] Of the services described, only those delivered by, or in partnership with, ACCHS are specifically tailored for Aboriginal people. The majority of eye health services available are mainstream services. The Outback Eye Service works in close partnership with the ACCHS and the Regional Eye Health Service Coordinators to improve access to the service for Aboriginal people, and 26% of their services are delivered to Aboriginal people. No other services specifically modify their services to improve cultural competence for Aboriginal people. Many key service providers identified lack of cultural competency, particularly in private secondary eye health-service providers, as a significant barrier to accessibility of services for Aboriginal people.

**DISCUSSION:**

This review provides an overview of eye health services in western NSW for Aboriginal people. The focus was on secondary and tertiary services, and therefore service delivery at the primary health care level was not considered in depth. The review was also limited by the quality and availability of routinely collected service delivery data.

There is differential access to secondary and tertiary eye health services between Aboriginal and non-Aboriginal people in western NSW. There appears to be three main barriers for Aboriginal people accessing secondary eye health services in the region: availability, affordability and cultural competency. In many areas in the region that have a high number of Aboriginal people, there are either no ophthalmology services available, or only private clinics. This review demonstrated a clear relationship between the availability of public ophthalmology clinics and the uptake of cataract surgery for Aboriginal people. The availability of private ophthalmology clinics in an area does not increase uptake of cataract surgery, perhaps because private clinics present cultural and financial barriers for Aboriginal people. The National Indigenous Eye Health Survey identified some of the barriers reported by Aboriginal people that limited access to eye care when there was an eye problem, with the main reasons related to cost, availability and accessibility of services, perceptions around the severity of problems, and people having other priorities.[7] These reported barriers are consistent with the findings of this review.

The review identified two other key issues affecting eye health-service delivery, which are limited coordination between the main eye health service providers and incomplete monitoring and evaluation of eye health services in the region. Improved coordination and collaboration between the eye health-service providers in the region could result in improved access to services and eye health for Aboriginal people. Coordinated and integrated eye health clinics improve efficiency of services for patients,[8] and one proposed solution involved the establishment of private-public partnerships between the Local Health District, private ophthalmologists, ACCHS, and the Outback Eye Service, whereby outreach eye clinics for Aboriginal people could be established in the private rooms of ophthalmologists. This is a potentially inexpensive initiative that could significantly improve access to and uptake of services for Aboriginal people at the secondary level. Additionally, improved monitoring and evaluation of services will allow information about service delivery and eye health outcomes to

be available, and highlight the current inequitable access and uptake of services for Aboriginal people.

The report prepared for the Ministry of Health [4] following this review process made a number of recommendations which are consistent with the recommendations in the road map for closing the gap in eye health for Aboriginal people developed by Taylor.[9] These recommendations were: to enhance primary eye care as part of primary health care; to increase the availability and accessibility of secondary eye health services in the region; to maintain the availability of tertiary services; to improve coordination of eye care services between key providers; to improve cultural competence of eye health services; and to ensure appropriate monitoring and evaluation of eye health services for Aboriginal people in the region.

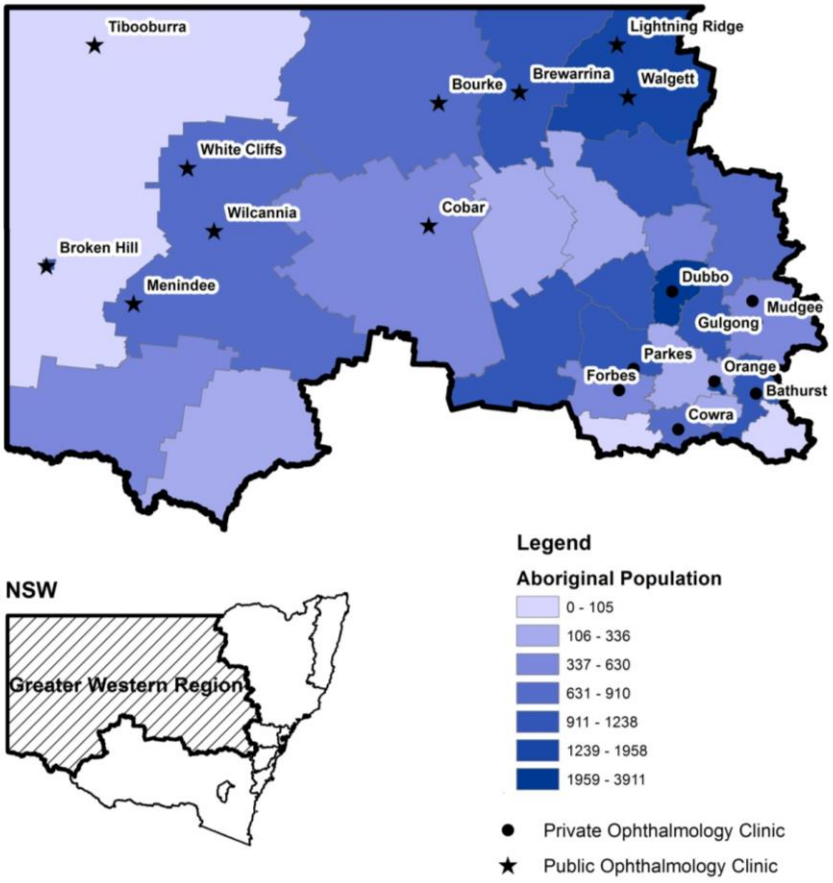
**CONCLUSION:**

Improved availability of affordable and culturally competent services, improved coordination between service providers, and improved monitoring and evaluation of eye health services are recommended to close the gap in eye health for Aboriginal people in western NSW.

**Table 1. Eye health-service providers in western NSW, 2010**

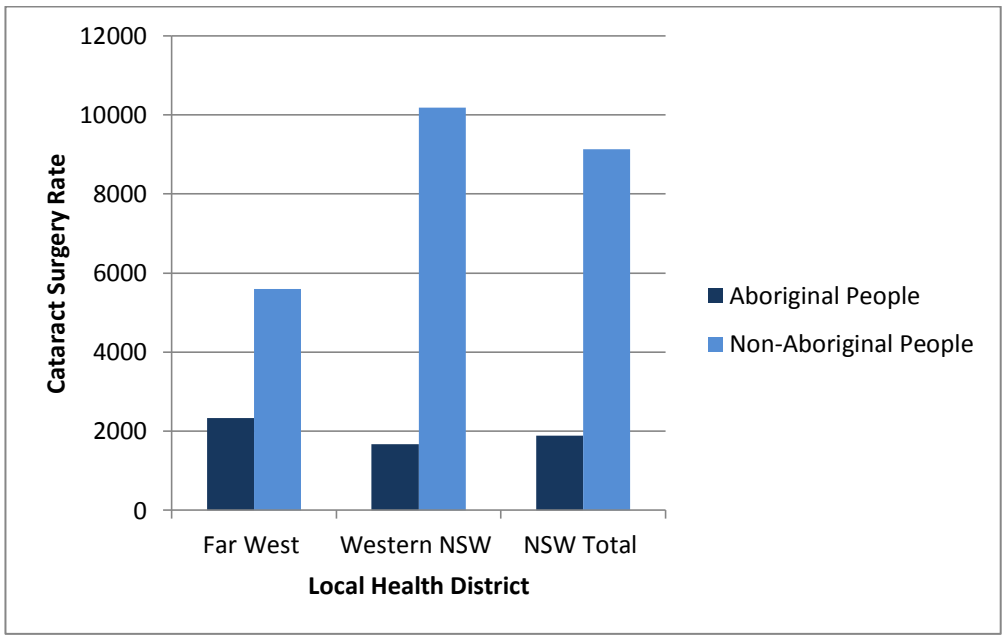
| Level of eye care services | Provider | Services | Annual throughput | Location and frequency |
|---|---|---|---|---|
| PRIMARY | Aboriginal Community Controlled Health Services; Community health centres; General practitioners; Royal Flying Doctor Service | Primary health care | Figures not available | All locations |
| SECONDARY | Aboriginal Community Controlled Health Services (with International Centre for Eyecare Education) | Outreach optometry clinics | 1138 spectacles delivered to clients (2009-10) | 36 outreach locations in the region (4-12 times / year) |
| | Far West Local Health District (Broken Hill Base Hospital) | Public ophthalmology clinic | Figures not available | Broken Hill Base Hospital (6 days / month) |
| | Outback Eye Service | Integrated outreach clinics (eye nurse, optometrist, ophthalmologist) | 1582 occasions of service total. 339 (21%) Aboriginal (2009) | Bourke Brewarrina Walgett Lightning Ridge Cobar (4 times /year) |
| | Maari Ma | Outreach eye clinics (ophthalmology registrar only) | (2008): 195 clients seen total 135 (69%) Aboriginal | Broken Hill Ivanhoe Menindee White Cliffs Wilcannia Tibooburra (1-6 times / year) |
| | | Integrated outreach clinics (eye nurse, optometrist, ophthalmologist) | (2009): 203 clients seen in total 111 (55%) Aboriginal | Wilcannia Menindee (Once per year) |
| | RFDS | Ophthalmology outreach clinics (ophthalmologist and optical dispenser) | 86 clients seen; (Aboriginal people not reported) (2010) | Menindee Tibooburra White Cliffs Ivanhoe (Once per year) |
| | Private optometrists | Optometry | Figures not available | 19 locations in the region |
| | Private ophthalmologists | Ophthalmology | Figures not available | Bathurst Dubbo Orange Forbes Mudgee Gulgong Parkes Cowra |
| TERTIARY | Western NSW Local Health District | Tertiary ophthalmology services | 2634 cataract operations; 40 (1.5%) Aboriginal (2009-10) | Bathurst Forbes Dubbo Orange Cowra Mudgee |
| | Outback Eye Service with Western NSW Local Health District | Tertiary ophthalmology services | 60 eye operations annually | Bourke |
| | Far West Local Health District | Tertiary ophthalmology services | 189 cataract operations 7 (4%) Aboriginal (2009-10) | Broken Hill |

**Figure 1: Ophthalmology service locations in western NSW**



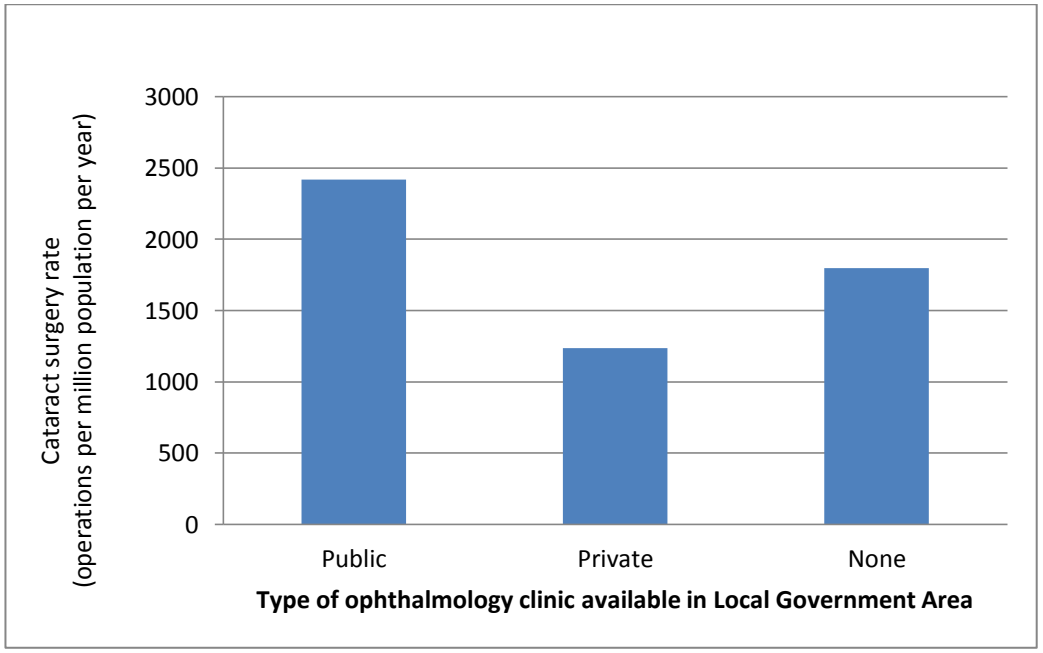

*Source: Maher L, Brown A. Eye health services for Aboriginal people. A review within the greater western region of NSW. Sydney: NSW Ministry of Health; 2011.*

**Figure 2: Cataract surgery rate per million population per year in western NSW and all NSW 2007-2010**




*Source: Maher L, Brown A. Eye Health Services for Aboriginal People. A Review within the Greater Western Region of NSW. Sydney: NSW Ministry of Health; 2011.*

**Figure 3: Cataract surgery rate per million population per year for the Aboriginal population in western NSW by ophthalmology clinic availability 2007-2010**




*Source: Maher L, Brown A. Eye Health Services for Aboriginal People. A Review within the Greater Western Region of NSW. Sydney: NSW Ministry of Health; 2011.*

**REFERENCES:**

1. Taylor HR. The prevalence and causes of vision loss in Indigenous Australians: the National Indigenous Eye Health Survey. Med J Aust 2010; 192(6): 312-8.

2. Centre for Epidemiology and Research. ABS Population Estimates (HOIST). Sydney: NSW Ministry of Health; 2011.

3. NSW Department of Aboriginal Affairs. Two Ways Together Regional Report. Public report. Murdi Paaki. November 2006. Sydney: NSW Department of Aboriginal Affair; 2006. Available at: http://www.daa.nsw.gov.au/publications/MurdiPaakiRegionalReport.pdf (Cited 20 November 2011).

4. Maher L, Brown A. Eye health services for Aboriginal people. A review within the greater western region of NSW. Sydney: NSW Ministry of Health; 2011.

5. World Health Organisation. Vision 2020 The Right To Sight. *Global Initiative for the Elimination of Avoidable Blindness. Action Plan 2006-2011.* 2007. ISBN 978 92 4 159588 9

6. Betancourt JR, Green AR, Carrillo JE, Ananeh-Firempong O 2nd. Defining cultural competence: a practical framework for addressing racial / ethnic disparities in health and health care. Public Health Rep 2003; 118: 293-302.

7. Taylor HR, Stanford E. Provision of Indigenous Eye Health Services. Melbourne: Indigenous Eye Health Unit, The University of Melbourne; 2010. Available at: http://www.iehu.unimelb.edu.au/about_us/?a=326761 (Cited 20 November 2011).

8. Turner AW, Mulholland WJ, Taylor HR. Coordination of outreach eye services in remote Australia. Clin Experiment Ophthalmol 2011; 39(4): 344-9.

9. Taylor HR, Boudville A, Anjou M, McNeil R. The roadmap to close the gap for vision. Melbourne: Indigenous Eye Health Unit, The University of Melbourne; 2011.

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# Chapter Four: Enhanced reporting of health services delivery for Aboriginal people in NSW

## Introduction

In December 2010 I commenced a placement at the Centre for Aboriginal Health at the NSW Ministry of Health, and in September 2011 I undertook an eight month secondment to the position of Epidemiologist in the Research and Evaluation Team in the Centre for Aboriginal Health. I was based in the Centre for Aboriginal Health for eighteen months in total, and worked on various projects which aimed to improve evidence based practice, research, evaluation, and transparent reporting in Aboriginal health in NSW. One of the key projects I worked on while at the Centre for Aboriginal Health was the major report: "The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012" [1]. This report provides information on the health status of Aboriginal people and health system performance in Aboriginal health in NSW, and demonstrates a commitment to strengthen performance monitoring, management and accountability to improve Aboriginal health in NSW, as outlined in the NSW Aboriginal Health Plan 2013 – 2023. [2]

### Project Overview:

**"The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012"** is the first special Report of the Chief Health Officer to focus on the health of Aboriginal people in NSW. The report presents population health and health service delivery data in the areas of:

1. Life expectancy and child mortality
2. Health of mothers, babies and children
3. Risk and protective factors for health
4. Burden of ill-health
5. Health service delivery

The report provides information on indicators which represent those health issues that contribute most to the burden of disease and injury experienced by Aboriginal people in NSW, or where there is a large disparity in health outcomes or health care between Aboriginal and non-Aboriginal people. Many of these indicators contribute to national targets set by Australian governments to close the gap in life expectancy and improve the health of Aboriginal people in Australia. It is anticipated that increased reporting will facilitate improved monitoring of progress towards closing the gap between Aboriginal and non-Aboriginal people across key population health and health system indicators.

My role in the development and publication of this report included project co-management, data management, and text writing. I was responsible for overseeing the development of the whole report, and specifically for writing and co-ordinating two chapters of the report – the chapter on mothers and babies, and the chapter on health services delivery. The health services delivery chapter (Chapter 5 of the report) is the main focus of this doctoral chapter.

**Health Service Delivery: The fifth chapter of "The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012":** This chapter reports on the performance of mainstream health services at the Local Health District level in providing effective, equitable, and culturally competent services to Aboriginal people in NSW. In the chapter, key health service indicators in Aboriginal health are reported by NSW Local Health District. To identify the indicators for inclusion in this chapter, the policy context and reporting commitments under key agreements were considered. Indicators were included where data were available, reliable, of sufficient quality, and with sufficient numbers to disaggregate by Aboriginality and Local Health District of residence. Indicators were only included where it was considered that Local Health Districts could feasibly improve health outcomes by making services more accessible, equitable and culturally competent for Aboriginal people.

Key policies with performance indicators relevant to Aboriginal people include the National Health Care Agreement [3], the National Indigenous Reform Agreement [4], the Aboriginal and Torres Strait Islander Health Performance Framework [5], and NSW 2021: A plan to make NSW number one, which outlines Aboriginal health targets for NSW [6]. Many of the indicators reported in this chapter come from these agreements. It is anticipated that transparent monitoring and reporting of health system performance will facilitate improved delivery of

accessible, equitable, and culturally-competent public health services to Aboriginal people, and thereby contribute to improving health, and closing the gap in health outcomes.

Fourteen indicators are reported in this chapter, using data mostly sourced from the Admitted Patients Data Collection and the Emergency Department Data Collection, reflecting services to people who attend hospitals. Indicators are reported in the following key areas of health system performance: (1) hospital admissions; (2) access to health services; (3) emergency departments; (4) mothers and babies; (5) reporting of Aboriginal people in NSW Health data; (6) workforce. State-wide comprehensive data from the outpatient and primary health-care settings were unfortunately not available for inclusion in the report. The main findings presented in the chapter on health services delivery are as follows:

**Improvements:**

• Over the past 10 years, the proportion of Aboriginal people who discharge from hospital against medical advice has decreased, and the gap between the proportion of Aboriginal and non-Aboriginal people who discharge against medical advice has decreased.

**Of continuing concern:**

• Aboriginal people were 4.3 times more likely to discharge against medical advice than non-Aboriginal people in the past 10 years.

• Admission rates for potentially preventable hospitalisations are 2.5 times higher in Aboriginal than non-Aboriginal people, with no significant change in the difference between Aboriginal and non-Aboriginal people in the past 10 years.

• In NSW in 2010–11, unplanned readmissions to hospital within 28 days were 1.3 times higher among Aboriginal people (6.3% of all admissions compared to 8.1%). There has been no significant change in the rate over the past 10 years, and no significant change in the difference between Aboriginal and non-Aboriginal people.

• In NSW in 2010, Aboriginal people were 20% less likely to access high volume surgical procedures than non-Aboriginal people.

• Aboriginal people are significantly less likely to receive revascularisation procedures than non-Aboriginal people. While the rate of procedures for Aboriginal people has increased over the past 10 years, there has been no significant change in the gap between the rates for Aboriginal and non-Aboriginal people.

• Aboriginal people have lower rates of cataract procedures than non-Aboriginal people, despite a higher prevalence of cataracts. While the rate of cataract procedures for Aboriginal people has increased over the past 10 years, there has been no significant change in the gap between rates for Aboriginal and non-Aboriginal people.
• Aboriginal people are more likely to leave the Emergency Department before completing treatment than non-Aboriginal people in the past 10 years.
• Aboriginal people are more likely to re-present to the same Emergency Department within 48 hours of a previous presentation. Re-presentation rates have increased significantly over the past 10 years, and the gap between rates for Aboriginal and non-Aboriginal people has increased.

## Project Impact:

This project resulted in one major project output: the final report "The health of the people of NSW: Report of the Chief Health Officer". This report was released in November 2012. It was distributed widely to key stakeholders in Aboriginal health in NSW, and an electronic version is available at http://www.health.nsw.gov.au/publications/Pages/aboriginal-cho-report-2012.aspx

In addition, I gave an oral presentation on this project, entitled "Closing the Gap in NSW: Health performance monitoring and reporting in Aboriginal health" at the Australian Population Health Congress in Adelaide in September 2012.

The report was published concurrently with the "NSW Aboriginal Health Plan 2013 – 2023" [2]. The key indicators published within the report will be regularly updated and reported as new information becomes available, which will contribute to the evaluation of the Plan.

## Project Reflections:

My experiences working in the Centre for Aboriginal Health for eighteen months and contributing to the development and the publication of "The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012" were beneficial for me both professionally and personally. The report highlights the significant disparity for Aboriginal people in NSW compared to non-Aboriginal people across most population health indicators and health care

service indicators. I believe this inequity in unacceptable, and that we all have a moral and ethical imperative to strive towards closing these gaps between Aboriginal and non-Aboriginal people across Australia. The challenge of achieving the agreed national target to close the gap in life expectancy within a generation is significant and requires a holistic approach, including recognition of the significant contribution of social determinants of health towards the health disparity. Effective health services, policies, and programs that meet the needs of Aboriginal people will also contribute towards closing the gap, and the health services delivery chapter of the report provides a starting point to measure and report on health system performance in Aboriginal health in NSW.

In the preface to the report, the Chief Health Officer states that the report "presents an opportunity to reflect on how we can improve health policy and service provision for Aboriginal people in NSW" and encourages health staff to use the report "in their planning processes to ensure all services and programs contribute towards improving the health of Aboriginal people in NSW." (Page V) This was a key intention for the chapter on health services delivery – mainstream health services achieve differential outcomes in key performance indicators for Aboriginal and non-Aboriginal people in NSW, and it is anticipated that enhanced reporting of performance in Aboriginal health may increase awareness and precipitate action at a local level to address this disparity.

In developing the chapter on health systems delivery for the report, we had two key underlying purposes. Firstly, we needed to identify and report on appropriate indicators that could reflect how mainstream health services are meeting the needs of Aboriginal people in NSW, which may indicate issues of availability, accessibility, equity, and cultural competence. Secondly, we wanted to present this information in a way that may improve awareness and drive improved performance at a local level. To meet this second purpose, we incorporated a number of strategies into the presentation of the data for each indicator in this chapter. Firstly, we showed a ten-year trend graph disaggregated for Aboriginal and non-Aboriginal people, to clearly demonstrate any disparity in the performance indicator at a state level, and any changes over time. Secondly, we quantified this difference by calculating an odds ratio for each indicator (e.g. Aboriginal people were 4.3 times more likely to discharge against medical advice than non-Aboriginal people in the past 10 years). Thirdly, we disaggregated the data by Local Health District for the most recent year of available data, and presented this data graphically so that the disparity between Aboriginal and non-Aboriginal people for each Local

Health District is evident, and the performance of each Local Health District can be compared. For many indicators, this is the first time this data has been published at a Local Health District level, and identifying these disparities and demonstrating the relative performance between districts may raise awareness and encourage local action to address the issues. Lastly, where possible we presented the data in terms of the number of cases or events that would be required at the state or Local Health District level to achieve equal rates for Aboriginal and non-Aboriginal people for each indicator. For example, at the NSW level to achieve equal cataract procedure rates for Aboriginal and non-Aboriginal people in 2010–11, an additional 388 cataract procedures above the 363 operations performed were required for Aboriginal people in NSW. As a second example, to close the gap at the Local Health District level in incomplete emergency department attendances, South Eastern Sydney Local Health District would have required 556 less occurrences of incomplete attendances for Aboriginal people, 332 less in Murrumbidgee, and 307 less in Northern NSW. These strategies were employed to attempt to facilitate a sense of enablement at the Local Health District level: while it may be difficult for Local Health Districts to envisage how they can contribute to closing the gap in life expectancy between Aboriginal and non-Aboriginal people in NSW, it may be more possible to consider how to ensure equal access to services such as cardiac surgery, cataract surgery, or rehabilitation for Aboriginal people in their district, for example, as described.

Within the report, the data on health services delivery is reported factually only. The report does not attempt to describe the causes for the disparity observed – in many cases further investigation or research is required to identify the reasons for the disparity, which are likely to be multi-factorial and complex. Similarly, the strategies required to improve performance and deliver equitable health services for Aboriginal people at the Local Health District level are also not described. The Aboriginal Health Plan 2013-2023 describes strategies to improve health system performance in Aboriginal health in NSW. However, it is also hoped that Local Health Districts will develop strategies that are context-specific and appropriate, in order to improve their performance in these indicators. If these actions are delivered within the framework of the second strategic direction of the Aboriginal Health Plan 2013 – 2033 [2] which is "Implementing what works and building the evidence by supporting quality research and evaluation, disseminating evidence of effective programs and services, and supporting the translation of evidence into policy and practice", then actions at a local level can also contribute to an understanding of what strategies work in improving delivery of services to Aboriginal people in NSW.

The data reported in this chapter suggest there are significant issues and challenges for Local Health Districts in delivering equitable health services to Aboriginal people. For example, Aboriginal people do not have equal access to services despite higher rates of hospitalisation and a higher burden of disease. This suggests that health services may not be culturally competent or accessible for Aboriginal people, and are therefore unable to meet the health needs of Aboriginal people. The fifth strategic direction of the Aboriginal Health Plan 2013 – 2023 is "Providing culturally safe work environments and health services by developing the structures, policies, and processes required for culturally safe work environments and culturally respectful and secure health service provision." During the consultation process for developing the Aboriginal Health Plan, issues of institutional racism and interpersonal racism were frequently raised. [2] Aboriginal people experience interpersonal racism in the way they are treated by health service staff, and institutional racism when the organisation has a whole fails to meet the needs to Aboriginal people, [2] and these both will have a negative effect on health service access and utilisation, and health. Improving the cultural competence of health staff should lead to improved health services delivery for Aboriginal people, improved performance on the indicators reported in this chapter, and contribute towards realising equitable health outcomes for Aboriginal people in NSW.

While transparent reporting may contribute to improved health services delivery for Aboriginal people in NSW, more systematic methods of enhancing accountability in Aboriginal health are also required. One potential method to improve accountability systematically is to include health service delivery indicators for Aboriginal people into the service level agreements between Local Health Districts and the NSW Ministry of Health. In this way, Local Health Districts would be required to report their achievements in delivering health services to Aboriginal people using agreed and verified outcome indicators. While the report was being developed, there was concurrently significant work undertaken within the Centre for Aboriginal Health for the inclusion of some indicators from the fifth chapter of the report into the service agreements, which was achieved in 2013.

## Limitations

The report introduction outlines the well-documented limitations to the quality and availability of data in NSW on health service use and health outcomes for Aboriginal people. For the chapter on health services delivery the two most relevant of these limitations are:

• Under-reporting of Aboriginal people in NSW health data sets impacts on many aspects of reporting on the health of Aboriginal people. Under-reporting creates uncertainty about the size and composition of the Aboriginal population in NSW, the estimated size of health issues reported, and the size of the difference between Aboriginal and non-Aboriginal people in terms of health service use and health status.
• The limited availability of data to provide a complete picture of some health issues. Ideally information on prevalence and incidence, primary health care and medication use would be reported for health issues covered in this Report. For some indicators, only information on hospitalisations is available, which does not reflect the true burden of disease, particularly for conditions that generally do not require hospitalisation or are usually treated through primary health care.

## Ethics Approval:

This chapter did not require approval by a Human Research Ethics Committee, as the Chief Health Officer may publish routinely collected population health data and health system performance data. The Human Research Ethics Committee of the Aboriginal Health and Medical Research Council of NSW were consulted regarding the publication of new information on health outcomes of Aboriginal people in NSW, and invited to advise on any cultural issues requiring consideration in the publication of this data.

## Contributions and acknowledgements:

A report of this size is the result of a collaborative effort from many people. On page 11 of the report the contributors and the acknowledgements are listed as reproduced in the box on the following page. As stated, my role included project co-management, data management and text writing. I was responsible for writing and co-ordinating Chapter 2 (Mothers and Babies) and Chapter 5 (health services delivery), and overseeing the development of the complete report. For these chapters I determined the chapter content, identified the appropriate indicators for inclusion, wrote the text, and developed the data figures and tables in collaboration with a biostatistician who extracted the data from the appropriate data sources and conducted the statistical analysis where required. A significant editing, review, and approval process was followed prior to the publication of the report.

## Contributors to this Report

**The health of Aboriginal people of NSW: Report of the Chief Health Officer** represents the efforts of many people and organisations, working together to acknowledge the importance of improving the health of Aboriginal people in NSW. The following list indicates the broad roles played by the many contributors to the Report.

**Centre for Epidemiology and Evidence and Centre for Aboriginal Health, NSW Ministry of Health**
**Project management:** Jessica Stewart and Louise Maher
**Editor:** Jessica Stewart
**Data analysis and/or biostatistical advice:** Jillian Patterson, Tina Navin, Hanna Noworytko, Helen Moore and Lee Taylor
**Data management:** Jillian Patterson, Tina Navin, Louise Maher and Nicola Scott
**Text:** Louise Maher, Nicola Scott, Tina Navin, Jessica Stewart and Scott Winch

**Acknowledgments**

**NSW Ministry of Health gratefully acknowledges:**

**For guidance and input into the development of the Report:** the Aboriginal Health and Medical Research Council of NSW

**For review of the Report:** Jenny Hunt, Aboriginal Health and Medical Research Council of NSW; Elizabeth Develin and Sarah Thackway, Centre for Epidemiology and Evidence, NSW Ministry of Health.

**For technical advice on indicators:** Hanna Noworytko and Helen Moore, Centre for Epidemiology and Evidence, Ministry of Health; Kathryn Smith, Demand, Performance and Evaluation, Ministry of Health; Robyn Martin, Mid North Coast Local Health District; Tony Martin, Belinda Border and Aimee Smith, Hunter New England Local Health District.

**Acknowledgments:** From NSW Ministry of Health: Lee Taylor (Centre for Epidemiology and Evidence), Helen Moore (Centre for Epidemiology and Evidence), Hanna Noworytko (Centre for Epidemiology and Evidence), Tim Badgery-Parker (Centre for Epidemiology and Evidence), Kathryn Smith (Health System Information and Performance Reporting), Paula Spokes (Centre for Health Protection), Margo Barr (Centre for Epidemiology and Evidence), Elizabeth Best (Primary Health, Community Partnerships and Chronic Disease), Charles Davison (Workforce Planning and Development), Tracey Flanagan (Workforce Planning and Development), Jeff Standen, Angela Pitts (Centre for Health Protection), Deni Fukunishi (Centre for Population Health). From other organisations: Aboriginal Health and Medical Research Council of NSW Ethics Committee, Deborah Baker (Cancer Institute NSW).

## Chapter Overview:

The body of this chapter is comprised of one main piece of work:

- ”The health of the people of NSW: Report of the Chief Health Officer 2012.” Chapter Five: Health Services.

As this chapter has been previously published and is available in the public domain, the published versions has been reproduced as published (with revised formatting) in the following section. As with other chapters in this thesis, all reports or papers which have been published and are available in the public domain have been boxed to demonstrate that they are final pieces of work.

## References (for Introduction):

[1] Centre for Epidemiology and Evidence. 2012. The health of Aboriginal people of NSW: Report of the Chief Health Officer, 2012. Sydney: NSW Ministry of Health.
[2] NSW Ministry of Health. NSW Aboriginal Health Plan 2013-2023. http://www0.health.nsw.gov.au/policies/pd/2012/PD2012_066.html
[3] Council of Australian Governments. 2008. National Health Care Agreement. Intergovernmental agreement on federal financial relations 2003–08. Available at: http://www.health.gov.au/internet/main/publishing.nsf/Content/health-ahca-agreement.htm (Cited 26 June 2012).
[4] Council of Australian Governments. 2009. National Indigenous Reform Agreement (Closing the Gap). Intergovernmental agreement on federal financial relations. Available at: http://www.coag.gov.au/coag_meeting_outcomes/2009–07-02/docs/NIRA_closing_the_gap.pdf (Cited 26 June 2012). (COAG 2009),National Indigenous Reform Agreement
[5] [AHMAC] Australian Health Ministers’ Advisory Council. 2011. Aboriginal and Torres Strait Islander Health Performance Framework. 2010 Report. Canberra: Australian Health Ministers’ Advisory Council (AHMAC).
[6] NSW Government. 2011. NSW 2021: A plan to make NSW number one [internet]. Available at: http://2021.nsw.gov.au/sites/default/files/NSW2021_WEB%20VERSION.pdf (Cited 17 June 2012).

# Chapter Four Part A:

# Published Report: "The health of Aboriginal people of NSW: Report of the Chief Health Officer" (Chapter 5: health services delivery).


The health of Aboriginal people of NSW:
Report of the Chief Health Officer
2012
NSW GOVERNMENT
Health

# Health service delivery

In this chapter, key health service indicators in Aboriginal health are reported by NSW Local Health District. To identify the indicators for inclusion in this report, the policy context and reporting commitments under key agreements were considered. Indicators were included where data were available, reliable, of sufficient quality, and with sufficient numbers to disaggregate by Aboriginality and Local Health District of residence. Indicators were only included where it was considered that Local Health Districts could feasibly improve health outcomes by making services more accessible, equitable and culturally competent for Aboriginal people.

Monitoring and improving the delivery of accessible, equitable, and culturally-competent public health services to Aboriginal people will contribute to improving health, and closing the gap in health outcomes. Key policies with performance indicators relevant to Aboriginal people include the *National Health Care Agreement* (COAG 2008), the *National Indigenous Reform Agreement* (COAG 2009c), the *Aboriginal and Torres Strait Islander Health Performance Framework* (AHMAC 2011), and *NSW 2021: A plan to make NSW number one*, which outlines Aboriginal health targets for NSW (NSW Government 2011).

Only trends that are statistically significant (to a *p*-value of < 0.05) are reported as 'significant'; no statistically significant trend is reported as 'no significant change'. Fourteen indicators are reported, mostly using data sourced from the Admitted Patients Data Collection and the Emergency Department Data Collection, reflecting services to people who attend hospitals. State-wide comprehensive data from the outpatient and primary health-care settings are not available. Further information on methods and indicators are available in Appendices 1 and 2.

## 5.1 Hospital Admissions

This section examines the differences in hospital admissions between Aboriginal and non-Aboriginal people in NSW. Potentially preventable hospitalisations are hospital admissions that could have been avoided by providing appropriate preventive care or early medical treatment in primary health-care settings. Unplanned readmissions within 28 days, and discharge against medical advice from inpatient care, are indicators of the quality of care provided to Aboriginal people while inpatients in hospital, and are used as a measure of the cultural competence

(Betancourt et al. 2003). A culturally competent health service is one that 'acknowledges and incorporates the importance of culture, assessment of cross-cultural relations, and vigilance towards the dynamics that result from cultural differences, expansion of cultural knowledge, and adaption of services to meet culturally unique needs' (Betancourt et al. 2003). Improving the cultural competence of health services may contribute to decreasing the rates of unplanned readmissions and the proportion of Aboriginal people who discharge from hospital against medical advice. The NSW Ministry of Health has developed *Respecting the Difference: An Aboriginal Cultural Training Framework for NSW Health* to increase cultural respect training in health services in NSW.

**Key facts**

- Aboriginal people were 2.5 times more likely to be admitted for potentially preventable hospitalisations than non-Aboriginal people.
- Rates of potentially preventable hospitalisations for Aboriginal people have increased over the past 10 years.
- Aboriginal people were 4.3 times more likely to discharge themselves from hospital against medical advice than non-Aboriginal people in 2010-11.

## 5.1 (a) Potentially Preventable Hospitalisations

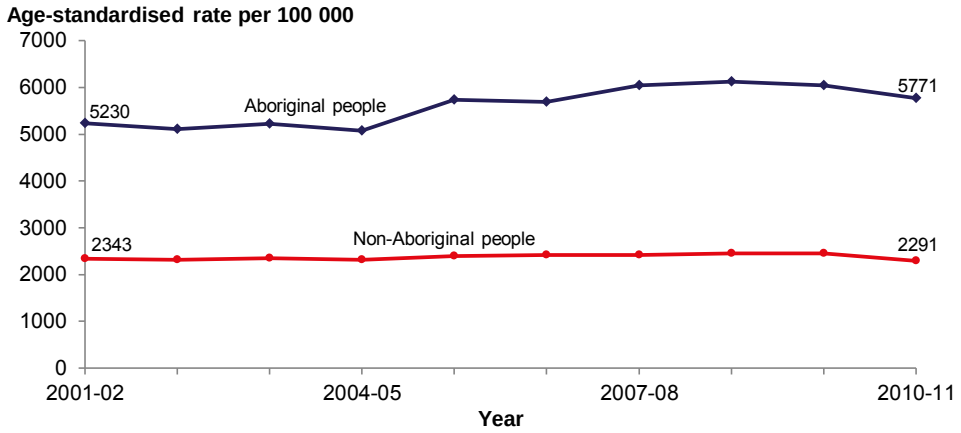
**Health issue:** Potentially preventable hospitalisations are hospital admissions that could have been avoided by providing accessible, timely, and effective preventive care or early medical treatment delivered through primary health care (Australian Government 2011; Porter et al. 2007).

**Health disparity:** In NSW in 2010-11, admission rates for potentially preventable hospitalisations were 5771 per 100 000 population for Aboriginal people, 2.5 times higher than the rate for non-Aboriginal people of 2291 per 100 000 population (Figure 67). Aboriginal people were 3.2 times more likely to be admitted for potentially preventable hospitalisations due to chronic conditions than non-Aboriginal people, and 2.0 times more likely to be admitted for potentially preventable hospitalisations due to acute conditions than non-Aboriginal people. In the past 10 years the rates of potentially preventable hospitalisations have significantly increased for Aboriginal people, with no significant change in the gap between Aboriginal and non-Aboriginal people over this time.

The five Local Health Districts with the highest rates of potentially preventable hospitalisations for Aboriginal people in 2010-11 were: Mid North Coast (9569 per 100 000), Far West (7995), Western NSW (7780), Southern NSW (7512) and Northern NSW (7211) (Figure 68).

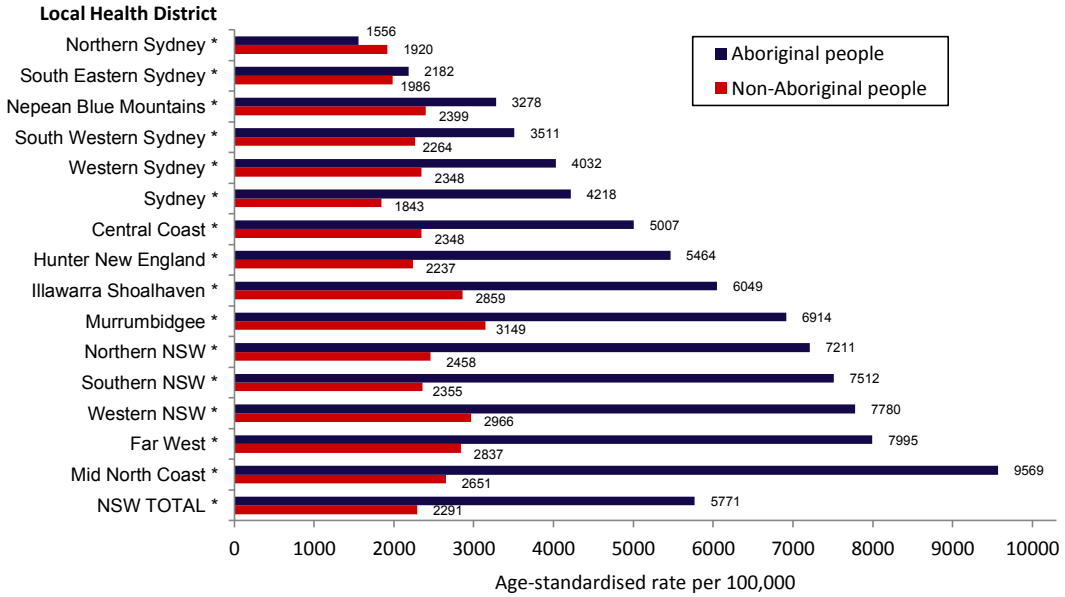
**Closing the gap:** Differences in the rates of potentially preventable hospital admissions between Aboriginal and non-Aboriginal people may indicate gaps in the effectiveness of population health interventions, access to and quality of primary care services, and continuity of care support (Australian Government 2011). *NSW 2021* (NSW Government 2011) target is to decrease potentially preventable hospitalisations for Aboriginal people by 2.5% from 2010-11 to 2014-15. Figure 69 is a trajectory that would be required for rates of potentially preventable hospitalisations to be the same for Aboriginal and non-Aboriginal people by 2033.

**Figure 67: Potentially preventable hospitalisations by Aboriginality, NSW, 2001-02 to 2010-11**



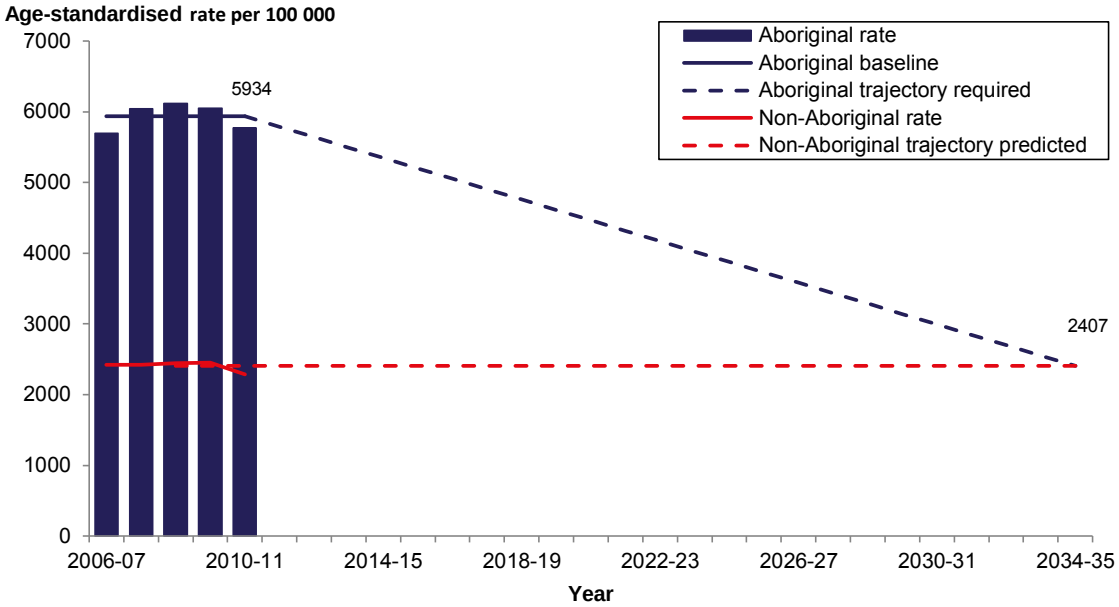

*Note: After July 2010, rates were affected by a change in coding standards for diabetes, a substantial contributor to total preventable hospitalisations. Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 68: Potentially preventable hospitalisations by Aboriginality and Local Health District of residence, NSW, 2010-11**




** Indicates that the difference between Aboriginal and non-Aboriginal people is significant*
*Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 69: Potentially preventable hospitalisations, trajectory required to close the gap in NSW by 2033**




*Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

## 5.1 (b) Unplanned hospital readmissions within 28 days

**Health issue:** An unplanned hospital readmission is defined as a readmission within 28 days of discharge from the first admission, which was not planned. It is an indicator of the quality and continuity of care provided to patients while in hospital and in the weeks following discharge (van Walvaren et al. 2011). 'Unplanned readmissions' is an indicator in NSW 2021 (NSW Government 2011).

**Health disparity:** In NSW in 2010-11, unplanned readmissions within 28 days occurred in 8.1% of all admissions for Aboriginal people, and 6.3% of all admissions for non-Aboriginal people (Figure 70). This difference was significant, with Aboriginal people 1.3 times more likely to have an unplanned readmission. There has been no significant change in the rate of unplanned admissions for Aboriginal people over the past 10 years, and no significant change in the gap between Aboriginal and non-Aboriginal people. The five Local Health Districts with the highest proportion of unplanned readmissions within 28 days for Aboriginal people were Southern NSW (13.2%), Mid North Coast (11.0%), Illawarra Shoalhaven (9.8%), Western NSW (8.4%) and Sydney (8.3%) (Table 1).

**Closing the gap:** The higher rates of unplanned hospital admissions within 28 days among Aboriginal people in 2010 resulted in 711 additional readmissions that needed to be avoided through appropriate out of hospital care and support for rates to be the same between

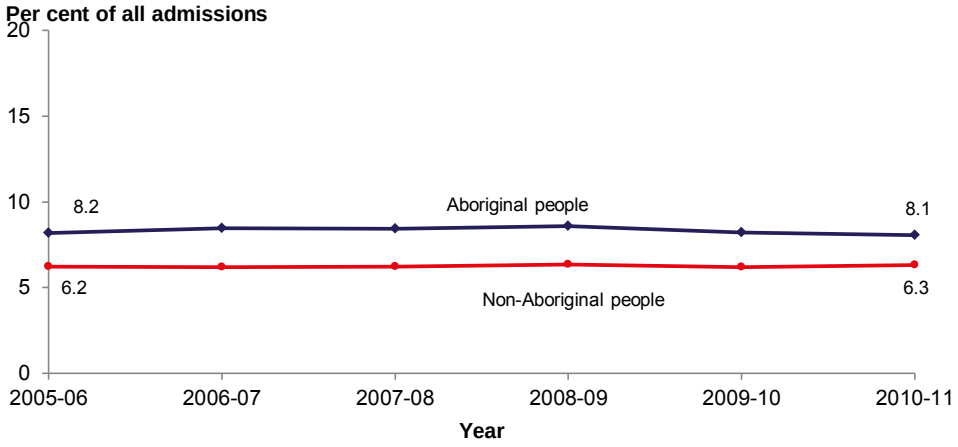
Aboriginal and non-Aboriginal people. At the Local Health District level, the difference in rates amounted to 136 additional readmissions in Mid North Coast of Aboriginal people, 129 additional readmissions in Western NSW, and 85 additional readmissions in Southern NSW (Table 1).

**Table 1: Unplanned readmissions within 28 days as a proportion of all admissions in hospitals by Aboriginality and Local Health District of residence, NSW, 2008-09 to 2010-11**

| NSW Local Health District | Aboriginal people | | | Non-Aboriginal people | Number needed to be prevented to close the gap# |
|---|---|---|---|---|---|
| | 2008-09 % | 2009-10 % | 2010-11 % | 2010-11 % | 2010-11 |
| Central Coast | 9.7 | 6.5 | 7.3 | 7.2 | 2 |
| Far West | 10.8 | 11.6 | 8.2 | 8.3 | 0 |
| Hunter New England* | 6.1 | 6.4 | 6.7 | 6.1 | 54 |
| Illawarra Shoalhaven | 9.3 | 9.0 | 9.8 | 9.3 | 12 |
| Mid North Coast* | 11.2 | 11.7 | 11.0 | 7.2 | 136 |
| Murrumbidgee | 9.9 | 9.3 | 8.1 | 8.2 | NA |
| Nepean Blue Mountains | 8.9 | 6.0 | 6.1 | 6.8 | NA |
| Northern NSW* | 7.4 | 8.1 | 8.1 | 6.8 | 52 |
| Northern Sydney* | 4.6 | 3.7 | 3.0 | 5.8 | NA |
| South Eastern Sydney* | 7.3 | 6.5 | 7.3 | 5.8 | 15 |
| South Western Sydney* | 7.8 | 8.4 | 7.9 | 6.0 | 36 |
| Southern NSW* | 11.8 | 10.4 | 13.2 | 6.8 | 85 |
| Sydney* | 7.3 | 9.4 | 8.3 | 4.3 | 49 |
| Western NSW* | 9.9 | 9.2 | 8.4 | 6.5 | 129 |
| Western Sydney | 7.8 | 6.3 | 6.9 | 6.0 | 16 |
| NSW TOTAL | 8.6 | 8.2 | 8.1 | 6.3 | 711 |

** Indicates a significant difference between Aboriginal and non-Aboriginal people for the Local Health District*
*# The number of unplanned readmissions for Aboriginal people in 2010-11 that would have needed to have been avoided through appropriate care for the proportion to be the same between Aboriginal and non-Aboriginal people. This may underestimate the amount of services needed given the higher prevalence of disease and co-morbidity among Aboriginal people compared to non-Aboriginal people.*
*NA: Not Applicable. Note: In relation to services provided to NSW or LHD residents, hospitalisations that occurred in interstate private hospitals are not included in the statistics. Source: NSW Admitted Patient Data Collection (HIE). Demand and Performance Evaluation Branch, NSW Ministry of Health.*

**Figure 70: Unplanned readmissions within 28 days as a proportion of all admissions in NSW Hospitals for Aboriginal and non-Aboriginal people, 2005-06 to 2010-11**




*Source: NSW Admitted Patient Data Collection (HIE). Demand and Performance Evaluation Branch, NSW Ministry of Health.*

## 5.1 (c) Patients who leave hospital against medical advice

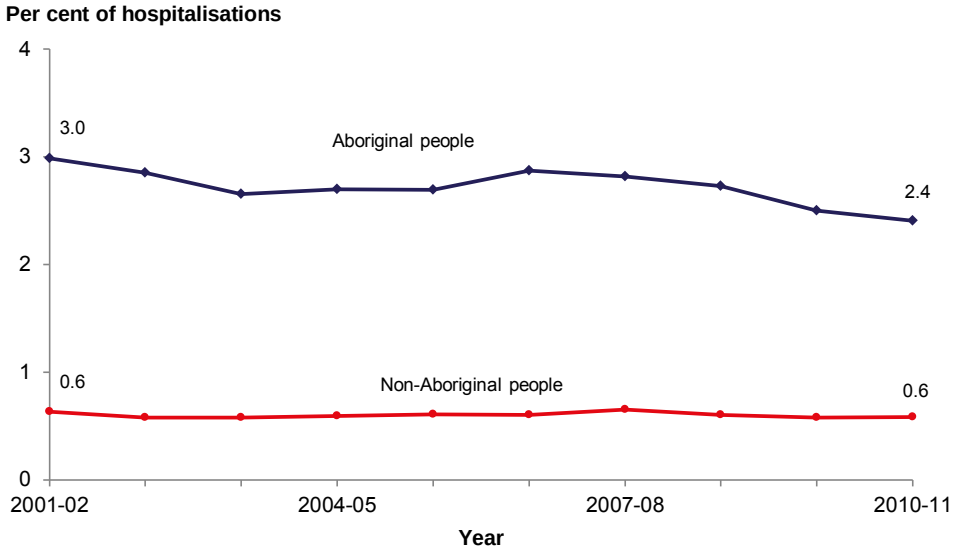
**Health issue:** Discharge against medical advice involves patients who have been admitted to hospital who leave against the expressed advice of their treating physician. Patients who discharge against medical advice have higher readmission rates, higher levels of multiple admissions, and a higher in-hospital mortality (Choi et al. 2011; Glasgow et al. 2010). This measure provides indirect evidence of the cultural competence of hospital services, and the extent of patient satisfaction with the quality of care provided (Australian Government 2011).

**Health disparity:** In 2010-11, the proportion of hospitalisations of Aboriginal people resulting in discharge against medical advice was 2.4%, compared with 0.6% for non-Aboriginal people. This difference is significant, with Aboriginal people 4.3 times more likely to discharge against medical advice than non-Aboriginal people. Over the past 10 years, the proportion of Aboriginal people discharging against medical advice has decreased, which has reduced the gap between Aboriginal and non-Aboriginal people (Figure 71).

In 2010-11, the five Local Health Districts with the highest rates of discharge against medical advice for Aboriginal people were: Sydney (4.1%), Far West (4.0%), South Western Sydney (3.1%), Southern NSW (3.0%), and Nepean Blue Mountains (3.0%) (Table 2).

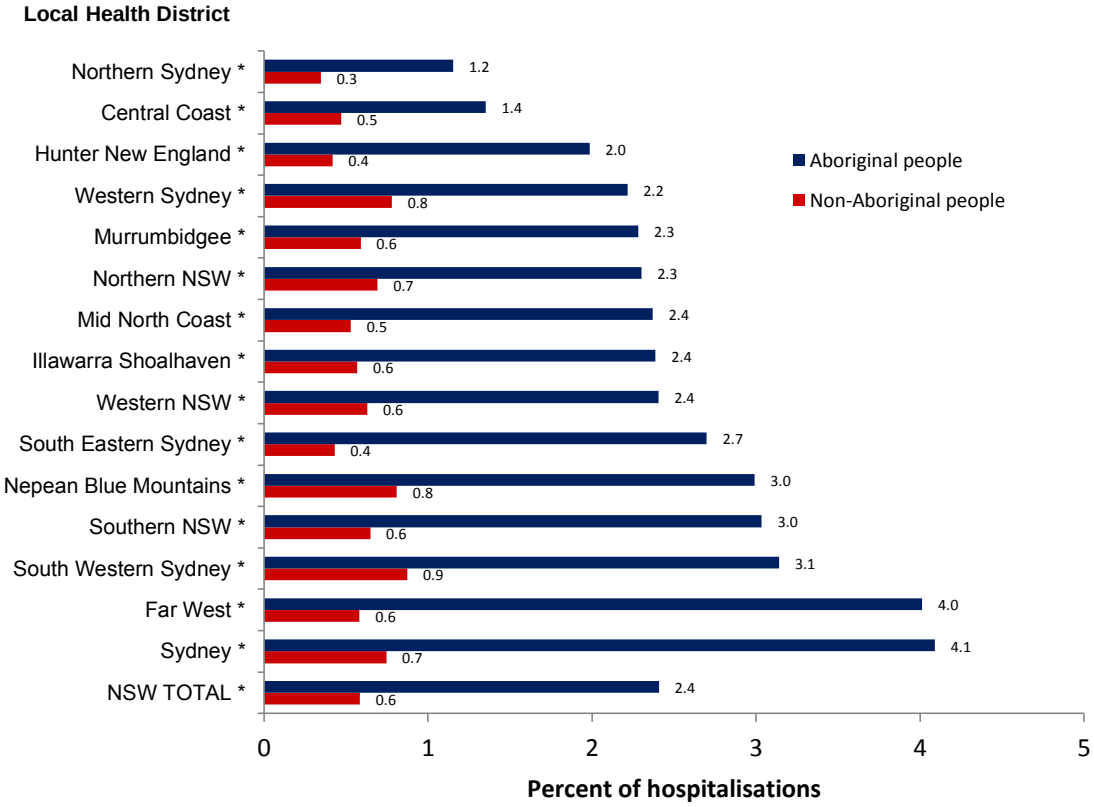
**Closing the gap:** For the proportion of Aboriginal and non-Aboriginal people who discharge against medical advice to be the same, in 2010-11, 1209 out of 1597 fewer occasions of discharge against medical advice for Aboriginal people were required. Three Local Health Districts would have each needed more than 100 fewer occasions of discharge against medical advice in 2010-11 to close the gap: Western NSW (242), Hunter New England (202), and Northern NSW (104) (Figure 72, Table 2).

**Figure 71: Hospitalisations ending with discharge against medical advice by Aboriginality, NSW, 2001-02 to 2010-11**




*Source: NSW Admitted Patient Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 72: Hospitalisations ending with discharge against medical advice by Aboriginality and Local Health District of residence, NSW, 2001-02 to 2010-11**




** Indicates the difference between Aboriginal and non-Aboriginal people is significant*
*Source: NSW Admitted Patient Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Table 2: Hospitalisations ending with discharge against medical advice by Aboriginality and Local Health District of residence, per cent of hospitalisations, NSW, 2008-09 to 2010-11**

| NSW Local Health District | Aboriginal people | | | Non-Aboriginal people | Number needed to be prevented to close the gap[#] |
|---|---|---|---|---|---|
| | 2008-09 % | 2009-10 % | 2010-11 % | 2010-11 % | 2010-11 |
| Central Coast | 2.8 | 1.9 | 1.4 | 0.5 | 23 |
| Far West | 2.8 | 4.9 | 4.0 | 0.6 | 44 |
| Hunter New England | 2.4 | 2.0 | 2.0 | 0.4 | 202 |
| Illawarra Shoalhaven | 2.9 | 1.9 | 2.4 | 0.6 | 75 |
| Mid North Coast | 2.1 | 2.9 | 2.4 | 0.5 | 97 |
| Murrumbidgee | 2.6 | 2.4 | 2.3 | 0.6 | 61 |
| Nepean Blue Mountains | 2.2 | 2.3 | 3.0 | 0.8 | 45 |
| Northern NSW | 2.8 | 2.4 | 2.3 | 0.7 | 104 |
| Northern Sydney | 0.8 | 1.5 | 1.2 | 0.3 | 3 |
| South Eastern Sydney | 2.1 | 1.6 | 2.7 | 0.4 | 40 |
| South Western Sydney | 3.9 | 3.2 | 3.1 | 0.9 | 65 |
| Southern NSW | 2.3 | 2.6 | 3.0 | 0.6 | 53 |
| Sydney | 3.7 | 3.6 | 4.1 | 0.7 | 77 |
| Western Sydney | 3.2 | 2.5 | 2.2 | 0.8 | 67 |
| Western NSW | 3.0 | 2.8 | 2.4 | 0.6 | 242 |
| NSW TOTAL | 2.7 | 2.5 | 2.4 | 0.6 | 1209 |

[#] *Number of occurrences of discharge against medical advice for Aboriginal people in 2010-11 that would need to be avoided in order to close the gap in discharge against medical advice rates between Aboriginal and non-Aboriginal at the State and Local Health District level.*
*Source: NSW Admitted Patient Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

# 5.2 Access to health services and procedures

Providing equitable access to hospital-based services is a critical responsibility of the health system (Australian Government 2011). Aboriginal people often do not have equal access to medical services and procedures, despite having higher rates of hospitalisation and a higher burden of disease (Cunningham 2002; Coory and Walsh 2005; Yeates et al. 2009). These disparities in access are not explained fully by diagnosis, gender, age, or location of residence (Cunningham 2002). This section highlights selected indicators of access to health services and procedures where there is a significant difference between Aboriginal and non-Aboriginal people which cannot be entirely explained by differences in health service needs. The differences may be an indication of the cultural competency and accessibility of services being delivered to Aboriginal people in NSW.

**Key facts**

- Aboriginal people are significantly less likely to receive revascularisation procedures than non-Aboriginal people, and receive procedures at 72% of the rate for non-Aboriginal people.
- Aboriginal people have lower rates of access to cataract procedures than non-Aboriginal people. For cataract procedure rates to be the same for Aboriginal and non-Aboriginal people in 2010 would have required an additional 388 cataract procedures for Aboriginal people in NSW, however this does not account for a higher prevalence of cataract among Aboriginal people.
- In NSW in the period 2006-07 to 2010-11, the age-standardised rate of total knee and total hip replacements was 176 per 100 000 for Aboriginal people, and 288 per 100 000 for non-Aboriginal people.
- There has been a significant increase in the rate of inpatient rehabilitation services for Aboriginal people; however the gap between Aboriginal and non-Aboriginal people has also increased significantly in the past 10 years.

## 5.2 (a) Access to high volume surgical procedures

**Health issue:** Aboriginal people have higher rates of hospitalisation and higher rates of many diseases but are less likely than non-Aboriginal people to access common surgical procedures to treat or manage a range of conditions.

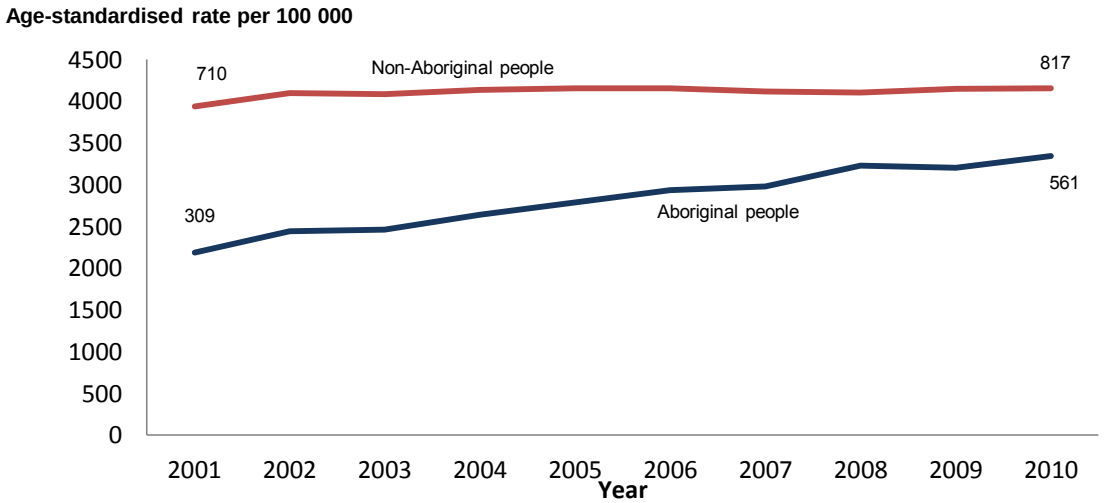
**Health disparity:** In 2010, the rate of access to high volume surgical procedures# was 3348 per 100 000 in Aboriginal people compared to 4154 per 100 000 in non-Aboriginal people. This difference is significant, with Aboriginal people 20% less likely to access high volume surgical procedures than non-Aboriginal people. Rates of procedures for Aboriginal people have increased over the past 10 years, from 2190 per 100 000 people in 2001, which has significantly decreased the difference in rates between Aboriginal and non-Aboriginal people (Figure 73).

In 2010, rates of high volume surgical procedures were lower for Aboriginal people across all age groups compared to non-Aboriginal people, except 10-29 years, which may reflect increased burden of injury requiring surgical treatment in young Aboriginal people.

In 2010, the five Local Health Districts with the greatest disparity in rates of access to high volume surgical procedures between Aboriginal and non-Aboriginal people were South Eastern Sydney, Murrumbidgee, Northern Sydney, South Western Sydney and Western Sydney (Figure 74).

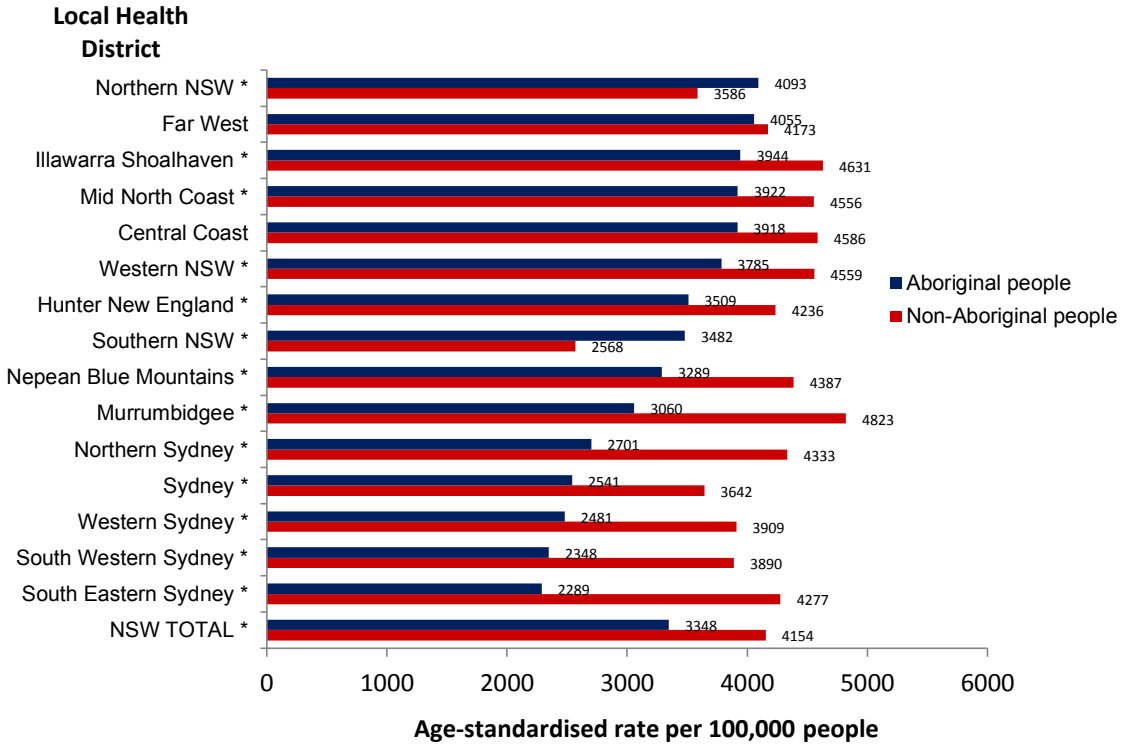
**Closing the gap:** An additional 573 high volume surgical procedures across NSW would be required to close the gap between Aboriginal and non-Aboriginal patients. However, this does not reflect increased need due to higher burden of injury and disease in Aboriginal people.

**Figure 73: Access to high volume surgical procedures by Aboriginality in NSW, 2001-2010**




*Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence,NSW Ministry of Health.*

**Figure 74: Access to high volume surgical procedures by Aboriginality and Local Health District of residence, SW, 2010**




*Note: * indicates that the difference between Aboriginal and non-Aboriginal people is significant. Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health. #The 26 selected 'high volume surgical procedures' include abdominal hysterectomy, appendectomy, arthroplasty of the hip, arthroplasty of the knee, arthroscopic menisectomy of the knee, caesarean section, cholecystectomy, colectomy, coronary artery bypass, curettage of the uterus, destruction procedures on the cervix,endarterectomy, fracture of the femur, major lens procedures, myringotomy, procedures for haemorrhoids, release of carpal tunnel, repair of abdominal aneurysm, repair of inguinal hernia, repair of tendon of the hand, repair of umbilical, epigastric or linea alba hernia, transluminal coronary angioplasty, transurethral prostatectomy, tonsillectomy or adenoidectomy and vaginal hysterectomy. The 26 procedures included were selected by key stakeholders in the NSW Ministry of Health in 2010. Some procedures included are medium volume but high cost. Some procedures may be classified as non-admitted care and will not be included in the counts of high volume surgical procedures in the NSW Admitted Patient Data Collection.*

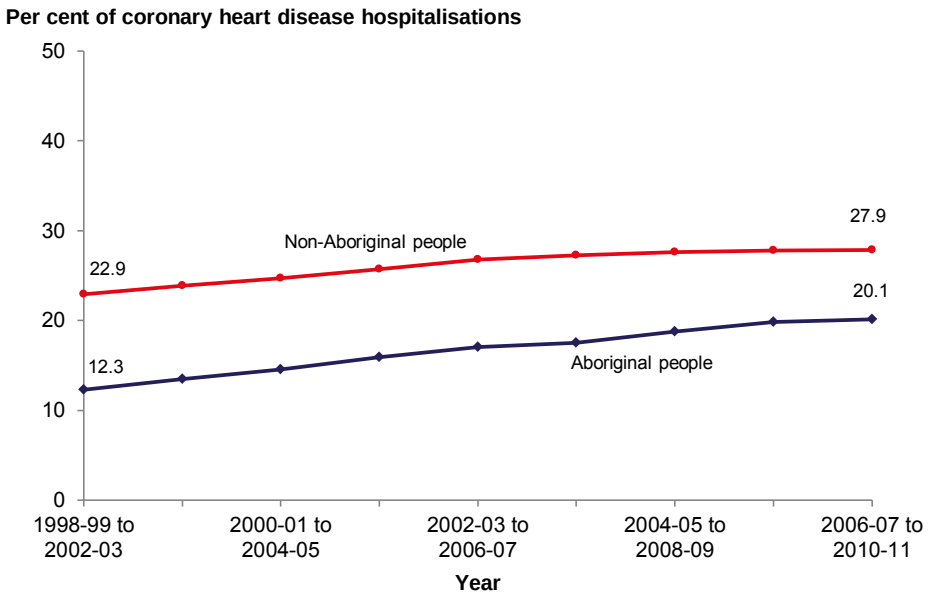
## 5.2 (b) Coronary procedures

**Health issue:** Coronary revascularisation procedures, which include angioplasty and coronary artery bypass graft, are interventions for treating coronary heart disease. Aboriginal people have high rates of coronary heart disease, however Aboriginal people admitted to public hospitals with circulatory disease are less likely to have a diagnostic or therapeutic procedure (Cunningham 2002; Australian Government 2011), or to receive a revascularisation procedure after a heart attack (Coory and Walsh 2005). Equitable access to optimal care is an important aspect of public health system performance (Coory and Walsh 2005).

**Health disparity:** In NSW in the period 2006-07 to 2010-11, the rate of coronary revascularisation procedures (angioplasty or coronary artery bypass graft) as a proportion of all hospitalisations for coronary heart disease was 20% for Aboriginal people, and 28% for non-Aboriginal people. This difference is significant, with Aboriginal people receiving procedures at 72% of the rate of non-Aboriginal people. Rates of procedures for Aboriginal people have increased over the past 10 years, from 12% in the period 1998-99 to 2002-03, which has significantly decreased the gap between Aboriginal and non-Aboriginal people (Figure 75).

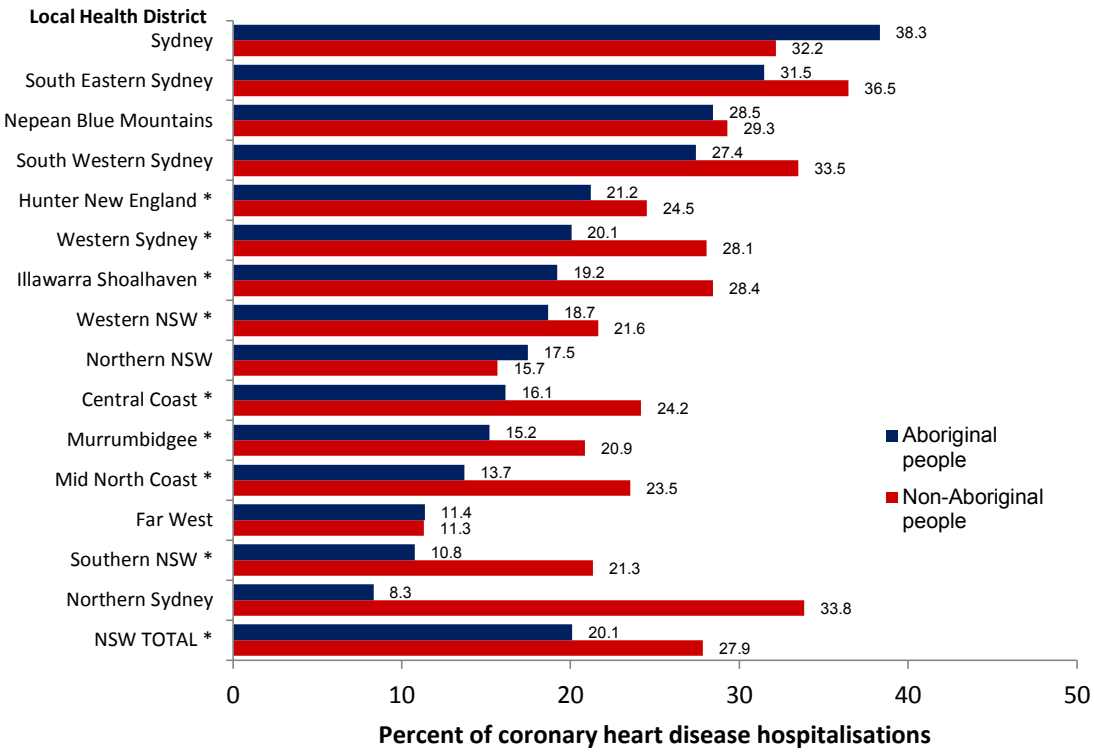
In the period 2006-07 to 2010-11, the five Local Health Districts with the lowest rates of revascularisation procedures as a proportion of all hospitalisations for coronary heart disease for Aboriginal people were: Northern Sydney, Southern NSW, Far West, Mid North Coast, and Murrumbidgee (Figure 76, Table 3).

**Figure 75: Revascularisation procedures as a proportion of all hospitalisations for coronary heart disease by Aboriginality, combined 5-year proportions, NSW, 1998-99 to 2010-11**




*Source: NSW Admitted Patient Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 76: Revascularisation procedures as a proportion of all hospitalisations for coronary heart disease by Aboriginality and Local Health District of residence, NSW, 2006-07 to 2010-11 combined**




** Indicates that the difference between Aboriginal and non-Aboriginal people is significant*
*Source: NSW Admitted Patient Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Table 3: Revascularisation procedures as a proportion of all hospital admissions for coronary heart disease by Aboriginality and Local Health District of residence, combined 5-year percentages, NSW, 2002-03 to 2010-11**

| NSW Local Health District | Aboriginal people | | | Non-Aboriginal people |
|---|---|---|---|---|
| | 2002-03 to 2006-07 % | 2004-05 to 2008-09 % | 2006-07 to 2010-11 % | 2006-07 to 2010-11 % |
| Central Coast | 13.0 | 17.8 | 16.1 | 24.2 |
| Far West | 12.2 | 15.8 | 11.4 | 11.3 |
| Hunter New England | 17.3 | 19.6 | 21.2 | 24.5 |
| Illawarra Shoalhaven | 21.6 | 18.0 | 19.2 | 28.4 |
| Mid North Coast | 12.4 | 12.8 | 13.7 | 23.5 |
| Murrumbidgee | 10.5 | 15.5 | 15.2 | 20.9 |
| Nepean Blue Mountains | 24.5 | 26.2 | 28.5 | 29.3 |
| Northern NSW | 15.4 | 15.7 | 17.5 | 15.7 |
| Northern Sydney | 17.4 | 18.5 | 8.3 | 33.8 |
| South Eastern Sydney | 29.3 | 28.1 | 31.5 | 36.5 |
| South Western Sydney | 24.9 | 26.8 | 27.4 | 33.5 |
| Southern NSW | 15.0 | 19.6 | 10.8 | 21.3 |
| Sydney | 42.1 | 39.4 | 38.3 | 32.2 |
| Western NSW | 15.4 | 17.4 | 18.7 | 21.6 |
| Western Sydney | 16.7 | 18.1 | 20.1 | 28.1 |
| NSW TOTAL | 17.1 | 18.8 | 20.1 | 27.9 |

*Note: In relation to services provided to NSW or LHD residents, hospitalisations that occurred in interstate private hospitals are not included in the statistics. Source: NSW Admitted Patient Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

## 5.2 (c) Cataract procedure rate

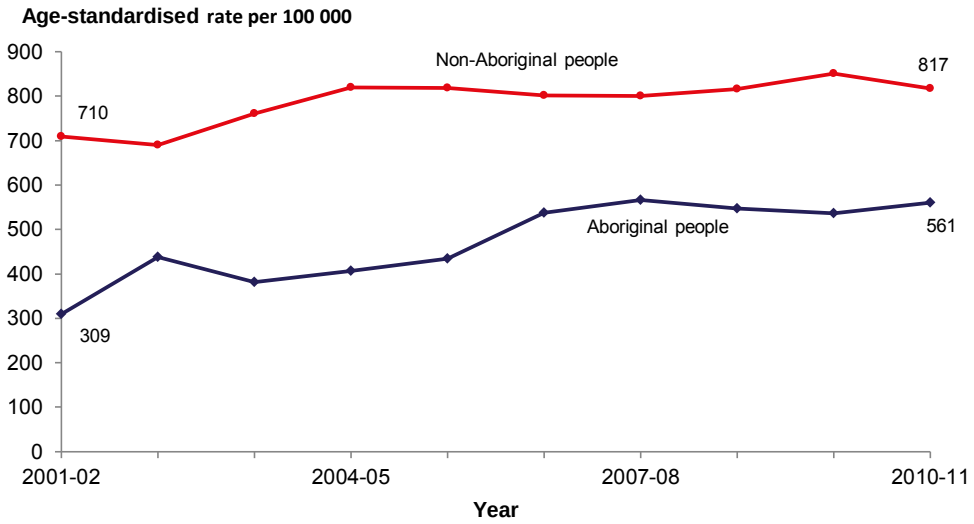
**The health issue:** Cataract procedures address vision loss and blindness due to cataract, and the cataract procedure rate is a standard measure of the delivery of cataract surgical services used to monitor the coverage of cataract procedures (WHO 2007). Aboriginal people experience a higher burden of eye disease than the general population.

**Health disparity:** The occurrence of cataract is higher in Aboriginal people, with 11% of Aboriginal and Torres Strait Islander people aged over 55 years reporting a history of cataract, compared with 7% for non-Indigenous people (ABS 2006). Cataract causes 32% of blindness and 27% of low vision in Aboriginal and Torres Strait Islander adults (aged over 40 years), with only 65% of those with vision loss from cataract having received surgery (Taylor et al. 2010). The national blindness rate for Aboriginal and Torres Strait Islander adults is 1.9% (6.2 times the rate for non-Aboriginal people) and the low vision rate is 9.4% (2.8 times the rate for non-Aboriginal people) (Taylor et al. 2010).

The cataract procedure rate for NSW in 2010-11 was 561 per 100 000 for Aboriginal people and 817 for non-Aboriginal people (Figure 77). This difference is significant, with Aboriginal people accessing cataract procedures at 0.67 the rate of non-Aboriginal people. Over the past 10 years there has been an increase in the rate of cataract procedures for Aboriginal people, from 309 per 100 000 in 2001-02, however there has been no significant change in the gap between the rates for Aboriginal and non-Aboriginal people. Cataract procedure rates for Aboriginal people and non-Aboriginal people differ widely across NSW (Figure 78). Across Local Health Districts, the cataract procedure rates for Aboriginal people range from 159 per 100 000 in Sydney Local Health District, to 971 per 100 000 in Northern NSW Local Health District (Table 4).

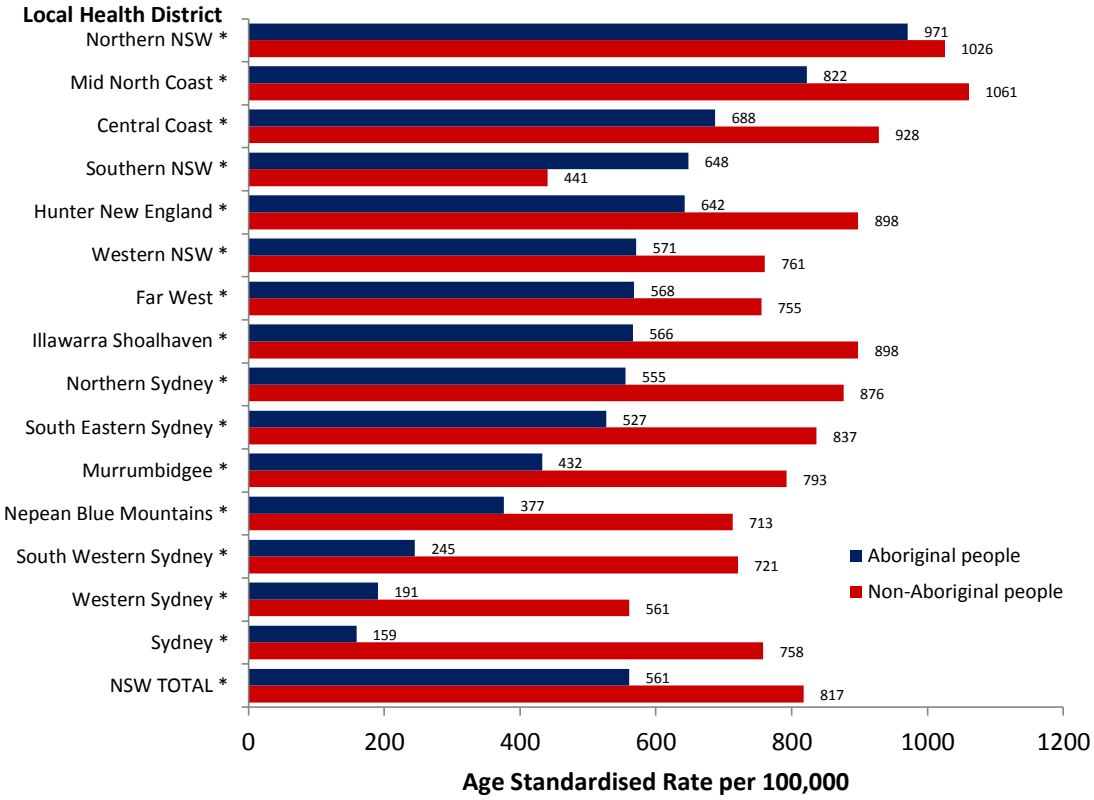
**Closing the gap:** To achieve equal cataract procedure rates for Aboriginal and non-Aboriginal people in 2010-11, an additional 388 cataract procedures above the 363 operations performed were required for Aboriginal people in NSW. However to provide equitable access to Aboriginal people, additional operations may be required given the higher prevalence of cataract among Aboriginal people. The three Local Health Districts with the highest number of additional cataract procedures required for Aboriginal people for the rate to be the same as the non-Aboriginal surgery rate were: Hunter New England (91 operations required), Western NSW (46 operations) and South Western Sydney (36 operations) (Table 4).

**Figure 77: Cataract procedures by Aboriginality, NSW, 2001-02 to 2010-11**




*Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 78: Cataract procedures by Aboriginality and Local Health District of residence, NSW, 2010-11**




** Indicates that the difference between Aboriginal and non-Aboriginal people is significant*
*Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Table 4: Cataract procedures by Aboriginality and Local Health District of residence, age-standardised rates per 100 000, NSW, 2008-09 to 2010-11**

| NSW Local Health District | Aboriginal people | | | Non-Aboriginal people | Number of additional procedures needed to close the gap in procedure rates# |
|---|---|---|---|---|---|
| | 2008-09 | 2009-10 | 2010-11 | 2010-11 | 2010-11 |
| Central Coast | 742 | 450 | 688 | 928 | 15 |
| Far West | 1060 | 876 | 568 | 755 | 5 |
| Hunter New England | 631 | 557 | 642 | 898 | 91 |
| Illawarra Shoalhaven | 604 | 884 | 566 | 898 | 27 |
| Mid North Coast | 860 | 654 | 822 | 1061 | 27 |
| Murrumbidgee | 477 | 413 | 432 | 793 | 30 |
| Nepean Blue Mountains | 265 | 144 | 377 | 713 | 18 |
| Northern NSW | 887 | 932 | 971 | 1026 | 16 |
| Northern Sydney | 322 | 681 | 555 | 876 | 9 |
| South Eastern Sydney | 379 | 365 | 527 | 837 | 23 |
| South Western Sydney | 386 | 415 | 245 | 721 | 36 |
| Southern NSW | 1075 | 947 | 648 | 441 | NA |
| Sydney | 480 | 633 | 159 | 758 | 23 |
| Western NSW | 385 | 437 | 571 | 761 | 46 |
| Western Sydney | 65 | 101 | 191 | 561 | 26 |
| NSW TOTAL | 547 | 537 | 561 | 817 | 388 |

*Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health. # Number of additional cataract procedures required in 2010-11 for Aboriginal people in order to close the gap in cataract procedure rates between Aboriginal and non-Aboriginal at the State and Local Health District level. Numbers based on a 57% higher prevalence for Aboriginal people aged 55 years and over. Equal prevalence was assumed for younger age groups. NA: Not Applicable*

## 5.2 (d) Elective orthopaedic surgery

**Health issue:** Elective orthopaedic surgery includes total hip replacement and total knee replacement, which are operations most commonly used to address joint failure due to arthritis. Aboriginal people have a lower rate of both hip and knee replacement compared with non-Aboriginal people nationally despite having a similar prevalence of osteoarthritis (AIHW 2007b; Dixon et al. 2011). This may reflect lower access to these procedures, lower acceptance of the procedures, or co-morbidities precluding orthopaedic surgery (Dixon et al. 2011).

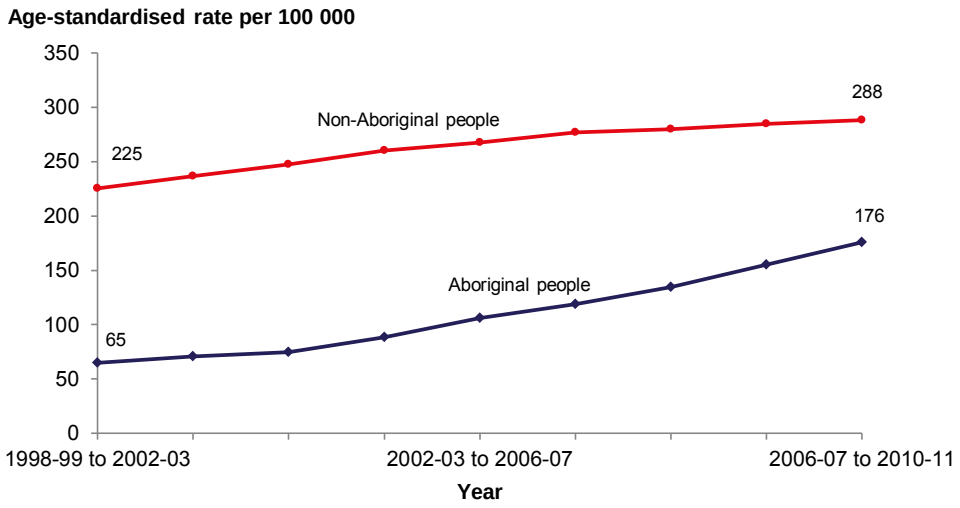
**Health disparity:** In NSW in the period 2006-07 to 2010-11, the rate of total knee and total hip replacements was 176 per 100 000 for Aboriginal people, and 288 per 100 000 for non-Aboriginal people. This difference is significant with Aboriginal people accessing orthopaedic surgery at 0.61 the rate of non-Aboriginal people. Over the past 10 years the rate of hip and knee replacements has increased for Aboriginal people, from 65 per 100 000 in the period

1998-99 to 2002-03; and there has been a significant decrease in the gap between the rates for Aboriginal and non-Aboriginal people (Figure 79).

The three Local Health Districts with the lowest rates of total hip and knee replacements per 100 000 Aboriginal people for the period 2006-07 to 2010-11 were 88 in South Eastern Sydney, 135 in Illawarra Shoalhaven, and 136 in Southern NSW (Figure 80, Table 5).

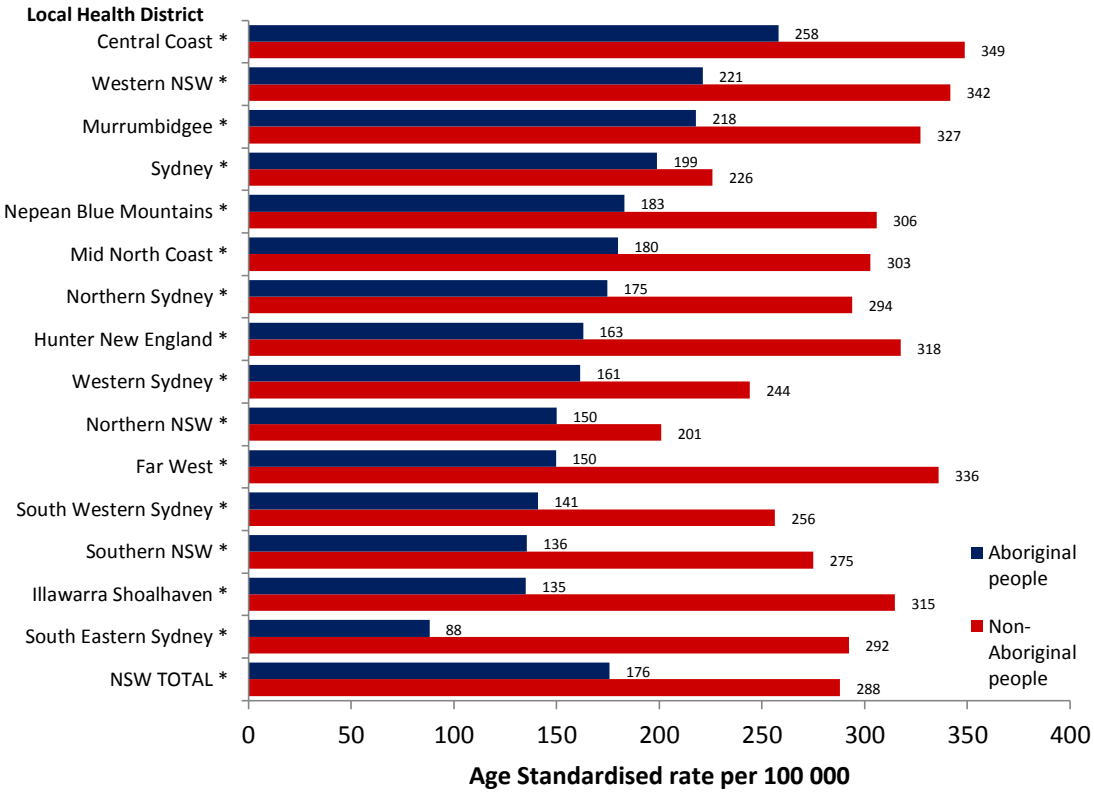
**Closing the gap:** For elective orthopaedic surgery rates to be the same for Aboriginal and non-Aboriginal people in 2010-11, approximately 66 additional total knee and hip replacement operations would have been required for Aboriginal people across NSW from a total of 571 performed. For Local Health Districts, in 2010-11 required approximately 21 additional operations in Hunter New England, and 12 additional operations in Western NSW (Table 5).

**Figure 79: Total knee and total hip replacement surgery by Aboriginality, combined 5-year rates, NSW, 1998-99 to 2010-11**




*Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 80: Total knee and total hip replacement surgery by Aboriginality and Local Health District of residence, NSW, 2006-07 to 2010-11 combined**




** Indicates that the difference between Aboriginal and non-Aboriginal people is significant*
*Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Table 5: Total knee and total hip replacement surgery by Aboriginality and Local Health District of residence, combined 5-year age-standardised rates per 100 000, NSW, 2002-03 to 2010-11**

| NSW Local Health District | Aboriginal people | | | Non-Aboriginal people | Number of additional procedures needed to close the gap in procedure rates[#] |
|---|---|---|---|---|---|
| | 2002-03 to 2006-07 | 2004-05 to 2008-09 | 2006-07 to 2010-11 | 2006-07 to 2010-11 | 2006-07 to 2010-11 |
| Central Coast | 166 | 209 | 258 | 349 | 3 |
| Far West | 86 | 163 | 150 | 336 | 3 |
| Hunter New England | 102 | 135 | 163 | 318 | 21 |
| Illawarra Shoalhaven | 115 | 105 | 135 | 315 | 6 |
| Mid North Coast | 81 | 124 | 180 | 303 | 5 |
| Murrumbidgee | 181 | 221 | 218 | 327 | 5 |
| Nepean Blue Mountains | 71 | 102 | 183 | 306 | 4 |
| Northern NSW | 96 | 94 | 150 | 201 | 1 |
| Northern Sydney | 152 | 161 | 175 | 294 | 1 |
| South Eastern Sydney | 27 | 52 | 88 | 292 | 6 |
| South Western Sydney | 90 | 97 | 141 | 256 | 5 |
| Southern NSW | 152 | 156 | 136 | 275 | 3 |
| Sydney | 136 | 210 | 199 | 226 | 0 |
| Western NSW | 129 | 139 | 221 | 342 | 12 |
| Western Sydney | 24 | 100 | 161 | 244 | 4 |
| NSW TOTAL | 88 | 122 | 176 | 288 | 66 |

*[#] Number of additional total hip and knee replacement operations required each year between 2006-07 and 2010-11 for Aboriginal people in order to close the gap in elective orthopaedic rates between Aboriginal and non-Aboriginal at the State and Local Health District level.*
*Note: In relation to services provided to NSW or LHD residents, hospitalisations that occurred in interstate private hospitals are not included in the statistics. Hip and knee procedures are mostly provided as inpatient care.*
*Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

## 5.2 (e) Inpatient rehabilitation

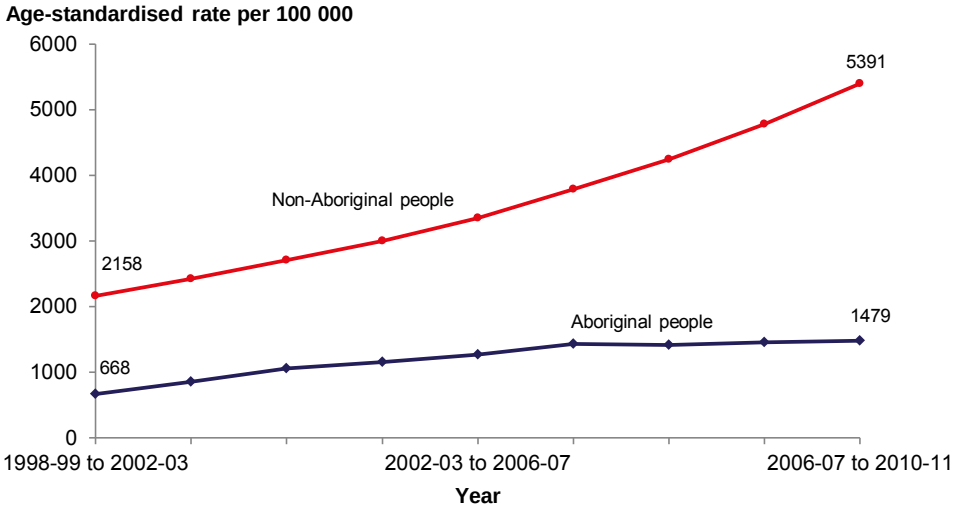
**Health issue:** Inpatient rehabilitation is the provision of multidisciplinary, medically directed services that aim to improve the functioning of an individual after illness or injury (New and Poulos 2008). Aboriginal people may have an increased need for inpatient rehabilitation, due to higher incidence of stroke (Katzenellenbogen et al. 2011) and injury than the general population, however Aboriginal people have lower rates of inpatient rehabilitation hospitalisation compared with non-Aboriginal people. Reviews suggest that referrals to inpatient rehabilitation can be influenced by a range of non-clinical patient factors, which can include the Aboriginal and Torres Strait Islander status of the patient (Foster et al. 2004).

**Health disparity:** In NSW in the period 2006-07 to 2010-11, the rate for inpatient rehabilitation hospitalisations was 1479 per 100 000 Aboriginal people and 5391 per 100 000 non-Aboriginal people. This is a significant difference, with Aboriginal people accessing rehabilitation services at 0.27 the rate of non-Aboriginal people. There has been a significant increase in the rate of inpatient rehabilitation services for Aboriginal people, from 668 per 100 000 in the period 1998-99 to 2002-03, however the gap in the rates between Aboriginal and non-Aboriginal people has increased significantly over the past 10 years (Figure 81).

In the period 2006-07 to 2010-11, the five Local Health Districts with the lowest rates (per 100 000 population) of rehabilitation hospitalisations for Aboriginal people were: Nepean Blue Mountains (750), Central Coast (805), Northern NSW (818), Far West (919), and Hunter New England (1027) (Figure 82, Table 6).

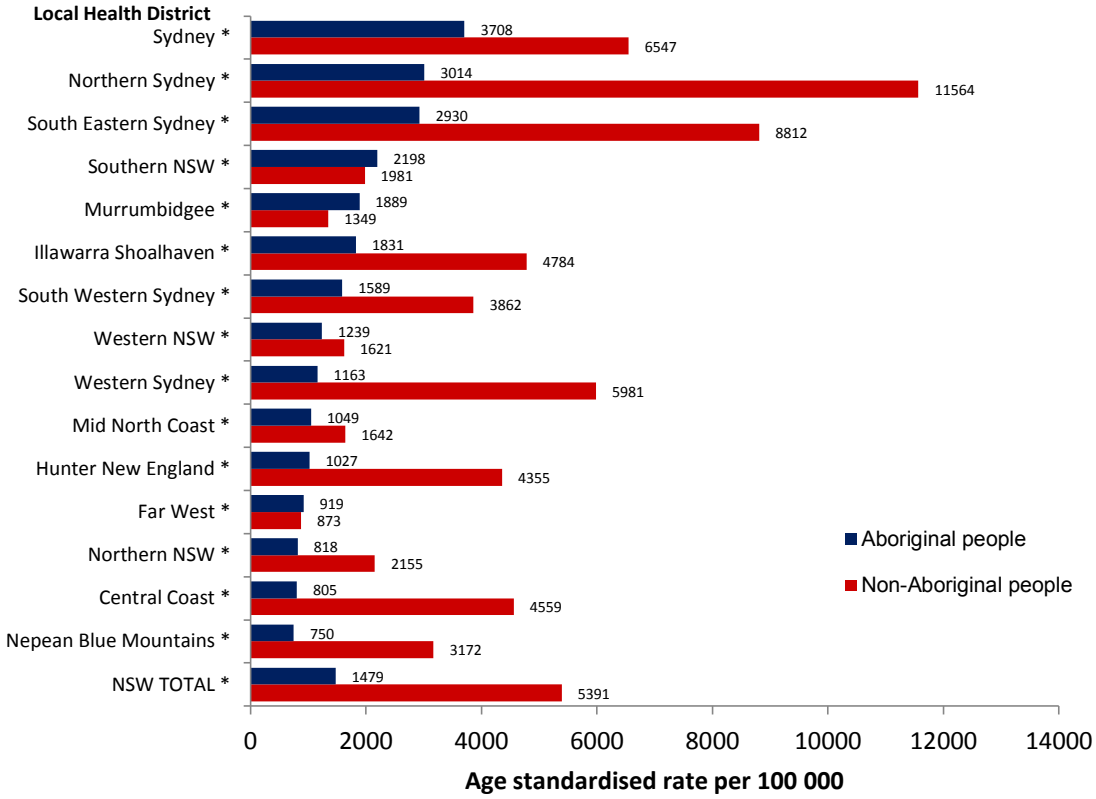
**Closing the gap:** For inpatient rehabilitation rates to be the same for Aboriginal and non-Aboriginal people in 2010-11, an additional 473 inpatient rehabilitation hospitalisations for Aboriginal people were needed across NSW from a total of 882 hospitalisations. For Local Health District's an additional 87 inpatient rehabilitation episodes were required in Hunter New England, 38 in Western Sydney, and 37 in South Eastern Sydney (Table 6). This does not account for differences in need due to higher prevalence of illness and injury.

**Figure 81: Rehabilitation episodes of care by Aboriginality, people aged 55 years and over, combined 5-year rates, NSW, 1998-99 to 2010-11**




***Source:*** *NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 82: Rehabilitation rates of episodes of care by Aboriginality and Local Health District of residence, people aged 55 years and over, NSW, 2006-07 to 2010-11 combined**




** Indicates that the difference between Aboriginal and non-Aboriginal people is significant*
***Source:*** *NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Table 6: Rehabilitation episodes of care by Aboriginality and Local Health District of residence, people aged 55 years and over, combined 5-year age-standardised rates per 100 000, NSW, 2002-03 to 2010-11**

| NSW Local Health District | Aboriginal people | | | Non-Aboriginal people | Number of additional episodes of care needed to close the gap# |
|---|---|---|---|---|---|
| | 2002-03 to 2006-07 | 2004-05 to 2008-09 | 2006-07 to 2010-11 | 2006-07 to 2010-11 | 2006-07 to 2010-11 |
| Central Coast | 815 | 1,096 | 805 | 4559 | 20 |
| Far West | 1384 | 963 | 919 | 873 | NA |
| Hunter New England | 1408 | 1323 | 1027 | 4355 | 87 |
| Illawarra Shoalhaven | 856 | 1643 | 1831 | 4784 | 24 |
| Mid North Coast | 659 | 488 | 1049 | 1642 | 2 |
| Murrumbidgee | 1038 | 1791 | 1889 | 1349 | NA |
| Nepean Blue Mountains | 767 | 951 | 750 | 3172 | 12 |
| Northern NSW | 1307 | 921 | 818 | 2155 | 9 |
| Northern Sydney | 2654 | 3336 | 3014 | 11 564 | 20 |
| South Eastern Sydney | 2446 | 3419 | 2930 | 8812 | 37 |
| South Western Sydney | 1120 | 1070 | 1589 | 3862 | 22 |
| Southern NSW | 974 | 1490 | 2198 | 1981 | NA |
| Sydney | 2136 | 2978 | 3708 | 6547 | 15 |
| Western NSW | 1108 | 1042 | 1239 | 1621 | 5 |
| Western Sydney | 973 | 924 | 1163 | 5981 | 38 |
| NSW TOTAL | 1265 | 1414 | 1479 | 5391 | 473 |

*# Number of additional rehabilitation separations required each year between 2006-07 and 2010-11 for Aboriginal people aged 55 years and over in order to close the gap in rehabilitation separation rates between Aboriginal and non-Aboriginal at the State and Local Health District level.*
*NA: Not Applicable*
*Note: In relation to services provided to NSW or LHD residents, hospitalisations that occurred in interstate private hospitals are not included in the statistics.*
*Rehabilitation is mostly provided as inpatient care. Some rehabilitation services are classified as non-admitted care and will not be included in the statistics.*
*Source: NSW Admitted Patient Data Collection and Australian Bureau of Statistics population estimates (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

# 5.3 Emergency Departments

In 2010-11, there were 82 108 attendances to NSW Emergency Departments recorded for Aboriginal people in NSW, with Aboriginal people 2.1 times more likely to attend Emergency Departments than non-Aboriginal people. The rates of access to Emergency Departments for Aboriginal people may be influenced by the availability, affordability, accessibility and cultural appropriateness of primary health-care options and the increased burden of acute and chronic disease experienced by Aboriginal people.

**Key facts**

- Aboriginal people are more likely to leave the Emergency Department before completing treatment than non-Aboriginal people, and are more likely to re-present to the same Emergency Department within 48 hours of a previous attendance.
- Aboriginal people are 1.2 times more likely to be admitted, referred or discharged within 4 hours of presentation to an Emergency Department than non-Aboriginal people.

## 5.3 (a) Incomplete Emergency Department attendances

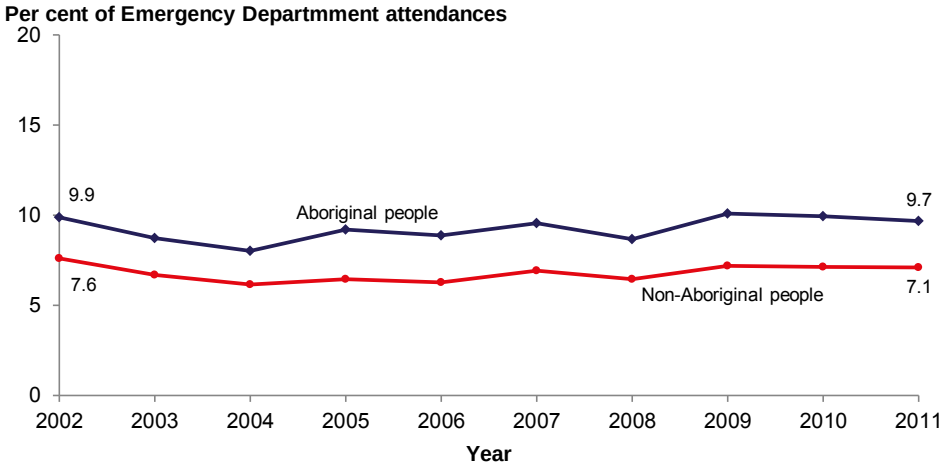
**Health issue: ‘**Did not wait’ is a term used to describe patients who leave Emergency Departments before medical assessment, and ‘left at own risk’ refers to patients who leave Emergency Department after medical assessment but before completion of care or medical discharge. Together, these incomplete Emergency Department attendances are a significant safety concern for people’s health (Ding et al. 2007), and patients who do not wait are more likely to re-present to hospital (Hall and Jelinek 2007).

**Health disparity:** In NSW in 2011 the proportion of incomplete Emergency Department attendances was 9.7% (8047) for Aboriginal people and 7.1% (117 334) for non-Aboriginal people. This difference is significant, with Aboriginal people 1.36 times more likely to have an incomplete emergency attendance than non-Aboriginal people. Over the past 10 years there has been no significant change in rates for Aboriginal people and no significant change in the gap between Aboriginal and non-Aboriginal people (Figure 83). Five Local Health Districts had proportions of greater than 10% for incomplete Emergency Department attendances for Aboriginal people in 2011: Sydney (16.4%), Illawarra Shoalhaven (16.2%), South Western Sydney (13.3%), Western NSW (10.4%), and Northern NSW (10.1%) (Figure 84, Table 7).

**Closing the gap:** To close the gap in incomplete Emergency Department attendances between Aboriginal and non-Aboriginal people, Emergency Departments in NSW in 2011 needed to prevent 2149 occurrences of Aboriginal people who ‘did not wait’ or ‘left at own risk’ from a

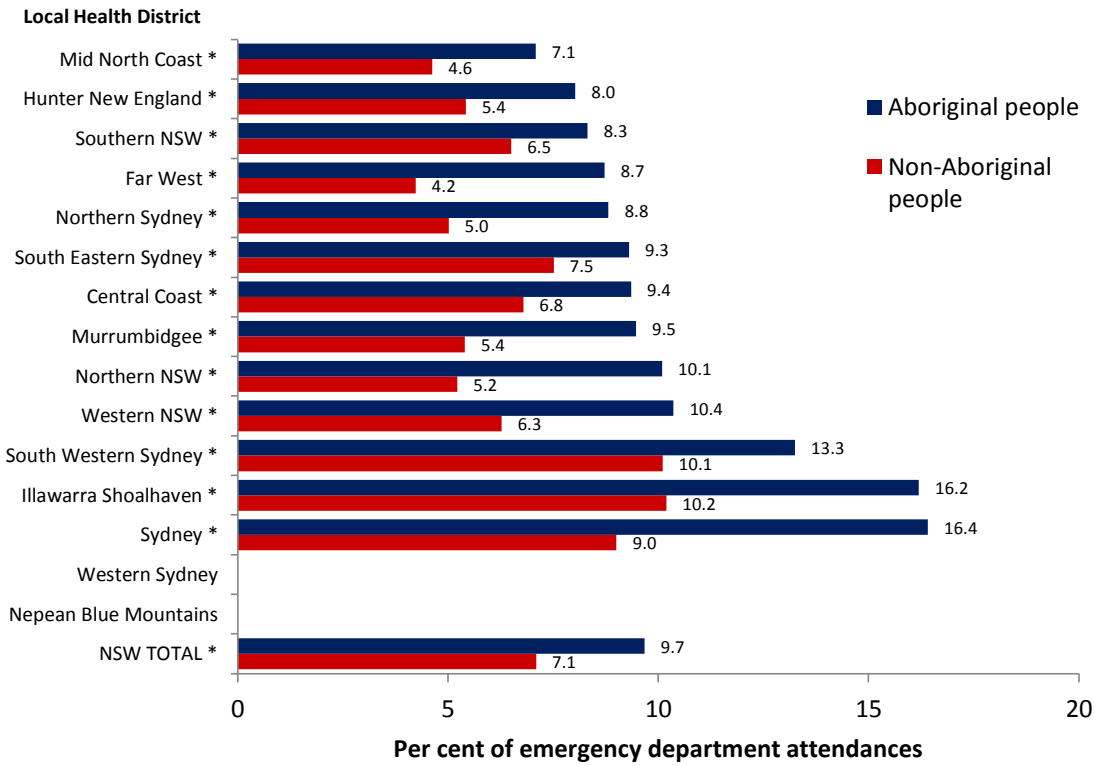
total of 8047. To close the gap at the Local Health District level, South Eastern Sydney Local Health District would have required 556 less occurrences of incomplete attendances for Aboriginal people, 332 less in Murrumbidgee, and 307 less in Northern NSW (Table 10).

**Figure 83: Emergency Department attendances resulting in 'did not wait' or 'left at own risk' by Aboriginality, NSW, 2002 to 2011**




***Source:*** *Emergency Department Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 84: Emergency Department attendances resulting in 'did not wait' or 'left at own risk' by Aboriginality and Local Health District of residence, NSW, 2011**




** Indicates that the difference between Aboriginal and non-Aboriginal people is significant*
*Note: Western Sydney and Nepean Blue Mountains Local Health Districts are unable to provide information on Emergency Department attendances for Aboriginal people*
*Source: Emergency Department Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Table 7: Emergency Department attendances resulting in 'did not wait' or 'left at own risk' by Aboriginality and Local Health District of residence, per cent of admissions, NSW, 2009 to 2011**

| NSW Local Health District | Aboriginal people | | | Non-Aboriginal people | Number needed to be avoided to close the gap# |
|---|---|---|---|---|---|
| | 2009 % | 2010 % | 2011 % | 2011 % | 2011 |
| Central Coast | 9.4 | 9.0 | 9.4 | 6.8 | 112 |
| Far West | 7.2 | 7.9 | 8.7 | 4.2 | 87 |
| Hunter New England | 9.0 | 9.1 | 8.0 | 5.4 | 65 |
| Illawarra Shoalhaven | 19.8 | 16.5 | 16.2 | 10.2 | 37 |
| Mid North Coast | 11.2 | 8.6 | 7.1 | 4.6 | 224 |
| Murrumbidgee | 8.3 | 8.7 | 9.5 | 5.4 | 332 |
| Nepean Blue Mountains | NA | NA | NA | NA | NA |
| Northern NSW | 9.0 | 8.6 | 10.1 | 5.2 | 307 |
| Northern Sydney | 6.7 | 8.4 | 8.8 | 5.0 | 229 |
| South Eastern Sydney | 10.5 | 9.2 | 9.3 | 7.5 | 556 |
| South Western Sydney | 10.4 | 11.6 | 13.3 | 10.1 | 62 |
| Southern NSW | 7.4 | 7.6 | 8.3 | 6.5 | 80 |
| Sydney | 13.5 | 14.7 | 16.4 | 9.0 | 70 |
| Western NSW | 9.0 | 10.4 | 10.4 | 6.3 | 210 |
| Western Sydney | NA | NA | NA | NA | NA |
| NSW TOTAL | 10.1 | 9.9 | 9.7 | 7.1 | 2149 |

*# Number of incomplete Emergency Department attendances for Aboriginal people in 2011 that were required to be avoided in order to close the gap in incomplete Emergency Department attendance rates between Aboriginal and non-Aboriginal at the State and Local Health District level.*
*NA: Not Available –Western Sydney and Nepean Blue Mountains Local Health Districts are unable to provide information on Emergency Department attendances for Aboriginal people for the majority of their hospitals.*
*Source: Emergency Department Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

## 5.3 (b) Emergency Department timeliness of treatment

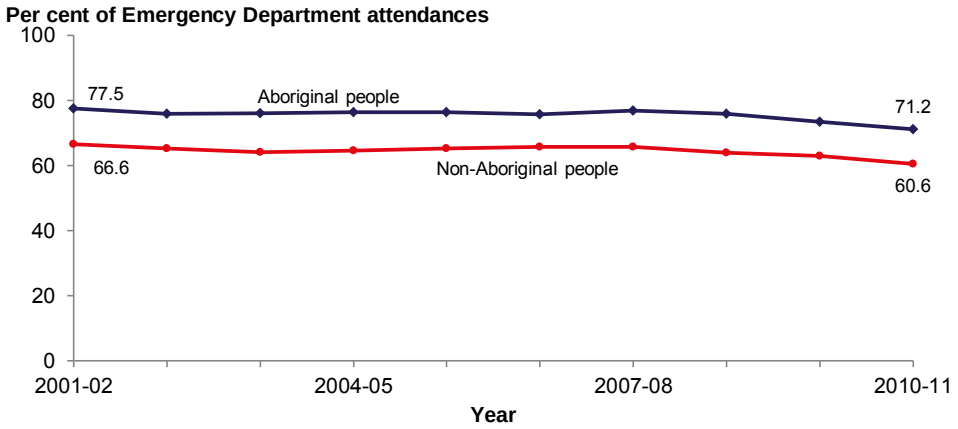
**Health issue:** Emergency Department timeliness of treatment can be assessed in terms of the amount of time taken for clients assigned to each triage category to be admitted, referred or discharged from the Emergency Department. The proportion of Emergency Department patients who are admitted, referred or discharged within 4 hours of presentation, those categorised as Triage 3 who are treated within benchmark times, and those requiring admissions to mental health inpatient care who are admitted within 8 hours, are all key performance indicators for Local Health Districts in NSW.

**Health disparity:** In NSW in 2010-11, the proportion of Emergency Department attendances who were admitted, referred, or discharged within 4 hours of presentation was 71% for Aboriginal people and 61% for non-Aboriginal people (Figure 85). This difference is significant,

with Aboriginal people 1.2 times more likely to be admitted, referred, or discharged within 4 hours of presentation than non-Aboriginal people.

In NSW in 2010-11, the proportion of Emergency Department attendances categorised as Triage 3 (people with potentially life threatening conditions who require treatment within 30 minutes) who were treated within benchmark times was 69% for Aboriginal people and 72% for non-Aboriginal people. This difference is not significant. In 2010-11, the proportion of Emergency Department patients who required admission to hospital to mental health inpatient care, and were admitted within 8 hours, was 74% for Aboriginal people and 70% for non-Aboriginal people. This difference is not significant.

**Figure 85: Emergency Department patients admitted, referred or discharged within 4 hours by Aboriginality, NSW, 2001-02 to 2010-11**




***Source:*** *Emergency Department Data Collection (HIE). Demand and Performance Evaluation Branch, NSW Ministry of Health.*

## 5.3 (c) Emergency Department re-presentations

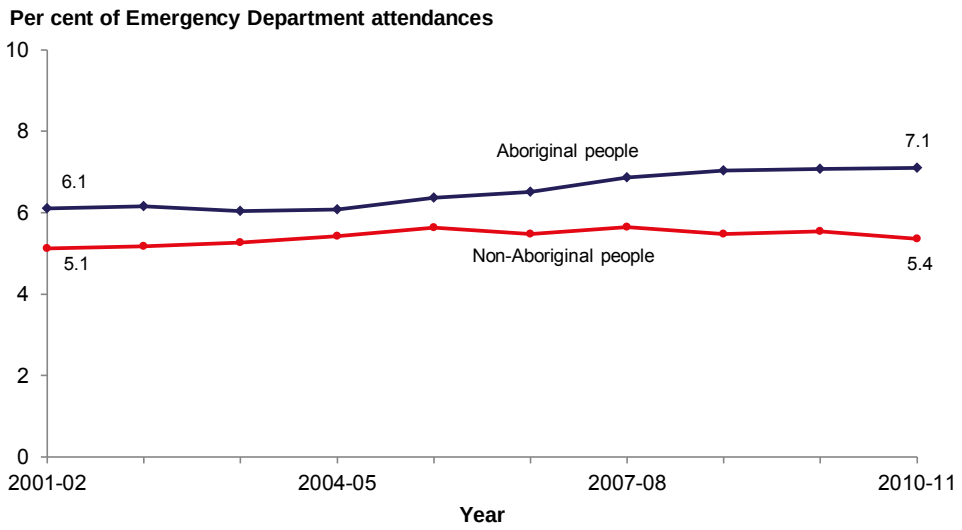
**Health issue:** An Emergency Department re-presentation is when a patient returns to an Emergency Department less than 48 hours after previously presenting to the same Emergency Department. 'Unplanned Emergency Department re-presentations to the same Emergency Department within 48 hours' is a key performance indicator for Local Health Districts in NSW. The indicator provides information on the effectiveness of Emergency Department care, and the adequacy of primary health-care follow-up for clients after attendance to an Emergency Department.

**Health disparity:** In 2010-11, the proportion of re-presentations to the same Emergency Department within 48 hours was 7.1% for Aboriginal people and 5.4% for non-Aboriginal people. This is a significant difference, with Aboriginal people 1.3 times more likely to re-present than non-Aboriginal people. Over the past 10 years there has been a significant

increase in the rate of Emergency Department re-presentations for Aboriginal people, from 6.1% in 2001-02, and the gap between the rates for Aboriginal and non-Aboriginal people has significantly increased (Figure 86). The five Local Health Districts with the highest proportion of Emergency Department representations in 2010-11 were: Western NSW (8.0%), Northern Sydney (8.2%), Far West (8.3%), Murrumbidgee (8.8%), and Hunter New England (7.6%) (Figure 87, Table 8).

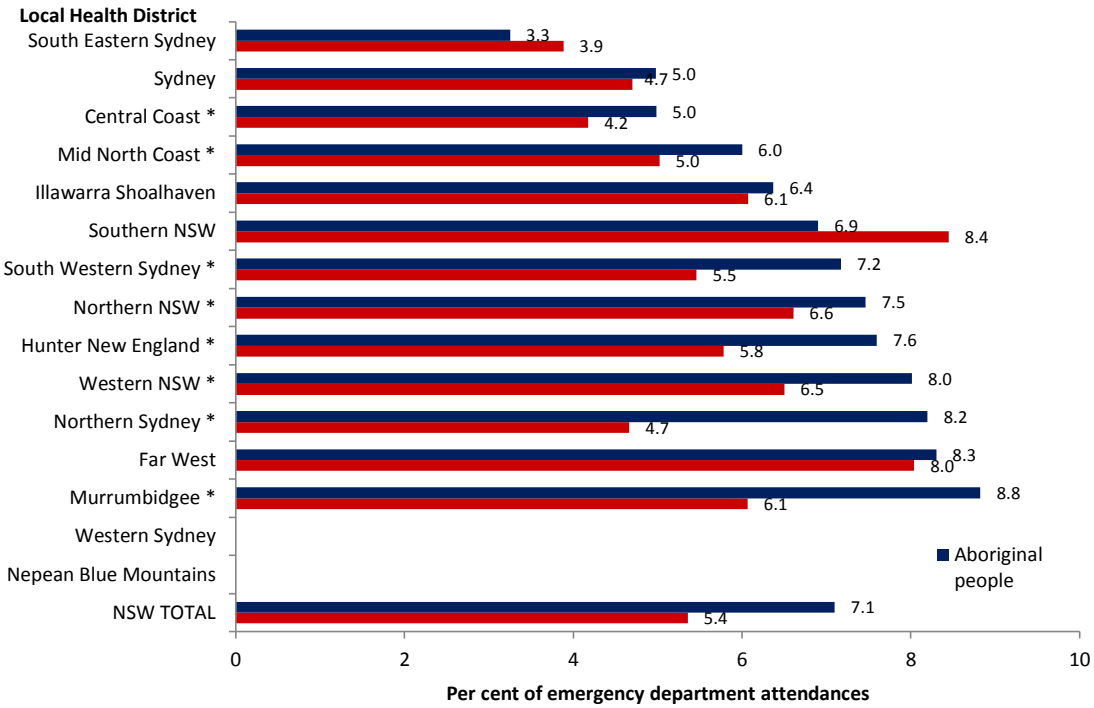
**Closing the gap:** In 2010-11 there were 973 more cases of Emergency Department re-presentations for Aboriginal people than would have been expected if Aboriginal and non-Aboriginal people had the same re-presentation rate. The total number of representations for Aboriginal people was 3963. At the Local Health District level, the higher rate resulted in 400 additional re-presentations in Hunter New England that would have needed to have been prevented through appropriate care, 96 in Western NSW, and 56 in Mid North Coast (Table 8).

**Figure 86: Emergency Department re-presentations where the patient returns to an Emergency Department less than 48 hours after previously presenting to the same Emergency Department by Aboriginality, NSW, 2001-02 to 2010-11**




*Source: Emergency Department Data Collection (HIE). Demand and Performance Evaluation Branch, NSW Ministry of Health.*

**Figure 87: Emergency Department re-presentations where the patient returns to an Emergency Department less than 48 hours after previously presenting to the same Emergency Department by Aboriginality and Local Health District of residence, NSW, 2001-02 to 2010-11**




*Note: Western Sydney and Nepean Blue Mountains Local Health Districts are unable to provide information on Emergency Department attendances for Aboriginal people*
***Source:*** *Emergency Department Data Collection (HIE). Demand and Performance Evaluation Branch, NSW Ministry of Health.*

**Table 8: Emergency Department re-presentations where the patient returns to an Emergency Department less than 48 hours after previously presenting to the same Emergency Department by Aboriginality and Local Health District of residence, percentage of attendances, NSW, 2008-09 to 2010-11**

| NSW Local Health District | Aboriginal people | | | Non-Aboriginal people | Number needed to be prevented to close the gap[#] |
|---|---|---|---|---|---|
| | 2008-09 % | 2009-10 % | 2010-11 % | 2010-11 % | 2010-11 |
| Central Coast | 3.4 | 4.4 | 5.0 | 4.2 | 23 |
| Far West | 5.7 | 8.0 | 8.3 | 8.0 | 3 |
| Hunter New England | 8.2 | 7.9 | 7.6 | 5.8 | 400 |
| Illawarra Shoalhaven | 5.9 | 6.4 | 6.4 | 6.1 | 12 |
| Mid North Coast | 5.7 | 7.0 | 6.0 | 5.0 | 56 |
| Murrumbidgee | 6.9 | 6.0 | 8.8 | 6.1 | 77 |
| Nepean Blue Mountains | NA | NA | NA | NA | NA |
| Northern NSW | 7.3 | 7.7 | 7.5 | 6.6 | 35 |
| Northern Sydney | 3.6 | 6.2 | 8.2 | 4.7 | 13 |
| South Eastern Sydney | 4.6 | 4.7 | 3.3 | 3.9 | NA |
| South Western Sydney | 6.1 | 6.9 | 7.2 | 5.5 | 44 |
| Southern NSW | 6.1 | 4.4 | 6.9 | 8.4 | NA |
| Sydney | 4.9 | 6.4 | 5.0 | 4.7 | 4 |
| Western NSW | 7.1 | 6.7 | 8.0 | 6.5 | 96 |
| Western Sydney | NA | NA | NA | NA | NA |
| NSW TOTAL | 7.0 | 7.1 | 7.1 | 5.4 | 973 |

*[#] Number of Emergency Department representations for Aboriginal people in 2010-11 that were required to be avoided in order to close the gap in representation rates between Aboriginal and non-Aboriginal at the State and Local Health District level.*
*Note: Western Sydney and Nepean Blue Mountains Local Health Districts are unable to provide information on Emergency Department attendances for Aboriginal people.*
*NA: Not Available.*
*Source: Emergency Department Data Collection (HIE). Demand and Performance Evaluation Branch, NSW Ministry of Health.*

# 5.4 Mothers and babies

Chapter 1 summarises infant and child mortality rates for Aboriginal and non-Aboriginal children, and Chapter 2 summarises key maternal, infant, and young children's health indicators for Aboriginal and non-Aboriginal children for NSW. In this section, three key indicators in maternal and child health are reported at the Local Health District level: antenatal care attendance, smoking during pregnancy, and low birth-weight babies.

## 5.4 (a) Antenatal care

**The health issue**: Antenatal care is provided to pregnant women by primary health-care providers and includes recording medical history, assessment of individual needs, advice and guidance on pregnancy and delivery, screening tests, education on self-care during pregnancy,

identification of conditions detrimental to health during pregnancy, first-line management and referral if necessary (WHO 2006). Antenatal care is important for monitoring the health of the mother and baby, and providing advice to promote health, and identify complications with pregnancy so that appropriate care can be provided at the earliest time.

**Health disparity:** In 2010, the five Local Health Districts with the lowest rates of attendance to antenatal care before 14 weeks' gestation for Aboriginal women were: Sydney (48%), South Western Sydney (54%), Mid North Coast (66%), Western NSW (66%), and South Eastern Sydney (70%) (Table 9).

**Closing the gap:** For the proportion of antenatal visits before 14 weeks' gestation to be the same for Aboriginal and non-Aboriginal women in 2010, an additional 18 Aboriginal women in Sydney needed to attend an antenatal visit before 14 weeks' gestation, 46 more Aboriginal women in Mid North Coast, 107 more Aboriginal women in Western NSW, and 3 more Aboriginal women in South Eastern Sydney (Table 9).

**Table 9: First antenatal visit before 14 weeks' gestation by mother's Aboriginality and Local Health District of residence, percentage of mothers, NSW, 2008 to 2010**

| NSW Local Health District | Aboriginal women | | | Non-Aboriginal women | Number needed to close the health gap[#] |
|---|---|---|---|---|---|
| | 2008 % | 2009 % | 2010 % | 2010 % | 2010 |
| Central Coast | 82 | 86.4 | 80 | 89 | 11 |
| Far West | 60.8 | 54.3 | 72.2 | 83 | 6 |
| Hunter New England | 67.7 | 70.8 | 71.2 | 84.7 | 108 |
| Illawarra Shoalhaven | 76.3 | 74.7 | 84 | 82.6 | NA |
| Mid North Coast | 70 | 66.2 | 65.9 | 86.7 | 46 |
| Murrumbidgee | 69.7 | 65.6 | 74.8 | 88.1 | 21 |
| Nepean Blue Mountains | 85 | 80.5 | 85.7 | 89.8 | 5 |
| Northern NSW | 68.1 | 73.9 | 75 | 87.4 | 27 |
| Northern Sydney | 81 | 85.7 | 77.8 | 86.6 | 3 |
| South Eastern Sydney | 52.6 | 57.8 | 69.6 | 73.4 | 3 |
| South Western Sydney | 67.6 | 51.2 | 54 | 53.8 | 0 |
| Southern NSW | 53.4 | 63.2 | 69.8 | 83 | 11 |
| Sydney | 49 | 34.3 | 48.3 | 69.5 | 18 |
| Western NSW | 62.9 | 68.7 | 66.3 | 87.1 | 107 |
| Western Sydney | 77.1 | 84.2 | 79.4 | 92.4 | 27 |
| NSW TOTAL | 68.7 | 69.2 | 71.3 | 79.6 | 257 |

*[#] Number of additional Aboriginal mothers in 2010 that would have been required to attend antenatal care before 14 weeks' gestation in order to close the gap in antenatal attendance rates between Aboriginal and non-Aboriginal mothers at the State and Local Health District level.*
*NA: Not Applicable.*
*Source: NSW Perinatal Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

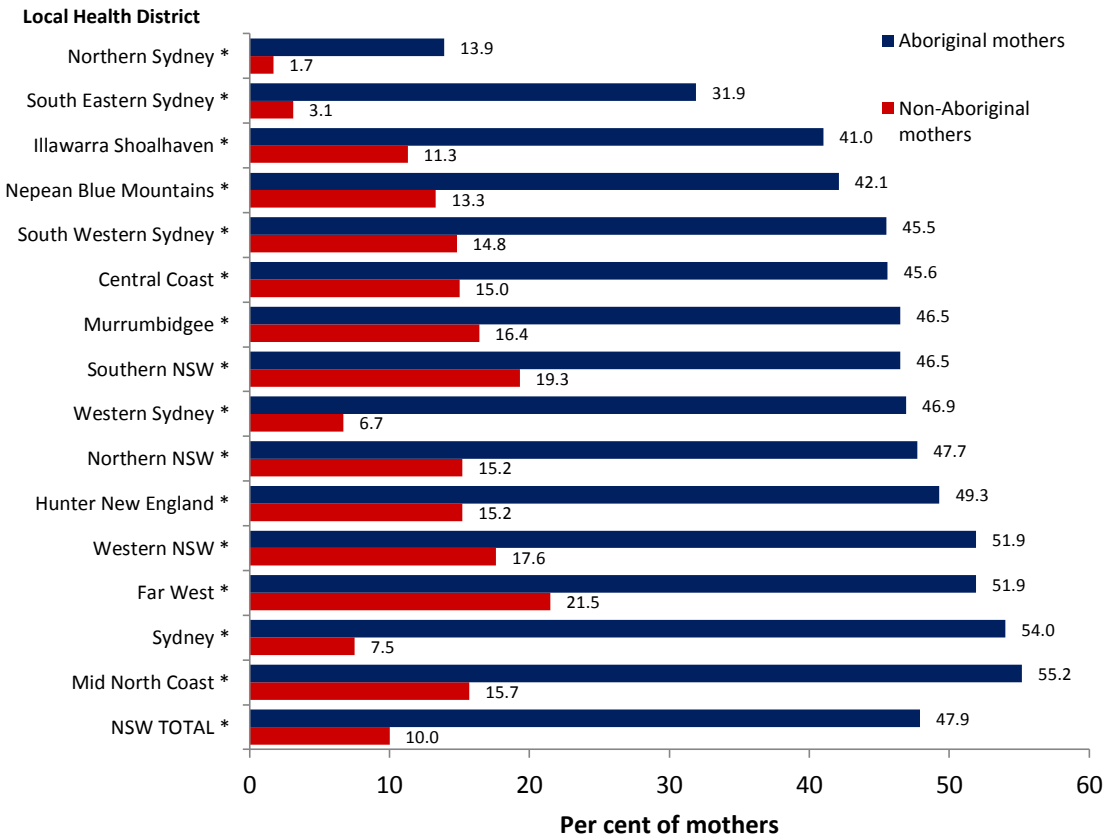
## 5.4 (b) Smoking during pregnancy

**The health issue:** Maternal smoking during pregnancy increases the risk of adverse outcomes for both the mother and the child. For the mother, smoking during pregnancy increases the risk of placental abruption, placenta praevia, preterm labour and preterm rupture of membranes (Laws et al. 2006; British Medical Association 2004). For the baby, a mother's smoking during pregnancy is a risk factor for intrauterine growth retardation, low birth-weight, preterm delivery, perinatal death, and sudden infant death syndrome.

**Health disparity:** At the Local Health District level in 2010, the five Local Health Districts with the highest rates of smoking during pregnancy for Aboriginal women were: Mid North Coast (55%), Sydney (54%), Far West (52%), Western NSW (52%), and Hunter New England (49%) (Figure 86, Table 10).

**Closing the gap:** For smoking rates to be the same for pregnant Aboriginal and non-Aboriginal women at the Local Health District level in 2010, there would need to have been 88 fewer Aboriginal women smoking during pregnancy in the North Coast, 40 fewer in Sydney, 16 fewer in Far West, 176 in Western NSW, and 274 fewer in Hunter New England (Table 10).

**Figure 88: Smoking during pregnancy by mother's Aboriginality and Local Health District of residence, NSW, 2010**




** Indicates that the difference between Aboriginal and non-Aboriginal mothers is significant*
*Source: NSW Perinatal Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Table 10: Smoking during pregnancy by mother's Aboriginality and Local Health District of residence, percentage of mothers, NSW, 2008 to 2010**

| NSW Local Health District | Aboriginal women | | | Non-Aboriginal women | Number fewer needed to close the gap* |
|---|---|---|---|---|---|
| | 2008 % | 2009 % | 2010 % | 2010 % | 2010 |
| Central Coast | 41.0 | 40.0 | 45.6 | 15.0 | 38 |
| Far West | 68.6 | 71.4 | 51.9 | 21.5 | 16 |
| Hunter New England | 52.1 | 52.3 | 49.3 | 15.2 | 274 |
| Illawarra Shoalhaven | 48.4 | 48.2 | 41.0 | 11.3 | 56 |
| Mid North Coast | 51.2 | 54.7 | 55.2 | 15.7 | 88 |
| Murrumbidgee | 46.7 | 50.3 | 46.5 | 16.4 | 47 |
| Nepean Blue Mountains | 43.6 | 50.4 | 42.1 | 13.3 | 36 |
| Northern NSW | 50.5 | 46.8 | 47.7 | 15.2 | 70 |
| Northern Sydney | 9.5 | 21.4 | 13.9 | 1.7 | 4 |
| South Eastern Sydney | 24.6 | 37.5 | 31.9 | 3.1 | 20 |
| South Western Sydney | 52.6 | 48.2 | 45.5 | 14.8 | 54 |
| Southern NSW | 58.6 | 60.3 | 46.5 | 19.3 | 23 |
| Sydney | 50.0 | 52.4 | 54.0 | 7.5 | 40 |
| Western NSW | 55.3 | 51.4 | 51.9 | 17.6 | 176 |
| Western Sydney | 47.3 | 49.8 | 46.9 | 6.7 | 84 |
| NSW TOTAL | 50.2 | 50.5 | 47.9 | 10.0 | 1172 |

** Number of fewer occurrences of smoking in pregnancy in Aboriginal pregnant women in 2010 required to close the gap in smoking in pregnancy rates between Aboriginal and non-Aboriginal women at the State and Local Health District level.*
*Source: NSW Perinatal Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

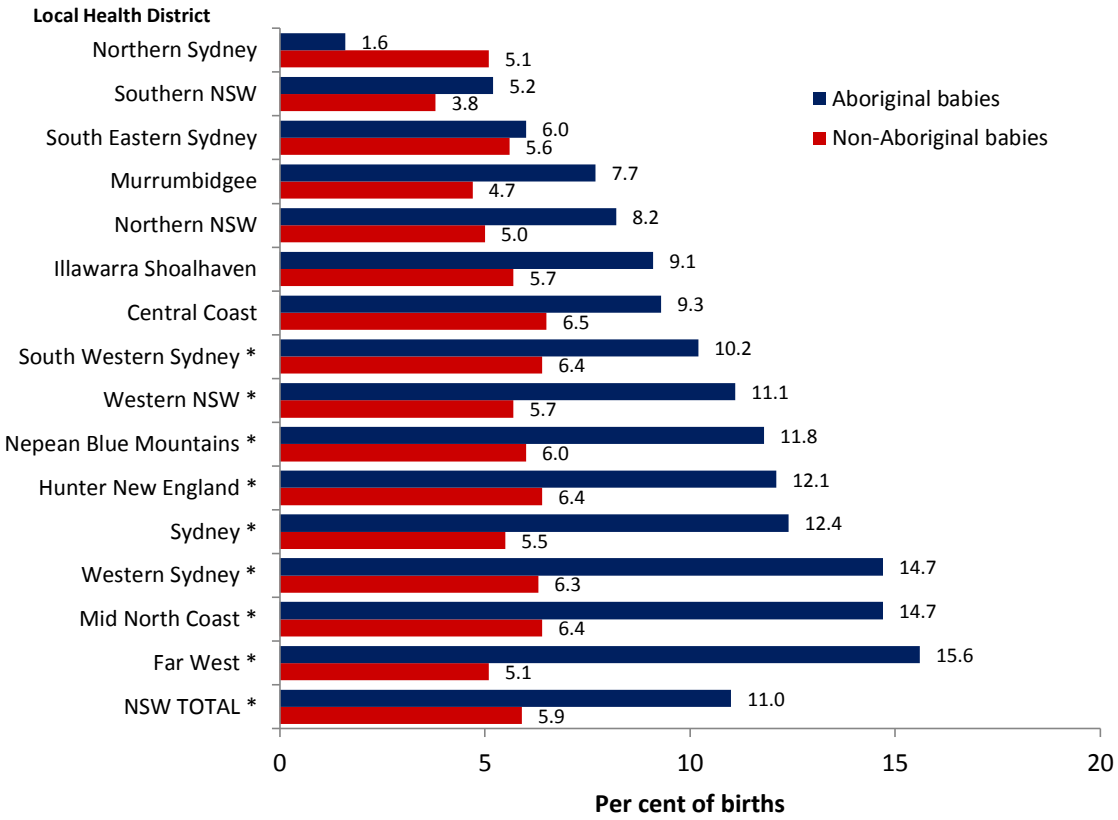
## 5.4 (c) Low birth-weight babies

**The health issue:** *Low birth-weight babies are those born with a weight of less than 2500 grams.* Low birth-weight babies have a greater risk of poor health and mortality, require longer hospitalisation after birth, and are more likely to develop disabilities. See Chapter 4 for more information on low birth-weight babies.

**Health disparity:** The five Local Health Districts with the highest proportion of low birth-weight babies born to Aboriginal mothers are Far West (15.6%), Mid North Coast (14.7%), Western Sydney (14.7%), Sydney (12.4%), and Hunter New England (12.1%) (Figure 89, Table 11).

**Closing the gap:** For rates of low birth-weight babies born to Aboriginal and non-Aboriginal mothers to be the same in the period 2009 to 2010, five fewer occurrences of low birth-weight would have been required among babies born to Aboriginal mothers in Far West Local Health District, 19 fewer in Mid North Coast, 17 fewer in Western Sydney, 7 fewer in Sydney, and 42 fewer in Hunter New England (Table 11).

**Figure 89: Low birth-weight babies by mother's Aboriginality and Local Health District of residence, NSW, 2009 to 2010 combined**




** Indicates that the difference between Aboriginal and non-Aboriginal people is significant*
*Source: NSW Perinatal Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Table 11: Low birth-weight babies by mother's Aboriginality and Local Health District of residence, combined 2-year per cent of births, NSW, 2007 to 2010**

| NSW Local Health District | Aboriginal babies | | | Non-Aboriginal babies | Number fewer needed to close the gap* |
|---|---|---|---|---|---|
| | 2007 to 2008 % | 2008 to 2009 % | 2009 to 2010 % | 2009 to 2010 % | 2009 to 2010 |
| Central Coast | 12.4 | 9.4 | 9.3 | 6.5 | 3 |
| Far West | 12.5 | 10.3 | 15.6 | 5.1 | 5 |
| Hunter New England | 12.9 | 12.3 | 12.1 | 6.4 | 42 |
| Illawarra Shoalhaven | 8.4 | 9.6 | 9.1 | 5.7 | 6 |
| Mid North Coast | 13.3 | 12.8 | 14.7 | 6.4 | 19 |
| Murrumbidgee | 9.6 | 9.9 | 7.7 | 4.7 | 5 |
| Nepean Blue Mountains | 8.8 | 9.7 | 11.8 | 6.0 | 7 |
| Northern NSW | 10.9 | 8.7 | 8.2 | 5.0 | 7 |
| Northern Sydney | 0.0 | 2.0 | 1.6 | 5.1 | NA |
| South Eastern Sydney | 10.3 | 9.7 | 6.0 | 5.6 | 0 |
| South Western Sydney | 14.1 | 13.0 | 10.2 | 6.4 | 7 |
| Southern NSW | 12.0 | 11.0 | 5.2 | 3.8 | 1 |
| Sydney | 15.9 | 14.8 | 12.4 | 5.5 | 7 |
| Western NSW | 11.8 | 10.8 | 11.1 | 5.7 | 29 |
| Western Sydney | 12.0 | 10.6 | 14.7 | 6.3 | 17 |
| NSW TOTAL | 11.8 | 11.2 | 11.0 | 5.9 | 160 |

** Number of fewer occurrences of low birth-weight in babies born to Aboriginal mothers in the period 2009 to 2010 required to close the gap in low birth-weight rates between babies born to Aboriginal and non-Aboriginal mothers at the State and Local Health District level.*
*NA: Not Applicable.*
*Source: NSW Perinatal Data Collection (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.*

# 5.5 Reporting of Aboriginal people in NSW Health data

Reliable data on the health of Aboriginal people are essential for measuring the effectiveness of health services in meeting the health needs of Aboriginal people and achieving equitable health outcomes. Correct and consistent reporting of Aboriginal and Torres Strait Islander peoples in administrative data sets is required to meet these outcomes. The *National best practice guidelines for collecting Indigenous status in health data sets* (AIHW 2010) describes self-report in response to a standard Indigenous status question as the most accurate means of ascertaining if a person identifies as being of Aboriginal or Torres Strait Islander origin, and outlines clearly how to ask the question, record the response, and put the guidelines into practice.

Under-reporting occurs when Aboriginal and Torres Strait Islander origin information is not correctly recorded for all clients. Aboriginal and Torres Strait Islander peoples are known to be under-reported in population-based data collections in NSW. In all other chapters of this report, the term 'Aboriginal people' has been used when describing the health of Aboriginal and Torres Strait Islander people in NSW, as Aboriginal people are the original inhabitants of NSW. For this section, the term 'Aboriginal and Torres Strait Islander peoples' is used, as it relates to the accurate recording of people in NSW who identify as Aboriginal and Torres Strait Islander peoples.

**Improved reporting of Aboriginal and Torres Strait Islander peoples from population data sets using record linkage:** The NSW Ministry of Health has developed a method to improve the reporting of Aboriginal and Torres Strait Islander peoples from administrative data collections using record linkage, by using information from linked administrative data sets to update information on whether a person is Aboriginal (Neville et al. 2011). Record linkage was carried out by the Centre for Health Record Linkage (CHeReL)(CHeReL 2012) using the following data collections: Registry of Births Deaths and Marriages (RBDM) birth registration data; NSW Perinatal Data Collection; Australian Bureau of Statistics (ABS) death registration data; NSW Admitted Patient Data Collection; NSW Emergency Department Data Collection; and the NSW Central Cancer Registry.

Enhanced reporting relies on having independent sources of information on whether a person is an Aboriginal or Torres Strait Islander. Each independent report was counted as a 'unit of

information' that contributed to the weight of evidence as to whether a person was reported as Aboriginal or Torres Strait Islander.

The following algorithm was used:

(1) Where a person is reported as Aboriginal or Torres Strait Islander on the data set of interest this is accepted as reported; otherwise

(2) (a) If the person has three or more units of information, at least two indicating that the person is Aboriginal or Torres Strait Islander are required to report the person as Aboriginal or Torres Strait Islander; otherwise

(b) one unit of information is sufficient to report the person as Aboriginal or Torres Strait Islander.

Where a data set may contain more than one unit of information for a person, part (1) of the algorithm is modified to read: 'where a person is *always* reported as Aboriginal of Torres Strait Islander this is accepted as reported'.

It is important to note that this methodology is not able to recognise or include Aboriginal people who have not been previously reported as Aboriginal in any of the linked data collections, and as a result the levels of reporting calculated may be an over-estimate of the true value.

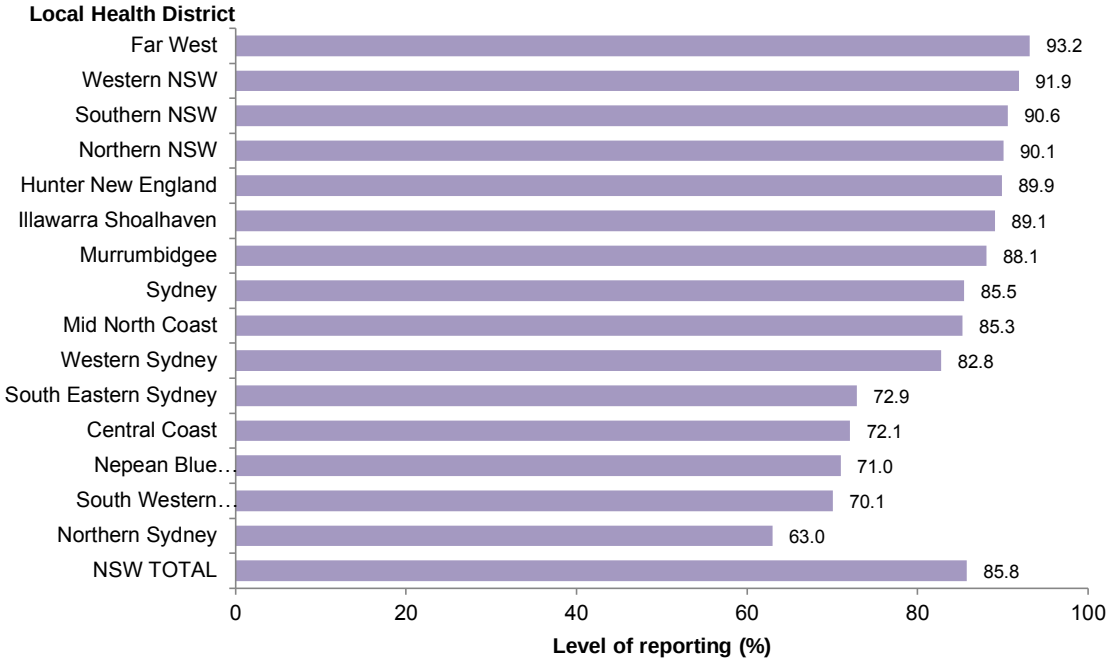
The estimated level of correct reporting for Aboriginal people in the Admitted Patients Data Collection in NSW in 2008 was 85.8% (Table 12, Figure 88). The estimated level of correct reporting for Aboriginal people in the Emergency Department Data Collection in NSW in 2008 was 70.6% (Table 12, Figure 89). The estimated level of correct reporting in the Perinatal Data Collection for Aboriginal mothers was 93.10% (Table 12, Figure 90). The estimated level of correct reporting for each data collection by Local Health Districts is shown in Table 12 and Figures 90–92.

**Table 12: The estimated level of reporting of Aboriginal people in the health data collections by Local Health Districts, NSW, identified through the improved reporting of Aboriginal and Torres Strait Islander peoples on population data sets using the record linkage project, 2007-2008**

| NSW Local Health District | Admitted Patient Data Collection | Emergency Department Data Collection | Perinatal Data Collection (mothers) |
|---|---|---|---|
| | 2007-08 % | 2007-08 % | 2008 % |
| Central Coast | 72.1 | 74.8 | 98.2 |
| Far West | 93.2 | 88.8 | 94.6 |
| Hunter New England | 89.9 | 82.3 | 95.5 |
| Illawarra Shoalhaven | 89.1 | 73.4 | 95.6 |
| Mid North Coast | 85.3 | 75.5 | 96.7 |
| Murrumbidgee | 88.1 | 87.9 | 85.9 |
| Nepean Blue Mountains | 71.0 | 22.8 | 97.0 |
| Northern NSW | 90.1 | 62.9 | 93.0 |
| Northern Sydney | 63.0 | 43.3 | 92.9 |
| South Eastern Sydney | 72.9 | 41.6 | 90.5 |
| South Western Sydney | 70.1 | 51.1 | 91.8 |
| Southern NSW | 90.6 | 63.5 | 78.9 |
| Sydney | 85.5 | 80.0 | 96.3 |
| Western NSW | 91.9 | 83.0 | 90.8 |
| Western Sydney | 82.8 | NA | 89.9 |
| NSW TOTAL | 85.8 | 70.6 | 93.1 |

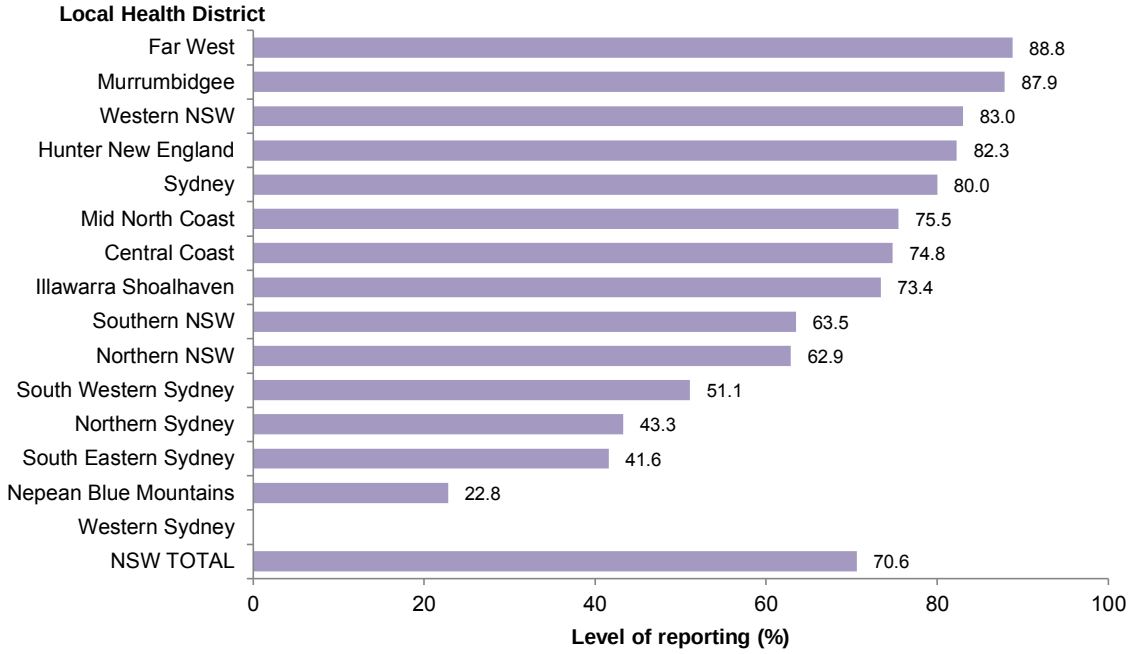
*NA: Not Available – Western Sydney Local Health District was unable to provide information on Emergency Department attendances among Aboriginal people to the Emergency Department Data Collection.*
*Source: Linked records of NSW Admitted Patient Data, NSW Emergency Department Data Collection, NSW Perinatal Data Collection, Australian Bureau of Statistics death registration data and Registry of Births, Deaths and Marriages birth registration data. Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 90: Estimated level of reporting in the Admitted Patient Data Collection by Local Health District, NSW, 2007-08**



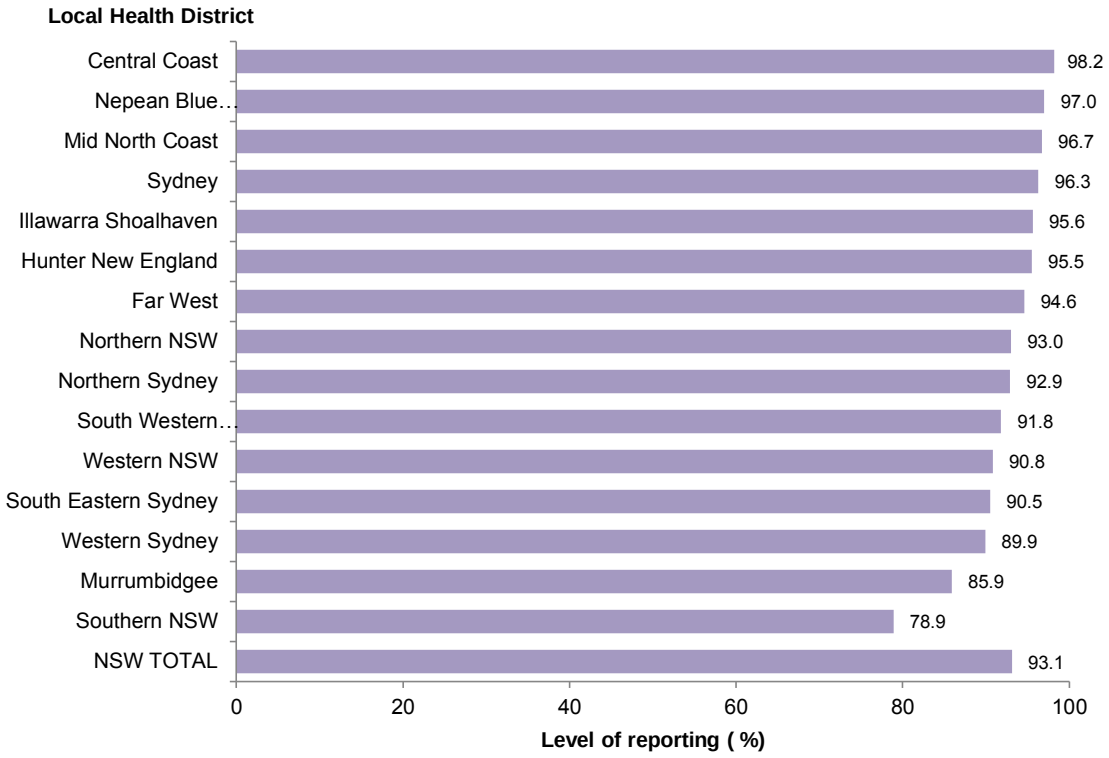

*Source: Records of NSW Admitted Patient Data linked with records of the NSW Emergency Department Data Collection, NSW Perinatal Data Collection, Australian Bureau of Statistics death registration data and Registry of Births, Deaths and Marriages birth registration data. Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 91: Estimated level of reporting in the Emergency Department Data Collection by Local Health District, NSW, 2007-08**




*Source: NSW Emergency Department Data Collection (EDDC) for 2007-08 linked with records of the NSW Admitted Patient Data, NSW Emergency Department Data Collection (2005-2007), NSW Perinatal Data Collection and Registry of Births, Deaths and Marriages birth registration data. Centre for Epidemiology and Evidence, NSW Ministry of Health.*

**Figure 92: Estimated Level of reporting of babies born to Aboriginal and Torres Strait Islander mothers on the Perinatal Data Collection by Local Health District, NSW, 2008**




*Source: NSW Perinatal Data Collection records linked with records of NSW Admitted Patient Data (birth record only) and Registry of Births, Deaths and Marriages birth registration data. Centre for Epidemiology and Evidence, NSW Ministry of Health.*

# 5.6 Workforce

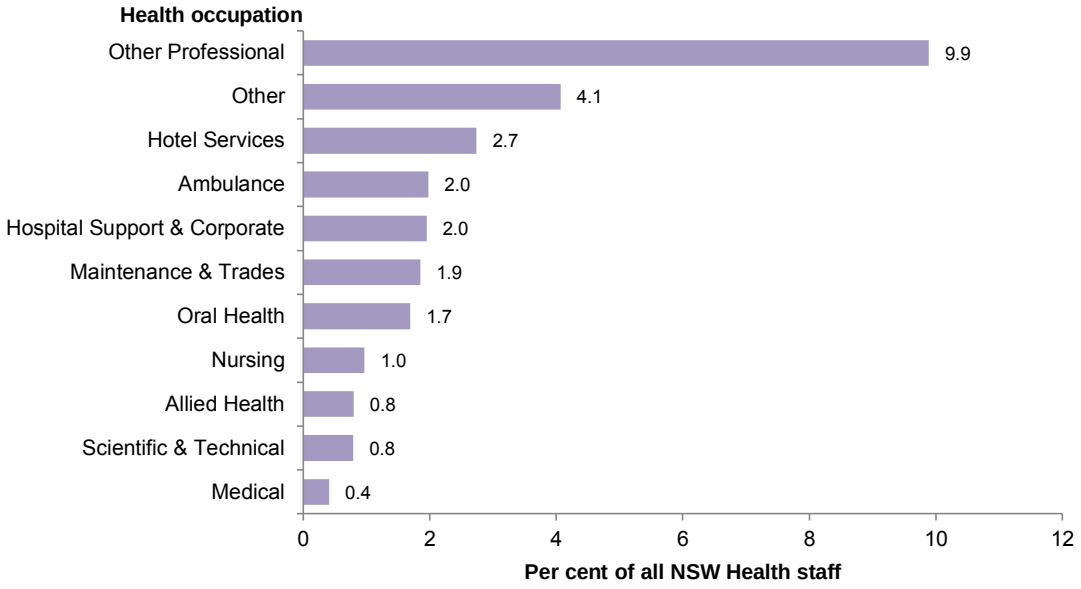
**The health issue:** Increasing the proportion of Aboriginal people in the health workforce in NSW will support the economic and social wellbeing of Aboriginal people, and will enable NSW health services to provide culturally safe and competent health services to Aboriginal people. Aboriginal people are best placed to determine and define the mechanics of support, assistance and delivery of health needs for Aboriginal individuals and communities. The engagement and support of the Aboriginal workforce is crucial in providing effective health services in NSW (NSW Health 2011).

In 2009 the NSW Government agreed to a whole-of-government Aboriginal workforce participation target of 2.6% by 2015, in line with the 2009 Council of Australian Governments (COAG) decision and ongoing state and national reporting requirements.

**Current status:** In 2011 NSW Health had 1721 Aboriginal employees, up from 1313 in 2007, 1304 in 2008, 1626 in 2009 and 1618 in 2010. Figure 91 shows the percentage of NSW Health staff who identified as Aboriginal people in 2011, by health occupation. Of all ambulance staff, 2.0% identified as Aboriginal. Of all nurses, 1.0% identified as Aboriginal, and of all medical staff, 0.4% identified as Aboriginal. Of all those included in the 'Other Professional' occupation group, 9.9% identified as Aboriginal, as this grouping includes a number of Aboriginal-identified roles including Aboriginal health coordinators and Aboriginal health education officers. Of all those included in the 'Other' group, 4.1% identified as Aboriginal, this group includes staff not included in any other grouping such as child-care workers, librarians and teachers.

**Closing the gap:** Aboriginal employees currently make up 1.8% of the NSW health workforce. To achieve 2.6% representation, an increase of a further 1400 Aboriginal employees is needed by 2015. This is the equivalent to an additional 280 people per year across NSW Health.

**Figure 93: NSW Health staff who identify as Aboriginal people, by health occupation, 2011**




*Other professional: employees that are not included in medical, nursing and allied health professions, who provide, plan or support the provision of patient care, such as Aboriginal health co-ordinators and Aboriginal health education officers.*
*Other: employees not grouped elsewhere, such as child-care workers, librarians and teachers.*
*Hotel Services: employees who provide non-clinical services that include food services, cleaning, transport, care parking, security, linen, waste management and retail services.*
*Source: Health Information Exchange (HIE), NSW Ministry of Health*

# Appendix 1: Methods

Appendix One of *the "The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012"* describes all Methods used in the Report. The statistical methods and data limitations described that are relevant to the indicators and analyses included in this thesis are replicated below:

### 1.1 Statistical Methods:

**Crude rates and percentages:** 'Crude rates' represent an estimate of the proportion of a population that experiences an outcome during a specified period. They are calculated by dividing the number of people with an outcome 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. This is particularly relevant when considering comparisons between the Aboriginal and non-Aboriginal population, as the Aboriginal population has a higher proportion of younger people and a smaller proportion of older people.

**Age-standardised rates:** Age-adjustment of rates uses 'direct age-standardisation'. This method adjusts for the 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 (5-year age group) rates, where the weighting factor is the corresponding age-specific population. For this Report, the Australian estimated residential population (persons) as at 30 June 2001 was used as the standard population. The same population was used for males and females to allow valid comparison of age-standardised rates between the sexes.

**Analysis of trend in key population health indicators:** Trends in Aboriginal people and the gap between Aboriginal and non-Aboriginal people were assessed using regression techniques to look for a trend over time. Poisson or negative-binomial regression models were used to analyse age- and sex-adjusted trends in death rates, hospital separation rates, and communicable disease notification rates, depending on over-dispersion (Chiang 1984). A significance level of 5% was used to identify significant trends over time.

**Numbers needed to close the gap between Aboriginal and non-Aboriginal people:** Where the indicator is a crude rate or proportion, it was possible to calculate the number of additional (or fewer) events that would need to have occurred in the most recent year for the rate for the Aboriginal population to be equal to the rate for the non-Aboriginal population.

This calculation was done by multiplying the difference in rates between the Aboriginal and non-Aboriginal populations by the Aboriginal rate denominator for that year. Where the indicator is related to health service delivery, and is an age-standardised rate, the number of additional (or fewer) events required for the age-standardised rate for the Aboriginal population to equal the age-standardised rate for the non-Aboriginal population was also estimated. This calculation was done by applying the non-Aboriginal 5-year age-specific rate to the Aboriginal age-specific population, calculating the difference between these results and the number of events observed in each Aboriginal age group.

The number of additional (or fewer) events within each age group were then summed. This method assumes that the age-distribution of the indicator is the same in the Aboriginal and non-Aboriginal populations. Where there was a known difference in age-distribution, the numbers were adjusted accordingly.

High numbers needed to close the health gap may reflect a large Aboriginal population in a given area, such as a Local Health District, a large disparity between Aboriginal and non-Aboriginal people, or both. Note that due to age-standardisation and some imputation for recent years of hospitalisation data, the numbers needed to close the health gap within a Local Health District will not necessarily add up to the numbers needed to close the health gap statewide.

**Small area:** The term 'small area' refers to a small geographical area and a small population. Data from a small area are characterised by considerable variability. 'Smoothing' is a general term for statistical methods used to reduce the random variability of data. Examples include rounding, moving averages, extending the period of time in which cases are counted or increasing the size of the areas. To address this issue, in most cases in this Report, data were combined over a number of years, and the average of these reported.

**Analysis of differences between Aboriginal and non-Aboriginal people within each Local Health District:** The following is relevant for indicators related to health service delivery. To determine whether differences were significant:

- Where the indicator is a crude rate or proportion it was possible to test whether the observed proportion for the Aboriginal population in the most recent year or time interval was equal to the observed proportion in the non-Aboriginal population. The hypothesis tested was whether number of cases within the Aboriginal population for a given Local Health District came from a binomial distribution with probability equal to the observed proportion in the non-Aboriginal population.
- Where the indicator is an age-standardised rate, the standardised rate ratio was used to compare the difference between the age-standardised rate in the Aboriginal population (the numerator) and the age-standardised rate in the non-Aboriginal population (the denominator).

## 1.2 Data Limitations

This Report is based on the best available data at the time of publication. However the following data limitations should be considered when reading the Report.

**Timeliness of data:** For some indicators there is a long delay in the availability of data. At the time of publication, perinatal data was available to 2010, and admitted patient data was available to 2010–11, with interstate hospitalisations included to 2008–09 only, and imputation used for 2009–10 and 2010–11.

**Under-reporting of Aboriginal people in administrative data:** The under-reporting or identification of Aboriginal and Torres Strait Islander people is an ongoing issue in most administrative data collections including hospital morbidity and mortality data collections. Under-reporting is due to various factors, for example, whether the Indigenous status question is asked in the first instance, consistency in the way the question is asked, and the choice to respond. Work is underway to improve data quality; however caution should be exercised in the interpretation of the data presented in this Report, particularly estimates of trends over time, mortality data and indicators that report using small numbers.

In the primary care setting, only a minority of general practitioners have effective routine Aboriginal identification processes in place. Therefore, any data generated on Aboriginal people through general practice are currently problematic and have not been reported in this Report.

**Small numbers:** Some indicators in this Report relate to rare events in the Aboriginal population, particularly when Local Health District populations or narrow age groups are analysed. Analysis of rare events leads to small sample sizes for some indicators, and instability in rates between years. While methods have been used to account for this, only the most robust estimates have been reported.

# Appendix 2: Indicator Notes

This section provides a detailed description of each indicator, including its definition, explanatory notes, the data sources used, and where additional information can be sourced. Additional methods specific to each indicator are also described here.

| INDICATOR | DEFINITION | NOTES | DATA SOURCE | FOR MORE INFORMATION |
|---|---|---|---|---|
| Potentially preventable hospitalisations | Numerator: Hospital admissions where a diagnosis was potentially preventable (ICD-10-AM codes). Denominator: ABS population estimates (SAPHaRI). Rates are age-adjusted. | After July 2010, numbers and rates were affected by changes in coding standards for diabetes, a substantial contributor to total preventable hospitalisations (see data note in Chapter 4, Figure 47) | NSW Admitted Patient Data Collection and ABS Population estimates (SAPHaRI). | Health Statistics NSW; Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| Unplanned readmissions | Numerator: The total number of unplanned admissions with admission date within reference period and patient previously discharged from the same facility in previous 28 days for any other purpose than mental health, chemotherapy, or dialysis. Denominator: Total number of admissions within reference period, excluding mental health, chemotherapy, or dialysis. | Patients with change of care type, patients who are transfers from other hospitals, and patients in small hospitals (facilities with peer groups below D2) are also excluded. | NSW Admitted Patient Data Collection (HIE). | Demand and Performance Evaluation Branch, NSW Ministry of Health. |
| Hospitalisations ending with discharge against medical advice | Numerator: Number of hospitalisations resulting in discharge against medical advice. Denominator: Total number of hospitalisations. | | NSW Admitted Patient Data Collection (SAPHaRI). | Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| Access to high volume surgical procedures | Numerator: The number of high volume surgical procedures (abdominal hysterectomy, appendectomy, arthroplasty of the hip, arthroplasty of the knee, arthroscopic menisectomy of the knee, caesarean section, cholecystectomy, colectomy, coronary artery bypass, curettage of the uterus, destruction procedures on the cervix, endarterectomy, fracture of the femur, major lens procedures, myringotomy, procedures for haemorrhoids, release of carpal tunnel, repair of abdominal aneurysm, repair of inguinal hernia, repair of tendon of the hand, repair of umbilical, epigastric or linea alba hernia, transluminal coronary angioplasty, transurethral prostatectomy, tonsillectomy or adenoidectomy and vaginal hysterectomy). Denominator: ABS population estimates (SAPHaRI). Rates are age-adjusted. | The 26 'high volume surgical procedures' were selected by key stakeholders in the NSW Ministry of Health in 2010. Some procedures included are medium volume but high cost. | NSW Admitted Patient Data Collection (SAPHaRI) | Centre for Epidemiology and Evidence, NSW Ministry of Health |
| Revascularisation procedures | Numerator: Number of revascularisation procedures (coronary artery bypass graft or angioplasty). Denominator: Hospital admissions where a diagnosis was coronary heart disease (ICD-10-AM codes). | Data are collated into 5-year time periods due to low numbers | NSW Admitted Patient Data Collection (SAPHaRI). | Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| Cataract procedures | Numerator: The number of cataract operations conducted (identified by The Australian Classification of Health Interventions (7th Ed) procedure code blocks 195–200). Denominator: ABS population estimates (SAPHaRI). Rates are age-adjusted. | | NSW Admitted Patient Data Collection and ABS population estimates (SAPHaRI). | Centre for Epidemiology and Evidence, NSW Ministry of Health. |

| | | | | |
|---|---|---|---|---|
| Total knee and total hip replacement surgery | Numerator: Number of total hip and total knee replacement operations.<br>Denominator: ABS population estimates (SAPHaRI).<br>Rates are age-adjusted. | Data are collated into 5-year time periods due to low numbers | NSW Admitted Patient Data Collection and ABS population estimates (SAPHaRI). | Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| Rehabilitation episodes of care | Numerator: Number of separations coded as rehabilitation for people aged 55 years or over.<br>Denominator: ABS population estimates (SAPHaRI).<br>Rates are age-adjusted. | | NSW Admitted Patient Data Collection and ABS population estimates (SAPHaRI). | Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| Emergency Department attendances resulting in 'did not wait' or 'left at own risk' | Numerator: Number of people who attended Emergency Department but did not wait or left at own risk.<br>Denominator: All Emergency Department attendances in NSW. | | NSW Emergency Department Data Collection (SAPHaRI). | Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| Emergency Department patients admitted/referred/discharged within 4 hours | Numerator: All patients who have a length of stay from presentation time to actual departure time of less than or equal to 4 hours.<br>Denominator: The total number of Emergency Department presentations reported in the reporting period. | | NSW Emergency Department Data Collection (HIE). | Demand and Performance Evaluation Branch, NSW Ministry of Health. |
| Emergency Department re-presentations | Numerator: Number of unplanned Emergency Department presentations where the previous Emergency Department presentation of the same patient to the same facility was in the previous 48 hours and resulted in the patient returning home following treatment.<br>Denominator: Number of Emergency Department presentations where the patient returned home following treatment. | | NSW Emergency Department Data Collection (HIE). | Demand and Performance Evaluation Branch, NSW Ministry of Health. |
| First antenatal visit before 14 weeks' gestation | Numerator: Number of women who attended at least 1 antenatal visit in the first trimester (up to and including 13 completed weeks) and gave birth to at least one live-born or stillborn baby in a calendar year.<br>Denominator: Total number of women who gave birth to at least one live-born or stillborn baby in a calendar year. | | NSW Perinatal Data Collection (SAPHaRI). | Health Statistics NSW; Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| Smoking during pregnancy | Numerator: Number of women who reported smoking during pregnancy.<br>Denominator: Total number of women who gave birth to at least one live-born or stillborn baby in a calendar year. | | NSW Perinatal Data Collection (SAPHaRI) | Health Statistics NSW; Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| Low birth-weight babies | Numerator: Number of low birth-weight babies (less than 2500 grams).<br>Denominator: Total number of births (live births and stillbirths). | | NSW Perinatal Data Collection (SAPHaRI) | Health Statistics NSW; Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| Estimated level of identification in the Admitted Patient Data Collection | Numerator: The number of hospitalisation records on the Admitted Patient Data Collection that were identified as Aboriginal people.<br>Denominator: Estimated number of Aboriginal records according to the algorithm. | The algorithm used with the linked datasets for the NSW Admitted Patient Data Collection was:<br>1. where a person is always reported as Aboriginal or Torres Strait Islander on the Emergency Department Data Collection this is accepted as reported;<br>2. otherwise:<br>a) if the person has three or more units of information, at least two indicating that the person is Aboriginal or Torres Strait Islander are required to | NSW Admitted Patient Data, NSW Emergency Department Data Collection, NSW Perinatal Data Collection, ABS death registration data and Registry of Births, Deaths and Marriages birth registration data. | Centre for Epidemiology and Evidence, NSW Ministry of Health. |

| | | | | |
|---|---|---|---|---|
| | | report the person as Aboriginal or Torres Strait Islander; or<br>b) if the person has one or two units of information, one is sufficient to report the person as Aboriginal or Torres Strait Islander. | | |
| Estimated level of identification in the Emergency Department Data Collection | Numerator: The number of admission records on the Emergency Department Data Collection that were identified as Aboriginal people.<br>Denominator: Estimated number of Aboriginal records according to the algorithm. | The algorithm used with the linked datasets for the NSW Emergency Department Data Collection was:<br>1. where a person is always reported as Aboriginal or Torres Strait Islander on the Emergency Department Data Collection this is accepted as reported;<br>2. otherwise:<br>a) if the person has three or more units of information, at least two indicating that the person is Aboriginal or Torres Strait Islander are required to report the person as Aboriginal or Torres Strait Islander; or<br>b) if the person has one or two units of information, one is sufficient to report the person as Aboriginal or Torres Strait Islander. | NSW Admitted Patient Data, NSW Emergency Department Data Collection, NSW Perinatal Data Collection, ABS death registration data and Registry of Births, Deaths and Marriages birth registration data. | Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| Estimated level of identification in the Perinatal Data Collection | Numerator: The number of Aboriginal and Torres Strait Islander babies born that were reported on the Perinatal Data Collection.<br>Denominator: Estimated number of births according to the algorithm. | The algorithm used with the linked datasets for the NSW Emergency Department Data Collection was:<br>1. where a baby is reported as Aboriginal or Torres Strait Islander on the Perinatal Data Collection data this is accepted as reported;<br>2. otherwise:<br>a) if the baby has three or more units of information, at least two indicating that the baby is Aboriginal or Torres Strait Islander are required to report the baby as Aboriginal or Torres Strait Islander; or<br>b) if the baby has one or two units of information, one is sufficient to report the baby as Aboriginal or Torres Strait Islander. | NSW Admitted Patient Data, NSW Emergency Department Data Collection, NSW Perinatal Data Collection, ABS death registration data and Registry of Births, Deaths and Marriages birth registration data. | Centre for Epidemiology and Evidence, NSW Ministry of Health. |
| NSW Health staff who identify as Aboriginal | Numerator: Number of NSW Health staff who have identified as Aboriginal.<br>Denominator: Total number of NSW Health staff. | Aboriginal workforce data are collected through the NSW Ministry of Health's Health Information Exchange (HIE) and by Local Health Districts, networks and other public health organisations. | Health Information Exchange (HIE), NSW Health. | Workforce Planning and Development, NSW Ministry of Health. |

# References

[ABS] Australian Bureau of Statistics. 2006. 4715.0 National Aboriginal and Torres Strait Islander Health Survey, 2004–05. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/4715.0 (Cited 26 June 2012).

[AHMAC] Australian Health Ministers' Advisory Council. 2011. Aboriginal and Torres Strait Islander Health Performance Framework. 2010 Report. Canberra: Australian Health Ministers' Advisory Council (AHMAC).

[AIHW] Australian Institute of Health and Welfare. 2007. A picture of osteoarthritis in Australia. Arthritis series Number 5. AIHW cat. no. PHE 93. Canberra: Australian Institute of Health and Welfare.

[AIHW] Australian Institute of Health and Welfare. 2010. National best practice guidelines for collecting Indigenous status in health data sets. AIHW cat. no. IHW 29. Canberra: Australian Institute of Health and Welfare.

Betancourt JR, Green AR, Carrillo JE, Ananeh-Firempong O 2nd. 2003. Defining cultural competence: a practical framework for addressing racial / ethnic disparities in health and health care. Public Health Report 118:293-302.

British Medical Association. 2004. Smoking and reproductive life: the impact of smoking on sexual, reproductive and child health. London: Board of Science and Education and Tobacco Control Resource Centre.

[CHeReL] Centre for Health Record Linkage [internet]. 2012. Available at: http://www.cherel.org.au (Cited 8 April 2012).

Choi M, Kim H, Qan H, Palepu A. 2011. Readmission rates of patients discharged against medical advice: a matched cohort study. PLoS One 6(9):e24459. Epub 2011 Sep 8.

Coory MD, Walsh WF. 2005. Rates of percutaneous coronary interventions and bypass surgery after acute myocardial infarction in Indigenous patients. Med J Aust 182;507-12.

[COAG] Council of Australian Governments. 2008. National Health Care Agreement. Intergovernmental agreement on federal financial relations 2003–08. Available at: http://www.health.gov.au/internet/main/publishing.nsf/Content/health-ahca-agreement.htm (Cited 26 June 2012).

[COAG] Council of Australian Governments. 2009. National Indigenous Reform Agreement (Closing the Gap). Intergovernmental agreement on federal financial relations. Available at: http://www.coag.gov.au/coag_meeting_outcomes/2009–07-02/docs/NIRA_closing_the_gap.pdf (Cited 26 June 2012).

Cunningham J. 2002. Diagnostic and therapeutic procedures among Australian hospital patients identified as Indigenous. Med J Aust 176:58-62.

Ding R, Jung JJ, Kirsch TD, Levy F, McCarthy ML. 2007. Uncompleted emergency department care: patients who leave against medical advice. Acad Emerg Med 14;870–6.

Dixon T, Urquhart DM, Berry P, Bhatia K, Wang Y, Graves S, et al. 2011. Variation in rates of hip and knee replacement in Australia based on socio-economic status, geographical locality, birthplace and indigenous status. ANZ J Surg 81:26-31.

Foster M, Tilse C, Fleming J. 2004. Referral to rehabilitation following traumatic brain injury: practitioners and the process of decision making. Soc Sci Med 59:1867-78.

Glasgow JM, Vaughn-Serrazin M, Kaboli P. 2010. Leaving against medical advice (AMA): risk of 30–day mortality and hospital readmission. J Gen Intern Med 25:926-9.

Katzenellenbogen JM, Vos T, Somerford P, Begg S, Semmens JB, Codde JP. 2011. Burden of stroke in Indigenous Western Australians: a study using data linkage. Stroke 42:1515-21.

Hall J, Jelinek GA. 2007. Characteristics and outcomes of patients who "did not wait" after attending Perth public hospital emergency departments 2000–2003. Med J Aust 187:626-9.

Laws PJ, Grayson N, Sullivan EA. 2006. Smoking and pregnancy. AIHW cat. no. PER 33. Sydney: Australian Institute of Health and Welfare.

Neville SE, Taylor LK, Moore H, Madden R, Ring I, Pulver LJ, et al. 2011. Using linkage between hospital and ABS mortality data to enhance reporting of deaths among Aboriginal and Torres Strait Islander peoples. Aust NZ J Public Health 35(6):543-8.

New PW, Poulos CJ. 2008. Functional improvement of the Australian health care system - can rehabilitation help? Med J Aust 189:340–3.

NSW Government. 2011. NSW 2021: A plan to make NSW number one [internet]. Available at: http://2021.nsw.gov.au/sites/default/files/NSW2021_WEB%20VERSION.pdf (Cited 17 June 2012).

Porter J, Herring J, Lacroix J, Levinton C. 2007. Avoidable admissions and repeat admissions: what do they tell us? Healthc Q 10:26-8.

Taylor HR, Xie J, Arnold AL, Goujon, N., Dunn RA, Fox S, et al. 2010. Cataract in indigenous Australians: the National Indigenous Eye Health Survey. Clin Experiment Ophthalmol 38:790–5.

van Walvaren C, Bennett C, Jennings A, Austin P, Forster A. 2011. Proportion of hospital admissions deemed avoidable: a systematic review. CMAJ 183:E391-402.

[WHO] World Health Organization. 2006. Health Services Coverage Statistics. Antenatal care coverage (%). Available at:
http://www.who.int/whosis/whostat2006AntenatalCareCoverage.pdf (Cited 27 June 2012).

[WHO] World Health Organization. 2007. Global initiative for the elimination of avoidable blindness. Action plan 2006–2011.

Yeates KE, Cass A, Sequist TD, McDonald SP, Jardine MJ, Trpeski L, et al. 2009. Indigenous people in Australia, Canada, New Zealand and the United States are less likely to receive renal transplantation. Kidney Internat 76:58

# Chapter Five: Influenza Vaccination during Pregnancy in central and south-western Sydney

## Introduction

In June 2012 I commenced my final placement for the NSW Public Health Officer Training Program at the Sydney and South Western Sydney Local Health Districts' Public Health Unit (PHU), where I was to undertake workplace projects in the areas of communicable diseases, epidemiology and biostatistics, and risk assessment. This chapter describes two research studies undertaken during this placement, concerning influenza vaccination during pregnancy.

### Project Overview:

Influenza infection during pregnancy is associated with increased risk of complications for both mother and baby. Routine seasonal influenza vaccination for all pregnant women is recommended in order to reduce the risk of serious complications [1], and the vaccine is available free of charge to pregnant women. However, estimates of vaccine uptake during pregnancy in Australia are low [2-6]. Previous studies indicate that pregnant women who receive a recommendation for the influenza vaccine from a health care worker are significantly more likely to receive the vaccine [6-10].

In March 2012 the South Western Sydney and Sydney Local Health Districts Public Health Unit implemented a number of strategies to promote influenza vaccination during pregnancy in their region. These strategies targeted both antenatal care providers and pregnant women. General practitioners (GPs) are the main providers of the vaccine in NSW, and a letter was sent a letter to all GPs in the region, encouraging them to recommend influenza vaccine to women in their care who are pregnant or planning a pregnancy. Brochures promoting influenza

vaccination during pregnancy were distributed to all antenatal providers in the region, for them to make available to their patients [11], and translated versions were developed A reminder stamp regarding influenza vaccination was included in patients' ante-natal care record cards.

There is no routine system to monitor the uptake influenza vaccination during pregnancy, therefore the PHU had no information on vaccination coverage rates during pregnancy in this region in the years prior to the implementation of these strategies, and were not aware of what issues influenced vaccination uptake. Therefore this project was designed to investigate influenza vaccine coverage and factors influencing vaccine uptake in pregnant women, and also to investigate the perspectives of GPs towards influenza vaccination during pregnant.

The aims of this study were:

1. To ascertain the coverage of influenza vaccination in pregnant women in the South Western Sydney and Sydney Local Health Districts during the 2012 influenza season, and to identify associated factors.
2. To investigate the knowledge, attitudes, beliefs, and practices of general practitioners in Australia towards influenza vaccination during pregnancy.

There were two components of this project, undertaken to meet these aims:

1. A quantitative component involving a telephone survey of 462 post-partum women who had delivered a baby in Sydney and South-Western Sydney Local Health Districts' hospitals in the period 1 June – 30 September, 2012 was conducted in December 2012.
2. A qualitative component involving semi-structured interviews with 17 general practitioners was conducted in September 2012.

The survey identified that 25% of women interviewed had received an influenza vaccination during their pregnancy. Women who had received a recommendation from their health care provider were 32 times more likely to have received the vaccination. The interviews with general practitioners revealed that these doctors have varied knowledge and perceptions about influenza vaccination during pregnancy, and that more than half of the general practitioners had significant concerns about the safety of the vaccination during pregnancy.

In conjunction with these two research projects, I conducted a review of current and potential surveillance strategies to monitor influenza uptake during pregnancy in the Local Health Districts. The overall project required close consultation with senior representatives from the areas Obstetrics, Gynaecology, and Women's Health from the Sydney and South Western Sydney Local Health Districts for the project development, approval, and dissemination of results; through these consultations, discussions also considered how to improve surveillance and develop a routinely collected surveillance system. From early 2013 the two Local Health Districts are trialling the inclusion of information about receipt of the influenza vaccine during pregnancy into their electronic medical record systems for the perinatal period.

## Project Impact:

This project resulted in two main project outputs:

1. Published Paper: Influenza vaccination during pregnancy: coverage rates and influencing factors in two urban districts in Sydney *Vaccine.* In press.

2. Manuscript: Influenza Vaccination during Pregnancy: the attitudes and practices of general practitioners in central and south-western Sydney. Submitted to *BMC Family Practice*

In addition, I presented an oral presentation entitled "Influenza vaccination during pregnancy in south-western Sydney" at the Communicable Diseases Control Conference in Canberra in March 2013.

The results of these research projects will be used to develop targeted strategies, aimed at both pregnant women and ante-natal care providers, to improve uptake of influenza vaccination during pregnancy. The PHU is liaising with the Local Health Districts and the relevant Medicare Locals to disseminate results and consider potential strategies to implement. The new surveillance system will enable monitoring of uptake of influenza vaccination during pregnancy, and evaluation of the effectiveness of strategies implemented which aim to improve these rates.

## Project Reflections:

Implementing this project enabled me to further develop my skills in epidemiological research design, implementation, and analysis. Project management was the most challenging aspect of this project, and it was a significant achievement to develop the project, obtain project approval and funding, implement the project, and analyse and report on the results, in a relatively short time frame. The component which required the most significant skill development and learning from me was the data analysis component – essentially I learned how to manipulate and analyse quantitative data using SAS Enterprise Guide, and how to order and analyse qualitative data using N-VIVO, in order to in order to complete these studies. This thesis charts the trajectory of my skills development in applied professional practice in public health, as the chapters are presented chronologically as the projects were conducted. It is my impression that the studies reported in this chapter are of superior quality in terms of project design, methods, implementation, analysis, and reporting, in comparison to the studies reported in Chapters 2 and 3.

Conducting the surveillance system analysis was also an essential component of the project, and one that will assist the Local Health Districts to improve event monitoring, and enable them to monitor, improve, and evaluate influenza vaccination coverage rates in the future. Surveys are valuable as they provide not only estimates of vaccine uptake but also information about the knowledge, attitudes, and experiences of women, however conducting such a survey is resource intensive, and alternative solutions to routine surveillance of influenza vaccination during pregnancy need to be considered and implemented. It is encouraging that these Local Health Districts are willing to trial a potential solution.

The survey of post-partum women demonstrates the significant influence of the ante-natal health care provider on the uptake of influenza vaccination during pregnancy. Women who receive an antenatal health care provider recommendation are significantly more likely to take up the vaccine than those who do not receive such a recommendation, however only one third of pregnant women are receiving any recommendation. Our study provides information on vaccine coverage and influencing factors for a large and diverse population across Sydney and the results confirm the findings of single-site studies conducted elsewhere in Australia, in particular the strong potential influence of the antenatal care provider. While the strong

influence of the provider recommendation on influenza vaccine uptake during pregnancy is becoming accepted knowledge, little was known about the perceptions of GPs in Australia who are the main provider or avenue through whom pregnant women may access the influenza vaccine. To our knowledge, the qualitative study the first study to ascertain the attitudes, perceptions, and practices of Australian general practitioners towards influenza vaccination during pregnancy, and the qualitative methods enabled us to capture rich information on their perspectives which could not have been garnered from a written survey. A strong finding was in relation to risk perception, with GPs perceiving the risks associated with maternal influenza infection to be lower than the evidence suggests, while their perception of the risks associated with the vaccine are higher than evidence suggests. Their concerns, as now identified through this project, need to be addressed in order to improve rates of recommendation and uptake. The results from these studies are a significant contribution to previous existing knowledge about this issue.

## Limitations

The limitations of each study are clearly defined within each paper in the main body of this chapter.

## Contributions and acknowledgements:

The project design, implementation, analysis, and reporting was completed primarily by myself. I am the first author of the two manuscripts submitted for publication. The project was supported by an unrestricted educational grant from the pharmaceutical company Sanofi Pasteur. The Hunter Valley Research Foundation was contracted by the Public Health Unit to undertake the survey of post-partum women. Representatives from the Foundation developed the Computer Assisted Telephone Interviewing tool required to implement the survey.

The following people made the following contributions to this project:

- Dr Kirsty Hope: Placement supervisor. Provided guidance on the project design, implementation, analysis, and reporting. Data analysis for the qualitative component. Co-author of both manuscripts.
- Dr Stephen Conaty: PHU Director. Project oversight. Guidance on the project design, implementation, analysis, and reporting. Co-author of both manuscripts.
- Dr Siranda Torvaldsen, University of New South Wales: Guidance on the project design, implementation, analysis, and reporting. Co-author of both manuscripts.
- Dr Glenda Lawrence, University of New South Wales: Guidance on the project design, implementation, analysis, and reporting. Co-author of both manuscripts.
- Dr Angela Dawson, University of New South Wales, NSW: Guidance on the project design, implementation, analysis, and reporting. Data analysis for the qualitative component. Co-author of both manuscripts.
- Ms Kerrie Wiley: Guidance on the project design, implementation, analysis, and reporting. Data analysis for the qualitative component. Co-author of both manuscripts.
- Ms Deborah Thomson: Provided context specific information on maternal and child health and vaccination delivery in the Local Health Districts. Guidance on the project design and interpretation of results. Secondary author of manuscript reporting the survey results.
- Dr Andrew Hayen: Statistical advice and review for the quantitative component. Co-author of manuscript reporting the survey results.
- Mr David Lee: Provided assistance in co-ordinating the administrative requirements of the project, in particular in regard to contract management with Sanofi Pasteur and the Hunter Valley Research Foundation.
- Ms Claire Hogue: Managed the project for the Hunter Valley Research Foundation.

## Ethics Approval:

This project was approved by the Sydney Local Health District Human Research Ethics Committee (RPAH Zone), and received Site Specific Approval from the Research Governance Offices of South-Western Sydney and Sydney Local Health Districts. In addition, the ethics approval was ratified by the University of New South Wales Human Research Ethics Committee. The ethics approval letters are reproduced in Appendix 2.

## Chapter Overview:

The body of this chapter is comprised of two main pieces of work:

- Chapter Five Part A (Page 283): Maher L, Hope K, Torvaldsen S, Lawrence G, Dawson A, Wiley K, Thomson D, Hayen A, Conaty S. Influenza vaccination during pregnancy: coverage rates and influencing factors in two urban districts in Sydney. *Vaccine.* In press.

- Chapter Five Part B (Page 301): Maher L, Dawson A, Wiley K, Hope K, Torvaldsen S, Lawrence G, Conaty S: Influenza Vaccination during Pregnancy: the attitudes and practices of general practitioners in central and south-western Sydney.

At the time of thesis completion, both of these manuscripts have been submitted to journals for publication, the first paper is in press with *Vaccine* and the second paper is currently under review. As both of these components are likely to be published in the current form, and are due to be available in the public domain, the submitted versions have been reproduced as submitted (with revised formatting only) in the following sections. As with other chapters in this thesis, all reports or papers which have been published or submitted and are available in the public domain have been boxed to demonstrate that they are final pieces of work.

## References (for Introduction):

[1] Royal Australian and New Zealand College of Obstetrics and Gynecology, Influenza vaccination for pregnant women C-Obs 45. Available from http://www.ranzcog.edu.au/womens-health/statements-a-guidelines/new-a-revised-statements-and-guidelines/744-influenzavaccinationforpregnantwomenc-obs45.html
[2] Mak DB, Daly AM, Armstrong PK, and Effler PV. Pandemic (H1N1) 2009 influenza vaccination coverage in Western Australia. *Medical Journal of Australia.* 193 (7): 401-404.
[3] White S, Petersen R, Quinlivan J. Pandemic (H1N1) 2009 influenza vaccine uptake in pregnant women entering the 2010 influenza season in Western Australia. *Medical Journal of Australia* 2010; 193: 405–407

[4] McCarthy, E. A., Pollock, W. E., Nolan, T., Hay, S. and McDonald, S. Improving influenza vaccination coverage in pregnancy in Melbourne 2010–2011. *Australian and New Zealand Journal of Obstetrics and Gynaecology*. (2012). doi: 10.1111/j.1479-828X.2012.01428.x

[5] Lu AB, Halim AA, Dendle C, Kotsanas D, Giles ML, Wallace EM, Buttery JP, and Stuart RL. Influenza vaccination uptake amongst pregnant women and maternal care providers is suboptimal. *Vaccine.* 2012. 30: 4055-4059.

[6] Wiley K, Massey PD, Cooper Robbins SC, Wood N, Ho J, Quinn HE, Leask J. Uptake of influenza vaccine by pregnant women: A cross-sectional survey with implications for policy and practice. *In press.*

[7] Blanchard-Rohner G, Meier S, Ryser J, Schaller D, Combescure C, Yudin MH, Burton-Jeangros C, de Tejada BM, Siegrist CA. Acceptability of maternal immunization against influenza: the critical role of obstetricians. J Matern Fetal Neonatal Med. 2012 Sep;25(9):1800-9. doi: 10.3109/14767058.2012.663835. Epub 2012 Mar 16.

[8] Dlugacz Y, Fleischer A, Carney MT, et al. 2009 H1N1 vaccination by pregnant women during the 2009-10 H1N1 influenza pandemic. Am J Obstet Gynecol 2012;206:339.e1-8.

[9] Lau J, Caia Y, Tsuia H, Choia K. Prevalence of influenza vaccination and associated factors among pregnant women in Hong Kong. Vaccine. 2010. 28: 5389–5397

[10] Ding H, Santibanez T, Jamieson D, Weinbaum C, Euler G, Grohskopf L, Lu P, Singleton J. Influenza vaccination coverage among pregnant women–National 2009 H1N1 Flu Survey (NHFS). American Journal of Obstetrics & Gynaecology. 2011: June: S96-S106.

[11] NSW Ministry of Health. Influenza Vaccination during Pregnancy. Protect you and your baby from influenza (flu). Brochure. Available at http://www0.health.nsw.gov.au/resources/publichealth/infectious/influenza/pdf/flu_vacc_eng_broch_may12.pdf. Accessed 28/02/2013.

# Chapter Five Part A:

# Manuscript: "Influenza vaccination during pregnancy: coverage rates and influencing factors in two urban districts in Sydney"

## Influenza vaccination during pregnancy: coverage rates and influencing factors in two urban districts in Sydney

Maher L, Hope K, Torvaldsen S, Lawrence G, Dawson A, Wiley K, Thomson D, Hayen A, Conaty S.

Submitted to: *Vaccine.*

# ABSTRACT:

**Background:** Pregnant women have an increased risk of complications from influenza. Influenza vaccination during pregnancy is considered effective and safe; however estimates of vaccine coverage are low. This study aimed to determine influenza vaccination coverage and factors associated with vaccine uptake in pregnant women in two Sydney-based health districts.

**Methods:** A random sample of women who delivered a baby in a public hospital in Sydney and South-Western Sydney Local Health Districts between June and September 2012 were surveyed using a computer assisted telephone interviewing service.

**Results:** Of the 462 participants (participation rate 92%), 116 (25%) reported receiving the influenza vaccine during their pregnancy. In univariate analysis, vaccination coverage varied significantly depending on antenatal care type, hospital of birth, and parity ($p<0.05$), but not for age category, highest level of education, country of birth, language spoken at home, or Aboriginal status. Women who received antenatal care through a general practitioner (GP) had 2.3 (95% CI 1.4-3.6) times the odds (unadjusted) of receiving the influenza vaccination than those who received their antenatal care through a public hospital. The main reason cited for vaccination was GP recommendation (37%), while non-recommendation (33%) and lack of knowledge (26%) were cited as main reasons for not receiving the vaccination. 30% of women recalled receiving a recommendation for the vaccination from an antenatal provider and these women had 33.0 times the odds (unadjusted) of receiving the vaccination than women who had not received a recommendation. In a multivariate model a provider recommendation was the only variable that was significantly associated with vaccination (OR 41.9; 95% CI 20.7-84.9). Of all women, 55% had concerns about vaccine safety, and a significantly lower proportion of these women received the influenza vaccinate than those without safety concerns ($p<0.05$).

**Conclusion:** Rates of influenza vaccination during pregnancy are low. There is a significant relationship between healthcare provider recommendation for the vaccination and vaccine uptake. Increasing provider recommendation rates has the potential to increase coverage rates of influenza vaccination in pregnant women.

## INTRODUCTION:

Influenza infection during pregnancy is associated with increased risk of complications for both mother and baby, including respiratory and cardio-pulmonary illness requiring hospitalisation, pre-term delivery, foetal distress, and in severe cases, death. [1-7] Influenza vaccination during pregnancy is considered safe for both the mother and the foetus for use in any trimester of pregnancy. [8-11] Influenza vaccination during pregnancy protects pregnant women and their infants from severe influenza infection, significantly reducing respiratory illnesses in both the mothers and their infants in the first six months of life. [12-14]

Routine seasonal influenza vaccination for all pregnant women is recommended in Australia by health authorities [15,16] and the Royal Australian and New Zealand College of Obstetrics and Gynaecology. [17] Despite the influenza vaccine being free of charge for all pregnant women in Australia, vaccine uptake during pregnancy is low, with coverage rates estimated to be between 10 to 40%. [18-22] Multiple factors influence vaccine uptake during pregnancy, with women more likely to receive the influenza vaccine during pregnancy if they perceive themselves to be at higher risk of influenza complications during pregnancy, perceive the vaccination to be safe, have received an influenza vaccinate before, and receive a recommendation from a healthcare provider.[21-26]

There is no surveillance of influenza vaccination during pregnancy in Australia hence most available data are derived from single-site surveys conducted in ante-natal care facilities or post-natal hospital wards. [19-21] Strategies to improve awareness about influenza vaccination during pregnancy in both antenatal care providers and pregnant women, including a letter, brochures, poster, and a reminder stamp in records, were implemented across central and south-western Sydney in early 2012. [27] However, little information is available on vaccination uptake and associated factors in this population. This study was designed to ascertain the coverage of influenza vaccination in pregnant women central and south-western Sydney during the 2012 influenza season, and to identify factors that affect vaccine uptake for these women.

## METHODS:

A cross-sectional survey of women who delivered a baby in public hospitals in South Western Sydney and Sydney Local Health Districts during the 2012 influenza season was conducted using computer assisted telephone interviewing. These Local Health Districts cover a population of 1.4 million people, and include higher proportions of people from culturally and

linguistically diverse backgrounds and low socio-economic areas than the state average. In 2010 there were 21,252 births to residents of these districts, representing 22% of all births in the state of New South Wales, Australia, that year.

**Study population:** The study population was defined as women who gave birth in one of the seven public hospitals in South Western Sydney and Sydney Local Health Districts in the period June 1 – September 30, 2012. The following women were excluded: mothers of babies who were born before 35 weeks' gestational age, who were discharged to another hospital facility after delivery, who were still born or who died while in hospital, or women under 18 years and women who left hospital against medical advice after delivery.

**Sample Size:** Based on an estimated population of 6321, an estimated vaccination coverage rate of 25%, and an accepted precision of ± 4%, it was estimated that a sample size of 420 would be required. To allow for 40% non-participation, 700 women were randomly selected, using random number allocation and ordering.

**Survey Content:** The survey tool consisted of questions designed to determine a woman's knowledge, attitudes, perceptions, and experiences of influenza vaccination during their recent pregnancy, reasons for being vaccinated or not, and demographic characteristics. Knowledge, attitudes and perceptions questions using a 5-point Likert-type scale were used in this survey, some of which had been field tested in a previous survey. [22] Pre-survey interviews were conducted with 20 women to check face validity, following which minor refinements were made.

**Survey Delivery:** A Computer Assisted Telephone Interviewing (CATI) service was employed to contact randomly selected women following the distribution of an introductory letter and information sheet. Translated information sheets in the three most common languages were provided as appropriate. Women were telephoned by an experienced interviewer who invited them to participate in the study, and the survey was conducted with consenting women. A minimum of six call attempts were made to contact each respondent, and once contacted a minimum of three further call attempts were made to complete the interview. When required a telephone interpreter assisted interview in the relevant language was arranged. The survey was conducted in November – December 2012.

**Data Analysis:** The Index of Relative Socio-economic Disadvantage (IRSD) for areas was used to determine socio-economic status of women based on their postcode of residence, and reported in quintiles, where for example the most disadvantaged 20% of areas in NSW are in the lowest quintile. [28] Data analysis was conducted using SAS Enterprise Guide Version 5.1. A chi-squared goodness of fit test was conducted to compare the study group and study

population from which they were selected to assess representatives. Chi squared tests for difference in proportions were conducted for each demographic and knowledge category to determine if any group category was more likely to have received the influenza vaccine. Within each category factors predicting whether the influenza vaccination was received or not were identified by conducting univariate regression, and calculating odds ratios and their respective 95% confidence intervals compared to a nominated referent category. A multi-variate logistic regression analysis was undertaken, which included all demographic and ante-natal care experience variables, with the exception of country of birth due to correlation with language spoken at home. The multi-variate analysis did not include knowledge and attitudes variables. A p-value of <0.05 was considered statistically significant.

**Ethics:** This project was approved by the Sydney Local Health District Human Research Ethics Committee.

## RESULTS:

**Participation:** In the period June 1-September 30 2012 a total of 6133 women delivered a baby within the seven public hospitals of interest; of these 5421 met the eligibility criteria and 700 women were randomly selected to be invited to participate. Of these, 500 (71%) were contactable, and 462 women (92%) agreed to participate and completed the survey resulting in an overall response rate of 66%.

**Study Participants:** No difference between the study group and the study population in terms of country of birth and proportion of Aboriginal people was found. However, study participants were significantly more likely to be older, from less socio-economically disadvantaged areas, and to have given birth at Royal Prince Alfred Hospital (Table 1). 26% of participants reported speaking a language other than English at home, and 39 participants (8%) required a telephone interpreter service to complete the interview. The majority of participants (56%) accessed antenatal care through a public hospital, 17% accessed ante-natal shared care through their general practitioner (GP) and 18% of participants reported an underlying chronic medical condition.

**Uptake and Demographic Factors:** Overall, 116 women reported receiving the influenza vaccination during their pregnancy, giving a vaccination coverage rate of 25% (95% CI 21.2% - 29.1%). Vaccination coverage varied significantly depending on antenatal care type, hospital of birth, and parity with women having their first baby, receiving antenatal care through general practitioner, or birthing in Royal Prince Alfred Hospital, having greater odds of receiving the vaccination (Table 2). (Royal Prince Alfred Hospital is a large teaching hospital which has the

highest proportion of antenatal shared care provision and the largest number of births of the seven hospitals in this study). Women who received antenatal care through a general practitioner (GP) or through GP shared care had 2.4 times the odds for receiving the influenza vaccination than women whose their antenatal care was through a public hospital ($p<0.001$). There was no significant difference in the proportion of women who received the influenza vaccine during pregnancy in relation to age group, highest level of education, country of birth, language spoken at home, or Aboriginal status (note that the results for Aboriginal women are not published as there is a potential of individuals being identifiable due to small numbers). Women who reported having one or more of chronic diseases of asthma, renal disease, diabetes, heart disease, hypertension, or being overweight had no greater odds for receiving the vaccine than those who did not report any of these conditions. The majority of women who had received the vaccine had obtained it through their GP (83%).

**Provider Recommendation:** Of all the 462 women surveyed, 30% could recall receiving a recommendation for the vaccine from an antenatal health care provider during their pregnancy. Some women received a recommendation from more than one provider (27% had received a recommendation from a general practitioner, 10% from a midwife, and 5% from an obstetrician). Of those women who attended a general practitioner, 38% recalled receiving a recommendation for the vaccine, while 12% of women who attended a midwife and 5% of women who attended an obstetrician recalled receiving a recommendation. Women who received a recommendation for the vaccine from an antenatal care provider had 33 times greater odds of receiving the vaccination than women who had not received such a recommendation. Women who reported having one or more of the listed chronic diseases were no more likely to have received a provider recommendation for the vaccine than those who did not list chronic diseases.

From the multi-variate regression model, the only significant variable was provider recommendation, with an adjusted odds ratio of 41.89 (95% CI 20.68-84.86; $p<0.001$).

Of all women, 78% said they would have the influenza vaccine during pregnancy if their doctor advised it, and 72% said they would receive it during pregnancy if their midwife recommended it (Table 4). Of the 346 women who did not receive the influenza vaccine during their pregnancy, 68% said they would receive it during pregnancy if their GP or obstetrician recommended it and 67% if their midwife recommended it.

**Reasons for Vaccination:** The main reasons women cited for receiving the vaccine were that their GP recommended it (43%), they wanted to prevent influenza (21%), or they normally receive the vaccine (13%) (Table 3). Overall, 45% of women cited a recommendation from the

GP as one of the reasons for receiving the vaccine, 34% women cited wanting to prevent influenza, and 26% cited wanting to protect the baby.

Of the women who did not receive the vaccine, 204 (59%) stated their main reason for not receiving it was that it was not recommended to them or because they were not aware of it (Table 3). Only 10% of women reported safety concerns as the main reason for not receiving the vaccine. Overall, 44% of women cited the absence of a suggestion or recommendation as one of the reasons they did not receive it, 32% did not think or know about it, and 20% had safety concerns.

**Knowledge and Perceptions:** There was a significant association between the knowledge and perceptions of women regarding influenza vaccination during pregnancy and the uptake of the influenza vaccine during the pregnancy (Table 4). The majority of women (69%) perceived that influenza had more serious consequences for pregnant women, and women who perceived that influenza was more serious during pregnancy or who believed that an influenza vaccine would protect a pregnant woman from the effects of influenza were significantly more likely to receive the vaccine than those who did not (Table 4). Only 29% of all women believed that maternal influenza vaccination during pregnancy would protect the baby from influenza once the baby was born.

Of all women, 45% had concerns about the safety of influenza vaccination during pregnancy for the woman, and 55% had concerns about safety for the baby. Women who were concerned about safety for the mother or the baby had significantly lower uptake of the influenza vaccine. Of the women who did not receive the vaccine, 82% had concerns about safety for the baby, however of these 67% still stated that they would receive the vaccine during pregnancy if their general practitioner or obstetrician recommended it.

**Access to Information:** Of all women, 160 (35%) could recall seeing information about influenza vaccination during pregnancy, through brochures, posters, information sheets, or the internet, and they reported seeing this information mostly at their general practitioners or at the public hospital (Table 2) The odds of these women having received the vaccine while pregnant were three times higher ($p<0.0001$) than women who did not recall seeing information.

Many women (45%) reported that they felt that they did not have access to enough information to enable them to make an informed decision about influenza vaccination during their pregnancy (Table 4). Of the women who had not received the vaccine 89% felt they did not have access to enough information, and women who felt that they had enough

information had six times greater odds of having received the influenza vaccine during their pregnancy than those who did not.

## DISCUSSION:

Influenza vaccination coverage during pregnancy in Sydney and South-Western Sydney Local Health Districts is low, despite evidence confirming the efficacy and safety of the vaccine, and clear recommendations from health authorities that the vaccine should be received during pregnancy.

The limitations of this study are firstly that it only includes women who gave birth in a public hospital and therefore does not represent all women who live in this region because women who delivered in a private hospital facility were not included. Secondly, this telephone survey was conducted after the women gave birth, which would have affected contact with some women, and increased the potential for recall bias. However, interviewing women after the pregnancy was completed enabled a measure of vaccine uptake rather than an intention to vaccinate. Finally, the characteristics of our study group were different to the study population they were selected from in terms of the distribution of age, hospital of delivery, and socioeconomic status. While these differences were statistically significant, the size of the difference was not large for any of the factors. A major strength of this study is that it was conducted over a large area of Sydney with a diverse population in terms of socio-economic status and cultural diversity, which enabled us to determine if demographic factors influenced uptake of influenza vaccine during pregnancy.

Our findings suggest that demographic factors have little influence on influenza vaccine uptake during pregnancy, however factors related to antenatal care provision and access (antenatal care type, hospital of delivery, and parity) do influence uptake. The most significant factor influencing vaccine uptake is provider recommendation – in multivariate analysis this association was very strong and the only significant predictor of vaccination, and appeared to account for all antenatal care factors associated with vaccination in the univariate analysis. A higher proportion of women who received a recommendation from a health care provider for influenza vaccination during pregnancy reported receiving the vaccine while pregnant, and most women said they would accept it during pregnancy if their doctor recommended it. This concurs with previous findings which identify that provider recommendation increases vaccine uptake. [23-26, 29] Providers are more likely to recommend vaccination if they are knowledgeable about influenza and vaccination during pregnancy, have positive attitudes

towards influenza vaccination during pregnancy, have observed serious conditions due to influenza, or have personally received the influenza vaccine.[21, 30-32]

Our results demonstrate that some women still have significant safety concerns regarding use of influenza vaccine during pregnancy. Women with more confidence in the safety of the vaccine have greater uptake, but even those who were not confident in the safety report they would accept the vaccine if their health care provider recommended it. While providers may perceive that safety fears of the vaccine in pregnant women may preclude vaccine uptake, our results indicate that a provider recommendation can overcome these concerns.

Our findings show the significant influence of the GP, with women who receive GP-provided antenatal care being more likely to have received the vaccine. This may be partly due to the vaccine only being available through GPs in this region, and therefore the vaccine may be less available to women who are not accessing antenatal care through a GP. A recent survey in three antenatal clinics in NSW showed that the one antenatal clinic in which the vaccine was available onsite had a significantly higher vaccine coverage than the other two clinics. [22] Increasing the availability of the vaccine through avenues other than GPs may improve coverage.

The coverage rate found in this study represents that achieved during the influenza season when awareness is heightened and likely to be higher than other times during the year. This survey was also conducted after the implementation of a number of strategies aimed at increasing coverage of influenza vaccine during pregnancy – in March 2012 all GPs in this region received a letter from local public health and obstetric divisions encouraging them to recommend influenza vaccine to women in their care who were pregnant or planning a pregnancy, and brochures and posters promoting influenza vaccination during pregnancy were also distributed. There are no coverage estimates available for the period before these actions were implemented, however low coverage afterwards suggests that further action is required to increase coverage of influenza vaccine among pregnant women. A number of studies conducted at single antenatal clinic sites have demonstrated that it is possible to increase provider knowledge about influenza vaccination during pregnancy, rates of provider recommendation or patient acceptance of the vaccine through strategies targeting providers, pregnant women, or both. [20, 33-34] Strategies targeting women include displaying posters in the clinics and providing them with information brochures, while strategies targeting providers include education programs, reminder stamps in patients' files, e-mail reminders to providers, and making the vaccine available in the clinic. In an obstetric hospital in Melbourne, the

implementation of a combination of these strategies saw influenza vaccine coverage increase from 30 to 40%, and provider recommendation increase from 37% to 62%. [20]

The strong influence of the provider's recommendation suggests that strategies to improve coverage should initially target providers. Previous studies indicate that antenatal care providers have varying levels of knowledge about influenza vaccination during pregnancy,[21, 30-34] and that improved provider knowledge is associated with higher rates of influenza vaccination in patients. [30,31] Concurrently with this study, we conducted a qualitative study to investigate the attitudes of GPs in the same region towards influenza vaccination during pregnancy. That study identified that they are concerned about vaccine safety, and are generally unwilling to strongly recommend the vaccine in pregnancy. [35] This suggests that strategies should target both provider knowledge and their perception of risk in order to improve their willingness to recommend the vaccine to pregnant women.

There are currently no routine systems available to monitor influenza vaccine coverage among pregnant women, making it difficult to monitor trends and evaluate the impact of strategies aimed at increasing coverage. Surveys are valuable as they provide not only estimates of vaccine uptake but also information on the knowledge, attitudes, and experiences of women, however conducting such a survey is resource intensive. Alternative solutions to routine surveillance of influenza vaccination during pregnancy need to be considered and implemented. The two Local Health Districts where this study was conducted are currently trialling the inclusion of information about receipt of the influenza vaccine during pregnancy into their electronic medical record systems for the perinatal period. This will enable surveillance of coverage of influenza vaccination during pregnancy, and evaluation of strategies aimed to increase these rates.

## CONCLUSION:

Antenatal health care providers have a significant influence on the uptake of influenza vaccine during pregnancy in South Western Sydney. Women who receive an antenatal health care provider recommendation were significantly more likely to be vaccinated than those who did not receive such a recommendation. However, only one third of pregnant women are receiving any recommendation. Improving rates of provider recommendation for the vaccine is likely to have a significant impact on the uptake of the influenza vaccine by pregnant women.

### *Table 1: Characteristics of Participants and Study Population*

| Characteristic | Participants N (%) | Study Population N (%) | P Value |
|---|---|---|---|
| **Age (years)** | | | |
| < 25 | 51 (11%) | 871 (16%) | <0.01 |
| 25 - 34 | 296 (64%) | 3379 (62%) | |
| ≥ 35 years | 114 (25%) | 1171 (22%) | |
| Unknown | 1 (0%) | 0 | |
| **Country of Birth** | | | |
| Australia | 229 (50%) | 2569 (47%) | 0.35 |
| Other | 233 (50%) | 2852 (53%) | |
| **Aboriginal and/or Torres Strait Islander** | | | |
| Yes | 8 (2%) | 90 (2%) | 0.90 |
| No | 454 (98%) | 5331 (98%) | |
| **Hospital** | | | |
| Royal Prince Alfred | 157 (34%) | 1574 (29%) | <0.05 |
| Liverpool | 55 (12%) | 912 (17%) | |
| Fairfield | 55 (12%) | 641 (12%) | |
| Canterbury | 48 (10%) | 533 (10%) | |
| Campbelltown | 79 (17%) | 905 (17%) | |
| Bowral | 18 (4%) | 151 (3%) | |
| Bankstown | 49 (11%) | 705 (13%) | |
| Other | 1 | 0 | |
| **Socio-economic Disadvantage Quintile#** | | | |
| 1 – most disadvantaged | 134 (29%) | 1857 (34%) | <0.01 |
| 2 | 78 (17%) | 1162 (21%) | |
| 3 | 39 (8%) | 431 (8%) | |
| 4 | 143 (31%) | 1362 (25%) | |
| 5 – least disadvantaged | 64 (14%) | 605 (11%) | |
| Missing | 4 (1%) | 4 (0%) | |
| **TOTAL** | **462 (100%)** | **5421 (100%)** | |

# Socio-economic Disadvantage determined using the Index of Relative Socio-economic Disadvantage (IRSD) based on the postcode of residence.

## *Table 2: Characteristics of participants according to vaccination status*

| | TOTAL N (%) | Vaccinated N(%) | Not Vaccinated N (%) | Univariate Regression | | | Multivariate Regression * | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Unadjusted OR (95% CI) for Vaccination | Stratum Specific P value | Over-all P value | Adjusted OR (95% CI) for Vaccination | Stratum specific p value | Overall P value |
| **Age (years)** | | | | | | 0.89 | | | 0.34 |
| < 25 | **51 (11%)** | 12 (24%) | 39 (76%) | 1.0 | | | 1.0 | | |
| 25 - 34 | **296 (64%)** | 76 (26%) | 220 (74%) | 1.12 (0.56 - 2.26) | 0.75 | | 0.96 (0.34-2.76) | 0.45 | |
| ≥ 35 | **114 (25%)** | 27 (24%) | 87 (76%) | 1.01 (0.46 - 2.20) | 0.98 | | 0.54 (0.16-1.84) | 0.19 | |
| Unknown | **1 (0%)** | 1 (100%) | 0 | | | | | | |
| **Highest Level of Education** | | | | | | 0.12 | | | 0.18 |
| No Higher School Certificate | **71 (15%)** | 18 (25%) | 53 (75%) | 1.0 | | | 1.0 | | |
| Higher School Certificate | **81 (18%)** | 16 (20%) | 65 (80%) | 0.73 (0.34 - 1.56) | 0.41 | | 0.30 (0.10-1.00) | 0.09 | |
| Certificate / Diploma | **112 (24%)** | 22 (20%) | 90 (80%) | 0.72 (0.35 - 1.46) | 0.36 | | 0.65 (0.23-1.85) | 0.53 | |
| University degree or higher | **198 (43%)** | 60 (30%) | 138 (70%) | 1.28 ( 0.69 - 2.38) | 0.43 | | 0.43 (0.15-1.21) | 0.40 | |
| **Country of Birth** | | | | | | 0.75 | | | |
| Australia | **229 (50%)** | 56 (24%) | 173 (76%) | 1.0 | | | N/A | N/A | N/A |
| Other | **233 (50%)** | 60 (26%) | 173 (74%) | 1.07 (0.70 - 1.63) | 0.75 | | | | |
| **Language Spoken at Home** | | | | | | 0.74 | | | 0.29 |
| English | **340 (74%)** | 84 (25%) | 256 (75%) | 1.0 | | | 1.0 | | |
| Other | **122 (26%)** | 32 (26%) | 90 (74%) | 1.08 (0.68 - 1.74) | 0.74 | | 1.55 (0.69-3.47) | 0.29 | |
| **Parity** | | | | | | | | | 0.61 |
| Second baby or higher | **253 (55%)** | 51 (20%) | 202 (80%) | 1.0 | | | 1.0 | | |
| First Baby | **209 (45%)** | 65 (31%) | 144 (69%) | 1.78 (1.17 - 2.73) | <0.01 | | 1.18 (0.62-2.27) | 0.61 | |
| **Socio-economic Disadvantage Quintile#** | | | | | | 0.03 | | | 0.13 |
| Fifth – least disadvantaged | **64 (14%)** | 16 (25%) | 48 (75%) | 1.0 | | | 1.0 | | |
| Fourth | **143 (31%)** | 41 (29%) | 102 (71%) | 1.21 (0.62 - 2.36) | 0.59 | | 1.38 (0.55-3.47) | 0.52 | |
| Third | **39 (8%)** | 15 (38%) | 24 (62%) | 1.88 (0.80 - 4.42) | 0.15 | | 3.63 (1.02-12.94) | 0.07 | |
| Second | **78 (17%)** | 10 (13%) | 68 (87%) | 0.44 (0.18 - 1.06) | 0.07 | | 0.92 (0.27-3.17) | 0.15 | |
| First – most disadvantaged | **134 (29%)** | 32 (24%) | 102 (76%) | 0.94 (0.47 -1.90) | 0.86 | | 2.80 (0.85-9.23) | 0.16 | |
| Missing | **4 (1%)** | 2 (50%) | 2 (50%) | | | | | | |
| **Major Chronic Disease** | | | | | | 0.50 | | | 0.94 |
| None | **380 (82%)** | 93 (24%) | 287 (76%) | 1.0 | | | 1.0 | | |
| One or more | **82 (18%)** | 23 (28%) | 59 (72%) | 1.20 (0.70 - 2.06) | 0.50 | | 1.03(0.47-2.28) | 0.94 | |
| **Hospital of Delivery** | | | | | | <0.05 | | | 0.75 |
| Royal Prince Alfred | **157 (34%)** | 54 (34%) | 103 (66%) | 1.0 | | | 1.0 | | |
| Liverpool | **55 (12%)** | 7 (13%) | 48 (87%) | 0.28 (0.12 - 0.66) | <0.01 | | 0.84 (0.24-2.94) | 0.60 | |
| Fairfield | **55 (12%)** | 10 (18%) | 45 (82%) | 0.42 (0.20 - 0.91) | <0.05 | | 0.37 (0.10-1.42) | 0.27 | |
| Canterbury | **48 (10%)** | 15 (31%) | 33 (69%) | 0.87 (0.43 - 1.74) | 0.69 | | 0.56 (0.17-1.89) | 0.74 | |
| Campbelltown | **79 (17%)** | 16 (20%) | 63 (80%) | 0.48 (0.26 - 0.92) | <0.05 | | 1.00 (0.36-2.77) | 0.29 | |
| Bowral | **18 (4%)** | 6 (33%) | 12 (67%) | 0.96 (0.34 - 2.68) | 0.93 | | 0.74 (0.17-3.24) | 0.85 | |
| Bankstown | **49 (11%)** | 8 (16%) | 41 (84%) | 0.37 (0.16 - 0.85) | <0.05 | | 0.39 (0.10-1.53) | 0.32 | |
| Other | **1 (0%)** | 0 | 1 (100%) | | | | | | |
| **Ante-natal Care Type** | | | | | | <0.01 | | | 0.43 |
| Ante-natal Clinic (Public Hospital) | **293 (63%)** | 60 (20%) | 233 (80%) | 1.0 | | | 1.0 | | |
| General practitioner or shared care | **125 (27%)** | 46 (37%) | 79 (63%) | 2.26 (1.42- 3.59) | <0.001 | | 1.51(0.76-2.98) | 0.23 | |
| Private obstetrician | **44 (10%)** | 10 (23%) | 34 (77%) | 1.14 (0.53 - 2.44) | 0.73 | | 0.87(0.28-2.79) | 0.55 | |
| **Provider Recommendation Received** | | | | | | <0.001 | | | <0.001 |
| No | **322 (70%)** | 20 (6%) | 302 (94%) | 1.0 | | | 1.0 | | |
| Yes | **140 (30%)** | 96 (69%) | 44 (31%) | 32.95 (18.51 - 58.62) | <.0001 | | 41.89 (20.68-84.86) | <0.001 | |
| **Saw Information about Influenza Vaccination when Pregnant** | | | | | | <.0001 | | | 0.11 |
| No | 302 (65%) | 54 (18%) | 248 (82%) | 1.0 | | | 1.0 | | |
| Yes | 160 (35%) | 62 (39%) | 98 (61%) | 2.91 (1.88 - 4.48) | <.0001 | | 1.69 (0.88-3.23) | 0.11 | |

# Socio-economic Disadvantage determined using the Index of Relative Socio-economic Disadvantage (IRSD) based on the postcode of residence.

* The multivariate logistic regression analysis included all the variables in this table, with the exception of country of birth

N/A: Not Applicable. This variable was not included in the multivariate analysis.

***Table 3: Reasons cited by women for receiving or not receiving the vaccination***

| | Main Reason Cited | All Reasons Cited# |
|---|---|---|
| | N (%) | N (%) |
| **Reasons cited for Receiving the influenza vaccination during pregnancy** | | |
| GP Recommended It | 43 (37%) | 52 (45%) |
| I wanted to prevent influenza | 24 (21%) | 39 (34%) |
| I normally get the influenza vaccine | 15 (13%) | 20 (17%) |
| I wanted to protect the baby | 14 (12%) | 30 (26%) |
| Midwife recommended it | 4 (3%) | 6 (5%) |
| Information from family/friends/media | 2 (2%) | 3 (3%) |
| High risk work environment | 4 (3%) | 7 (6%) |
| I think pregnant people should get it | 2 (2%) | 5 (4%) |
| Other | 8 (7%) | 20 (17%) |
| TOTAL | 116 (100%) | N/A |
| **Reasons cited for NOT receiving the influenza vaccination during pregnancy** | | |
| It was not suggested / recommended to me | 115 (33%) | 152 (44%) |
| I did not think / know about it | 89(26%) | 112 (32%) |
| I was concerned about safety / vaccine risk to the baby or myself | 35 (10%) | 69 (20%) |
| I did not need it | 21 (6%) | 40 (12%) |
| General practitioner or obstetrician advised against | 13 (4%) | 15(4%) |
| I didn't have time | 12 (3%) | 14 (4%) |
| I was concerned the vaccination would give me the influenza | 9 (3%) | 12 (3%) |
| I do not normally get the influenza vaccine | 11 (3%) | 19 (5%) |
| I was not concerned about getting the influenza | 8 (2%) | 21 (6%) |
| I was unsure of the benefits or effectiveness of the vaccine | 4 (1%) | 13 (4%) |
| Other | 29 (8%) | 65 (19%) |
| TOTAL | 346 (100%) | N/A |

# Women nominated all the reasons for receiving or not receiving the vaccination, which were collated. There may be multiple reasons cited and counted for each woman.

***Table 4: Maternal knowledge and attitudes towards influenza vaccination during pregnancy***

| Maternal Factors | | TOTAL N (%) | Vaccinated N (%) | Not Vaccinated N (%) | Odds Ratio (95% CI) | P value |
|---|---|---|---|---|---|---|
| Perceives that the consequences of influenza are more serious in pregnant women than other people | No | **143 (31%)** | 26 (18%) | 117 (82%) | 1.0 | |
| | Yes | **319 (69%)** | 90 (28%) | 229 (72%) | 1.76 (1.08 - 2.89) | <0.05 |
| Believes that having a influenza vaccine would protect a pregnant woman from the effects of influenza | No | **181 (39%)** | 23 (13%) | 158 (87%) | 1.0 | |
| | Yes | **281 (61%)** | 93 (33%) | 188 (67%) | 3.39 (2.06 - 5.62) | <.0001 |
| Believes that a maternal influenza vaccination would protect the baby from influenza after birth | No | **329 (71%)** | 77 (23%) | 252 (77%) | 1.0 | |
| | Yes | **133 (29%)** | 39 (29%) | 94 (71%) | 1.36 (0.86 - 2.13) | 0.18 |
| Concerned about the safety of maternal influenza vaccination for the mother | No | **253 (55%)** | 75 (30%) | 178 (70%) | 1.0 | |
| | Yes | **209 (45%)** | 41 (20%) | 168 (80%) | 0.58 (0.38 - 0.90) | <0.05 |
| Concerned about the safety of maternal influenza vaccination for the baby | No | **208 (45%)** | 70 (34%) | 138 (66%) | 1.0 | |
| | Yes | **254 (55%)** | 46 (18%) | 208 (82%) | 0.43 (0.28 -0.67) | <0.001 |
| Would have an influenza vaccination while pregnant if the GP or obstetrician recommended it | No | **102 (22%)** | 1 (1%) | 101 (99%) | 1.0 | |
| | Yes | **360 (78%)** | 115 (32%) | 245 (68%) | 47.41 (6.53 - 344.06) | <0.001 |
| Would have an influenza vaccination while pregnant if the midwife recommended it | No | **131 (28%)** | 8 (6%) | 123 (94%) | 1.0 | |
| | Yes | **331 (72%)** | 108 (33%) | 223 (67%) | 7.45 (3.51 - 15.78) | <.0001 |
| Feels she had access to enough information to enable an informed decision about influenza vaccination during pregnancy | No | **255 (55%)** | 28 (11%) | 227 (89%) | 1.0 | |
| | Yes | **207 (45%)** | 88 (43%) | 119 (57%) | 6.00 (3.71 - 9.68) | <.0001 |

## REFERENCES:

[1] Rothberg HB, Haessler SD, Brown RB. Complications of viral influenza. *Am J Med.*2008; 121(4): 258-64.

[2] Neuzil KM, Reed GW, Mitchel EF, Simonsen L, Griffin MR. Impact of influenza on acute cardiopulmonary hospitalizations in pregnant women. *Am J Epidemiol.* 1998; 148(11):1094-102.

[3] Jamieson DJ, Honein MA, Rasmussen SA, Williams JL, Swerdlow DL, Biggerstaff MS, et al. H1N1 2009 influenza virus infection during pregnancy in the USA. *Lancet.* 2009;374(9688):451-58.

[4] Cox S, Posner SF, McPheeters M, Jamieson DJ, Kourtis AP, Meikle S. Hospitalisation with respiratory illness among pregnant women during Influenza season. *Obstet Gynecol*. 2006; 107: 1315-22.

[5] The ANZIC Influenza Investigators, Webb SA, Pettila V, Seppelt I, Bellomo R, Bailey M, et al. Critical Care Services and 2009 H1N1 Influenza in Australia and New Zealand. *New Engl J Med.* 2009; 361: 1925-34.

[6] Hewagama S, Walker SP, Stuart RL, Gordon C, Johnson PD, Friedman ND, O'Reilly M, Cheng AC, Giles ML. 2009 H1N1 Influenza A and pregnancy outcomes in Victoria, Australia. *Clin Infect Dis.* 2010; 50 (5): 686-9.

[7] ANZIC Influenza Investigators, Webb SA, Pettila V, Seppelt I, Bellomo R, Bailey M, et al. Critical illness due to 2009 A/H1N1 influenza in pregnant and postpartum women: Population based cohort study. *BMJ.* 2010;340(7749):751.

[8] Tamma PD, Ault KA, del Rio C, Steinhoff MC, Halsey NA, Omer SB. Safety in Influenza vaccination during pregnancy. Am J *Obstet and Gynecol.* 2009; 201(6): 547-52.

[9] Moro PL, Border K, Zheteyeva Y, et al. Adverse events in pregnant women following administration of trivalent inactivated Influenza vaccine and live attenuated Influenza vaccine in the Vaccine Adverse Event Reporting System, 1990-2009. *Am J Obstet and Gynecol*. 2011; 204(2): 146.e1-146.e7.

[10] Moro PL, Broder K, Zheteyeva Y, Revzina N, Tepper N, Kissin D, Barash F, Arana J, Brantley M, Ding H, Singleton J, Walton K, Haber P, Lewis P, Yue X, DeStefano F, Vellozzi C. Adverse events following administration to pregnant women of Influenza A (H1N1) 2009 monovalent vaccine reported to the Vaccine Adverse Event Reporting System. *Am J Obstet Gynecol.* 2011; 205: 473.e1-9.

[11] Haberg S, Trogstad L, Gubbes N, Wilcox A, Gjessing H, Samuelsen S, Skrondal A, et al. Risk of Fetal Death after Pandemic Influenza Virus Infection or Vaccination. *New Engl J Med*. 2013; DOI: 10.1056/NEJMoa1207210

[12] Zaman K, Eliza Roy, Shams E, Arifeen S, Rahman R, Raqib R, Wilson E, Omer S, Shahid N, Breiman R, Steinhoff N. Effectiveness of Maternal Influenza Immunization in Mothers and Infants. *New Engl J Med*. 2008; 359: 1555-1564.

[13] Benowitz I, Esposito DB, Gracey KD, Shapiro ED, Vázquez M. Influenza vaccine given to pregnant women reduces hospitalization due to Influenza in their infants. *Clin Infect Dis.* 2010 Dec; 15; 51 (12): 1355-61.

[14] Eick AA, Uyeki T, Klimov A, Hall H, Reid R, Santosham M, O'Brien K. Maternal Influenza Vaccination and Effect on Influenza Virus Infection in Young Infants. Arch Pediat Adol Med 2011; 165(2): 104-111.

[15] National Health and Medical Research Council, editor. *Australian Immunisation Handbook*. 9th ed. Canberra: Australian government, Department of Health and Ageing, 2008.

[16] NSW Health. Influenza Information for Antenatal Care Providers. http://www0.health.nsw.gov.au/PublicHealth/Infectious/Influenza/hp_pregnancy_advice.asp. Accessed 08/01/2013.

[17] Royal Australian and New Zealand College of Obstetrics and Gynaecology, Influenza vaccination for pregnant women. www.ranzcog.edu.au/component/docman/doc_download/978-c-obs-45-influenza-vaccination-for-pregnant-women.html. Accessed 01/03/2013.

[18] Mak DB, Daly AM, Armstrong PK, and Effler PV. Pandemic (H1N1) 2009 Influenza vaccination coverage in Western Australia. *Med J Australia.* 2010; 193 (7): 401-404.

[19] White S, Petersen R, Quinlivan J. Pandemic (H1N1) 2009 Influenza vaccine uptake in pregnant women entering the 2010 Influenza season in Western Australia. *Med J Australia.* 2010; 193: 405–407

[20] McCarthy, E. A., Pollock, W. E., Nolan, T., Hay, S. and McDonald, S. Improving Influenza vaccination coverage in pregnancy in Melbourne 2010–2011. *Aust N Z J Obstet Gynaecol.* 2012; doi: 10.1111/j.1479-828X.2012.01428.x

[21] Lu AB, Halim AA, Dendle C, Kotsanas D, Giles ML, Wallace EM, Buttery JP, and Stuart RL. Influenza vaccination uptake amongst pregnant women and maternal care providers is suboptimal. *Vaccine.* 2012. 30: 4055-4059.

[22] Wiley K, Massey PD, Cooper Robbins SC, Wood N, Ho J, Quinn HE, Leask J. Uptake of Influenza vaccine by pregnant women: A cross-sectional survey with implications for policy and practice. *Medical Journal of Australia.* In press.

[23] Blanchard-Rohner G, Meier S, Ryser J, Schaller D, Combescure C, Yudin MH, Burton-Jeangros C, de Tejada BM, Siegrist CA. Acceptability of maternal immunization against Influenza: the critical role of obstetricians. *J Matern-Fetal Neo M.* 2012; 25(9): 1800–1809.

[24] Dlugacz Y, Fleischer A, Carney MT, et al. 2009 H1N1 vaccination by pregnant women during the 2009-10 H1N1 Influenza pandemic. *Am J Obstet Gynecol.* 2012; 206:339.e1-8.

[25] Lau J, Caia Y, Tsuia H, Choia K. Prevalence of Influenza vaccination and associated factors among pregnant women in Hong Kong. *Vaccine.* 2010; 28: 5389–5397

[26] Ding H, Santibanez T, Jamieson D, Weinbaum C, Euler G, Grohskopf L, Lu P, Singleton J. Influenza vaccination coverage among pregnant women–National 2009 H1N1 Influenza Survey (NHFS). *Am J Obstet Gynecol*. 2011: June: S96-S106.

[27] NSW Ministry of Health. Influenza Vaccination during Pregnancy. Protect you and your baby from influenza (flu). Brochure. Available at http://www0.health.nsw.gov.au/resources/publichealth/infectious/influenza/pdf/flu_vacc_eng_broch_may12.pdf.
Accessed 28/02/2013.

[28] Australian Bureau of Statistics. An Introduction to Socio-Economic Indexes for Areas (SEIFA). 2006. ABS Catalogue No. 2039.0. www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/D729075E079F9FDECA2574170011B088/$File/20390_2006.pdf Accessed 28/02/2013.

[29] Lu AB, Halim AA, Dendle C, Kotsanas D, Giles ML, Wallace EM, Buttery JP, and Stuart RL. (2012). Influenza vaccination uptake amongst pregnant women and maternal care providers is suboptimal. *Vaccine.* 30: 4055-4059.

[30] Eppes C, Wu A, Cameron K, Garcia P, Grobman W. Does obstetrician knowledge regarding Influenza increase HINI vaccine acceptance among their pregnant patients? *Vaccine*. 2012; 30: 5782– 5784

[31] Tong A, Biringer A, Ofner-Agostini M, Upshur R, McGeer A. A cross-sectional study of maternity care provider's and women's knowledge: attitudes, and behaviours towards Influenza vaccination during pregnancy. *J Obstet Gynaecol Can.* 2008; 30(5):404–10.

[32] Kissin D, Power M, Kahn E, Williams J, Jamieson D, MacFarlane K, Schulkin J, Zhang Y, Callaghan W. Attitudes and Practices of Obstetrician–Gynecologists Regarding Influenza Vaccination in Pregnancy. *Obstet Gynecol*. 2011; 118 (5): 1074–1080.

[33] Panda B, Stiller R, Panda A. Influenza vaccination during pregnancy and factors for lacking compliance with current CDC guidelines. *J Matern-Fetal Neo M*. 2011; 24(3): 402–406

[34] Yudin H, Salripour M, Sgro M. Impact of Patient Education on Knowledge of Influenza and Vaccine Recommendations Among Pregnant Women. *J Obstet Gynaecol Can*. 2009;32(3):232–237.

[35] Maher et al (2013) Influenza vaccination during pregnancy: the attitudes and practices of general practitioners in central and south-western Sydney. Submitted.

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# Chapter Five Part B:

# Paper: "Influenza Vaccination during Pregnancy: the attitudes and practices of general practitioners in central and south-western Sydney"

# Influenza Vaccination during Pregnancy: the attitudes and practices of general practitioners in central and south-western Sydney

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Submitted to: *BMC Family Practice*

## ABSTRACT:

**Background:** Pregnant women have an increased risk of influenza complications. Influenza vaccination during pregnancy is safe and effective, however coverage in Australia is less than 40%. Pregnant women who receive a recommendation for influenza vaccination from a health care provider are more likely to receive it, however the perspectives of Australian general practitioners has not previously been reported.

**Objective:** To investigate the knowledge, beliefs, and practices of general practitioners practicing in South-Western Sydney, Australia towards influenza vaccination during pregnancy.

**Methods:** A qualitative descriptive study was conducted, with semi-structured interviews completed with seventeen general practitioners in October 2012. A thematic analysis was undertaken by three researchers, and transcripts were analysed using N-Vivo software according to agreed codes.

**Results:** One-third of the general practitioners interviewed did not consider influenza during pregnancy to be a serious risk for the mother or the baby. The majority of the general practitioners were aware of the government recommendations for influenza vaccination during pregnancy, but few general practitioners were confident of their knowledge about the vaccine and most felt they needed more information. More than half the general practitioners had significant concerns about the safety of influenza vaccination during pregnancy. Their practices in the provision of the vaccine were related to their perception of risk of influenza during pregnancy and their confidence about the safety of the vaccine. While two-thirds reported that they are recommending influenza vaccination to their pregnant patients, many were adopting principles of patient-informed choice in their approach and encouraged women to decide for themselves whether they would receive the vaccine.

**Conclusions:** General practitioners have varied knowledge and perceptions about influenza vaccination during pregnancy. Addressing these could have a significant impact on improving vaccine uptake during pregnancy.

## INTRODUCTION:

Pre-natal influenza infection is associated with an increased risk for both mother and baby, including respiratory and cardio-pulmonary hospitalisation, pre-term delivery, fetal distress, and in some cases death. [1-7] These risks are compounded when the mother has comorbidities such as asthma or diabetes, or is infected with a pandemic strain of the virus. [8] The most effective strategy for preventing influenza in pregnant women is immunisation, and benefits for both the mother and the infant have been demonstrated, with maternal immunisation significantly reducing respiratory illnesses in both the women and their infants in the first six months of life. [9-11] Influenza vaccination during any trimester of pregnancy is considered safe for both the mother and the foetus. [12-15] It is recommended that all pregnant women in Australia receive the vaccine, [16-18] which is available to them free of charge. However, the proportion of pregnant women who receive the vaccine is low, with coverage between 10 and 40%. [19-23]

While many factors may influence influenza vaccine uptake during pregnancy, it has been identified that pregnant women who receive a recommendation for the vaccine from a health care provider are more likely to receive the vaccine. [22, 24-27] However, antenatal care providers do not routinely recommend influenza vaccination to their pregnant patients: three recent surveys of pregnant and post-partum women in Australia found that only 21 – 41% of women could recall receiving such a recommendation. [21-23] Where a recommendation was given, approximately half were by a general practitioner. [22-23]

Antenatal care providers are more likely to recommend the influenza vaccine to pregnant women if they have good knowledge about influenza and influenza vaccination during pregnancy, positive attitudes towards influenza vaccination during pregnancy, have observed serious medical conditions due to influenza, or have personally received the influenza vaccine.[22, 28-30] These studies, which investigated the knowledge, attitudes, and practices of antenatal care providers towards influenza vaccination during pregnancy, have mainly relied on data gathered using written survey techniques in antenatal care settings such as a hospital or clinic. No studies have been undertaken in the Australian primary health care context, and little is known about the perceptions of general practitioners who are the main provider group or avenue through whom pregnant women can access influenza vaccination. The attitudes and

practices of general practitioners are therefore likely to have a significant influence on influenza vaccine uptake during pregnancy.

In early 2012, strategies to improve awareness about influenza vaccination during pregnancy among general practitioners working in central and south-western Sydney were implemented. The local director of public health with the directors of obstetrics wrote to all general practitioners in the region reminding them of the recommendation to vaccinate pregnant women for influenza, and referring them to a recent evidence-based statement. [18] They were also provided with multiple copies of a brochure designed to encourage women to be vaccinated, [31] and a reminder stamp about the vaccine was placed in patient-held antenatal care cards.

The aim of this study therefore was to investigate the knowledge, attitudes, beliefs, and practices of general practitioners in the Sydney and South-Western Sydney Local Health Districts in Australia towards influenza vaccination during pregnancy, using qualitative methodology. The qualitative approach was used to provide rich information on the perspectives of the general practitioners, to identify their practices regarding influenza vaccination during pregnancy, and the beliefs and experiences that inform these practices.

## METHODS:

A qualitative descriptive methodology [32] was used to describe general practitioners attitudes and practices regarding influenza vaccination during pregnancy, and to generate knowledge that can be applied to practice.

Purposive sampling [33] was used to select general practitioners to ensure diversity in terms of the location of the general practice, the practice size, and the practitioner's sex. A matrix was developed to map these characteristics to guide participant selection informed by a detailed list of all 666 general practices in the Sydney and South-Western Sydney Local Health Districts. The matrix fields included size of the practice (a large practice is where there are 3 or more general practitioners), type of local government area (urban and rural) and sex of general practitioners within a practice. From this matrix, 44 general practitioners were selected to be

invited to participate in the study, to ensure that sex, practice size and type of local government area were evenly represented. A low participation rate was expected.
The 44 selected general practitioners were initially contacted by letter, and subsequently by telephone, to invite them to participate. A semi-structured interview guide, using open-ended questions, was developed and consisted of the following broad topic sections: reflections on antenatal care in general practice, the risk of influenza during pregnancy, attitudes and practices about influenza vaccination during pregnancy, perceptions of women's attitudes towards influenza vaccination during pregnancy, and reflections on how to improve and record coverage rates of influenza vaccination during pregnancy. Within each section of the interview topic guide, more detailed questions and specific probes were prepared to allow the discussion to develop. The interview questions were piloted with two non-participating general practitioners and minor modifications were made to question expression. Semi-structured interviews were conducted in person with all consenting general practitioners by the one researcher (LM) in September 2012. Interviews were audio-recorded and transcribed verbatim by an independent transcriber.

Four researchers (LM, KW, AD, KH) conducted the analysis. Transcripts were read and re-read by the four researchers several times who then met to discuss the emergent concepts, themes and issues across the dataset. Consensus was reached on the main themes and categories to be included in the analysis, based on the aim of the study, and a conceptual framework was developed to capture this. The researchers undertook a closer analysis of each transcript using the conceptual framework to direct this. The qualitative research software tool N-Vivo was employed to code the transcripts using a constant comparative method [34] and each researcher generated a diagrammatic model to illustrate their coding and patterns. These models were then synthesised and guided the reporting process.

This project was approved by the Sydney Local Health District Human Research Ethics Committee (RPAH Zone).

## RESULTS:

Of the 44 general practitioners selected, 17 agreed to participate in the study : 9 females and 8 males; 10 from small and seven from large practices; and 6 from Sydney Local Health District

and eleven from South Western Sydney Local Health District. The reasons for non-participation were not ascertained.

Thirty main codes were identified, and grouped into three main categories: (1) general practitioners' risk perception of influenza infection during pregnancy; (2) general practitioners' knowledge and perceptions about influenza vaccination during pregnancy; and (3) general practitioners' approach to promoting and providing influenza vaccination during pregnancy.

**(1) General practitioners risk perception of influenza infection during pregnancy**

Overall the general practitioners were not concerned about the risks associated with influenza during pregnancy. One-third did not consider influenza during pregnancy to be a serious risk for the mother or the baby. Two-thirds thought that there was an increased risk associated with influenza during pregnancy, and mentioned miscarriage or premature labor as potential consequences. Some thought that the risks of infection were specifically associated with the H1N1 strain of the 2009 pandemic and not other influenza strains. Other general practitioners said that although they were aware that the risks are reported to be higher in pregnant women compared to the general population, they had no direct experience of a pregnant patient contracting influenza and having serious consequences, and that this in turn decreased their perception of the risk. Many did not perceive that pregnancy alone placed a woman in a high-risk category for influenza, and felt that only pregnant women with other co-morbidities, such as respiratory disease or obesity, were at risk of complications.

> *"I'm aware that if women get the influenza virus during pregnancy complications are much higher, the severity of the influenza is much higher and so we ought to be vaccinating women during pregnancy "*
>
> *"I guess the same (risks) as anyone who doesn't have a pregnancy. Whether it brings on pre-term labour, possibly, but I am not aware of any specific problems directly related to the pregnancy".*
>
> *"I think with the number of people (pregnant women) who catch the flu and the number of people who don't have any problems with it….I see it's a small amount of risk involved".*

**(2) General practitioners knowledge and perceptions about influenza vaccination during pregnancy**

The majority of the general practitioners were aware of the recommendations for influenza vaccination during pregnancy, but most were not confident on all aspects of the recommendations, particularly in relation to timing. Some thought the recommendation specified provision during a specific trimester or only during the influenza season. Some wondered why this recommendation had become a priority.

> *"So I am fully aware that it is recommended that they get their influenza vaccine if they are going to be pregnant in the flu season, particularly second and third trimester".*
> *"The thing that surprised us is why suddenly there is a push for vaccinating for flu in pregnant woman….most of us are quite surprised that it is recommended".*
> *"If you look at it throughout the years that we've never given flu needles to pregnant women we haven't run into much significant problems"*

Most general practitioners identified that influenza vaccination during pregnancy would be beneficial in preventing consequences of infection such as miscarriage or premature labour. Very few specifically nominated the benefits of vaccination for the baby, and when questioned had varied opinions about this.

More than half of the general practitioners had significant concerns about the safety of the vaccine during pregnancy. Many of these general practitioners raised the issue of time – providing the influenza vaccine during pregnancy is a relatively recent practice and they felt that there needed to be a longer period of time where this was practiced without adverse outcomes before they could be confident that the vaccine was completely safe for pregnant women. A number of the general practitioners were concerned that if they provided the vaccine to pregnant women and an adverse event subsequently occurred (which may or may not be related to the vaccine), that women may blame the vaccine and hold the practitioner liable. Some were particularly concerned that the influenza vaccine was rated in product information as Australian Category B2 (drugs which have been taken by only a limited number of pregnant women and studies in animals are lacking but available data shows no evidence of harmful effects on the foetus [35]).

> *"I'm not fully convinced that it's totally safe to them, no".*

*"I think it is more of an unknown and you tend to be more conservative about what you give [pregnant] patients".*

*"With the small amount of risk involved [with influenza] I don't see that the benefits [of the vaccination] outweigh the risks".*

*"My understanding is it category B in pregnancy. Which is a little bit of grey area…. If it was Category A I would be much more likely to recommend it."*

*"We have to wait and see whether the information is correct. Most times after a few years you find out that the information might not be that accurate."*

*"I just think if they had the flu injection, then whether it was a day, a month, or at any stage after getting the vaccine, that if anything went wrong like foetal death or early labour, I know that they would look at pointing the finger at the flu vaccine as the cause. Whether it is or not. So it is safer as a doctor not to do that".*

The general practitioners who were confident that the vaccine is safe were either more informed about the evidence regarding safety of the vaccine in pregnancy, or were more willing to trust that the vaccine is safe and beneficial based on the fact that it is recommended under the national immunisation guidelines. Most of this group recommended the vaccine to pregnant women and had not observed any adverse outcomes which reinforced their belief that it is safe.

*"Yes, well, it was recommended from the health department to do so I would assume that the information is accurate and there's no risk in doing it so I'm happy to follow that".*

*"I've given it during pregnancy for a few patients and I haven't noticed anything unusual".*

Few general practitioners were confident about their knowledge regarding influenza vaccination during pregnancy. Most felt that they needed more information; however none reported actively searching to obtain information. Many reported challenges in information management and staying aware of recent research and evidence. Many interviewees specifically asked questions of the interviewer to obtain information about the guidelines and evidence.

*"I would take it that somewhere in the world they've been vaccinating pregnant women for a reasonably length period and I would probably like to look at some figures in relation to that as to the number of adverse effects that occur and the efficacy of doing it".*

**(3) General practitioners approach to promoting and providing influenza vaccination during pregnancy**

The general practitioners' approach to recommending and providing the influenza vaccine during pregnancy was related to their perception of the risks associated with influenza infection during pregnancy, their confidence in the safety of the vaccine during pregnancy, and also more practical issues such as limited consultation time to cover issues like vaccination with their patients.

Of the two-thirds of those who reported that they recommend the vaccine to their pregnant patients, either intermittently or routinely, the majority recommend the vaccine during the autumn / early winter period, or in a specific trimester (either first or third). Some general practitioners only recommended it to pregnant patients who have higher risks associated with infections due to other conditions such as asthma or chronic disease. A number of general practitioners who were not confident in the safety of the vaccine reported recommending it to patients purely because of the guidelines. The general practitioners who said they do not recommend it were from larger practices, were not registered antenatal shared care providers, and included both male and female general practitioners. Some general practitioners reported challenges in prioritising competing demands during a consultation with a pregnant woman, and that influenza vaccination was often not a high priority, or something that they did not always remember to do.

*"If the patient comes to me, and they're in the first trimester, and it's winter, I would give it to them".*

*"I don't like the concept of giving a flu vaccine during the first trimester, I would rather wait till later on and that's what I'll do."*

*"If they are otherwise fit healthy people with no asthma or other particular indications to have the flu injection, I wouldn't – I probably wouldn't advise having it".*

*"It's not high on my priority. I think around March, when the flu vaccines come out, you tend to be much more likely to bring it up with patients, or they will bring it up with you."*

All general practitioners said that the majority of their pregnant patients were not aware that the influenza vaccine was recommended, and that most were initially reluctant to receive the vaccine due to safety concerns. They reported that only on rare occasions would a pregnant patient request the vaccine because they had heard about it elsewhere. The general practitioners who recommended the vaccine described their approach to the topic of influenza vaccination with their patients as involving an explanation of the risks of infection, benefits of vaccination, and reassurance that the vaccine is safe.

> *"They're [pregnant women]always worried about side effects from it in terms of relating to the pregnancy but with a bit of explanation their fears can be allayed usually".*
>
> *"I think it's more educating the patient because they're not comfortable to have injection or anything during pregnancy but we have to offer it. I think I just have to convince them that given the pros and cons during pregnancy I think I have no problem. Initially I have some difficulty of convincing the pregnant lady to have the injection".*

Many of the general practitioners who recommend the vaccine reported that while they would advise the patient to be vaccinated as per the guidelines, they would ultimately leave the decision regarding vaccination to their patient. They saw influenza vaccination during pregnancy as a personal choice, and were not willing to strongly recommend it. These were predominantly the general practitioners who were not confident about the safety of the vaccine, and those who feared adverse outcomes or being blamed if there was an adverse outcome. One stated that they felt they could not be held liable for not recommending the vaccination.

> *"We do not push it. We do not insist. We just advise them. If they accept that's fine".*
>
> *"It's a personal choice thing, so I don't impose too much education on them at that stage because I'm not sure myself. I'm not fully convinced that it's totally safe to them, no."*
>
> *"I'd even probably be relieved if they gave an indication that they weren't keen or felt a little bit uneasy, I would probably encourage that because then that's easier. (Then) there's no risk of anything going wrong with the vaccination. Kind of a 'first do no harm' kind of thing".*

The general practitioners who do recommend the vaccine to pregnant women reported varied rates of acceptance and uptake among their pregnant patients. Most general practitioners reported that "most" or "some" of their patients would agree to receive the vaccine once recommended, while a few reported that they had not yet convinced one pregnant patient to accept it. The general practitioners with more success identified a strong patient-doctor relationship and their patients having trust in them as important factors in patients accepting the vaccine, and some identified that as a general practitioner, they have significant power in convincing patients to accept the vaccine.

> *"I have a good relationship with the patients and if I recommend it they probably would take it on board".*
>
> *"I've got very convincing powers. They trust. I guess having a family doctor, they do trust."*
>
> *"They will take it positively if I am positive about it. If I say it is good they will see it as good. This is for the most part anyway".*
>
> *"It depends on how long you have the relationship as a doctor because I'm just new here so it's sometimes there's some difficulty of getting them to trust me because they don't know me".*

## DISCUSSION:

Many of the general practitioners interviewed in this study demonstrated limited knowledge about the risks of influenza infection and vaccination during pregnancy, or expressed limited confidence in the safety of the vaccine. These general practitioners may therefore either not be recommending the vaccine, or recommending it with varying levels of clarity and conviction. This may impact upon the fact that only a few general practitioners were able to report high acceptance of the vaccine among their pregnant patients. Our research findings concur with the results of previous studies which report that other antenatal care providers have varying levels of knowledge about influenza vaccination during pregnancy.[22, 28-30, 36]. This is significant, as increased levels of provider knowledge are associated with higher rates of influenza vaccination in pregnant patients. [28]

This is the first study to ascertain the attitudes, perceptions, and practices of Australian general practitioners towards influenza vaccination during pregnancy, and the qualitative

methods used enabled us to capture rich information about their perspectives which could not have been garnered from a written survey. The limitation of this study is that only 17 of the 44 general practitioners invited to participate in the study agreed to participate. A greater number of interviews may have provided greater diversity of practice types. The responses of the general practitioners may have been affected by the fact that the interviewer is a NSW public health employee, however the findings did not indicate that they were reluctant to report practices and attitudes that were contrary to current guidelines.

In our study, general practitioners appear to base their overall risk assessment on their perceptions of the risk of influenza infection during pregnancy, the benefits and risks of the influenza vaccine, as well as their personal experiences of influenza. General practitioners appear to perceive the risks associated with maternal influenza infection to be lower than the evidence suggests, while conversely, their perception of the risks associated with the vaccine seem to be higher. Based on their risk assessments, general practitioners appear to be demonstrating two decision-making biases which influence whether and how they recommend the vaccine. Firstly, omission bias (choosing to do nothing with some probability of harm over doing something with a lower probability of equivalent harm) is demonstrated with general practitioners choosing to not recommend influenza vaccination, even though the probability of harm from influenza during pregnancy is higher than the probability of harm from the vaccine. [15, 37] Omission bias is greater when practitioners anticipate that they will feel regret should an adverse outcome occur. However practitioners may anticipate a greater sense of regret if they perceive that the outcome could be the result of their own action rather than lack of action. [38,39] The general practitioners interviewed in our study clearly indicated anticipating regret (and fearing liability) should an adverse outcome occur due to the vaccine. Omission bias has been observed in parents deciding whether or not to vaccinate their child against pertussis, [40] and in practitioners deciding whether or not to recommend hormone replacement therapy for women. [41] Secondly, ambiguity bias (avoiding an option when information about the consequences is perceived to be missing [36]) is also observed here, with some general practitioners perceiving that more time is required to demonstrate that the use of the vaccine during pregnancy is safe. Both these decision-making biases may be limiting the extent to which the general practitioners provide influenza vaccination during pregnancy, and strategies aimed at improving the frequency of influenza vaccination to pregnant women by general practitioners should address these biases.

While the majority of the general practitioners reported intermittently recommending the vaccine, they reported varied levels of acceptance of the vaccine by their pregnant patients, which may be related to the quality, style, and consistency of the recommendation they give. This may in turn be related to our finding that these practitioners often lack confidence in their knowledge of the evidence, or in the safety of the vaccine for pregnant women. Many of the general practitioners reported that they are adopting the principles of patient informed choice – they are reluctant to provide a strong opinion or recommendation to their patients, often due to their own lack of confidence in the safety of the vaccine and their fear the consequences of liability should something go wrong. Those interviewed stated that they believe it is the patient's decision whether they receive the vaccine or not, and pregnant women are therefore expected to decide for themselves. However, an informed decision requires relevant good quality information,[42] and it appears that pregnant women may not receive clear information from their general practitioner on the risks of influenza, and the benefits and risks of the vaccine. A qualitative survey of post-partum women in Switzerland indicated that they perceived that the information they received about vaccination from a provider, when given, lacked unequivocal advice and a sure recommendation. [43] Significant challenges have been reported regarding patient informed decision making - even when good information is provided patients face difficulties, especially when making complex decisions or when they are required to weigh benefits and risks. [44] In relation to influenza vaccination during pregnancy, women have indicated that they feel it is the physician who should explain the choice of whether to be vaccinated or not, and if the message was clear and unequivocal then they would follow the recommendation. [42] Even women who have safety concerns about the vaccine still indicate that they would accept it if the provider recommended it. [23] These interviews were undertaken approximately six months after the implementation of a number of strategies aimed to increase awareness of maternal influenza vaccination during pregnancy among general practitioners, including a letter and a brochure, however only a small number of interviews recalled the information contained in these documents. A survey of post-partum women in the same region conducted concurrently with this study found the rate of vaccine uptake among pregnant women to be 25% during the 2012 influenza season, and that only 30% of women could recall receiving a recommendation for the vaccine from an antenatal health care provider during their pregnancy. [45] This suggests that the strategies undertaken were not sufficient to increase rates of provider recommendation and vaccine uptake to acceptable levels. Different strategies may be required that more clearly address

the risk perceptions of general practitioners identified in this study, and as many interviewees raised the issue of requiring more time to increase their confidence, it may be expected that changes in practice regarding this issue may not occur quickly.

We have not located any research that has investigated how to improve rates of vaccination recommendation in general practitioners across a region; however a number of studies conducted at single antenatal clinic sites have demonstrated that it is possible to increase provider knowledge about influenza vaccination during pregnancy, rates of provider recommendation or patient acceptance of the vaccine through strategies targeting providers, pregnant women, or both. Strategies targeting women include displaying posters in the clinics and providing patients with information brochures, and strategies targeting providers include provider education programs, reminder stamps in patient's files, e-mail reminder to providers, and making the vaccine available in the clinic. [21, 46-47]. In an obstetric hospital in Melbourne the implementation of a combination of these strategies saw influenza vaccination coverage increase from 30 to 40%, and rates of provider recommendation increasing from 37% to 62.5%. [21] The inclusion of an electronic best practice alert about influenza vaccination in each patient's electronic medical record in an antenatal clinic in Wisconsin saw vaccination coverage improve from 42% to 61% and provider recommendation rates improve from 49 to 89%. [48] This strategy could translate well to the general practice context in Australia, where electronic decision support for cardiovascular disease management in general practice shows promising potential to increase provider adherence to best practice guidelines. [49] A number of general practitioners in this study reported that influenza vaccination during pregnancy is not always their key priority and they often forget to mention it, and some suggested an electronic reminder could assist with this. Others also recommended that if women were more aware and knowledgeable about the vaccination it would make their job easier to convince them, and suggested that a public awareness campaign could assist with this.

## CONCLUSION:

General practitioners have varied knowledge, perceptions, and confidence about influenza vaccination during pregnancy and this is likely to influence both the number of recommendations given to pregnant women, and the conviction with which these recommendations are made. General practitioners have a low perception of risk of influenza

during pregnancy, and have considerable concerns about vaccine safety and potential liability. Providing clear information and communication to general practitioners on the current recommendations regarding influenza vaccination during pregnancy, and the evidence upon which they are made, will increase provider knowledge and confidence in recommending the vaccine, which is likely to improve influenza vaccine coverage among Australian pregnant women.

## REFERENCES:

[1] Rothberg HB, Haessler SD, Brown RB. Complications of viral influenza. *Am J Med.* 2008; 121(4): 258-64.

[2] Neuzil KM, Reed GW, Mitchel EF, Simonsen L, Griffin MR. Impact of influenza on acute cardiopulmonary hospitalizations in pregnant women. *Am J Epidemiol.* 1998; 148(11):1094-102.

[3] Jamieson DJ, Honein MA, Rasmussen SA, Williams JL, Swerdlow DL, Biggerstaff MS, et al. H1N1 2009 influenza virus infection during pregnancy in the USA. *Lancet.* 2009;374(9688):451-58.

[4] Cox S, Posner SF, McPheeters M, Jamieson DJ, Kourtis AP, Meikle S. Hospitalisation with respiratory illness among pregnant women during Influenza season. *Obstet Gynecol*. 2006; 107: 1315-22.

[5] The ANZIC Influenza Investigators, Webb SA, Pettila V, Seppelt I, Bellomo R, Bailey M, et al. Critical Care Services and 2009 H1N1 Influenza in Australia and New Zealand. *New Engl J Med.* 2009; 361: 1925-34.

[6] Hewagama S, Walker SP, Stuart RL, Gordon C, Johnson PD, Friedman ND, O'Reilly M, Cheng AC, Giles ML. 2009 H1N1 Influenza A and pregnancy outcomes in Victoria, Australia. *Clin Infect Dis.* 2010; 50 (5): 686-9.

[7]ANZIC Influenza Investigators, Webb SA, Pettila V, Seppelt I, Bellomo R, Bailey M, et al. Critical illness due to 2009 A/H1N1 influenza in pregnant and postpartum women: Population based cohort study. *BMJ.* 2010;340(7749):751.

[8] Cox S, Posner SF, McPheeters M, Jamieson DJ, Kourtis AP, Meikle S. Hospitalisation with respiratory illness among pregnant women during influenza season. *Obstetrics Gynaecology*. 2006. 107: 1315-22.

[9] Zaman K, Eliza Roy, Shams E, Arifeen S, Rahman R, Raqib R, Wilson E, Omer S, Shahid N, Breiman R, Steinhoff N. Effectiveness of Maternal Influenza Immunization in Mothers and Infants. *New Engl J Med*. 2008; 359: 1555-1564.

[10] Benowitz I, Esposito DB, Gracey KD, Shapiro ED, Vázquez M. Influenza vaccine given to pregnant women reduces hospitalization due to Influenza in their infants. *Clin Infect Dis.* 2010 Dec; 15; 51 (12): 1355-61.

[11] Eick AA, Uyeki T, Klimov A, Hall H, Reid R, Santosham M, O'Brien K. Maternal Influenza Vaccination and Effect on Influenza Virus Infection in Young Infants. Arch Pediat Adol Med 2011; 165(2): 104-111.

[12] Tamma PD, Ault KA, del Rio C, Steinhoff MC, Halsey NA, Omer SB. Safety in Influenza vaccination during pregnancy. Am J *Obstet and Gynecol.* 2009; 201(6): 547-52.

[13] Moro PL, Border K, Zheteyeva Y, et al. Adverse events in pregnant women following administration of trivalent inactivated Influenza vaccine and live attenuated Influenza vaccine in the Vaccine Adverse Event Reporting System, 1990-2009. *Am J Obstet and Gynecol*. 2011; 204(2): 146.e1-146.e7.

[14] Moro PL, Broder K, Zheteyeva Y, Revzina N, Tepper N, Kissin D, Barash F, Arana J, Brantley M, Ding H, Singleton J, Walton K, Haber P, Lewis P, Yue X, DeStefano F, Vellozzi C. Adverse events following administration to pregnant women of Influenza A (H1N1) 2009 monovalent vaccine reported to the Vaccine Adverse Event Reporting System. *Am J Obstet Gynecol.* 2011; 205: 473.e1-9.

[15] Haberg S, Trogstad L, Gubbes N, Wilcox A, Gjessing H, Samuelsen S, Skrondal A, et al. Risk of Fetal Death after Pandemic Influenza Virus Infection or Vaccination. *New Engl J Med*. 2013; DOI: 10.1056/NEJMoa1207210

[16] National Health and Medical Research Council, editor. *Australian Immunisation Handbook*. 9th ed. Canberra: Australian government, Department of Health and Ageing, 2008.

[17]NSW Health. Influenza Information for Antenatal Care Providers. http://www0.health.nsw.gov.au/PublicHealth/Infectious/Influenza/hp_pregnancy_advice.asp. Accessed 08/01/2013.

[18] Royal Australian and New Zealand College of Obstetrics and Gynaecology, Influenza vaccination for pregnant women. www.ranzcog.edu.au/component/docman/doc_download/978-c-obs-45-influenza-vaccination-for-pregnant-women.html. Accessed 01/03/2013.

[19] Mak DB, Daly AM, Armstrong PK, and Effler PV. Pandemic (H1N1) 2009 Influenza vaccination coverage in Western Australia. *Med J Australia.* 2010; 193 (7): 401-404.

[20] White S, Petersen R, Quinlivan J. Pandemic (H1N1) 2009 Influenza vaccine uptake in pregnant women entering the 2010 Influenza season in Western Australia. *Med J Australia.* 2010; 193: 405–407

[21] McCarthy, E. A., Pollock, W. E., Nolan, T., Hay, S. and McDonald, S. Improving Influenza vaccination coverage in pregnancy in Melbourne 2010–2011. *Aust N Z J Obstet Gynaecol.* 2012; doi: 10.1111/j.1479-828X.2012.01428.x

[22] Lu AB, Halim AA, Dendle C, Kotsanas D, Giles ML, Wallace EM, Buttery JP, and Stuart RL. Influenza vaccination uptake amongst pregnant women and maternal care providers is suboptimal. *Vaccine.* 2012. 30: 4055-4059.

[23] Wiley K, Massey PD, Cooper Robbins SC, Wood N, Ho J, Quinn HE, Leask J. Uptake of Influenza vaccine by pregnant women: A cross-sectional survey with implications for policy and practice. *Med J Aust* In press.

[24] Blanchard-Rohner G, Meier S, Ryser J, Schaller D, Combescure C, Yudin MH, Burton-Jeangros C, de Tejada BM, Siegrist CA. Acceptability of maternal immunization against influenza: the critical role of obstetricians. *J Matern Fetal Neonatal Med*. 2012 Sep;25(9):1800-9. doi: 10.3109/14767058.2012.663835. Epub 2012 Mar 16.

[25] Dlugacz Y, Fleischer A, Carney MT, et al. 2009 H1N1 vaccination by pregnant women during the 2009-10 H1N1 influenza pandemic. *Am J Obstet Gynecol* 2012;206:339.e1-8.

[26] Lau J, Caia Y, Tsuia H, Choia K. Prevalence of influenza vaccination and associated factors among pregnant women in Hong Kong. *Vaccine.* 2010. 28: 5389–5397

[27]Ding H, Santibanez T, Jamieson D, Weinbaum C, Euler G, Grohskopf L, Lu P, Singleton J. Influenza vaccination coverage among pregnant women–National 2009 H1N1 Flu Survey (NHFS). *American Journal of Obstetrics & Gynaecology.* 2011: June: S96-S106.

[28] Eppes C, Wu A, Cameron K, Garcia P, Grobman W. Does obstetrician knowledge regarding influenza increase HINI vaccine acceptance among their pregnant patients? *Vaccine.* 2012. 30 (2012) 5782– 5784

[29] Tong A, Biringer A, Ofner-Agostini M, Upshur R, McGeer A. A cross-sectional study of maternity care provider's and women's knowledge: attitudes, and behaviors towards influenza vaccination during pregnancy. *J Obstet Gynaecol Can.* 2008;30(5):404–10.

[30] Kissin D, Power M, Kahn E, Williams J, Jamieson D, MacFarlane K, Schulkin J, Zhang Y, Callaghan W. Attitudes and Practices of Obstetrician–Gynecologists Regarding Influenza Vaccination in Pregnancy. *Obstet Gynecol*. 2011. 118 (5): 1074–1080.

[31] NSW Ministry of Health. Influenza Vaccination during Pregnancy. Protect you and your baby from influenza (flu). Brochure. Available at http://www0.health.nsw.gov.au/resources/publichealth/infectious/influenza/pdf/flu_vacc_eng_broch_may12.pdf.
Accessed 28/02/2013.

[32] Neergard MA, Olesen F, Andersen RS, and Sondergaard J. (2009). Qualitative description – the poor cousin of health research? *BMC Med Res Methodol.* 9 (52). DOI: 10.1186/1471-2288-9-52.

[33] Trost JE (1986). Statistically non-representative stratified sampling: a sampling technique for qualitative studies. *Qualitative Sociology.* 9(1): 54 – 57.

[34] Lincoln, Y. S., and E. G. Guba. 1985. *Naturalistic inquiry*. Beverly Hills, CA: Sage.1985:347–51

[35] Department of Health and Aging. Prescribing medicines in pregnancy database. http://www.tga.gov.au/hp/medicines-pregnancy.htm. Accessed 01/03/2012.

[36] Broughton D, Beigi R, Switzer G, Raker C, Anderson B. Obstetric health care workers' attitudes and beliefs regarding influenza vaccination in pregnancy. *Obstet Gynecol.* 114 (5): 981-987. 2009.

[37] Ritov I, Baron J. Reluctance to vaccinate: omission bias and ambiguity. *J Behav Decis Making*. 1990; 3: 263-77.

[38] Ritov I. Outcome knowledge, regret and omission bias. *Organ Behav Hum Dec*. 1996. Vol 64 (2): 119-127.

[39] Bornstein B, and Emler C. Rationality in medical decision making: a review of the literature on doctors' decision making biases. *J Eval Clin Pract.* 2001: 7 (2): 97-107.

[40] Asch D, Baron J, Hershey JC, et al. Determinants of resistance to pertussis vaccination. *Med Decis Making*. 1994;14: 118-23.

[41] Baron J, Holzman G, and Schulkin J. Attitudes of Obstetricians and Gynecologists toward Hormone Replacement Therapy. *Med Decis Making* 1998 18: 406 DOI: 10.1177/0272989X9801800408

[42] Marteau T, Dormandy E, Michie S. 2001a. A measure of informed choice. *Health Expect* **4**: 99–108.

[43] M. Schindler a, G. Blanchard-Rohner b, S. Meier b,c, B. Martinez de Tejada d,C.-A. Siegrist b,c, C. Burton-Jeangros
Vaccination against seasonal flu in Switzerland: The indecision of pregnant women encouraged by healthcare professionals
*Rev Epidemiol Sante.*2012; 60: 447–53.

[44] Woolf S, Chan E, Harris R, Sheridan S, Braddock C, Kaplan R, Krist A, O'Connor A, Tunis S. Promoting Informed Choice: Transforming Health Care To Dispense Knowledge for Decision Making. *Ann Intern Med.* 2005;143:293-300.

[45] Maher L, Hope K, Torvaldsen S, Lawrence G, Dawson A, Wiley K, Thomson D, Hayen A, and Conaty S. Influenza vaccination during pregnancy: coverage rates and influencing factors in two urban districts in Sydney. Submitted

[46] Panda B, Stiller R, Panda A. Influenza vaccination during pregnancy and factors for lacking compliance with current CDC guidelines. *J Matern-Fetal Neo M*. 2011; 24(3): 402–406

[47] Yudin H, Salripour M, Sgro M. Impact of Patient Education on Knowledge of Influenza and Vaccine Recommendations Among Pregnant Women. *J Obstet Gynaecol Can* 2009;32(3):232–237

[48] Klatt T, Hopp E. Effect of a Best-Practice Alert on the Rate of Influenza Vaccination of Pregnant Women. *Obstet Gynecol*. 2012. 119 (2)

[49] Peiris D, Joshi R, Webster R, Groenestein P, Usherwood T, Heeley E, Turnbull F, Lipman A, Patel A. An Electronic Clinical Decision Support Tool to Assist Primary Care Providers in Cardiovascular Disease Risk Management: Development and Mixed Methods Evaluation. *J Med Internet Res*. 2009 Oct-Dec; 11(4): e51.

# Chapter Six: Conclusion

Evaluation and research can be applied to promote equitable health services delivery through investigating and identifying disparities in health services delivery and health outcomes between different population groups, and recommending strategies to address these disparities based on the studies' findings. This thesis reports on four professional practice research projects which were undertaken as part of my participation in the NSW Public Health Officer Training Program, which consider issues of equitable health service delivery through applied research and evaluation. The actual studies included in this thesis were determined by a number of factors: the opportunities presented to me as a NSW Public Health Officer Trainee, the competency requirements of the Training Program, the opportunities that arose while on secondment to the Centre for Aboriginal Health, and also my professional and personal interests.

## Overview of Research Studies

Four studies are presented in this thesis. Chapter 2 describes the evaluation of the NSW Early Childhood Oral Health Program, a program designed to improve the oral health of infants and young children in NSW. A mixed methods process and impact evaluation was conducted in the third year of the program. The evaluation found that models of shared responsibility for oral health have been established in NSW which facilitate prevention and early intervention for early childhood caries, however additional strategies targeting vulnerable populations are required for more equitable access and outcomes. It was recommended that the program specifically targets Aboriginal children and families, and children from culturally and linguistically diverse backgrounds, in order to ensure an equitable delivery of services.

The Review of Eye Health Services for Aboriginal people in Greater Western NSW (Chapter 3) specifically investigated whether eye health services in this area are equitable for Aboriginal people. Aboriginal people experience a higher burden of eye health disease than non-Aboriginal people, yet have lower rates of access to eye health services in this region. The review was undertaken through observational visits, key stakeholder consultation and service provision data analysis. The findings indicate that eye health services are not equitably available

and accessible for Aboriginal people in this region. Strategies recommended to address this disparity include improved collaborative practice, improved cultural competence, and routine monitoring of service uptake by Aboriginal people.

Chapter 3 is comprised of a component of *"The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012"*, which reports on the performance of mainstream health services at the local level in providing effective, equitable, and culturally competent services to Aboriginal people in NSW. Appropriate indicators were identified, and analysis of available data undertaken, in order to provide reliable information on health services delivery for Aboriginal people in NSW. The data reported demonstrates that health services achieve differential outcomes in key performance indicators for Aboriginal and non-Aboriginal people, in areas including hospital admissions, emergency department attendances, access to procedures, and perinatal health. It is anticipated that enhanced reporting of performance in Aboriginal health may increase awareness and precipitate action at a local level to address this disparity.

Chapter 4 reports on two studies which investigated issues related to influenza vaccination during pregnancy in central and south western Sydney. Influenza during pregnancy poses significant risks to pregnant women, and although the influenza vaccine is safe, effective, and recommended in guidelines, uptake is low and providers do not routinely recommend it. The first study involved a telephone survey of women who gave birth during the 2012 influenza season in that region, and found that the only one quarter of the women had received the vaccination during their pregnancy. The findings demonstrated a significant relationship between healthcare provider recommendation for the vaccination and vaccine uptake. The second study involved qualitative interviews with general practitioners, and found that general practitioners have varied knowledge and perceptions about influenza vaccination during pregnancy, and that their practices in the provision of the vaccine were related to their perception of risk of influenza during pregnancy and their confidence about the safety of the vaccine. Understanding the perspectives of pregnant women and antenatal care providers towards the vaccine will enable targeted strategies to address their concerns in order to improve uptake of the vaccine and mitigate the risks of influenza during pregnancy.

## Emergent Themes

Two key themes emerged from four studies reported in this thesis, which are reflected in the thesis title '*Applied professional practice in public health: promoting equitable health services*

*delivery through evaluation and research'.* These are: (a) research and evaluation; and (b) promoting equitable health services delivery. In the studies reported, research and evaluation was applied to promote equitable health services delivery through investigating and identifying disparities in health services delivery and health outcomes between different population groups, and recommending strategies to address these disparities based on the studies' findings. The studies reported focus on varied public health issues where there is evidence of significant disparities in health outcomes or access to health services delivery for different population groups, in particular for Aboriginal people.

Investigating, measuring, and reporting inequities in health outcomes and health system performance for different population groups, particularly Aboriginal people, is a key element of the first three studies (Chapters 2 – 4). Health performance measurement systems are giving increased priority to monitoring health outcomes and health services delivery to Aboriginal and Torres Strait Islander people in Australia, particularly at a macro level, and focus on issues including financial accountability, political management, performance, and capacity development, of programs and services [1]. Identifying the most appropriate indicators, and the systems through which they are routinely collected and reported, is crucial for assessing health care services and health outcomes for Aboriginal people [2]. For the Evaluation of the Early Childhood Oral Health Program, limitations in data collection systems and data quality result in less-than-robust indicators to adequately measure the reach of the program to Aboriginal children, which are not able to describe if the impact of the program for these children is adequate to address the increased burden of oral health disease they experience. Monitoring the performance of dental health services in delivering equitable services to Aboriginal children is also complicated by the mixed public and private provision and monitoring of dental services activity in Australia. For the review of eye health services in western NSW, rates of access to cataract surgery for Aboriginal and non-Aboriginal people at the Local Health District level was used as an indicator to measure the overall performance of eye health services for Aboriginal people in the region – a significant disparity was described and the relationship between performance in the indicator and factors of service availability at a local government area level was demonstrated. This indicator of eye health services performance for Aboriginal people at a local level has since been further described in the NSW Chief Health Officers Report 2012 [3], and an independent study [4]. Finally, the measures of health service delivery for Aboriginal people reported in the Chief Health Officers Report 2012 (Chapter 4) demonstrate a concerted effort of the NSW Ministry of Health to measure,

monitor, and report on health system performance for Aboriginal people in NSW. The inclusion of some of these indicators in the Service Agreements for Locals Health Districts ensures that routine health services performance management includes consideration of performance of services for Aboriginal people specifically.

The evidence base on health inequity and what works to improve health equity needs further strengthening [5]. Measurement studies that develop and report on reliable, valid, and culturally appropriate measures of health outcomes and health-care access are important, as described above. Equally important is developing an evidence base on the effectiveness and acceptability of interventions aiming to reduce inequities – in the area of Aboriginal health there is a dominance of descriptive research which describes the size and nature of the health issues, and very few intervention research studies which contribute to the evidence base on the effectiveness of interventions [6]. However, identifying appropriate research and evaluation methods for assessing complex interventions which include several different components can be challenging, and evaluations of complex interventions requires the use of both qualitative and quantitative evidence. [7] Increasingly, evidence-based public health research involves the use of designs other than randomised controlled trials [8]. The studies reported in Chapter 2 and 3 use mixed methods to describe and assess the effectiveness of the Early Childhood Oral Health Program, and eye health services in western NSW, both of which could be described as complex interventions. In both cases, the use of a randomised design was not possible, due to issues including feasibility, timing, ethical considerations, and the requirement for qualitative information from key stakeholders on program implementation. While these studies provide valuable information on the delivery and reach of these programs, they are unable to comprehensively describe the effectiveness of the interventions assessed which a more rigorous intervention research methodology could have done.

The studies reported in Chapters 2, 3, and 4 demonstrate significant inequities in access to quality health care for Aboriginal people, and recommend strategies to improve access. The studies considering early childhood oral health services, eye health services, and influenza vaccination during pregnancy, all consider issues of collaborative practice, and how collaborative practice has or could be used to improve equitable health services. Health systems can be complex and disjointed and difficult for people to navigate, especially those from vulnerable populations, which can in part be addressed through collaborative practice. Collaborative practice is a partnership between various health providers and a client in a

participatory, collaborative and coordinated approach to shared decision making around health [9] and key elements include responsibility, accountability, coordination, communication, cooperation, decision making, mutual trust and respect [10]. Developing a collaborative practice network for early childhood oral health, described as a model of shared responsibility by Mouradian [11], was a key aim of the Early Childhood Oral Health Program, and the evaluation demonstrated that these partnerships had been effectively developed with child and family health nurses. Strengthening the collaborative partnerships with child health professionals in Aboriginal Community Controlled Health Services would further expand the collaborative partnerships and improve the reach of the program for Aboriginal children and their families. The eye health services review in Chapter 3 identified that all the essential components of eye health services for Aboriginal people are available across the region, however they are not being co-ordinated collaboratively between providers which limits accessibility and uptake by Aboriginal people. Many of the recommendations from this review were related to improving collaboration and co-ordination between existing services, rather than a blanket need for additional services. Other studies have also identified lack of co-ordination of services as being a key issue in closing the gap in vision for Aboriginal people – elements of the system work within their immediate domains of interest and have limited regard for components outside their domain, which results in an eye health care system analogous with a leaky pipe where gaps in co-ordination of services across the eye health care pathway results in few patients accessing all elements of the pathway as required. [12] Finally, the influenza vaccination during pregnancy study confirmed the benefits of collaborative practices and networks, identifying that the collaborative ante-natal care shared care model is the one which achieves the highest uptake of influenza vaccine for pregnant women. Enhancing co-ordination and collaboration between antenatal care providers in the public and primary health care sector and public health practitioners is likely to result in improved uptake of the influenza vaccine.

Improving health service delivery for equitable health outcomes required changes in the professional practice of health professionals, and the issue of achieving or requiring change in professional practice was considered in all four studies. Health professionals have a significant role to play in addressing health inequities [13]. Achieving change in professional practice of health care providers is a complex challenge, and barriers to change in practice can be related to issues of information management, clinical uncertainty, the providers sense of competence, perceptions of liability, patient expectations, standards of practice, financial disincentives, and

administrative constraints. [14] The Early Childhood Oral Health Program provides an example of how to facilitate change in the professional practices of providers – child and family health nurses are now routinely incorporating oral health promotion into their routine practice, a significant change over three years, due to the strategies undertaken through this program. The strategies which resulted in this change include the development of guidelines, the delivery of training, the development of collaborative and supportive networks with oral health professionals, and the inclusion of information about oral health screening into the 'Blue Book'. The projects in Chapter 3 and 4 clearly identify that changes are still required in the professional practices, behaviours, and cultural competence of individual mainstream health service providers in order to achieve more equitable health services and outcomes for Aboriginal people in NSW. In Chapter 5, we find that antenatal care providers are not routinely recommending influenza vaccination to pregnant women, despite clear guidelines to do so. Influenza vaccination rates are much higher in other population groups in NSW such as the elderly, so it is feasible that an improvement in vaccination coverage rates could also be achieved for pregnant women. The project identifies the perspectives of general practitioners which influence their practice, and their concerns can now be addressed in future strategies promoting influenza vaccination during pregnancy.

Cultural competence emerged as a significant issue in the findings and recommendations of the studies in Chapters 2, 3, and 4. Cultural competence reflects the capacity of the health system or health professionals to improve health and wellbeing by integrating culture into the delivery of health services – it is the behaviours, attitudes and policies that come together to enable the system to work effectively in cross-cultural situations. [15] Eggington [16] identifies cultural respect and autonomy as the two major ethical principles essential for the promotion of equity for Aboriginal people. The Early Childhood Oral Health Program had specifically implemented a number of strategies to improve the cultural competence of the program for Aboriginal families and culturally and linguistically diverse families through developing appropriate resources, however individual practitioners did not always feel confident in delivering the services equitably and appropriately to diverse populations. The eye health services review found that while some eye health services in western NSW at the primary and secondary level have strong foundations in cultural safety for Aboriginal people, tertiary mainstream eye health services require enhanced cultural competence in order to deliver equitable and accessible eye health services for Aboriginal people. Chapter 4 identifies a number of health service performance indicators that are currently being used to indicate the level of cultural competence of health service delivery for Aboriginal people. The indicators of

discharge from hospital against medical advice and incomplete emergency department attendances provide indirect evidence of the cultural competence of hospital services [17]; also the significantly higher proportion of Aboriginal people compared to non-Aboriginal people who have an unplanned readmissions to hospital within one month of discharge from hospital, or re-present to the same emergency department within two days of a prior presentation, are also considered to indicate that health services may not be adequately meeting the needs of Aboriginal people in a culturally competent way. The inclusion of these indicators in the Service Agreements of Local Health Districts will encourage health services to consider how to improve cultural competence of services for Aboriginal people in order to deliver equitable health services for improved health outcomes.

## Outcomes and Impact

The studies reported in this thesis have demonstrated that research and evaluation can be applied to promote equitable health services delivery in NSW. The impacts of the results from each study are reported within the chapters and summarised below. Each project has demonstrated impact or significant potential to improve health services for equitable health outcomes.

The Evaluation of the NSW Early Childhood Oral Health Program described the achievements of a multi-strategy state-wide program which aims to improve the oral health of children under five years of age, and demonstrated two significant areas of success for the program – child health professionals have reoriented their practices to include oral health promotion and early identification of tooth decay in infants, and the program has resulted in increased referrals to public dental services for children under five. The participatory evaluation process provided an opportunity for the key stakeholders involved in the oversight, implementation, and monitoring of the program to consider the key achievements and ongoing challenges for the program, and these were then addressed in ongoing planning and implementation of the program. In particular, the finding that the reach of the program to vulnerable population groups could be further improved was considered extensively, and the Centre for Oral Health Strategy is implementing a number of programs which aim to improve the availability and accessibility of oral health services to the Aboriginal community. The findings of this evaluation are also extremely relevant to oral health programs in other states, and also to health promotion initiatives in other health areas; the publication of the evaluation findings in the

Health Promotion Journal of Australia has enabled the information to be widely available. The evaluation identified the success of the program in developing a model of shared responsibility for oral health in children between oral health professionals, child health professionals and parents, and highlighted the aspects of the program roll-out which facilitated this achievement. These findings and lessons could well be applied to many other health areas, including for example in developing shared responsibilities for influenza vaccination during pregnancy between antenatal care providers, general practitioners, public health practitioners, and pregnant women.

The Review of Eye Health Services for Aboriginal People in Greater Western NSW highlighted that eye health services across this region are not equitably available, accessible, and culturally appropriate for Aboriginal people, which results in significantly lower rates of uptake to cataract surgery for Aboriginal people compared to non-Aboriginal people, an objective indicator of how well various groups are navigating the entire eye health services pathway which was not previously routinely calculated or analysed. This project significantly raised the profile of eye health issues for Aboriginal people within the NSW Ministry of Health, and resulted in a number of positive initiatives aimed to improve these issues. The allocation of funding to create Aboriginal eye health co-ordinator positions within each Local Health District in the region, and the development of an eye health clinic for Aboriginal people in a major regional centre in the region, were both significant and tangible results of this project. In addition, cataract surgery rates were published in *The health of the people of NSW: Report of the Chief Health Officer 2012,* disaggregated for Aboriginal and non-Aboriginal people and by each Local Health District, and will be routinely published in the future, which will provide transparent reporting on achievements or lack thereof in achieving equitable access to eye health services for all people in NSW.

"The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012" [3] highlights the significant disparity for Aboriginal people in NSW compared to non-Aboriginal people across most population health indicators and health care service indicators. Effective health services, policies, and programs that meet the needs of Aboriginal people will contribute towards closing these gaps, and the health services delivery chapter of the report provides a starting point to measure and report on health system performance in Aboriginal health in NSW. It is anticipated that enhanced reporting of performance in Aboriginal health may increase awareness and precipitate action at a local level to address this disparity. It is the

first time that some of these indicators have been publicly reported at a Local Health District level, and many are now routinely reported and available on the Health Statistics NSW web-based reporting portal. Significantly, a number of these performance indicators in health services delivery for Aboriginal people will now be included in the regular accountability and performance reporting mechanisms for Local Health Districts in NSW.

Finally, the Influenza Vaccination during Pregnancy Project involved two separate research components that use qualitative and quantitative methods respectively to reliably estimate the uptake of the influenza vaccine in pregnant women, and the factors influencing uptake. This project has only recently been concluded, and the findings will be considered by the Public Health Unit where the project was conducted, and by the NSW Ministry of Health more broadly, in planning to address the issue for the 2013 influenza season. The establishment of a routine surveillance system to monitor influenza vaccine uptake in pregnant women in the two Local Health Districts where this project was conducted will maintain the profile and importance of this issue, and also will enable vaccine coverage to be monitored, and strategies undertaken to address this issue to be evaluated.

## Reflection and Conclusion

The title and focus of this thesis '*Applied professional practice in public health: promoting equitable health services delivery through evaluation and research',* in many ways emerged from my professional background and personal interests. As a former health service provider and a manager of health programs I have strong foundations in evidence based practice, and applying rigorous evaluation frameworks in order to monitor and improve the effectiveness and efficiency of health services – I am interested in identifying practical and realistic solutions to the question of how things can be done better for better outcomes. The emphasis throughout the thesis on equity results from a strong personal interest in social justice – exploring the reach and appropriateness of these services and programs for vulnerable populations, and identifying how this can be improved for equitable outcomes, was an important element of these studies for me.

My professional career began as a physiotherapist, delivering clinical services and clinical education in various public hospitals in NSW and the UK. For the six years prior to commencing the NSW Public Health Officer Training Program, I worked for non-government organisations in

disability services development and community health programming in low and middle income countries, including Cambodia, Timor-Leste, and Fiji. The NSW Public Health Officer Training Program provided me with many varied and challenging opportunities which enabled me to consolidate and further develop my professional skills and practice in new contexts, and to develop new skills in public health practice.

The projects are presented chronologically as they were undertaken, and therefore they also chart the trajectory of my skills development in applied professional practice in public health. My impression is that the quality of the project design, methods, implementation, analysis, and reporting improves throughout the thesis chapters, and the final chapter presents two rigorous research projects that were implemented with an enhanced efficiency and professionalism compared to the first projects. While all projects were collaborative and supported significantly by my academic and workplace supervisors, my professional independence also developed as the three years progressed.

I concluded the NSW Public Health Officer Training Program in March 2013, and have now commenced in the position of Acting Manager of Aboriginal Health Research and Evaluation within the Centre for Epidemiology and Evidence in the NSW Ministry of Health. I look forward to applying the skills and professional competencies I have developed through the completion of the studies included in this thesis towards promoting equitable health services delivery for Aboriginal people in NSW through research and evaluation.

## References (for Conclusion):

[1] Smylie J, Anderson I, Ratima M, Crengle S, and Anderson M. Indigenous health performance measurement systems in Canada, Australia, and New Zealand. *Lancet.* 2006. 367: 2029 – 31.
[2] Peiris D, Mohsin M, Jenkins A, Hughes C, and Cass A. Robust data to close the gap: current vascular and maternal/newborn indictaors as measures of progress in Aboriginal health in New South Wales. *Australian New Zealand Journal of Public Health.* 2010. 34: 563 – 71.
[3] NSW Ministry of Health. The health of Aboriginal people of NSW: Report of the Chief Health Officer 2012. NSW Health, 2012.
[4] Randall DA, Reinten T, Maher L, Lujic S, Stewart J, Keay L, Leyland AH, Jorm LA. Disparities in cataract surgery between Aboriginal and non-Aboriginal people in New South Wales, Australia. 2013. *In press.*

[5] Marmot M, Friel S, Bell R, Houweling T, Taylor S. Closing the gap in a generations: health equity through action on the social determinants of health. *The Lancet.* 2008. 372: 1661 – 69.

[6] Sanson-Fisher R, Campbell EM, Perkins JJ, Blunden SV, and Davis BB. Indigenous health research: a critical review of outputs over time. *Medical Journal of Australia.* 2006. 184 (10): 502 – 505.

[7] Campbell M, Fitzpatrick R, Haines A, Kinmonth AL, Sandercock P, Spiegelhalter D, and Tyrer P. Framework for design and evaluation of complex interventions to improve health. *British Medical Journal.* 2000. 321: 694 – 696.

[8] Des Jarlai, Lyles C, Crepaz N, and the TREND group. Improving the Reporting Quality of Nonrandomised Evaluations of Behavioural and Public Health interventions: the TREND Statement. *American Journal of Public Health.* 2004. 94 (3): 361 – 366.

[9] Canadian Interprofessional Health Collaborative. A national interprofessional competency framework; February 2010. Available from: http://www.cihc.ca/files/CIHC_IPCompetencies_Feb1210.pdf (cited 35/05/2013).

[10] Kasperski M. Implementation strategies: 'Collaboration in primary care family doctors and nurse practitioners delivering shared care.' Toronto, ON: Ontario College of Family Physicians, 2000. Available from: http://www.cfpc.ca/English/CFPC/CLFM/bibnursing/default.asp.

[11] Mouradian WE, Wehr E, and Crall JJ. Disparities in Children's Oral Health and Access to Dental Care. *Journal of the American Medical Association.*2000; 284 (20): 2625-2631.

[12] Taylor HR, Boudville AI, Anjou MD and McNeil RJ. The Roadmap to Close the Gap for Vision. 2011. Melbourne: Indigenous Eye Health Unit, Melbourne School of Population Health, The University of Melbourne. (ISBN 978-0-7340-4739-7).

[13] UCL Institute of Health Equity: The Role of Health Professionals. 2013. www.instituteofhealthequity.org/projects/working-for-health-equity-the-role-of-health-professionals.

[14] Baker R, Camosso-Stefanovic J, Gilliss CL, Shaw EJ, Cheater F, Flottorp S, Robertson N: Tailored interventions to overcome identified barriers to change: Effects on professional practice and health care outcomes. *Cochrane Database Syst Rev*. 2010. CD005470.

[15] National Health and Medical Research Council. Cultural competency in health: a guide for policy, partnerships and participation. 2005 Canberra: National Health and Medical Research Council.

[16] Eggington D. Aboriginal health equity: the key is culture. *Australian New Zealand Journal of Public Health.* 2012; 36:516. doi: 10.1111/j.1753-6405.2012.00950.x

[17] Australian Health Ministers' Advisory Council. 2011. Aboriginal and Torres Strait Islander Health Performance Framework. 2010 Report. Canberra: Australian Health Ministers' Advisory Council.

# Appendix One: Certificate of Completion

# NSW Public Health Officer Training Program

NSW GOVERNMENT | Health

# Certificate of Completion

This is to certify that

***Louise Maher***

has successfully completed the three year

## NSW Public Health Officer Training Program

27 September 2013

Dr Rohan Hammett, Acting Director General
**NSW Ministry of Health**

# Appendix Two: Letter of Approval from Ethics Committees

GREATER WESTERN
AREA HEALTH SERVICE
NSW HEALTH

31st March, 2010

Ms Louise Maher
PO Box 533
WENTWORTHVILLE NSW 2145

Dear Ms Maher,

***Greater Western Area Health Service (AHS)***
***Human Research Ethics Committee (HREC)***
***Project No. HREC/10/GWAHS/6***

***Early Childhood Oral Health Program Evaluation***

Thank you for submitting your response to the Greater Western AHS HREC's request for further information and clarification for the above project. The HREC Executive reviewed your response at its meeting held on 25th March, 2010.

*The Greater Western AHS HREC has been accredited by the NSW Department of Health as a lead committee to provide the single ethical and scientific review of proposals, to conduct research within the NSW public health system. Further, this committee is constituted and operates in accordance with the National Health and Medical Research Council's National Statement on Ethical Conduct in Human Research and the CPMP/ICH Note for Guidance on Good Clinical Practice.*

I am pleased to advise that the HREC has granted ethical approval of this research project, but requires that the investigator comply with the following:

- The investigator is to contact the Manager of each Community Health facility and ask permission to attend the facility to conduct staff and parent/guardian interviews;
- The HREC does NOT grant permission for the investigator to ask the receptionist at each Community Health facility the age of the child attending the facility. Such an approach does not comply with privacy laws. The investigator is to ask the Manager's permission for the receptionist to act as an intermediary between the investigator and parent/guardian. The HREC suggests that the receptionist be the person to ask parents/guardians of children aged between 18 months and 5 years if they would be interested in participating in the project. If the parent/guardian indicates interest, the receptionist would then hand a copy of the Participant Information Sheet to the parent/guardian. If the parent/guardian agrees to be interviewed, the investigator would then provide the Consent Form.

Greater Western Area Health Service
ABN 88018692002

Human Research Ethics Committee
P O Box 143 "The Lodge"
Gorman's Hill Road
Bathurst NSW 2795
Tel (02) 6339 5601 Fax (02) 6339 5606

The following documentation has been reviewed and approved by the HREC:

- SWAHS HREC (Nepean and Westmead campuses) Quality Improvement / Quality Assurance Submission Checklist & Application Form, Final September 2008;
- Resolution that the Project meets the criteria for Quality Assurance according to NHMRC Guidelines Westmead Scientific Advisory Committee, 15 March 2010;
- SWAHS HREC approval for 'Evaluation of the Early Childhood Oral Health Program', 16 March 2010;
- Early Childhood Oral Health Program Evaluation Research Protocol, March 2010;
- Quantitative Data Collection Form, March 2010;
- Questionnaire Interview: Program Implementers
- Questionnaire Interview: Parents
- Early Childhood Oral Health Program Evaluation Participant Information Sheet (Parents and Carers), Version 2, 15 March 2010;
- Early Childhood Oral Health Program Evaluation Consent Form (Parents and Carers), Version 2, 15 March 2010;
- Early Childhood Oral Health Program Evaluation Participant Information Sheet (Program Implementers), Version 2, 15 March 2010;
- Early Childhood Oral Health Program Evaluation Consent Form (Program Implementers), Version 2, 15 March 2010;

The project is approved to be conducted at the following NSW Public Health sites:

- Dubbo Community Health Centre
- Auburn Community Health Centre
- Doonside Community Health Centre

Please note the following conditions of approval:

1. The coordinating investigator will immediately report anything which might warrant review of ethical approval of the project in the specified format, including any unforeseen events that might affect continued ethical acceptability of the project.

2. Proposed changes to the research protocol, conduct of the research, or length of HREC approval will be provided to the HREC for review in the specified format.

3. The HREC will be notified, giving reasons, if the project is discontinued at a site before the expected date of completion.

4. The coordinating investigator will provide an annual report to the HREC and at completion of the study in the specified format.

HREC approval is valid for 2 years from the date of this letter.

This HREC approval letter constitutes ethical approval only. You are required to submit a site specific assessment application for each site at which you wish to conduct this project. You must not commence this research project at a site until separate authorisation from the Chief Executive or delegate of that site has been obtained. A copy of this letter must be forwarded to all Principal Investigators at every site for submission to the relevant Research Governance Officer as part of the site specific assessment process.

Should you have any queries about your project please do not hesitate to contact the Greater Western AHS HREC Executive Officer on (02) 6339 5601 or via email ethics.committee@gwahs.health.nsw.gov.au .

Please quote HREC Reference No. HREC/10/GWAHS/6 in all correspondence.

The HREC wishes you every success in your research.

Yours sincerely

Suzanne Degiorgio
for
Dr Thérèse Jones
**Executive Officer**
**Human Research Ethics Committee**
**Greater Western Area Health Service**

THE UNIVERSITY OF
NEW SOUTH WALES

HUMAN RESEARCH ETHICS
COMMITTEE (HREC)

11 May 2010

Ms Louise Maher
School of Rural Health
University of Sydney

Dear Ms Maher

**Early childhood oral health program evaluation**
HREC 10149 / GWAHS HREC/10/GWAHS/6

Thank you for the above application for ratification of the ethics clearance given by the Greater Western Area Health Service Human Research Ethics Committee to you dated 31 March 2010.

The Executive noted the above protocol at its meeting held on 4 May 2010, and is pleased to advise it is satisfied that this protocol meets the requirements as set out in the National Statement on Ethical Conduct in Human Research*. The Deputy Vice-Chancellor (Research) accepted the ethics Committee's recommendation.

Please note that the UNSW HREC period of approval for this project is valid for the duration of the approval period given by the Primary Ethics Committee.

Yours sincerely,

A Metcalfe

Professor Andrew Metcalfe
Presiding Member
Human Research Ethics Committee

* http://www.nhmrc.gov.au

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**ADDRESS FOR ALL CORRESPONDENCE**
RESEARCH DEVELOPMENT OFFICE
ROYAL PRINCE ALFRED HOSPITAL
CAMPERDOWN NSW 2050

TELEPHONE: (02) 9515 6766
FACSIMILE: (02) 9515 7176
EMAIL: lesley.townsend@email.cs.nsw.gov.au
REFERENCE: X12-0231 & HREC/12/RPAH/365

NSW GOVERNMENT | Health Sydney Local Health District

29 August 2012

Ms L Maher
Public Health Unit
Population Health
PO Box 374
CAMPERDOWN NSW 2050

Dear Ms Maher,

**Re: Protocol No X12-0231 & HREC/12/RPAH/365 - "Influenza vaccination during pregnancy in South Western Sydney and Sydney Local Health Districts"**

The Executive of the Ethics Review Committee, at its meeting of 16 August 2012, considered your correspondence of 16 August 2012. In accordance with the decision made by the Ethics Review Committee, at its meeting of 8 August 2012, ethical approval is granted.

The proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research.*

This approval includes the following:

- Research Protocol (Master Version 1, 28 July 2012)
- Letter to Group 1 (Group 1 Mothers) (Master Version 1, 18 July 2012)

  This letter to be signed by Dr R Ogle or Professor G Matthias, as appropriate.
- Information for Participants – Mothers (Master Version 2, 14 August 2012)
- Survey Questionnaire for Group 1 (Mothers) (Master Version 1, 18 July 2012)

- Letter to Group 2 (GPs) (Master Version 1, 18 July 2012)
- Information for Participants – General Practitioners (Master Version 2, 14 August 2012)
- Participant Consent Form (Group 2 GPs) (Master Version 1, 18 July 2012)
- Qualitative Interview Questions for Group 2 (GPs) (Master Version 1, 18 July 2012)

You are asked to note the following:

- **This letter constitutes ethical approval only. You must NOT commence this research project at ANY site until you have submitted a Site Specific Assessment Form to the Research Governance Officer and received separate authorisation from the Chief Executive or delegate of that site.**

  **On the basis of this ethics approval, authorisation may be sought to conduct this study within any NSW public health organisation and/or within any private organisation which has entered into an appropriate memorandum of understanding with the Sydney Local Health District, Sydney Local Health Network or the Sydney South West Area Health Service.**

  The Committee noted that authorisation will be sought to conduct the study at the following sites:

  - Sydney Local Health District
  - South Western Sydney Local Health District

- This approval is valid for four years, and the Committee requires that you furnish it with annual reports on the study's progress beginning in September 2013. If recruitment is ongoing at the conclusion of the four year approval period, a full re-submission will be required. Ethics approval will continue during the re-approval process.

- This human research ethics committee (HREC) has been accredited by the NSW Department of Health as a lead HREC under the model for single ethical and scientific review and is constituted and operates in accordance with the National Health and Medical Research Council's *National Statement on Ethical Conduct in Human Research* and the *CPMP/ICH Note for Guidance on Good Clinical Practice*.

- You must immediately report anything which might warrant review of ethical approval of the project in the specified format, including unforeseen events that might affect continued ethical acceptability of the project.

- You must notify the HREC of proposed changes to the research protocol or conduct of the research in the specified format.

- You must notify the HREC and other participating sites, giving reasons, if the project is discontinued at a site before the expected date of completion.

- Where appropriate, the Committee recommends that you consult with your Medical Defence Union to ensure that you are adequately covered for the purposes of conducting this study.

Should you have any queries about the Committee's consideration of your project, please contact me. The Committee's Terms of Reference, Standard Operating Procedures, membership and standard forms are available from the Sydney Local Health District website.

A copy of this letter must be forwarded to all site investigators for submission to the relevant Research Governance Officer.

The Ethics Review Committee wishes you every success in your research.

Yours sincerely,

Lesley Townsend

Lesley Townsend
**Executive Officer**
**Ethics Review Committee (RPAH Zone)**

HERC\EXCOR\12-09


**HUMAN RESEARCH ETHICS COMMITTEE (HREC)**

---

03-Oct-2012
Louise Maher
Sydney NSW 2052

Dear Maher,

**HREC Ref # HC12535**
**Influenza vaccination during prgnancy in South Western Sydney and Sydney Local Health Districts**

Thank you for the above application for ratification of the ethics clearance given by the Sydney Local Health District HREC (RPAH Zone) (Ref HREC/12/RPAH/365) to Ms L Maher for the approval period from 29-Aug-2012 to 28-Aug-2016.

The Executive noted the above application at its meeting held on 02-Oct-2012, and is pleased to advise it is satisfied that this protocol meets the requirements as set out in the National Statement on Ethical Conduct in Human Research*. The Deputy Vice-Chancellor (Research) has accepted the Committee's recommendation.

Please note that the UNSW HREC period of approval for this project is valid for the duration of the approval period given by the Primary Ethics Committee.

Sincerely,

Andrew Metcalfe

Presiding Member
Human Research Ethics Committee

* http://www.nhmrc.gov.au/