The mission of the Clinical Excellence Commission is to build confidence in healthcare in NSW by making it demonstrably better and safer for patients and a more rewarding workplace.

Please note that with all statistical reports there is the potential for minor revisions of the data in Quality and Safety of Health Care in NSW – A Chartbook 2008 over its life. Please refer to the online version at www.cec.health.nsw.gov.au. Errata, if required, will also be published at this site.
The preparation of the second edition of CEC’s Quality and Safety of Healthcare in NSW: a Chartbook 2008 was once again very much a team effort. Many people within the CEC, NSW Health and other organisations were involved in indicator definition, data cleaning, analysis and presentation, writing and editing the report, and proofing. Thank-you especially to the following contributors:

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Richard Gilbert (Richard Gilbert Consulting) was engaged to assist with drafting Chartbook 2008. In some instances, the text is based in part on material developed for Chartbook 2007 by A/Professor Jim Pearse, et al of Health Policy Analysis Pty Ltd, in partnership with the Centre for Health Service Development, University of Wollongong, Dr Annette Pantle, Bernie Harrison, Dr Tony Burrell, and André Jenkins.

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Content and structural suggestions and advice

Dr Diane Watson, Dr Kim Sutherland, and Professor David Ben-Tovim.

Special Acknowledgements

CEC wishes to acknowledge the valuable advice, assistance and many suggestions for improvements received from Dr Diane Watson for the 2nd edition in 2009.

Finally, the CEC would like to make special acknowledgements to Professor Sheila Leatherman, and Professor Bruce Barracough AO, who provided valuable early advice to the Chartbook project during first edition in 2007.
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<th>Abbreviation</th>
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<tbody>
<tr>
<td>AACR</td>
<td>Australasian Association of Cancer Registries</td>
</tr>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
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<tr>
<td>ACHS</td>
<td>Australian Council on Healthcare Standards</td>
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<tr>
<td>ACS</td>
<td>Acute Coronary Syndrome</td>
</tr>
<tr>
<td>AHRQ</td>
<td>Agency for Healthcare Research and Quality</td>
</tr>
<tr>
<td>AICR</td>
<td>American Institute for Cancer Research</td>
</tr>
<tr>
<td>AIHW</td>
<td>Australian Institute of Health and Welfare</td>
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<tr>
<td>APACHE</td>
<td>Acute Physiological And Chronic Health Evaluation</td>
</tr>
<tr>
<td>APDC</td>
<td>Admitted Patient Data Collection (NSW, formerly ISC)</td>
</tr>
<tr>
<td>ARIA</td>
<td>Accessibility/Remoteness Index of Australia</td>
</tr>
<tr>
<td>CABG</td>
<td>Coronary Artery By-pass Graft</td>
</tr>
<tr>
<td>CATI</td>
<td>Computer-Assisted Telephone Interview</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<tr>
<td>CEC</td>
<td>Clinical Excellence Commission</td>
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<tr>
<td>CHeReL</td>
<td>Centre for Health Record Linkage</td>
</tr>
<tr>
<td>CHO</td>
<td>Report of the Chief Health Officer’s (NSW)</td>
</tr>
<tr>
<td>CIHI</td>
<td>Canadian Institute for Health Information</td>
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<tr>
<td>CMS</td>
<td>Centers for Medicare and Medicaid Services</td>
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<tr>
<td>COPD</td>
<td>Chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>CSRP</td>
<td>Clinical Services Redesign Program</td>
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<tr>
<td>DRG</td>
<td>Diagnosis-Related Group</td>
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<tr>
<td>GMCT</td>
<td>Greater Metropolitan Clinical Taskforce</td>
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<tr>
<td>GOLD</td>
<td>Global Initiative for Chronic Obstructive Lung Disease</td>
</tr>
<tr>
<td>HOIST</td>
<td>Health Outcomes Information Statistical Toolkit</td>
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<tr>
<td>ICU</td>
<td>Intensive Care Unit</td>
</tr>
<tr>
<td>IIMS</td>
<td>Incident Information Management System</td>
</tr>
<tr>
<td>IRSD</td>
<td>Index of Relative Socio-Economic Disadvantage</td>
</tr>
<tr>
<td>ISC</td>
<td>Inpatient Statistics Collection (now APDC)</td>
</tr>
<tr>
<td>LGA</td>
<td>Local Government Area</td>
</tr>
<tr>
<td>MDC</td>
<td>Midwives Data Collection</td>
</tr>
<tr>
<td>MH-CCP</td>
<td>Mental Health Clinical Care and Prevention Service Planning Model</td>
</tr>
<tr>
<td>PCI</td>
<td>Percutaneous Coronary Intervention</td>
</tr>
<tr>
<td>PTCA</td>
<td>Percutaneous Transluminal Coronary Angioplasty</td>
</tr>
<tr>
<td>SCRGSP</td>
<td>Steering Committee for the Review of Government Service Provision</td>
</tr>
<tr>
<td>SEIFA</td>
<td>Socio-Economic Indexes for Areas</td>
</tr>
<tr>
<td>TASC</td>
<td>Towards a Safer Culture</td>
</tr>
<tr>
<td>TIA</td>
<td>Transient Ischaemic Attack</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations International Children's Emergency Fund</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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Foreword

The mission of the Clinical Excellence Commission (CEC) is to build confidence in health care in NSW by making it demonstrably better and safer for patients and a more rewarding workplace. One role is to monitor and improve quality and safety of health care. Chartbook 2008 is the second Chartbook produced by the CEC and provides the people of NSW with a broad array of information about their health care system.

Whilst providing accurate information to the public, governments and the health community remains a worthy objective, our ambitions for this report are set high. We believe that the ultimate test of the usefulness is that it will stimulate discussion and informed action across the health care system to improve the quality and safety of health care services.

In order to inform those efforts, this Chartbook offers information on access to services; the appropriateness, effectiveness and safety of care; efficiency of service provision and consumer participation. It provides coverage of many types of services from child and maternal care, to mental health care and emergency services. It spans clinical areas such as cardiac care and neonatal services. There should be something in it for everyone.

Our staff at the CEC has worked very closely with experts from other organisations to identify measures of quality and safety that offer a glimpse into our healthcare system. They have taken great care to track change over time, highlight differences across area health services and to look at issues from metropolitan, urban and rural perspectives.

Importantly, they've also offered information about the experiences of people in NSW who live in neighbourhoods that differ in socioeconomic circumstance to inform efforts to improve equity. By tracking movements in these measures of quality and safety over time, and reporting on change, we hope to provide evidence of the impact of initiatives targeted at quality improvement and identify those areas that require our attention and action.

In Chartbook 2008 there are three new chapters (Aboriginal Health, Ambulance Cardiac Emergency Responsiveness and Initiatives in Safety and Quality) supported by 27 new charts. Several existing chapters have additional charts and in some cases have had charts ‘retired’. Additional analyses using rural and remote classifications, and classifications of socio-economic status are provided for selected charts. Chartbook 2008 also introduces thematic maps to enable detailed analysis of selected data at the Local Government Area.

I am keen to ensure that our publications are useful to readers and inform efforts to improve quality and safety of healthcare. Please let us know how we are doing by providing feedback. An evaluation form can be obtained on our web site at: www.cec.health.nsw.gov.au, or email comments or suggestion to: information@cec.health.nsw.gov.au

Thank you for your interest in reading this publication and to the individuals and organisations that so generously offered their time and talents to produce it.

Clifford F Hughes AO
Clinical Professor
Chief Executive Officer
Executive Summary

Across New South Wales (NSW), people want to be confident that they will get high quality, safe health care when they need it. Patients in need of immediate or ongoing services want compassionate care that meets their needs, and their health care providers want to offer the best possible care. What these people all have in common as a shared need for information about health care so that they can have confidence in care, make informed choices and make services demonstrably better.

NSW has one of the better public health care systems in the developed world and its doctors, nurses and other clinical staff are well-trained, skilled, caring and dedicated. Each day thousands of people receive care in emergency departments and hospitals and there is always work to be done to ensure that patients and their families will always get the type of care they are entitled to expect. In order to inform efforts to make health care demonstrably better and safer for patients, the Clinical Excellence Commission (CEC) put together a team of experts to create this chartbook to:

- Provide an overview of five-year trends in quality and safety across the NSW healthcare system to demonstrate historic improvements and areas requiring continued attention
- Offer insights to inform efforts to improve care received by people who live in different health service delivery areas, in urban or rural settings or in different socioeconomic circumstances
- Provide some perspective on the findings knowing prospectively that health care professionals across the state are best positioned to interpret the data in ways that can inform their efforts to improve
- Report on the progress of key initiatives of the CEC and NSW Health Department that address quality and safety issues.

Chartbook 2008 spans clinical areas such as cardiac care (Chapter 4), stroke care (Chapter 5) and orthopaedic care (Chapter 6). It also provides coverage of many types of services such as emergency services (Chapter 3), child and maternal care (Chapter 9) and mental health care (Chapter 13). Importantly, this edition offers new insights regarding Aboriginal health and health care (Chapter 12) and Ambulance services (Chapter 14), as well as information regarding initiatives to improve quality and safety (Chapter 15).

Chartbook 2008 offers a glimpse into a complex system of care. Across the collection of indicators include, our staff and Chartbook Advisory Committee thought it important to offer a broad scope of information. From the selected charts, many insights emerged.

Chapter 2: Population Health

- **Obesity and overweight.** In 2007, just over half (51.7 per cent) of NSW adults (aged 16 years and over) were either overweight or obese. These rates have increased significantly over time and vary across area health services.

- **Prevalence of current smoking.** The prevalence of current smokers among NSW adults (aged 16 years and over) has decreased from 22.3 per cent in 2003 to 18.6 per cent in 2007. In 2007 the prevalence was higher in males and did not vary among area health services, except in Northern Sydney & Central Coast (12.0 per cent).

- **Immunisation for older adults.** The proportion of persons aged 65 years and over, vaccinated against influenza in the last 12 months decreased between 2003 (76.0 per cent) and 2007 (72.8 per cent). In 2007, the proportion did not vary between males and females, or among area health services. The proportion of NSW adults aged 65 years and over vaccinated against pneumococcal disease in the last 5 years increased between 2003 (47.1 per cent) and 2007 (59.1 per cent). In 2007, the proportion was lower in males and higher in rural area health services.
- **Cervical cancer screening.** The biennial cervical cancer screening rate for 2004-05 was 57.5 per cent of women, which is below the target rate of 75 per cent. The cervical screening rate varies across area health services.

- **Difficulties accessing healthcare.** The proportion of adults who experienced difficulties getting health care when needing it, has increased from 13.3 per cent in 2003 to 17.0 per cent in 2007. In 2007, a higher proportion of adults in rural health areas experienced difficulties in getting access to health care. The main reason cited in 2007 were: waiting time for an appointment with a general practitioner (43.1 per cent), shortage of general practitioners in area (10.7 per cent), difficulty in accessing specialists (10.1 per cent), and cost of health services (9.5 per cent).

- **Deaths amenable to healthcare.** In 2002-2006, the rate of premature death (before 75 years of age) from causes amenable to healthcare was 67.6 per 100,000 population. These amenable deaths accounted for 19.6 per cent of all deaths during this period. Higher rates of amenable deaths occur in rural area health services and there is a clear gradient of increasing death rates with increasing geographic remoteness.

- **Satisfaction with hospital stay.** Among patients admitted to hospital in 2007, 40.2 per cent rated the overall quality of their hospital care as excellent, 30.4 per cent as very good, 19.0 per cent as good, 6.5 per cent as fair, and 3.9 per cent as poor. The main reasons for dissatisfaction (rated care as fair or poor) were: excessive waiting time for care (18.1 per cent), inadequate medication or management (14.7 per cent), poor quality accommodation (13.9 per cent), poor attitude of clinical staff (13.0 per cent), and not enough staff (12.8 per cent). The proportion of adults who rated their hospital care positively has not changed since 2003.

- **Potentially avoidable hospitalisations.** The rate of potentially avoidable hospitalisations increased from 775 per 100,000 population in 2004 to 836 per 100,000 population in 2007. Rates vary across area health services.

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**Chapter 3: Emergency Care**

- **Emergency department waiting times.** In 2007, national emergency department performance benchmarks were achieved for NSW for all triage categories except category 3 (potentially life-threatening) patients. Only three area health services were able to achieve the 75 per cent benchmark for triage category 3.

- **Emergency admission performance.** In 2007, 77.0 per cent of patients in emergency departments were admitted within eight hours. By comparison, 70 per cent were admitted in this time frame in 2003. Experiences varies cross area health services and five area health services achieved the 80 per cent benchmark in 2007.

- **Emergency department care rating.** In 2007, 79.4 per cent of the adults who attended an emergency department rated the overall quality of care they received as excellent (24.8 per cent), very good (27.5 per cent), or good (27.1 per cent). The proportion of adults who rated their care positively has not varied significantly over he previous five years and there was no significant variation by area health services. The main reasons for dissatisfaction (rating care as fair or poor) were: excessive waiting time (61.2 per cent), poor or inadequate service (17.1 per cent), not enough staff (12.2 per cent), and poor attitude of clinical staff (7.8 per cent). The proportion of adults who rated their emergency department care positively has not changed since 2003.

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**Chapter 4: Cardiac Care**

- **Effective care for acute coronary heart disease.** Between 2003 and 2007, the rate of admissions due to acute myocardial infarction (AMI) increased from 231 per 100,000 to 241 per 100,000 populations. Rates of admission vary significantly across area health services.

- **Mortality following heart bypass surgery.** In 2005, 4,465 patients received coronary artery by-pass graft (CABG) procedures in public and private hospitals, of which 103 patients (2.6 per cent) died within 30 days of undergoing the procedure. While rates varied across the
area health services in which the treating hospital was located, this
was not found to be statistically significant. Overall, mortality
increased with the presence of co-morbidities.

- **Mortality following percutaneous transluminal coronary angioplasty (PTCA).** Between 2002 and 2005, 14,461 patients received
  percutaneous transluminal coronary angioplasty (PTCA) in public and
  private hospitals, of which 297 patients (2.1 per cent) died within 30
days of undergoing the procedure. Rates varied across the area health
services and mortality (this variation was not statistically significant)
increased with the presence of co-morbidities.

Chapter 5: Stroke Care

- **Mortality following stroke.** The 30-day mortality rate for patients
  admitted for stroke declined from 19 per cent in 2002 to 16 per cent
  in 2005. Rates varied across area health services, but the variation
  was not statistically significant.

- **Effective care for stroke.** Among the facilities that participate in the
  collection of standard data for stroke patients, a standardised
  assessment of function for stroke patients at discharge from hospital,
  using the Modified Rankin Score was recorded for 57 per cent of
  patients in 2004 and for 81 per cent in 2007. A standardised
  assessment of stroke severity (Scandinavian Stroke Score) was
  recorded for 42 per cent of patients in 2004 and 63 per cent in 2007.
  In 2007, at least 50 per cent of patients admitted with stroke had
  their swallowing ability assessed within 24 hours of hospital arrival
  which was substantially higher than 2004 rates (35 per cent).

Chapter 6: Orthopaedic Care

- **Falls-related hospitalisations.** Between 2002 and 2005, there has
  been a steady reduction in the rate of falls-hospitalisations from 463
to 448 hospitalisations per 100,000 population. During this period in-
hospital mortality rates following admission for falls-related injuries
fluctuated and varied across area health services.

- **Access to hip replacement procedures.** Between 2005 and 2007,
  there has been a steady reduction in the rate of hip replacements
  (460 and 432 per 100,000 population aged 65 and above,
  respectively). There was wide variation in rates across area health
  services.

- **Mortality following hip replacement.** Between 2002 and 2005, 30-
day mortality rate following to hip replacement procedures for
  patients (aged 65 or more) was 0.55 per cent and no significant
differences were observed across the area health services.

- **Access to knee replacement procedures.** Between 2005 and 2007,
  the rate of knee replacements procedures performed for people aged
  65 and above decreased (719 and 695 per 100,000 population,
  respectively). This pattern was consistent across all area health
  services.

- **Mortality following knee replacement.** Between 2002 and 2005, the
  30-day mortality rate following knee replacement procedures for
  people aged 65 and above was 0.25 per cent and no significant
differences were observed across the area health services.

Chapter 7: Respiratory Medicine

- **Asthma hospitalisations.** Between 2003 and 2007, the admission
  rate for asthma for people aged 5 to 34 years in NSW has increased
from 108 in 2006 to 133 per 100,000 population, but has fluctuated
in the five years from 2003. The rate varied across the area health
services, with the highest in North Coast followed by Sydney West and
Greater West.

- **Chronic obstructive pulmonary disease (COPD) hospitalisations.**
  Between 2003 and 2007, the admission rate for chronic obstructive
  pulmonary disease (COPD) has declined from 259 to 244 per
  100,000 population. Rates varied across area health services.

Chapter 8: Endocrinology

- **Diabetes hospitalisations.** Between 2001 and 2007, the rate of
  admission for people with a primary diagnosis of diabetes in hospitals
  increased from 225 to 348 per 100,000 population. This pattern of
  use was observed within most area health services, and significant
  differences were observed between area health services.
Chapter 9: Maternity services

- **Timely initiation of antenatal care.** Between 2002 and 2006, the proportion of mothers started antenatal care prior to 20 weeks gestation has slightly increased from 87.3 to 88.4 per cent. This pattern was observed within most area health services.

- **Caesarean section rates.** Between 2003 and 2006, the caesarean section rate among women giving birth for the first time increased from 27.6 to 30.3 per cent. Between 2001 and 2006, the percent of vaginal deliveries after primary caesarean decreased from 19.9 to 14.3 per cent. The rate of both emergency and elective caesarean sections varied across area health services and local government areas.

- **Episiotomy rates and obstetric trauma for first births.** In 2006, 25.1 per cent of all vaginal first births involved episiotomy and variation was observed across the area health services. Between 2002 and 2006, the percentage of vaginal first births with tears (3rd or 4th degree) increased from 2.8 to 3.7 per cent. In rate varied across area health services.

- **Well-being at birth for term infants.** Between 2003 and 2006, the percent of live term infants with a 5-minute Apgar score (a 1-10 scale of infant well-being) of less than or equal to six, has been constant at 1.4 per cent.

- **Breastfeeding.** Between 2003-2004 and 2005-2006, the proportion of infants who had been fully breastfed at six months increased from 24.7 to 27.0 per cent. This practice varied across area health services.

Chapter 10: Neonatal Intensive Care

- **Registration of NICUS babies.** In 2006, 2155 babies who were born to mothers usually resident in NSW, met the NICUS registration criteria and were admitted to a neonatal intensive care unit in NSW or the ACT. Of the babies admitted, 74 per cent were less than 37 weeks of gestation (premature). The rate survival to hospital discharge for babies born less than 32 weeks of gestation has increased from 86.8 per cent in 2002 to 92.4 percent in 2006. Of those who died, most (59.6 per cent) were less than one week of age and a further 25.0 per cent were less than 29 days of age. The six months survival rate for babies born at all gestational ages was similar for those born in tertiary and non-tertiary centre.

- **Major congenital anomalies in NICU babies.** In 2006, 15.1 per cent of all NICUS registrants were born with a major congenital anomaly. Although rates fluctuated slightly year-to-year, no significant variation was observed across area health services.

Chapter 11: Other Acute Services

- **Hysterectomy rates.** Between 2003 to 2007, the rate of hysterectomy procedures have declined for women in NSW. The rate varies across the area health services, and is notably higher in non-metropolitan areas for women aged 34 years or under. When analysed further, those difference are especially notable for women from particular Local Government Areas.

- **Myringotomy rates (persons under 15 years).** Between 2004 and 2007, myringotomy rates for children aged less than 15 years decreased slightly from 548 to 510 per 100,000 population. There was significant variation between area health services, with higher rates in Northern Sydney Central Coast and South Eastern Sydney and Illawarra.

- **Cataract and lens procedure rates.** Between 2003 and 2007, rates of lens and cataract procedures for those aged 65 and over living in NSW increased from 5,183 to 5,469 per 100,000 population. There was significant variation between area health services’ use of cataract surgery. Rates were lowest in Greater Southern.

- **Laminectomy rates.** Between 2003 and 2007, rates of laminectomy procedures increased from 7.7 to 10.5 per 100,000 population. Rates varied significantly between area health services, particularly in Sydney West which has increased at a higher rate than other areas.

- **Waiting for booked treatment.** The number of patients waiting for booked treatment has fallen dramatically in all area health services. Between 2004 and 2007 the number of Category 1 & 2 (highest
priority) patients waiting longer than 30 days has fallen from 4,385 to 158. The number of ready-for-care patients in all categories waiting longer than one year has also fallen from 10,176 to 186 in the same period. The average waiting time for ready-for-care patients has declined from 2.7 months in 2005 to 2.4 months in 2007. In 2007, hospitals in North Coast had the highest average waiting times (3.3 months) while Sydney West had the lowest (1.9 months).

- **Day-of-surgery admission and day-only surgery.** Between 2003 and 2007, the day-of-surgery rates have increased from 84.4 percent to 91.5 per cent, meeting the state benchmark of 90 per cent. In that period, the rate of day-only surgery declined from 58.3 to 56.4 per cent which was just below the NSW benchmark rate of 60 per cent.

Chapter 12: Aboriginal Health

- **Timely initiation of antenatal care.** Between 2003 and 2007, the rate of early antenatal care (prior to 20 weeks gestation) for Aboriginal mothers (74.9 per cent) was significantly lower than all other NSW mothers (88.0 per cent). In that period, the rate of early antenatal care for Aboriginal mothers varied from 65.8 per cent in Sydney South West to 89.2 per cent in Northern Sydney Central Coast.

- **Asthma hospitalisations.** Between 2003 and 2007, 739 Aboriginal people were admitted to hospitals in NSW with a primary diagnosis of asthma (165.4 admissions per 100,000 people) which is one-third higher than the rate for the total NSW population. During the period, asthma admissions for Aboriginal people increased by 39 per cent.

- **Chronic obstructive pulmonary disease (COPD).** Between 2003 and 2007, the rate for chronic obstructive pulmonary disease (COPD) hospitalisations among Aboriginal people was 921.4 per 100,000 population. This was nearly six times the rate for all other persons in NSW (156.0 per 100,000 population). The rate for Aboriginal people varies across area health services, and is significantly higher in the three non-metropolitan areas of Greater Western, Greater Southern and North Coast.

- **Diabetes hospitalisations.** Between 2003 and 2007, the rate of hospitalisation for diabetes for the Aboriginal population (805.5 per 100,000 populations) was more than three times the rate for all other persons in NSW (242.9 per 100,000 populations). The rate for Aboriginal people was highest in non-metropolitan area health services, ranging from 903 to 1240 per 100,000 population in Hunter New England, North Coast and Greater Western.

Chapter 13: Mental Health Services

- **Regional self-sufficiency for mental health services.** Between 2003 and 2007, the level of self-sufficiency for mental health inpatient care across all area health services was consistently high. In 2007, all area health services achieved 91 to 96 per cent self-sufficiency.

- **Re-admissions for mental health patients.** Between 2003 and 2007, the re-admission rate for mental health patients across NSW was steady at around 15 per cent of separations from mental health units. This was above the Royal Australian and New Zealand College of Psychiatrists (RANZCP) benchmark level of 10 per cent.

- **Emergency admission performance for mental health patients.** Between 2005 and 2007, admissions to a mental health bed within eight hours for people presenting to health emergency departments with mental health problems, improved from 68 to 76 per cent, but was still below the 80 per cent target. Performance by all area health services was close to the benchmark (75 per cent or higher) except in Sydney South West where only 62 per cent of mental health ED presentations were admitted to a mental health bed in eight hours.

Chapter 14: Ambulance Services

- **Ambulance Cardiac Response and Transport.** For 2006-07 and 2007-08, Ambulance combined activation and mobilisation times for emergency cardiac cases in NSW were stable. In 2007-08 the average response time in NSW for emergency cardiac cases (time from recording of call to arrival on scene) was 11.4 minutes. The metropolitan division had the quickest response time of 10.5 minutes. Response times varied from 10.5 to 12.7 minutes for the four divisions. Average time on scene was comparable across the four
divisions, and averaged 15 minutes for NSW. Average transport time for NSW averaged 14.1 minutes (varying from 9.4 to 16.7 minutes).

Chapter 15: Initiatives in Safety and Quality

- **Strengthening the learning and reporting culture in healthcare: IIMS notifications.** Since the establishment of the IIMS system in July 2005, the number of incident notifications has increased each six-monthly period. The rate of clinical incident notifications in Northern Sydney Central Coast and Hunter New England (11.5 and 9.6 per 100 separations, respectively) is higher than other areas and NSW (7.9 per 100 separations). There is substantial variation in IIMS reporting rates between area health services, but this may reflect stronger reporting cultures in area health services rather than higher incident rates. Reporting is voluntary except in the most severe cases (SAC1).

- **Hand Hygiene Compliance.** Between Aug 2006 and July 2008, hand hygiene was audited as part of a NSW campaign to improve compliance. Rates varied according to area health service and professional group. While nursing staff had the highest compliance, medical staff compliance was poor overall, a phenomenon noted worldwide. Across NSW nursing and medical staff had higher levels of compliance after patient contact than before.

<table>
<thead>
<tr>
<th></th>
<th>Aug 2006</th>
<th>Jul 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand washing</td>
<td>before</td>
<td>after</td>
</tr>
<tr>
<td>Nursing staff</td>
<td>44.9 %</td>
<td>64.5 %</td>
</tr>
<tr>
<td>Medical staff</td>
<td>23.5 %</td>
<td>38.1 %</td>
</tr>
</tbody>
</table>

Area health services reported substantial variation both between profession groups and before/after patient contact, despite both being essential to protect patients from infection. This is an area of practice specifically targeted for further major improvement.

- **Intensive Care Unit Mortality (ANZICS APACHE III-J Mean Score and SMR).** Between 2002-03 and 2006-07, care in NSW Intensive Care Units (ICUs) was of a similarly high standard across NSW and comparable to ICU care in the rest of Australia, however, direct comparison of mortality rates is difficult. The APACHE III-J score (a means of risk-adjusting hospital mortality for ICU patients) is higher in NSW metropolitan hospital settings. Variation between different hospital groups is likely to reflect differences in casemix between those hospitals’ groups of patients (i.e. higher surgery rates in private hospitals). The data also showed a significant drop in ICU mortality in NSW over the five year period.

- **Blood Watch Program.** Following the collection of base-line data of for blood product usage in NSW, the relative number of transfusion episodes, and relative number of units transfused across all area health services shows an overall reduction of ten percent. The overall ten per cent reduction in utilisation in 2006-07 indicates that the Blood Watch program was having the desired impact. CEC have calculated that this 10 per cent reduction in total red blood cell transfusion (9,168 units) equates to a direct product cost of approximately $2,383,855 savings across the State (based on AUD$260 per unit). This figure includes the Australian Government’s 63 per cent contribution to the State’s blood budget.
Chapter 1: Introduction

People in New South Wales want to be confident that they will get high quality, safe health care when they need it. Patients in need of immediate care or ongoing services want compassionate care that meets their needs, and their health care providers want to offer the best possible care. These people all need information about health care so that they can have confidence in care and make services demonstrably better.

In 2008, a Special Commission of Inquiry of Acute Care Services in Public Hospitals acknowledged that NSW has one of the better public health care systems in the developed world and its doctors, nurses and clinical staff are well-trained, skilled, caring and dedicated. The Commissioner offered an array of recommendations to improve health care services so that patients and their families will always get the type of care they are entitled to expect.

In 2008, work began to create this Chartbook in order to provide an overview of five-year trends in quality and safety across the NSW healthcare system. The aims are to:

- Offer information to inform efforts to make health care in NSW demonstrably better and safer for patients and a more rewarding workplace.
- Offer insights to inform efforts to improve care received by people who live in different health service delivery areas, in urban or rural settings or in different socioeconomic circumstances.
- Provide some perspective on the findings knowing prospectively that health care professionals across the state are best positioned to interpret the data in ways that can inform efforts to improve.
- Report on the progress of key initiatives of the CEC and NSW Health Department that address quality and safety issues.

Chartbook 2008 is not the first of its kind. Similar to the previous edition (available from the CEC website¹), it spans clinical areas such as cardiac care (Chapter 4) and neonatal services (Chapter 10). It provides coverage of many types of services such as child and maternal healthcare (Chapter 9) and mental health care (Chapter 13).

Importantly, Chartbook 2008 is offering new insights regarding Aboriginal health and health care (Chapter 12), cardiac response time for Ambulance services (Chapter 14), as well as information regarding initiative to improve quality and safety (Chapter 15). Throughout, key indicators have been graphed by area health service or mapped by Local Government Area (LGA) and, in some instances, by levels of rurality or socioeconomic circumstance. For Chartbook 2008 there are 27 new charts and 3 new chapters.

Similar to all other reports about health care systems, Chartbook 2008 offers a glimpse into a complex system of care. It does not include information on adverse events which can be found elsewhere.²

While great care has been taken to select a broad range of indicators of performance, the capacity to measure and report on important issues are limited by the availability of comprehensive and appropriate data. In future years, this report will be enhanced in ways that parallel increases in the availability and usefulness of data.

NSW health care system The NSW health care system includes the Department of Health, the eight geographical area health services (see Figure 1), state wide service (The Children’s Hospital at Westmead and Justice Health) and several other public health organisations, such as the CEC, and the Cancer Institute. Many of the indicators presented in the Chartbook are reported at area health service level. In June 2008, the area health services and their proportion of the NSW population were:

- Sydney South West ...................................................... 19.6 %
- South Eastern Sydney and Illawarra.............................. 17.4 %
- Sydney West ............................................................... 16.1 %
- Northern Sydney Central Coast .................................... 16.2 %
- Hunter New England ................................................... 12.3 %
- North Coast ................................................................. 7.1 %
- Greater Southern ....................................................... 6.9 %
- Greater Western .......................................................... 4.4 %

Under the NSW Patient Safety and Clinical Quality Program, the Department of Health is working together with the CEC to increase safety and improve the efficiency and effectiveness of patient care on an ongoing basis. Under the program a uniform Incident Information Management System (IIMS) has been implemented in all area health services. This has been in place since May 2005 and allows information on incidents to be electronically captured, analysed and managed. In addition, clinical governance units were established in each area health service, with clearly defined points of accountability for safety and quality.

Quality improvement activities in the NSW health care system are being driven at both area health service and State levels. This allows facilities to tackle very specific issues within their systems of care and for the lessons learned to be integrated into State wide approaches. This bottom up/top down approach to improvements in patient care ensures that approaches are both comprehensive (State wide) and specific (tailored to individual health facilities).

Table 1: Characteristics of area health services, 2007–08 (% change from 2005-06)

<table>
<thead>
<tr>
<th>Area Health Service</th>
<th>Estimated Resident Population (June 08)</th>
<th>Hospital Separations</th>
<th>Hospital Beds</th>
<th>Expenses - All Programs ($000)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimated Resident Population (June 08)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public Hospitals</td>
<td>Private Hospitals</td>
<td>Average Available Public Hospital Beds on 30/6/2008</td>
</tr>
<tr>
<td>Sydney South West</td>
<td>1,347,107</td>
<td>297,202 (5.7%)</td>
<td>96,078 (5.1%)</td>
<td>3,985 (2.2%)</td>
</tr>
<tr>
<td>South Eastern Sydney and Illawarra</td>
<td>1,196,946</td>
<td>287,672 (3.9%)</td>
<td>229,520 (13.4%)</td>
<td>3,505 (-2.0%)</td>
</tr>
<tr>
<td>Sydney West</td>
<td>1,100,249</td>
<td>201,018 (-0.2%)</td>
<td>124,524 (18.1%)</td>
<td>2,946 (-3.3%)</td>
</tr>
<tr>
<td>Northern Sydney Central Coast</td>
<td>1,117,036</td>
<td>177,611 (-0.6%)</td>
<td>102,317 (13.5%)</td>
<td>3,195 (1.6%)</td>
</tr>
<tr>
<td>Hunter New England</td>
<td>848,626</td>
<td>186,611 (-2.2%)</td>
<td>102,317 (10.2%)</td>
<td>3,195 (1.6%)</td>
</tr>
<tr>
<td>North Coast</td>
<td>485,635</td>
<td>151,348 (10.5%)</td>
<td>38,264 (4.1%)</td>
<td>1,587 (-4.9%)</td>
</tr>
<tr>
<td>Greater Southern</td>
<td>475,748</td>
<td>109,033 (8.0%)</td>
<td>37,373 (9.2%)</td>
<td>2,009 (-0.4%)</td>
</tr>
<tr>
<td>Greater Western</td>
<td>300,815</td>
<td>88,071 (5.0%)</td>
<td>15,072 (8.9%)</td>
<td>1,910 (2.9%)</td>
</tr>
<tr>
<td>Children's Hospital at Westmead</td>
<td>n.a.</td>
<td>25,731 (-3.9%)</td>
<td>n.a. (n.a.)</td>
<td>267 (-0.4%)</td>
</tr>
<tr>
<td>Justice Health</td>
<td>n.a.</td>
<td>3,085 (n.a.)</td>
<td>n.a. (n.a.)</td>
<td>223 (n.a.)</td>
</tr>
<tr>
<td>Total NSW</td>
<td>6,881,162</td>
<td>1,527,382 (3.2%)</td>
<td>891,515 (10.7%)</td>
<td>22,397 (0.1%)</td>
</tr>
</tbody>
</table>

Source: (HOIST), Centre for Epidemiology and Research; Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health
Figure 1: NSW area health services’ comparisons
Structure of the Chartbook
The Chartbook has been structured to reflect the way clinical services are mainly organised in the NSW health system. As a result, indicators related to a particular group of clinical services appear together, although they may relate to different Dimensions of Quality (see below). This approach was taken to ensure the Chartbook is more meaningful to clinicians and also, hopefully, to members of the public. The chapters include:

- Population health & primary care
- Emergency services
- Cardiac care
- Stroke care
- Orthopaedic care
- Respiratory medicine
- Endocrinology
- Cancer services
- Child & maternal services
- Neonatal intensive care
- Other acute services
- Aboriginal Health
- Mental health services
- Ambulance services
- Initiatives in safety & quality
- Data sources & methods

Presenting the indicators
For each indicator reported, textual information is presented under the following headings:

- **Why is this important?** Reflecting underlying information about the condition or procedure to which the indicator relates and the rationale for selection.
- **Findings:** Summarises key findings, particularly in terms of time trends and variation across area health services. For many indicators additional analyses have been undertaken, but they are not always presented graphically. These are sometimes mentioned in the findings section. For many indicators we examine whether there were patterns evident across a rural-urban dimension or across socio-economic groups.
- **Implications:** Issues that require attention, or further investigation, have been highlighted.

- Graphical information is also presented for each indicator. Figure 2 provides an example of the typical presentation adopted for this report. This approach allows the reader to readily understand trends at the NSW level and within each area health service. In addition the reader can easily compare rates between area health services. The statistical significance of trends and variations can also be observed.

Each of the charts follows a standard presentation format for ease of comparison (see Figure 2). Occasionally there is a need to vary from this, or to present additional data (maps, or charts showing the effect of rurality, socioeconomic status, sex, or charts for risk-adjusting the data etc.). In some cases data has necessarily been grouped to provide sufficient confidence in the results.

**The Six Dimensions of Safety and Quality** Indicators for this report have been selected to ensure coverage of all the dimensions of safety and quality. For NSW, the dimensions were initially articulated in *A Framework for Managing the Quality of Health Services in NSW* (NSW Department of Health, 1999). Six primary dimensions were identified:

- SAFETY of healthcare
- EFFECTIVENESS of healthcare
- APPROPRIATENESS of healthcare
- CONSUMER PARTICIPATION in healthcare
- ACCESS to services
- EFFICIENCY of service provision

The document also identified five cross-dimensional issues:

- Competence of providers of health care
- Continuity of care
- Information management to support effective decision-making
- Education and training for quality
- Accreditation of health services.
Figure 2: Sample presentation of data

- **Observed rates** generally adjusted for age and sex
- **Five-year data trends** for areas and NSW
- **Confidence intervals** (95 per cent)
- **Target or benchmark**

The chart shows data for various areas in NSW, with observed rates for different years, along with confidence intervals and actual values of observed rates. The data includes years from 2003 to 2007 for different regions such as Sydney South West, South Eastern Sydney and Illawarra, Sydney West, Northern Sydney Central Coast, Hunter New England, North Coast, Greater Southern, Greater Western, and NSW data overall.
Introduction

**Impact:** Population health services refer to a broad range of public health interventions and organised preventive activities. Public health has been defined as ‘the organised response by society to protect and promote health and to prevent illness, injury and disability; the starting point for identifying public health issues, problems and priorities and for designing and implementing interventions, in the population as a whole, or population sub-groups’ (NPHP 1998 p1).

In NSW these activities are partly undertaken within the public healthcare system, partly through complementary activities undertaken by other government agencies and partly through activities of private general practitioners. It is estimated that total government expenditure on public health programs in NSW in 2006-07 totalled $334.9 m (AIHW, 2008b). Major areas of expenditure included organised immunisation programs ($110 m), communicable disease control ($70 m), health promotion ($47.2 m), screening programs ($52.6 m), prevention of hazardous and harmful drug use ($31.3 m), environmental health ($15.5 m) and food standards and hygiene ($5.2 m).

**Models of Care:** Primary health care services include general practitioners, mainly working in the private sector, and a range of community health services provided through the public sector and non-government organisations. In 2005–06, there were 6,310 full-time workload-equivalent general practitioners working in NSW, an average of 92.4 per 100,000 people (SCRGSP, 2007). This has increased slightly from 2000–01 (88.9 per 100,000). General practitioners are more accessible in urban areas (95.6 per 100,000) than in rural areas (75.5 per 100,000).

Community health services in NSW are generally provided through community health centres managed by area health services. They include child adolescence and family services, youth health, women’s health, physical abuse and neglect services, sexual health, aged care, allied health (physiotherapy, occupational therapy, social work and counselling, speech pathology, psychology and audiology), specialist medical services, early childhood nursing, immunisation, post-natal programs, early intervention, school surveillance services, oral health and drug and alcohol services. Non-government organisations also provide a range of services, including Aboriginal health.

The indicators presented in this chapter present areas of particular interest: overweight and obesity, smoking prevalence, immunisation for older adults and cervical cancer screening. In each of these areas, effective interventions are being implemented. The indicators provide some measure of their success across the NSW population. It has to be emphasised that there are many other effective population health and primary care interventions in place in NSW. Of necessity, this report focuses on a limited number of key areas.

The final four indicators presented, potentially avoidable hospitalisations, difficulties accessing healthcare, deaths amenable to healthcare, and satisfaction with hospital stay, provide more global measures. They give an indication of relative access and use of health services at a population level and, in so doing, provide a sense of the opportunities to achieve better outcomes through appropriate investments and strengthening of the performance of primary care, ongoing care for chronic conditions and outpatient interventions.
Obesity and Overweight

Why is this important? Obesity is one of the greatest public health challenges of the 21st century (WHO, 2009). It causes a great deal of unnecessary morbidity and premature mortality, substantially reduces quality of life and increases the demand for health services. It is often described as an epidemic and the prevalence of obesity continues to accelerate. Excess body fat increases the risk of developing a range of health problems, including type 2 diabetes, which in turn causes significant cardiovascular complications, kidney failure, blindness and amputations. Other obesity-associated disease are cardiovascular disease, high blood pressure, stroke, certain cancers, sleep apnoea, osteoarthritis, psychological disorders, social problems and reproductive problems for women (AIHW, 2008). Several of these problems are the subject of specific indicators elsewhere in the Chartbook. High body mass was responsible for 7.5 per cent of the total burden of disease in Australia in 2003, with type 2 diabetes and ischaemic heart disease accounting for almost three-quarters of this burden (Begg et al, 2007). Obesity often starts in childhood and data indicates that seven per cent of teenagers in Australia are obese (Booth et al, 2001).

The prevalence of overweight or obesity is measured in the NSW Population Health Survey by using self-reported height and weight in adults aged 16 years and over to calculate the Body Mass Index (BMI)*. While many factors may influence an individual’s weight, overweight and obesity are due mainly to an imbalance of energy intake from the diet (particularly energy-dense foods high in saturated fats and sugars) and energy insufficiently expended through physical activity.

Findings: In 2007, half (51.7 per cent) of NSW adults were considered to be overweight or obese. The proportion of males who were overweight (41.3 per cent) was significantly higher than females (26.2 per cent). There was no significant difference among males (17.6 per cent) and females (18.5 per cent) in reporting obesity. Over the five years from 2003 to 2007, the combined levels of overweight and obesity increased substantially in the NSW population, from 48.4 to 51.7 per cent. There are significant regional variations in rates of overweight and obesity in the NSW population. Obesity rates vary between 14.5 in Northern Sydney Central Coast and 24.5 per cent in Greater Southern. Combined rates vary between 45.2 overweight or obese in Northern Sydney Central Coast and 65.1 per cent in Greater Western.

Implications: The prevalence of overweight and obesity is likely to be worse than the levels revealed in the NSW Population Health Survey. Studies have found that people tend to under-estimate their weight and over-estimate their height (Hayes et al, 2008). They found that around 27 per cent of people put themselves in the wrong body mass category and that the true level of overweight and obesity is likely to be around 66 per cent for the Australian population (Hayes et al, 2008). This conforms with the 1999-2000 Australian Diabetes, Obesity and Lifestyle Study which found that over 60 per cent of the Australian population was overweight or obese in 2000 (Dunstan et al, 2000). The prevalence of obesity must be addressed through a range of long-term strategies. These include prevention, weight maintenance, management of co-morbidities and weight loss. They should be part of an integrated, multi-sectoral, population-based approach, which includes support for healthy diets and regular physical activity.

*BMI is calculated by dividing a person’s weight in kg by their height in metres squared. For adults over 18, a healthy BMI is between 18.5 and 25. A result below 18.5 indicates that a person may be underweight. A figure of or above 25 indicates that a person may be overweight. A result above 30 may be an indication of obesity (WHO, 2000). For the very young and the elderly, the very fit and muscular, these ranges are less reliable. Additionally, there are specific BMI for the age ranges of children.
Chart 2-1

OBESITY AND OVERWEIGHT, PERSONS AGED 16 YEARS AND OVER, BY AREA HEALTH SERVICE OF USUAL RESIDENCE, 2003–2007

Source: 2007 Report on Adult Health from the New South Wales Population Health Survey, Centre for Epidemiology and Research, NSW Department of Health
POPULATION HEALTH AND PRIMARY HEALTHCARE

Prevalence of current smoking

Why is this important? Tobacco use, including passive smoking, remains the leading preventable cause of death and disease in our society. It is a major risk factor for diseases of the heart and blood vessels, chronic bronchitis and emphysema, cancers of the lung, larynx, pharynx, oral cavity, oesophagus, pancreas and bladder, and other problems such as respiratory infections and stomach ulcers. Smoking accounts for 70 per cent of all chronic obstructive pulmonary disease (namely emphysema and chronic bronchitis) deaths and 87 per cent of lung cancer deaths (NSW Department of Health, 2005b).

Tobacco contains an addictive drug, nicotine. Most adult smokers say they would like to give up, but due to the addictive nature of nicotine, many find it hard to quit. In 2005, 60 per cent of smokers indicated that they intended to quit in the next six months (NSW Health Department, 2006). Nicotine can produce a withdrawal syndrome that begins within a few hours of abstinence, peaks within the first week, and continues for several weeks. The withdrawal syndrome can include several unpleasant effects such as insomnia, irritability, anxiety, difficulty in concentrating, restlessness and slowed heart rate.

Effective strategies to reduce the rate of smoking in the community are crucial to reducing the burden of disease it places on individuals, the healthcare system and wider society. For individuals, there are many health benefits from stopping smoking (CDC 1990; CDC, 2001), including reduced risk of dying prematurely (for all ages) and lower risks of lung and other types of cancer, coronary heart disease, stroke, and peripheral vascular disease. Smoking cessation also reduces respiratory symptoms, such as coughing, wheezing, and shortness of breath. Women who stop smoking before or during pregnancy reduce their risk of adverse reproductive outcomes, such as infertility, or having a low birth-weight baby.

While most ex-smokers stop smoking without any assistance, clinical interventions by healthcare providers can increase the chances of successful smoking cessation, as can counselling and behavioural cessation therapies. Pharmacological therapies found to be effective for treating tobacco dependence include nicotine replacement products (gum, inhaler, patch) and non-nicotine medications (CDC, 2007).

Findings: In 2007, 18.6 per cent of people aged 16 years and over were current smokers (14.6 per cent daily and 4.0 per cent occasionally) as reported in the NSW Population Health Survey. The proportion of NSW adults who are current smokers decreased from 22.3 per cent in 2003 to 18.6 per cent in 2007. In 2007 smoking prevalence was higher in males than females. Among males, smoking was lower in those aged 65 years and over. Among females, smoking was lower in those aged 55 years and over, and higher in those aged 35-54 years. There was no difference in current smoking among health areas, except Northern Sydney & Central Coast (11.9 per cent). Overall in 2007, 62.6 per cent of NSW adults who were current smokers intended to quit smoking in the next six months. There was no difference between males and females or among area health services.

Implications: The continued reduction in smoking rates in the NSW population is encouraging. There are many underlying factors and it is difficult to attribute causation to individual reasons or strategies. The NSW Tobacco Action Plan 2005–2009 sets out the NSW Government’s commitment to the prevention and reduction of tobacco-related harm. It builds on the achievements of previous Tobacco Action Plans and, in particular, the NSW Tobacco Action Plan 2001–2004 and addresses current and future challenges in tobacco control (NSW Department of Health, 2005b). Strategies and activities to be developed over the next five years will include new social marketing activities, smoking cessation programs and services, legislative and regulatory activities, research studies and evaluation programs (NSW Department of Health, 2005a).
Chart 2-2

PERCENTAGE OF PEOPLE AGED 16 YEARS AND OVER WHO SMOKE DAILY OR OCCASIONALLY BY AREA HEALTH SERVICE OF USUAL RESIDENCE, 2003–2007

Source: 2007 Report on Adult Health from the New South Wales Population Health Survey, Centre for Epidemiology and Research, NSW Department of Health
POPULATION HEALTH AND PRIMARY HEALTHCARE

Immunisation for older adults

Why is this important? Immunisation for the control of vaccine-preventable diseases is one of the most valuable and cost-effective public health measures (NSW Department of Health, 2003). Two major vaccine-preventable communicable diseases, particularly for older adults, are pneumonia and influenza.

Pneumococcal disease, Streptococcus pneumoniae and influenza together, are a leading cause of death among persons aged 65 years or older particularly during epidemics. Pneumococcal infection causes a significant number of hospitalisations annually. Pneumonia is an inflammation of the lung caused by infection with bacteria, viruses, and other organisms and can be triggered by a simple viral upper respiratory tract infection or a case of influenza.

There are no generally effective treatments for most types of viral pneumonia, which usually heal on their own, but there is a vaccine available for bacterial pneumonia that is advised for persons aged 65 years and older. The vaccine is up to 75 per cent effective in preventing pneumococcal bacteremia and meningitis. It is also an important vaccine, due to increasing antibiotic resistance among pneumococci (AHRQ, 2007d).

Influenza vaccination is the primary method for preventing influenza and its severe complications, including pneumonia. Vaccination is recommended for all adults aged 65 years and over and is available free of charge for this age group. Vaccination is also recommended for residents of nursing homes and chronic care facilities.

Findings: Overall there has been an increase in the proportion of persons aged 65 years and older vaccinated in the last five years for pneumococcal disease, from 47.1 per cent in 2003 to 59.1 per cent in 2007. This data is collected through the continuous NSW Population Health Survey. All area health services have seen increases in the proportion of persons aged 65 years and older vaccinated for pneumococcal disease over this period.

In 2007, 72.8 per cent of persons aged 65 years and over were vaccinated against influenza in the last 12 months. There was no difference between males and females, or among area health services. The proportion of persons aged 65 years and over vaccinated against influenza in the last 12 months decreased between 2003 (76.0 per cent) and 2007 (72.8 per cent).

Implications: Rates of pneumococcal vaccination have been increasing steadily since 1997 and current strategies should be continued. Influenza vaccination rates could be improved and additional efforts to increase rates should be implemented. A key NSW healthcare system objective is to increase vaccine coverage among various target populations, including Aboriginal and Torres Strait Islander people over the age of 50 and all people over the age of 65 years (NSW Department of Health, 2003).
Chart 2-3

Pneumococcal immunisation for older adults

PERCENTAGE OF PEOPLE AGED 65 YEARS AND OVER WHO HAVE BEEN VACCINATED AGAINST PNEUMOCOCCAL DISEASE IN THE LAST 5 YEARS BY AREA HEALTH SERVICE OF USUAL RESIDENCE, 2003–2007

Source: 2007 Report on Adult Health from the New South Wales Population Health Survey, Centre for Epidemiology and Research, NSW Department of Health
Chart 2-4

Influenza immunisation for older adults

Percentage of people aged 65 years and over who have been vaccinated against influenza in the last 12 months by area health service of usual residence, 2003–2007

Source: 2007 Report on Adult Health from the New South Wales Population Health Survey, Centre for Epidemiology and Research, NSW Department of Health
POPULATION HEALTH AND PRIMARY HEALTHCARE

Cervical cancer screening

Why is this important? In 2006 cervical cancer was the fifteenth most common new cancer in women, while in 1972 it was the fourth most common (Cancer Institute NSW, 2008). From 1997, the age-standardised incidence rate for cervical cancer has decreased by 40 per cent to 6.2 new cases per 100,000 women in 2006. The death rate almost halved in the decade between 1997 and 2008 (Cancer Institute NSW, 2008). A large reason for the reduced incidence and mortality from cervical cancer can be attributed to the introduction of the population screening program using the Pap test. The Pap test is effective in detecting pre-cancerous lesions in the cervix. Regular two-yearly testing with appropriate treatment can prevent cervical cancer from developing in most cases (NSW Cervical Screening Program, 2005). The screening program commenced nationally in 1991. The target for the NSW Cervical Screening Program is to screen 75 per cent of women at risk every two years. The target population for two-yearly screening using the Pap Test is all women aged between 18 and 70 years who have ever been sexually active. Women are entered onto the Pap Test Register unless they elect to opt out. The opt-out rate in NSW is about one per cent (Canfell et al, 2006). The data presented in this section is from the NSW Pap Test Register and is presented by area health service of residence and two age categories, 20-49 and 50-69 years. The first cervical cancer vaccine is now available in Australia and will be a major factor in reducing the incidence of cervical cancer for the next generation of women (Cancer Council, 2009).

Findings: The NSW Cervical Screening Program reported that 58.1 per cent of the female NSW population aged between 20 and 49 years and 56.4 per cent of females aged 50 to 69 years, had received a cervical cancer screening test in the two years 2004-2005 (NSW Cervical Screening Program, 2005). The combined biennial screening rate for women aged 20-69 years was 57.7 for 2004-05. The rate has been steady at around or just below 60 per cent since 1997-98. Screening rates vary between 53.1 in Sydney West and 66 per cent in the North Coast.

Implications: The combined biennial screening rate of 57.7 per cent for 2004-05 is well below the target rate of 75 per cent. It should be noted, however, that the two-year measurement does not take account of the fact that many women do not go back for a screen until they receive a reminder letter sent by the NSW Pap Test Register at 27 months from their last Pap test. NSW Cervical Screening Program data indicates that 75.8 per cent of women were screened over the three-year period 2001-2004 and 94.5 per cent in the five-year period 1999-2004 (NSW Cervical Screening Program, 2005). A three-year screening interval is the scientifically supported interval and applies in many countries such as the United Kingdom, where it has resulted in comparable reductions in incidence and mortality to those achieved in Australia (Dickinson, 2002, Canfell et al, 2006). The International Agency for Research on Cancer found that three-yearly screening conferred a substantial level of protection against cervical cancer and that more frequent screening afforded little further protection (Canfell et al, 2006). In terms of recruitment, the literature indicates that women most at risk were those who were unscreened or under-screened (unscreened for over five years) (NSW Cervical Screening Program, 2005). The NSW Cervical Screening Program has initiated a number of new programs to increase the participation rate and aims to increase it by three per cent per annum during the duration of the NSW Cancer Plan 2007-2010 (Cancer Institute NSW, 2006).
Chart 2-5

Cervical cancer screening

Biennial cervical screening rates for women aged 20-69 years by NSW area health service of usual residence, 2004-2005

Source: Cervical Cancer Screening in New South Wales, Annual Statistical Report 2005 (page 18)
POPULATION HEALTH AND PRIMARY HEALTHCARE

Difficulties accessing healthcare

Why is this important? Access to quality healthcare, from prevention to treatment, is a key health determinant and helps reduce health disparities across the population. Access to healthcare is often used as a leading health indicator reflecting one of the major concerns of society. Equity of access and standards of access issues are prominent in the objectives and principles of national health funding arrangements (Commonwealth of Australia and State of New South Wales, 2003). Reducing access barriers to healthcare involves strategies about general practitioners and specialists, public and private hospitals and dental clinics, pharmacists, allied health services and community health services. Difficulties in accessing services along the continuum of care can be due to a number of reasons, including those that involve the patient, provider, and system of care.

Findings: Data from the NSW Population Health Survey for 2007 shows that 17.0 per cent of adults had difficulties getting healthcare in the previous 12 months when needed. This is an increase on the 13.3 per cent reporting difficulties in 2003. The main issues reported in 2007 were:

- waiting time for an appointment with a general practitioner: 43.2%
- shortage of general practitioners in area: 10.7%
- difficulty in accessing specialists: 10.1%
- cost of health services: 9.5%
- quality of treatment: 8.7%
- shortage of health services: 8.6%
- transport issues: 8.8%
- waiting time in emergency departments: 7.8%
- waiting time for dental services: 7.0%

The most notable changes from the previous survey was the increase in the proportion of respondents reporting waiting time for general practitioners as the main difficulty (increase from 36.8 to 43.1 per cent) and the decrease in proportion of respondents indicating elective surgery waiting times as the main difficulty (decrease from 9.1 to 2.4 per cent). A lower proportion of males (14.7 per cent) than females (19.2 per cent) had difficulties in getting healthcare. A higher proportion of adults in rural area health services (27.6 per cent) than adults in urban area health services (12.5 per cent) had difficulties accessing healthcare. The majority increase occurred in 2007, with substantial increases being reported in all area health services, most noticeably from 20.1 to 29.4 per cent in the North Coast and from 22.3 to 29.9 per cent in Greater Western. Increases were reported in all area health services.

Implications: The majority of reasons given for the difficulty accessing healthcare are within the domain of the healthcare system, whether it be State (e.g., elective surgery in public hospitals) or federal (e.g., supply and location of general practitioners and bulk-billing incentives). The large percentage of access difficulties grouped under primary care general practitioners has flow-on effects to other ambulatory care services and secondary hospital care. Poor access to primary care providers hinders the provision of integrated services. These providers are accountable for addressing a large majority of personal health care needs, are required to develop a sustained partnership with patients and practice in the context of family and community. Improving access is an ongoing challenge for all healthcare systems, particularly for people with greater health needs and poorer health status. Health workforce recruitment and retention factors will only exacerbate these access difficulties in the future unless they can be satisfactorily addressed.
Chart 2-6

Difficulties accessing healthcare

DIFFICULTIES ACCESSING HEALTH CARE WHEN NEEDED (PERSONS AGED 16 YEARS AND OVER) BY AREA HEALTH SERVICE OF USUAL RESIDENCE, 2003–2007

Source: 2007 Report on Adult Health from the New South Wales Population Health Survey, Centre for Epidemiology and Research, NSW Department of Health
Difficulties accessing healthcare when needed (persons aged 16 years and over) by accessibility/remoteness index of Australia (ARIA) region, and socio-economic status for areas (index of relative socio-economic disadvantage) quintile, 2003–2007

Source: 2007 Report on Adult Health from the New South Wales Population Health Survey, Centre for Epidemiology and Research, NSW Department of Health
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POPULATION HEALTH AND PRIMARY HEALTHCARE

Deaths amenable to healthcare

**Why is this important?** Potentially avoidable mortality refers to premature deaths (persons aged under 75 years) that could have been avoided. These avoidable deaths can be differentiated into conditions where death can be averted either by prevention (‘preventable deaths’) or by treatment (‘deaths amenable to healthcare’). Preventable conditions include those for which there are effective means of preventing the condition from occurring (e.g., lung cancer caused by smoking).

Findings: In NSW, the rate of avoidable death from causes amenable to healthcare was 67.6 per 100,000 in the combined period from 2002 to 2006. These ‘amenable deaths’ accounted for 19.6 per cent of all deaths during this period. The age-standardised rate for males in NSW was 73.4 per 100,000 people, and 62.1 per 100,000 for females. The lowest age-standardised rates were in Northern Sydney Central Coast, followed by South Eastern Sydney and Illawarra.

The highest age-adjusted rates of death from causes amenable to healthcare were in the four rural area health services. There is a clear gradient of increasing death rates with increasing geographic remoteness. The higher mortality in rural and remote areas is significantly influenced by higher mortality rates for the Aboriginal population and relates to geographic isolation, socio-economic disadvantage, shortage of providers and less access to health services. It should be noted that the variation in amenable death rates between area health services and between sexes were less pronounced than in death rates for preventable causes.

Implications: Rates of potentially avoidable mortality are declining in NSW. This is the result of health improvement and prevention activities and non-health factors (e.g., randomised Breath Testing (RBT) and compulsory use of seat belts) that have reduced the incidence of many diseases and conditions, as well as healthcare interventions such as the earlier detection and management of disease and improved treatment of acute and chronic conditions. Rates of death from causes amenable to healthcare provide an indicator of the substantial variation in the causes of death for different age groups and sexes. The data indicates additional mortality burden is carried by those with the lowest socio-economic status, those living in rural and remote areas and Aboriginal people. This analysis of mortality from causes that are potentially avoidable through timely and effective health care provides a potentially useful tool to assess the quality and performance of the healthcare system over time. When interpreting the data, care should be taken to not use it as evidence of differences in the effectiveness of healthcare, but rather as an indicator of potential weakness in healthcare requiring investigation in greater depth. Further analysis of deaths amenable to healthcare stratified by cause, will inform health management and policy in NSW in the future.

Amenable conditions are those for which it is reasonable to expect death to be averted even after the condition has developed (e.g., through early detection and effective treatment). Using an internationally recognised methodology, the conditions considered amenable to healthcare include most cancers, asthma, diabetes, maternal and infant causes of death and 50 per cent of ischaemic heart disease (Nolte & McKee, 2003). There is a strong correlation with socio-economic status, due to differences in access and use of health services, which means in people from disadvantaged groups are more likely to be diagnosed with late-stage cancers and affected disproportionately by diabetes and heart disease (Nolte & McKee, 2008).

Rates of death from causes amenable to healthcare represent a metric that is increasingly being used to judge health system performance and track changes in performance over time. The use of amenable mortality allows the attribution of population health outcomes to health care provision. However, the method does have limitations, notably, the arbitrariness in choice of diagnostic categories and age range (Nolte & McKee, 2003). In 2002-03 Australia ranked third out of 19 OECD nations with an rate of deaths amenable to healthcare of 71.3 per 100,000 (Nolte & McKee, 2008).
Chart 2-8

Deaths amenable to healthcare

Age-standardised death rates (per 100,000 population) from causes amenable to healthcare among males and females aged 0–74 in Australia and NSW area health services of usual residence, 2002–2006

Source: Australian Bureau Statistics Mortality Data Collection and Population Estimates (HOIST), Centre for Epidemiology and Research, NSW Department of Health
POPULATION HEALTH AND PRIMARY HEALTHCARE

Satisfaction with hospital stay

Why is this important? A growing part of delivering health care today involves following-up with assessments of patient satisfaction. Efforts to improve the experience of care from the patient’s perspective depend on the availability of patient satisfaction measures. Patients and their families want to receive good care and people also like to know what others have to say about their hospital experiences. The information from surveys complements the data that hospitals collect to support improvements in customer services and quality-related activities. Public reporting of the survey results is designed to create incentives to improve quality of care and also serves to enhance public accountability in health care, by increasing the transparency of the quality of hospital care provided, in return for the public investment.

Findings: Respondents to the NSW Population Health Survey for 2007 who were admitted to hospital, were asked to rate the care they received. Overall, 40.5 per cent of NSW adults rated their care as excellent, 30.4 per cent as very good, 19.0 per cent as good, 6.5 per cent as fair, and 3.9 per cent as poor. Overall, 89.6 per cent of adults rated their care positively (as good, very good, or excellent). There was no difference between males and females, or between rural and urban health areas. The proportion of adults who rated their hospital care positively did not change between 2003 and 2007. The main reasons for dissatisfaction with hospital stay in 2007 were:

- excessive waiting time for care............................................ 18.1 %
- inadequate medication or management ............................. 14.7 %
- poor quality accommodation.............................................. 13.9 %
- poor attitude of clinical staff ............................................ 13.0 %
- not enough staff .............................................................12.8 %
- poor technical skills of clinical staff .................................... 12.7 %
- communication problems .................................................. 11.8 %
- hospital could not offer required care................................... 3.6 %
- poor or inadequate food ...................................................... 2.3 %
- other .................................................................................. 1.4 %

Implications: The increasing trend of short-stay admissions and non-inpatient treatment has implications for patient experiences in hospital, particularly in the reduction of symptoms, which has been linked to levels of patient satisfaction (Kroenke et al, 1999). In Australia the opportunities for harmonising and standardising patient satisfaction surveys and approaches to enhance comparability have been noted (SCRGSP, 2005). In some countries there is an increasing trend towards use of patient satisfaction measures in managing relationships between providers and funders of health care. For example, the US Centers for Medicare and Medicaid Services (CMS) under the Satisfy Medicare Modernization Act (2003), require participating hospitals to demonstrate that they have a program in place for assessing and improving quality of care and patient satisfaction (CMS, 2006). The British National Health Service (NHS) has adopted a national approach to surveying patient experience, which requires each NHS Trust in England to obtain feedback from patients about their experiences of care (Picker Institute Europe, 2006).
Chart 2-9


Source: 2007 Report on Adult Health from the New South Wales Population Health Survey, Centre for Epidemiology and Research, NSW Department of Health
POPULATION HEALTH AND PRIMARY HEALTHCARE

Potentially avoidable hospitalisations

Why is this important? Analysis of the conditions for which people are admitted to hospital reveals that in many cases the admission could have been prevented if more effective non-hospital care was available, either at an earlier stage in the disease progression or as an alternative to hospital care. Conditions that are sensitive to the effectiveness, timeliness and adequacy of non-hospital care are referred to as ambulatory care sensitive conditions (Public Health Division, Victorian Government Department of Human Services 2001; Centre for Epidemiology and Research, NSW Department of Health, 2006). Studies of hospitalisation for these conditions show that the availability of non-hospital care explains a significant component of the variation between geographic areas in hospitalisation rates for the specified conditions (Weissman et al, 1992; Billings et al, 1993; Bindman et al, 1995; UCSF-Stanford University Evidence-based Practice Center, 2001). The indicator presented here is based on a related set of conditions to those reported in the NSW Department of Health Chief Health Officer’s Report (NSW Health Department, 2008b). The set of conditions, called potentially avoidable hospitalisations, relate to admissions with diagnosis-related group codes for respiratory infections/ inflammations, chronic obstructive airways disease, bronchitis and asthma, venous thrombosis, musculoskeletal disorders, cellulitis, other kidney and urinary tract diagnoses and red blood cell disorders - all without complications. NSW Health has set itself the target of reducing potentially avoidable admissions in public hospitals by 15 per cent over five years (NSW Health Department, 2007b).

Findings: The age-sex standardised rate of potentially avoidable hospitalisations for NSW in 2007 was 836 per 100,000 population. Rates have been increasing slightly over the last four years. Rates vary significantly across area health services. The highest rate is in Greater Western, reflecting the poor access to primary care services, particularly general practice, in this area. This is more than twice the rate in Northern Sydney Central Coast. Rates are also higher than average in North Coast, Greater Southern and Sydney West. Rates are stable in metropolitan area health services, but have been increasing in recent years in all non-metropolitan areas. Rates of potentially avoidable hospitalisation vary by rurality and socio-economic advantage. Rates in remote and very remote regions are significantly higher than those in major cities. Rates also vary across socio-economic quintiles. Rates for people living in the most disadvantaged regions are more than twice those for people living in the least disadvantaged regions.

Implications: There is considerable potential to avoid hospitalisation by the provision of stronger and more accessible primary care services and out-of-hospital specialist services. This is particularly the case in rural and remote and most socially disadvantaged regions. For many of these admissions, hospital care is necessary and appropriate, but high rates highlight the need for strengthening services that intervene earlier in the disease process, particularly at the primary care level. NSW Health will implement a number of strategies to facilitate the achievement of the targeted 15 per cent reduction in potentially avoidable admissions in public hospital over the five years 2008-2012. These include the Health Care at Home initiative, establishment of a number of HealthOne integrated primary health centres and support for approaches that place a greater focus on prevention, early intervention, patient self-management and care co-ordination for frail old people (NSW Health Department, 2007b).
Chart 2-10  

**Potentially avoidable hospitalisations**

**Age and sex standardised rate of potentially avoidable hospitalisation per 100,000 population by area health service of usual residence, 2003 – 2007**

Source: NSW Admitted Patient Data Collection (HOIST), Centre for Epidemiology and Research, NSW Department of Health
Chart 2-11

Potentially avoidable hospitalisations

Age and sex standardised rate of potentially avoidable hospitalisation per 100,000 population by accessibility/remoteness index of Australia (ARIA) region, and socio-economic status for areas (index of relative socio-economic disadvantage) quintile, 2003 – 2007

Source: NSW Admitted Patient Data Collection (HOIST), Centre for Epidemiology and Research, NSW Department of Health
Emergency departments have been established in most NSW public hospitals. Some do not have an emergency department because of their size, capacity, or role. The key role for emergency departments is to treat patients with life-threatening emergencies or those which could cause serious disability. In addition, they treat a range of patients with less urgent need, although priority is given to those requiring urgent medical treatment.

‘Triage’ is the process of ascertaining how urgently a person arriving at an emergency department, must be seen. Patients are assigned to one of five categories by a triage nurse. Those assigned to a more urgent category are given priority. For each category, the Australasian College of Emergency Medicine has established a maximum time by which patients should be seen by a nurse or doctor for treatment.

In 2007, there were 2,417,800 emergency department occasions of service in NSW public hospitals. This was an increase of 10.1 per cent compared to 2005. For hospitals that participate in the emergency department data collection (accounting for 81 per cent of emergency department occasions of service), 23 per cent of patients arrived by ambulance and 29 per cent were subsequently admitted to hospital (AIHW, 2007b). Less than one percent (0.7 per cent) of patients were assigned to the triage category 1 (immediately life-threatening – formerly resuscitation), 8.1 per cent to category 2 (imminently life-threatening – formerly emergency), 33.2 per cent to category 3 (potentially life-threatening – formerly urgent), 53.5 per cent to category 4 (potentially serious – formerly semi-urgent) and 14.4 per cent to category 5 (less urgent or non-urgent) (AIHW, 2007b; ACEM, 2000).

The NSW Department of Health has implemented several initiatives to achieve improved performance in emergency departments. These include:

- The Clinical Services Redesign Program (CSRP), through which clinical service systems, including emergency departments, are being redesigned to improve patient journeys across multiple care centres in local health services. Under the CSRP, 75 projects have been initiated within all area health services, the Children’s Hospital at Westmead and the Ambulance Service of NSW. The aim of these projects is to improve patient access and experiences, as well as quality of care.
- Fast-track zones are being implemented to ensure that patients with less complex conditions, who have traditionally waited for long periods in emergency departments are cared for quickly but safely. These fast-track zones use skilled staff, such as nurse practitioners and advanced practice nurses.
- Emergency Medicine Units (EMUs) provide a place adjacent to emergency departments, where patients who need a longer period of care or observation can stay, without occupying emergency department beds. This allows for much more efficient processing of new patients as they arrive.
- Short-stay units have been created in a number of hospitals for patients who need shorter periods of admission to a speciality unit. This again allows for much more efficient processing of new patients as they arrive in the emergency department.
- General practitioner after-hours clinics co-located with a number of hospitals throughout NSW aim to deliver faster treatment for people attending emergency departments.
EMERGENCY CARE

Emergency department waiting times

Why is this important? Triage categories are allocated based on an initial and rapid assessment of the patient on arrival in an emergency department. They therefore represent only a proxy measure of severity of illness (Sibbritt, 2006). Triage time is the time spent in an emergency department from triage (assessment of urgency) to commencement of active treatment. Benchmark times for each of the five triage categories are based on recommendations from the Australasian College of Emergency Medicine. There are also Commonwealth and State recommended performance thresholds, which represent the percentage of patients for each triage category who should commence treatment within the relevant waiting time.

Findings: In 2007, emergency department performance benchmarks were achieved Statewide for all triage categories except category 3 (potentially life-threatening). All category 1 (immediately life-threatening) patients were treated within two minutes in all area health services. Since 2006, the proportion of category 2 (imminently life-threatening) patients seen within the benchmark time of ten minutes, increased to 84 per cent across NSW, above the 80 per cent performance benchmark. All area health services, with the exception of Northern Sydney Central Coast and Sydney West (both 77 per cent) achieved the benchmark in 2007. Fewer were able to achieve the 75 per cent benchmark for triage category 3 patients treated within 30 minutes. Statewide, the average proportion of patients treated within 30 minutes was 70 per cent. Three area health services were able to achieve the benchmark in 2007, an indication of improved performance since 2005, when the average proportion of patients treated within the benchmark time was 60 per cent and only one area achieved the benchmark. For patients in category 4 (potentially serious), the percentage seen within the benchmark time of one hour has increased from below the benchmark of 70 per cent before 2006 to 74 per cent in 2007. The majority of area health services achieved the 70 per cent benchmark, with the exceptions of Sydney West (66 per cent), North Coast (67 per cent) and the Children’s Hospital at Westmead (60 per cent). For patients in triage category 5 (less urgent or non-urgent) all area health services achieved the benchmark of 70 per cent of patients treated within two hours. Statewide, the average was 89 per cent of patients treated within two hours.

Implications: NSW Health in partnership with emergency departments in NSW have implemented strategies to improve performance, including triage times (NSW Department of Health, 2006a). Initiatives include fast-track zones (patients identified as ambulatory and non-complex are streamed separately from other patients and treated in accordance with standard protocols), the 3:2:1 process* and short-stay units. Strategies outside emergency departments have also been implemented, including performance management and additional beds. Improvements in triage performance indicate that these initiatives have been effective. Prior to 2004 the body of knowledge regarding emergency department waiting times has been mainly anecdotal, with reliance on expert opinion, rather than evidence from well-designed studies (Cooke et al, 2004). The need now is to understand what has been working and why, to maintain and improve triage time performance and add to the body of knowledge to continue to make improvements into the future.

*Key time points of the complex high-acuity patient journey are defined and are used to manage patient flow: decision to admit (<3 hours) - acceptance for care (<2 hours) - transfer (<1 hour). Alternatively, for patients suitable for discharge: disposition decision (< 3 hours) - completion of any in-patient consultation or complex investigations (< 2 hours) - discharge processes (1 hour). Prolonged (> 6 hours) diagnostic work-up, observation or treatment should occur as an in-patient. No patient should stay in the ED for more than 6 hours.

Chart 3-12

Emergency Department waiting times

Percentage of Emergency Department patients allocated to Triage Category 1 (immediately life-threatening) treated immediately, Area Health Service of treatment, 2003–2007

Source: NSW Emergency Department Data Collection, Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health
Chapter 3-13

Emergency Department waiting times

Percentage of emergency department patients allocated to triage category 2 (imminently life-threatening) treated within 10 minutes, area health service of treatment, 2003–2007

Source: NSW Emergency Department Data Collection, Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health
Chart 3-14 Emergency Department waiting times

Percentage of Emergency Department patients allocated to triage category 3 (potentially life-threatening) treated within 30 minutes, area health service of treatment, 2003–2007

Source: NSW Emergency Department Data Collection, Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health
Chart 3-15

Emergency Department waiting times

Percentage of Emergency Department Patients Allocated to Triage Category 4 (Potentially Serious) Treated Within 60 Minutes, Area Health Service of Treatment, 2003–2007

Source: NSW Emergency Department Data Collection, Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health
Chart 3-16

Emergency Department waiting times

Percentage of Emergency Department patients allocated to Triage Category 5 (less-urgent) treated within 120 minutes, Area Health Service of Treatment, 2003 – 2007

Source: NSW Emergency Department Data Collection, Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health
EMERGENCY CARE
Emergency admission performance

Why is this important? Emergency admission performance is defined as the percentage of admitted patients transferred from an emergency department to a hospital ward within eight hours of start of active treatment. Previously known as access block (the percentage of patients admitted to hospital who wait over eight hours to transfer out of the emergency department), it is one of four definitions for this measure of access (Forero et al, 2004). The target in NSW is for emergency admission performance to be more than 80 per cent. It measures one of the phases of the patient journey through an emergency department and should not be considered in isolation from other measures (such as triage times), each of which will be affected by different, but inter-related factors (Sibbritt et al, 2006). Inpatient bed capacity is essential for the effective management of emergency admissions. Modelling indicates that as hospital bed occupancy increases, the likelihood of having no bed available for an emergency admission increases (Bagust et al, 1999). In particular this modelling indicated that bed crises are more likely to occur when hospital bed occupancy exceeds 85 per cent. Work in the Australian Capital Territory indicates that patients who are not transferred from the emergency department to a ward within eight hours of the start of active treatment have a longer length of stay in hospital than those who are transferred within eight hours (Richardson, 2002). Inability to admit patients in a timely manner leads to emergency department overcrowding. Hospital and emergency department overcrowding can increase mortality amongst emergency admissions (Sprivulis et al, 2006).

Findings: From 2001 to 2004 emergency admission performance was consistently below 70 per cent in terms of achieving admission of emergency patients within eight hours in the four metropolitan area health services (Chartbook 2007). Performance improved considerably since 2005. By 2007, 77 per cent of emergency patients were admitted within eight hours, just below the performance benchmark of 80 per cent. A significant factor enabling this improved performance has been the 3.2 per cent increase in average available beds in NSW public hospitals achieved between June 2005 and October 2008. Average hospital bed occupancy was still over 90 per cent in metropolitan area health services in 2007 (NSW Health Department, 2008). Emergency admission performance at the State level started to improve in 2005 and this has continued, particularly in the four metropolitan area health services and Children’s Hospital, Westmead. During this period several initiatives have been implemented, including the Clinical Services Redesign Program, performance management of area health services by the NSW Department of Health, and provision of additional beds.

Implications: The improvement in emergency admission performance since 2005 provides some much needed ‘breathing space’ for busy emergency departments. There is a considerable volume of literature regarding the problem of waits and delays in emergency departments, but it tends to focus on describing the problem, rather than innovations to reduce waiting times (Cooke et al, 2004). The Clinical Redesign Program’s documentation of new models of care across the patient journey has led to a defined understanding of the best practice models, which have delivered improvements in performance and patient experience. There continues to be opportunity to ensure that sustained improvement is achieved by the embedding of these new models of care across NSW health facilities.
Chart 3-17

Emergency admission performance

Emergency department patients requiring admission: percentage admitted to a general ward, intensive care unit operating theatre within eight hours of active treatment, area health service of treatment, 2003 – 2007

Source: NSW Emergency Department Data Collection, Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health
EMERGENCY CARE

Patient satisfaction with emergency department services

**Why is this important?** Emergency departments are a key point of contact for patients accessing the healthcare system and are a gateway to additional healthcare. Assessment of patient and community experiences can provide an indication of the responsiveness of the system and, more importantly, help identify opportunities for improvement in health service delivery and policy making. Feedback on the specific reasons for patient dissatisfaction helps identify factors to be targeted, which cannot be detected from overall patient satisfaction scores. A systematic review of evidence relating to patient satisfaction in emergency departments identified three main factors influencing patient satisfaction: perceived staff interpersonal skills and attitudes, perceived waiting times and provision of information (Taylor & Benger, 2004). Efforts to improve patient satisfaction are amenable to specific interventions, including staff training and provision of information on arrival. Increased patient satisfaction can contribute to improved staff morale and job satisfaction, through reduced incidence of complaints and litigation. Patients are also more likely to comply with clinical advice and be willing to return for follow-up.

**Findings:** The NSW Population Health Survey asks respondents who presented to an emergency department in the previous 12 months for their own medical care, to rate the care they received. In 2007, 79.4 per cent of NSW adults rated their care positively (as excellent, very good, or good). This figure is consistent with more general findings in the literature (Thomas et al, 2006). There was no difference between males and females, or among health areas. The percentage of NSW adults who rated their care positively did not change significantly between 2003 and 2007. The main reasons for dissatisfaction with emergency department care in 2007 were:

- excessive waiting time ................................................... 61.2 %
- poor or inadequate service............................................. 17.1 %
- not enough staff........................................................... 12.2 %
- poor attitude of clinical staff ........................................... 7.8 %
- communication problems ................................................. 7.5 %
- misdiagnosis or contradictory diagnosis............................ 5.8 %
- inadequate medication or management ............................ 5.8 %
- sent home without treatment or follow-up ......................... 5.0 %
- poor technical skills of clinical staff ................................ 4.7 %
- poor accommodation quality ......................................... 2.3 %
- other .............................................................................. 3.8 %

**Implications:** Although the overall proportion of people who rated their care positively was relatively high and remained stable over time, there are opportunities for improvement. Waiting time remains a significant issue to be managed within hospital settings and is the major reason for dissatisfaction with emergency department care. Several of the reasons are inter-related and a significant proportion of the remaining reasons for dissatisfaction can be grouped into workforce-related issues, such as perceived attitudes and interpersonal and clinical skills (which include making wrong diagnosis and inadequate medication or management). Less frequently cited reasons do not necessarily indicate that these factors are insignificant. It may also be related to patients’ experiences and expectations coinciding.
Chart 3-18  
Satisfaction with Emergency Department services 

Persons aged 16 years and over who presented to an emergency department in the previous 12 months: percentage who rated their treatment as either 'good', 'very good' or 'excellent' by area health service of residence, 2003–2007

Source: 2007 Report on Adult Health from the New South Wales Population Health Survey, Centre for Epidemiology and Research, NSW Department of Health
**Chapter 4: Cardiac Care**

**Introduction**

**Impact/Burden of Disease:** Coronary heart disease (CHD) is the most common cause of premature death in Australia and accounted for nearly one-fifth of all deaths in 2005 (AIHW, 2008). CHD is a preventable disease which caused just under 8,500 deaths in NSW in 2006 (Population Health Division, 2008). CHD is caused by poor oxygen supply to the heart muscle. This results from narrowing of the arteries clogged by cholesterol and fat deposits causing chest pain (angina). If the blood supply to a portion of the heart is completely blocked, the result is acute myocardial infarction (AMI) or heart attack. The manifestations of CHD can include episodic chest pain, AMI, heart failure and sudden cardiac death. CHD death rates continue to decline, with a 42 per cent decrease in the last decade alone Australia-wide (AIHW, 2008). This decline is due to both a reduction in heart attacks and better survival. CHD was the principal reason for just over 54,000 hospitalisations in NSW in 2006-07.

**Causal Factors:** In association with age and family history of heart disease, modifiable risk factors such as smoking, high blood pressure, high blood cholesterol, poor nutrition, diabetes, physical inactivity, and being overweight contribute to the cause of CHD. The burden of CHD is not distributed equally across the population. Mortality rates due to CHD are higher in males than females, people form lower socio-economic background and Aboriginal and Torres Strait Islander people. Based on data from 2003-04, it is estimated that if all Australians experienced the same hospital admission rate as that in the least disadvantaged areas, 38 per cent of emergency coronary heart disease admissions would have been avoided.

**Effective Treatments:** Effective strategies to manage patients with CHD include reduction of risk factors, bypass surgery, angioplasty and stenting, the use of medications including aspirin, beta blockers, statins and ACE-inhibitors* and cardiac rehabilitation. Preventative strategies include lifestyle changes such as modification of diet, smoking cessation and exercise, in association with drug therapies. In the treatment of coronary heart disease, there has been a doubling in the use of percutaneous coronary intervention (PCI) over the period 1996/97-2005/06 and a 33 per cent decline in the rate of coronary artery bypass surgery or CABG (AIHW, 2008). More than 9,900 percutaneous transluminal coronary angioplasties (PTCA) were provided in 2006-07, more than double the 4,100 CABGs. The increased use of PTCA may reflect consumer preference for the less invasive, fast-recovery procedure rather than any difference in long-term clinical outcomes (Woollard & Newman, 2007).

**Latest/ Emerging Evidence:** Evidence indicates the importance of early revascularisation following AMI, to prevent damage to the heart muscle (Sivagangabalan et al, 2007). In the Early Triage of AMI (ETAMI) project in NSW, if the ECG recorded in the ambulance indicates an AMI, the patient is taken directly to a cardiac catheter laboratory for angioplasty. This process introduces the concept of a regional heart centre (similar to the model of a level 3 trauma centre).

This chapter presents a number of indicators related to cardiac care, including hospitalisation rates for AMI, effective care for acute coronary syndromes from the Towards a Safer Culture (TASC) project, survival following CABG and survival following coronary procedures.

* ACE inhibitors, or inhibitors of Angiotensin-Converting Enzyme, are a group of pharmaceuticals that are used primarily in treatment of hypertension and congestive heart failure, in some cases as the drugs of first choice.
CARDIAC CARE

Effective care for acute coronary heart disease

Why is this important? Treatment of patients admitted to hospital with acute myocardial infarction (AMI) and unstable angina requires a range of interventions. There is now clear evidence that these interventions are effective (Aroney et al, 2000; Braunwald et al, 2000; British Cardiac Society, 2001; National Heart Foundation of Australia, Cardiac Society of Australia and New Zealand, 2006). However, not all patients admitted for these conditions received care that was consistent with this evidence. In NSW, residents in rural areas have significantly lower rates of acute coronary interventions than residents of metropolitan areas and Aboriginal people have a 40 per cent lower rate of being investigated for angiography or receiving coronary angioplasty or stent procedures (Mathur et al, 2006).

Findings: In 2006-07, 18,272 patients were admitted to NSW hospitals for AMI. Admissions have increased by 13 per cent over the last five years. Increasing rates of admission for AMI has been partially offset by declining rates of admission for unstable angina (Chief Health Officer’s Report, 2007). In 2007 the admission rate for AMI was 241 per 100,000 residents in NSW. Rates of admission vary significantly across area health services, with the highest observed for Greater Western (350 per 100,000) and the lowest in Northern Sydney Central Coast (197 per 100,000). It is notable that there has been a substantial reduction in AMI admissions in Greater Southern since 2004. Rates of admission in the most disadvantaged regions of NSW are 60 per cent higher than in the least disadvantaged regions (284 compared with 179 per 100,000 people). The Towards a Safer Culture (TASC) project in NSW initially focused on improving care for patients admitted with acute coronary syndrome and stroke. A wide range of indicators relating to processes and outcomes of care were collected. One of the TASC indicators relates to appropriate prescribing at discharge. Not all hospitals participated in the TASC project, which meant that results are not able to be presented by AHS. For hospitals participating in TASC in 2006, 82 per cent of patients with acute coronary syndrome were discharged on beta blockers, compared to a benchmark target of 95 per cent. This compares with an estimate of 89 per cent of similar patients in the United States (AHRQ, 2006 p47). For hospitals participating in TASC, 84 per cent of patients are discharged on aspirin (a reduction from 91 per cent in 2005). The statistical significance of this result is considerably reduced because of the substantial reduction in the number of patients from whom this data was captured in 2006. The benchmark is 95 per cent.

Implications: These findings are consistent with patterns of hospitalisation observed at the national level, that coronary heart disease is strongly correlated with socio-economic disadvantage, rurality and indigenous status. The variations across NSW regions suggest that effective population health and preventive services (The Practical Implementation Taskforce for the Prevention of Cardiovascular Disease, 2004) targeted at the major risk factors associated with coronary heart disease, particularly in the more disadvantaged regions of NSW, could have a significant impact in reducing mortality and the need for hospitalisation.

Provision of effective medical care in hospital, and timely access to revascularisation procedures, will also impact on mortality rates and recurring use of hospital services. The results of the TASC project identify a number of areas in which effective care should be more consistently provided to eligible patients. It provides a model through which improvements in clinical care could be achieved (Ferry et al, 2004).
Chart 4-19

Admissions for Acute Myocardial Infarction (AMI)

Age and sex standardised rate per 100,000 population for AMI by area health service of residence, 2003 – 2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
Chart 4-20

Effective care for Acute Coronary Syndrome (ACS)

Percentage of patients admitted with ACS who are discharged on beta blockers — including missing and contraindicated — 35 selected hospitals in five area health services across NSW, 2004 – 2006

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
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<td>2005</td>
<td>82%</td>
</tr>
<tr>
<td>2006</td>
<td>82%</td>
</tr>
</tbody>
</table>

Source: Towards a Safer Culture (TASC) Online, Clinical Excellence Commission and Royal Australasian College Of Physicians
Effective care for Acute Coronary Syndrome (ACS)

Percentage of patients admitted with ACS who are discharged on aspirin or other antiplatelet medication— including missing and contraindicated — 35 selected hospitals in five area health services across NSW, 2004 – 2006

Source: Towards a Safer Culture (TASC) Online, Clinical Excellence Commission and Royal Australasian College Of Physicians
**CARDIAC CARE**

**Mortality following heart bypass surgery**

**Why is this important?** Coronary heart disease is a major cause of illness and premature death in the NSW community. In its early stages coronary heart disease may be treated through control of modifiable risk factors such as smoking, high blood pressure and high cholesterol levels. The disease may, however, progress to a point where revascularisation is required, either using a medical procedure (percutaneous coronary intervention) or a surgical procedure – a coronary artery bypass graft (CABG). CABG involves opening the patient’s chest and using veins taken from elsewhere in the body to bypass the diseased coronary arteries. CABG improves the quality of life for people with coronary heart disease and reduces the risk of death (Yusuf et al, 1994). The procedure itself carries a risk of death. These risks are related to characteristics of patients, such as the severity of the coronary heart disease, age and the presence of other conditions that complicate treatment. Characteristics of the relevant hospitals and surgeons, such as the volume of procedures regularly performed, have also been found to impact on patient outcomes.

**Findings:** In 2005, an estimated 4,465 patients received CABG procedures in NSW public and private hospitals. Fifty-seven per cent were treated in public hospitals. Around 65 per cent of patients were aged between 60 and 80 years and nine per cent were aged 80 years and over. An estimated 103 patients (2.3 per cent) died within 30 days of undergoing the procedure in 2005. Direct comparisons with other healthcare systems cannot be readily made. In Victoria, crude mortality rates for CABG procedures alone were 1.8 per cent in 2005–06 and for CABG plus valve surgery, around 4.4 per cent (Dinh et al, 2007). In 2005 the NSW 30-day mortality rate adjusted for age and sex was 2.6 per cent. Rates varied between area health services in which the treating hospital was located, although in the most recent year the variation was not statistically significant. Thirty-day mortality rates are generally higher for patients living in the most socio-economically disadvantaged regions of NSW. In 2005, the mortality rate was 3.3 per cent in the most disadvantaged regions compared to 2.4 per cent in the least disadvantaged regions. Overall, mortality increased significantly with the presence of co-morbidities, as reflected through the Charlson Index score. There are no significant differences between the health services within the three co-morbidity strata.

**Implications:** The number of CABGs performed in NSW has decreased by 17 per cent in the four years between 2002 and 2005. The mortality rate has also decreased slightly over this period. The comparisons presented are limited by the absence of a mechanism for adjusting indicators for the risk profile of the patients receiving cardiac surgery. Various health systems (e.g., Victoria, England, New York, Pennsylvania, California, various Canadian provinces) and clinical associations in some countries (e.g., the United States), have established cardiac surgery registers involving the collection of comprehensive data on patients receiving surgery and the outcomes. These databases have assisted surgeons and hospitals in those systems to benchmark outcomes and improve safety and quality of care. In some health systems, risk-adjusted outcomes for individual hospitals and/or surgeons are released publicly. There is evidence that the benchmarking efforts and the public release of results have had a sustained impact in reducing mortality rates (e.g., Chassin, 2002), although there is debate over the relative contribution of these two strategies. The Australasian Society of Cardiac and Thoracic Surgeons (ASCTS) is developing a national cardiac surgery database that could be used for benchmarking outcomes in future (Bidstrup, 2005). The ASCTS data collection is currently being implemented in NSW.
Mortality following heart by-pass surgery

**AGE AND SEX STANDARDISED 30-DAY MORTALITY RATE FOLLOWING CORONARY ARTERY BY-PASS GRAFT PROCEDURE BY AREA HEALTH SERVICE OF TREATMENT, 2002 – 2005**

<table>
<thead>
<tr>
<th>Year</th>
<th>Sydney South West</th>
<th>South Eastern Sydney and Illawarra</th>
<th>Sydney West</th>
<th>Northern Sydney Central Coast</th>
<th>Hunter New England</th>
<th>North Coast</th>
<th>Greater Southern</th>
<th>Greater Western</th>
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<td>2.7</td>
<td>3.0</td>
<td>2.5</td>
<td>3.0</td>
<td>2.7</td>
<td>2.6</td>
</tr>
<tr>
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<td>5.0</td>
<td>3.1</td>
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<td>3.2</td>
<td>1.1</td>
<td>2.1</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Source: NSW Admitted Patient Data Collection, Registry of Births, Deaths and Marriages death registration data, Australian Bureau of Statistics (ABS) mortality data linked by the Centre for Health Record Linkage (CHeReL) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

Notes: Rates are standardised for age and sex of patient. Deaths include deaths occurring in hospital and following discharge. Includes public and private hospitals.

These AHSs do not have cardio-thoracic units.
Chart 4-23

Mortality following heart by-pass surgery

Age and sex standardised 30-day mortality rate following coronary artery by-pass graft procedure by Charlson Index by Area Health Service of treatment, 2002 – 2005

Source: NSW Admitted Patient Data Collection, Registry of Births, Deaths and Marriages death registration data, Australian Bureau of Statistics (ABS) mortality data linked by the Centre for Health Record Linkage (CHeReL) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health

Notes: Rates are standardised for age and sex of patient. Deaths include deaths occurring in hospital and following discharge. Include public and private hospitals. Charlson Index risk categories are Low - No Co-morbidities, Medium - Index Score 1-2, High - Index Score 3 or more.

These AHSs do not have cardio-thoracic units
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CARDIAC CARE

Mortality following percutaneous transluminal coronary angioplasty (PTCA)

Why is this important? Coronary heart disease involves the clogging of the arteries with plaque made up of deposits of fat, cholesterol and other substances, a process known as atherosclerosis. There are options for treating these blockages, including coronary artery bypass graft and percutaneous coronary intervention (PCI). The most common PCI is percutaneous transluminal coronary angioplasty (PTCA). It involves passing a fine tube through the skin (percutaneously) into the arterial system. The catheter is moved through the arterial system until the balloon reaches the point where arteries have narrowed. A balloon at the tip of the catheter is briefly inflated, opening the artery. Usually a thin metal sleeve, called a stent, is inserted to keep the artery open. Stents may be coated with a substance that releases drugs over a long period of time (drug-eluting stents). PCI can occur on an elective or emergency basis. Primary PCI involves performing the procedure on a patient who has recently been admitted for an acute myocardial infarction. Ideally primary PCI should be performed as soon as possible following assessment of the patient’s suitability for the procedure. There are potential risks, including the need for a further procedure, a further coronary event, or death. Risks are related to characteristics of patients, such as the severity of the coronary heart disease, age and the presence of other conditions that complicate treatment.

Findings: Between 2002 and 2005, 14,461 patients received PTCA in NSW public and private hospitals. Forty-one per cent were treated in public hospitals. Ninety-four per cent were treated in public hospitals. Nine per cent were emergency procedures. Around 49 per cent of patients were aged between 65 and 79 years and 20 per cent were aged 80 years and over. Overall, 314 patients (2.2 per cent) receiving PTCA between 2002 and 2005 died within 30 days of the procedure. The NSW 30-day mortality rate adjusted for age and sex was 1.7 per cent between 2002 and 2005. Age and sex standardised rates varied between area health services, from around 1.4 per cent for residents of South Eastern Sydney and Illawarra to 2.9 per cent for residents of Sydney West. Overall, mortality increased significantly with the presence of co-morbidities as reflected through the Charlson Index score. Patients with the lowest level of co-morbidity make up 54 per cent of the total. Around 0.35 per cent of patients died within 30 days of the procedure. Patients with moderate levels of co-morbidity make up 38 per cent of those receiving the procedure, and 2.2 per cent of them died within 30 days. Patients with the highest level of co-morbidity account for seven per cent, and 10.7 per cent of patients died within 30 days of the procedure. Overall there are no significant differences between the health services within the three co-morbidity strata.

Implications: The data, presented with patients stratified by the Charlson Index, illustrates the importance of risk adjustment. An additional risk factor is whether the patient is receiving the intervention as a primary PCI or an elective procedure. There was variation in access to primary PCI across NSW, particularly in rural regions. As with CABG, there is a case for developing better mechanisms for benchmarking performance, such as a PCI register. This would facilitate the availability of high quality risk-adjusted measures of outcomes for all services in NSW, which could be used by clinicians to identify opportunities to improve quality and reduce risks to patients.
Chart 4-24

Mortality following coronary procedures

AGE AND SEX STANDARDISED 30-DAY MORTALITY RATE PER 100 PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY (PTCA) PROCEDURES BY AREA HEALTH SERVICE OF RESIDENCE, 2002 – 2005

Source: NSW Admitted Patient Data Collection, Registry of Births, Deaths and Marriages death registration data, Australian Bureau of Statistics (ABS) mortality data linked by the Centre for Health Record Linkage (CHerL) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

Notes: Rates are standardised for age and sex of patient. Deaths include deaths occurring in hospital and following discharge. Include public and private hospitals.
**Chart 4-25**

**Mortality following coronary procedures**

**Age and sex standardised 30-day mortality rate per 100 percutaneous transluminal coronary angioplasty (PTCA) procedures by Charlson index by area health service of residence, 2002 – 2005**

Source: NSW Admitted Patient Data Collection, Registry of Births, Deaths and Marriages death registration data, Australian Bureau of Statistics (ABS) mortality data linked by the Centre for Health Record Linkage (CHeReL) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

Notes: Rates are standardised for age and sex. Deaths include deaths occurring in hospital and following discharge. Include public and private hospitals. Charlson Index risk categories are Low - No Co-morbidities, Medium - Index Score 1-2, High - Index Score 3 or more.
Chapter 5: Stroke Care

Introduction

Impact/ Burden of Disease: Stroke is one of the major causes of death and a leading cause of adult disability. Each year in NSW it is estimated that around 13,000 people have a stroke, with 70 per cent of these being first time occurrences. Strokes claimed over 4,250 lives in NSW (Population Health Division, 2008). Strokes are the most common group of conditions managed in neurological care. Strokes are a result of cerebrovascular conditions – diseases of the blood vessels in the brain. There are two main types. Ischaemic strokes account for around 80-85 per cent and occur when the blood flow to part of the brain is interrupted, usually due to a blood clot and often associated with narrowing of the affected artery (atherosclerosis). Hemorrhagic strokes account for 15-20 per cent and involve bleeding in the brain from a broken or leaking blood vessel. Strokes result in a loss of cerebral functions, sensations and sight, lasting more than 24 hours. Transient ischaemic attacks (TIA), sometimes known as mini-strokes, cause temporary stroke symptoms. TIAs do not result in clinical evidence of brain injury. Between 10 and 15 per cent of strokes occur in patients who have previously experienced a TIA. Strokes can cause death, or injury to the brain. Approximately 10 per cent of patients suffering acute ischaemic strokes die within 30 days of onset (Bamford et al, 1990). Stroke is the leading cause of long-term disability in adults and places great demands on family members and caregivers. Around 50 per cent of patients surviving a stroke will experience some level of disability six months after its onset (Wade et al, 1987). There were around 19,000 hospital admissions in 2006-07 where the principal reason for admission was a stroke (Population Health Division, 2008), although these include re-admissions following an initial stroke. Strokes can occur at any age, but around 50 per cent affect people aged over 70 years.

Causal Factors: In association with age, previous TIA, atrial fibrillation and narrowing of the carotid arteries (carotid stenosis), modifiable risk factors for stroke include smoking, high blood pressure, high blood cholesterol, diabetes, and physical inactivity.

Effective Treatments: Effective strategies to manage patients with stroke include reduction of risk factors, fast-tracked thrombolysis and CT assessment after onset of symptoms, multidisciplinary treatment in a specialised stroke unit and stroke rehabilitation. Successful treatment requires a system capable of rapidly identifying and evaluating patients at time of first onset of symptoms.

Primary Low levels of physical activity are the most important modifiable predictors of long-term outcomes for stroke (Hankey et al, 2002). Prevention strategies include lifestyle changes such as smoking cessation and exercise.

Secondary Hospital services for patients presenting with stroke symptoms aim to achieve accurate diagnosis and to initiate appropriate treatment as rapidly as possible. Treatment is aimed at minimising the extent of injury to the brain, preventing complications, preventing stroke re-occurrence and minimising disability through appropriate rehabilitation. Surgery may be required for certain types of stroke. For some patients presenting with TIA or minor stroke, referral for carotid endarterectomy may be appropriate (see indicator below). Effective prevention is the most powerful strategy to reduce the burden of stroke. Rehabilitation and secondary prevention of recurrent stroke should begin as early as possible because the risk is highest in the first six months after the event (Hankey, 2000). The use of intravenous tissue plasminogen activator (tPA) in selected ischaemic stroke patients, acute use of aspirin and the use of hemicraniectomy in malignant middle cerebral stroke are additional effective therapies (Chartbook 2007).

Effective stroke care requires a high level of co-ordination between various health professionals, including ambulance, emergency department staff, physicians, geriatricians, neurologists, neurosurgeons, nurses, allied health staff and those delivering rehabilitation.

This chapter presents a number of indicators related to the prevention and effective treatment of stroke.
STROKE CARE

Mortality following stroke

Why is this important? Deaths following admission to hospital for stroke are an important measure of the outcomes of stroke care. There is evidence that deaths following admission for stroke can be reduced through several strategies, including early thrombolysis, and the provision of care in a specialised stroke unit. In 2002, the NSW Department of Health, through the Greater Metropolitan Clinical Taskforce, started the establishment of 23 Acute Stroke Units in NSW public hospitals, with an aim of providing high quality and uniform stroke care to patients. This indicator provides a basis for tracking the impact of this development on mortality. The data presented here are for the period to the end of 2005 and provides an ongoing benchmark against which past performance and future improvements can be measured. About one in six survivors of a first-ever stroke have recurrent stroke over the next five years (Hankey et al, 1998). Recurrent strokes have a similar 28-day survival to that of first-ever strokes. Nearly all patients are disabled at the time of the stroke. There may be permanent paralysis of one side of the body, speech or swallowing difficulties, problems with memory and a range of other difficulties, including depression and anxiety. By the end of the first year, about half of all survivors of stroke remain dependent on others for activities of daily living (Hankey et al, 2002). The substantial benefits and relative safety of tissue plasminogen activator (tPA) for acute ischaemic stroke within three hours of symptom onset have been accepted by stroke clinicians around the world (Hacke et al, 2004). Despite this knowledge, however, there is substantial potential to extend this intervention to stroke patients in Australia, geographic access permitting (Duffy et al, 2003). Despite licensing of intravenous thrombolysis with tissue plasminogen activator (tPA) in 2003, implementation rates in clinical practice remain sub-optimal, with main NSW metropolitan hospitals not yet achieving ‘tPA capability’. Care in a specialised stroke unit will reduce impairment and disability. Effective prevention is the most powerful strategy to reduce the burden of stroke. Rehabilitation and secondary prevention of recurrent stroke should begin as early as possible because the risk of recurrent stroke is highest in the first six months after the event (Hankey, 2000).

Findings: In 2005, there were 9121 admissions for stroke in NSW hospitals and the 30-day age and sex standardised mortality rate for patients admitted for stroke was 16 per 100 patients. The NSW average rate has decreased slightly from 19 per 100 patients in 2002. Rates vary between health services, but the variation is not statistically significant. Mortality rates for patients living in the most socio-economically disadvantaged regions are eight per cent higher than for those in the least socio-economically disadvantaged regions, although this difference is not statistically significant. People living in outer regional areas have a higher mortality rate (20.7 per 100) than those living in major cities (17.5 per 100) and this difference is statistically significant.

Implications: These data provide a baseline against which improvements in outcomes for stroke care can be measured, resulting from the range of stroke care initiatives implemented in NSW in recent years. Mortality is a key outcome indicator, but it is also important to monitor improvements occurring in the levels of disability stroke patient’s experience. A trial has started at RPAH in September 2008 to evaluate the outcomes from insertion of intra-arterial catheters plus tPA for patients within three hours of stroke.
Chart 5-26

AGE AND SEX STANDARDISED 30-DAY MORTALITY RATE AFTER ADMISSION FOR ACUTE STROKE BY AREA HEALTH SERVICE OF TREATMENT, 2002 – 2005

Source: NSW Admitted Patient Data Collection, Registry of Births, Deaths and Marriages death registration data, Australian Bureau of Statistics (ABS) mortality data linked by the Centre for Health Record Linkage (CHeReL) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
STROKE CARE
Effective care for stroke

Why is this important? The 12 key standards of stroke care agreed by experts from the Royal College of Physicians’ Sentinel Stroke Audit which have been derived from research evidence and agreed by experts in the management of stroke are (Leatherman and Sutherland, 2008):

- Treatment in a stroke unit
- More than 50 per cent of stay was in stroke unit
- Screened for swallowing disorders within 24 hours of admission
- Brain scan within 24 hours of stroke
- Commenced aspirin within 48 hours of stroke
- Physiotherapy assessment within first 72 hours of admission
- Assessment by occupational therapist within seven days of admission
- Weighed at least once during admission
- Mood assessed prior to discharge
- On antithrombotic therapy by discharge
- Rehabilitation goals agreed by multidisciplinary team
- Home visit performed before discharge.

The beneficial role of antiplatelet agents has been established, and for acute stroke, aspirin is the only proven antiplatelet agent (RCPE, 2000). It should be started within 48 hours. Thrombolysis should be provided within three hours of onset of symptoms in patients with ischaemic stroke.

In NSW the GMCT and TASC stroke expert group has developed a set of key process and outcome indicators. Selected indicators from the project are presented here. These are reported for hospitals participating in the TASC project in relation to stroke services.

Findings: A standardised assessment of function for stroke patients at discharge from hospital, using the Modified Rankin Score was recorded for 81 per cent of patients in participating units in 2007. This was an increase from 2004 (57 per cent). A standardised assessment of stroke severity (Scandinavian Stroke Score) was recorded for 63 per cent of patients in participating units in 2007. This was a substantial increase from 2004 (42 per cent). For participating units in 2007, at least 50 per cent of patients admitted with stroke had their swallowing ability assessed within 24 hours of hospital arrival. This represents a significant increase from 2004 (35 per cent). For participating units in 2005, at least 25 per cent of patients admitted with stroke were discharged on antiplatelet/anti-thrombotic agents. This was a decrease from 2004 (38 per cent), although these low rates most probably relate to a lack of documentation in the patient record. For a high proportion of patients this data item is missing (60 per cent in 2005), which means it is difficult to assess appropriateteness or trends. Similar issues regarding missing data for all measures compromise the ability to accurately assess stroke care.

Implications: The measures presented here are mainly reflective of the extent to which hospitals participating in TASC have been able to record data relating to key aspects of care for stroke patients. Overall recording of relevant data deteriorated in 2007. The exception was Sydney South West, which was able to capture data on medications at discharge for 72 per cent of patients. The proportion of missing data for this item increased from 44 in 2004 to 60 per cent in 2007. Hospitals in some area health services, however, have been able to achieve much higher levels of data recording and there is room for significant improvement in hospitals from other area health services. The significant potential of this data to improve patient outcomes and to provide a good account of these improvements to the general public, is limited by the absence of data from more units.
Patients admitted with stroke who have a Modified Rankin Score recorded at discharge from hospital by area health service of treatment, 2004-2007

Patients admitted with stroke who have a Scandinavian Stroke Score recorded on admission to hospital by area health service of treatment, 2004-2007

Patients admitted with stroke who have swallowing ability assessed within 24 hours of hospital arrival by area health service of treatment, 2004-2007*

Patients admitted with stroke who are discharged on antiplatelet/anti-thrombotic agents by area health service of treatment, 2004-2007

Source: Towards a Safer Culture (TASC) Online, Clinical Excellence Commission and Royal Australasian College of Physicians

Note: *For the “had swallowing ability assessed within 24 hours” chartlet, it would have been preferable for the data to treat “no” and “missing” as discrete categories.
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Chapter 6: Orthopaedic Care

Introduction

Impact/ Burden of Disease: Orthopaedic hospital services are often required following admission for an injury, but may also be required as a result of the progression of chronic and disabling conditions such as arthritis. Arthritis and musculoskeletal conditions are common causes of long-term disability. Arthritis is characterised by inflammation of the joints which causes pain, stiffness and disability. Other musculoskeletal conditions such as osteoporosis and back pain affect the bones, muscles and attachment to each other. Falls are a significant cause of death and morbidity and result in many hospital admissions. Overall, the rate of falls-related deaths in NSW increased over the period 1997 to 2004. Eighty-five per cent of all falls-related deaths were in people aged 65 years and older. In 2006, 24.3 per cent of adults aged 65 years and over, had a fall in the last twelve months and 32 per cent required hospitalisation (NSW Health, 2007). Falls have significant cost consequences for the health system and use more resources than any other cause of injury. Falls in older people commonly result in a fracture, often of the hip. It has been estimated that in NSW the total life-time costs of falls-related injuries occurring in 1998–99 were $333 million in direct healthcare system costs and $311 million in indirect costs (IRMRC, 2003).

In 2004-05, there were 4,314 falls-related hospitalisations for residents of NSW, a rate of 448 per 100,000 persons (Population Health Division, 2006). In 2005–06, approximately 22 per cent of patients undergoing surgery in NSW hospitals required orthopaedic surgery, accounting for 27 per cent of the total days spent in hospital by patients undergoing all types of surgery. In 2007, 10,450 knee and hip replacements were performed in NSW hospitals.

Causal Factors: Arthritis is caused by a range of factors, including age (wear and tear), previous injuries, infection, auto-immune diseases, genetics and excess body weight. Hip fractures result from a combination of weak bones (osteoporosis) and a fall.

Effective Treatments: Effective strategies to reduce the burden of disease include prevention of falls, strategies to improve bone density, exercise and provision of joint replacements (hip and knee).

Primary: Effective prevention is the most powerful strategy to reduce the burden of falls-related fractures. Falls-prevention strategies have been reported to be effective (Chartbook 2007). Prevention of hip fractures requires strategies to improve bone strength and a range of exercises to improve strength and mobility. Prevention of knee joint deterioration includes maintenance of a healthy weight and cardiovascular exercise.

Secondary: Significant advancements in surgical treatment have provided effective options to reduce the pain and disability associated with musculoskeletal conditions. Joint-replacement surgery is considered the most cost-effective intervention for severe osteoarthritis, reducing pain and disability and restoration of normal function (Bachmeier et al, 2001). Four of the indicators presented in this chapter relate to these procedures.

Rehabilitation should begin as early as possible after surgery because there is a high risk of loss of mobility for elderly people.

This chapter also presents two indicators related to the safety of hip and knee replacement, that is, survival of patients following the procedures.
ORTHOPAEDIC CARE
Falls-related hospitalisations

Why is this important? Hip fractures resulting from falls are a major threat to the health and well-being of older adults and impair quality of life. Falls account for about a third of all hospitalised injury cases and a fifth of all fatal injury in Australia (AIHW, 2008). Falls are a major medical problem among older adults, leading to impaired balance and gait, and loss of functional independence. Falls are one of the most common causes of disability and mortality in older age. Population studies have shown that hip fractures from falls are the most serious falls-related injury in older people, with 15 per cent dying in hospital and one third not surviving beyond one year (McClure et al., 2004). Seven out of ten falls resulting in hospitalisation of older people occurred either in the home or in aged care facilities (AIHW, 2008). Injurious falls by older people place a heavy burden on the hospital system because of the volume and long average stay. They also require long periods of rehabilitation after acute care.

Findings: There has been a steady reduction in the rate of hospitalisations for falls-related hip fractures in NSW between 2001-02 and 2004-05. In 2004-05, the age-sex standardised rate for NSW was 448 falls per 100,000 population, a 10 per cent decrease compared to 2002-03. At the area health service level, most had decreases in fall rates over the period, with two exceptions (South Eastern Sydney and Illawarra and Greater Western). Rates for North Coast were lower than for other areas over the four years. In 2004-05, there were 1,137 in-hospital deaths resulting from falls. In-hospital mortality rates following admission for falls-related injuries have fluctuated little over the period 2001-02 to 2004-05. In-hospital mortality rates are significantly higher in Hunter New England, with 5.2 deaths per 100 discharges, compared to the NSW average of 3.4 per 100 in 2004-05.

Implications: Across NSW, the incidence of hospitalisations for falls-related hip fractures has remained steady over the last few years. Hip fractures often result from a combination of weak bones (or osteoporosis) and a fall. If the rate is to be improved, prevention needs to include strategies to improve bone strength. Vitamin D and other related compounds have been used to reduce the risk of hip fractures. A Cochrane review found that frail older people given vitamin D with calcium supplements, had a marginal reduction in hip fractures but it was limited to those in nursing homes (Avenell et al., 2005).

A meta-analysis of 12 randomised control trials for post-menopausal women with low bone mass density, or osteoporosis, found that bisphosphonate (etidronate, alendronate, risedronate or clodronate therapy), was associated with a 42 per cent reduced risk of hip fracture (Nguyen et al., 2006). Hormone replacement therapy is now used less frequently, because of the increased risk of breast cancer.

Prospective controlled community trials have provided evidence supporting population-based interventions, such as hip protectors and increased physical activity, aimed at reducing the incidence of falls. Strategies include regulation, education, environmental change and population or community-based coordinated programs. Studies conducted in Australia, and overseas show a population-based approach leading to a relative reduction in population-wide falls-related injuries between six and 33 per cent (McClure et al., 2004). A systematic review by Carter et al. (2001) found evidence from several randomised controlled studies, that exercise is a useful tool in falls-prevention in older groups. A New Zealand study (Butler et al., 1998), found that strategies in residential facilities for older people were not consistent with current evidence about effectiveness. It recommended increased use of vitamin D, possibly calcium supplements, hip protectors and lower-extremity strength training.

In July 2004, the NSW Health Minister announced the NSW Falls Policy. The responsibility for the implementation of the policy is shared by agreement with the Injury Prevention Policy Branch, NSW Department of Health and the CEC. The CEC provides Statewide co-ordination and support to area health services for the program. Each area health service has appointed a falls prevention co-ordinator to implement the policy.
Chart 6-28

Age and sex standardised hospitalisations for falls-related hip fractures, persons aged 65 years and over, by area health service of residence, 2001-02 – 2004-05

Source: NSW Admitted Patient Data Collection linked by the Centre for Health Record Linkage (CHeReL) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
Chart 6-29

Falls-related mortality after hospitalisations

Age and sex standardised in-hospital mortality rate after hospitalisation for a falls-related injury, patients aged 65 years and over, by area health service of treatment, 2002 – 2005

Source: NSW Admitted Patient Data Collection linked by the Centre for Health Record Linkage (CHeReL) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

Notes: Rates are standardised for age and sex of patient. Deaths include deaths occurring in hospital and following discharge. Include public and private hospitals.
Chart 6-30

Falls-related mortality after hospitalisations

AGE AND SEX STANDARDISED 30-DAY MORTALITY RATE AFTER FALLS RELATED HOSPITALISATION BY CHARLSON INDEX BY AREA HEALTH SERVICE OF TREATMENT, 2002 – 2005

Source: NSW Admitted Patient Data Collection linked by the Centre for Health Record Linkage (CHeReL) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

Notes: Rates are standardised for age and sex of patient. Deaths include deaths occurring in hospital and following discharge. Include public and private hospitals. Charlson Index risk categories are Low - No Co-morbidities, Medium - Index Score 1-2, High - Index Score 3 or more.
ORTHOPAEDIC CARE
Access to hip replacement procedures

Why is this important? Hip replacement surgery is being performed at an increasing rate in hospitals throughout the world. It is a procedure designed to improve function, rather than extend life. Most patients are elderly and many have multiple medical conditions. In 2005-06 there were 18,549 hip replacements performed in Australia, a rate of around 80 per 100,000 people (AIHW, 2008). Hip replacement procedures have increased between five and 10 per cent each year for the past 10 years. With an ageing population, the rate of increase in this procedure can be expected to continue. Hip replacements are more common among older people, and among females. Osteoarthritis affects half of all people aged 75 years and over (Grainger & Cicuttini, 2004). Access to hip replacement surgery for people aged over 65 years is a key issue. In the public sector, some of the longest surgical waiting times relate to hip replacement. In 2005-06, the median waiting time for hip replacement in NSW was 119 days (AIHW, 2007b). Primary hip replacements may need to be revised if the artificial joint can no longer provide suitable function. In 2005-06, there were 14.3 total hip revisions per 100,000 population in Australia (AIHW, 2008). Some commentators believe there are opportunities to reduce the rate of hip revisions (Graves et al, 2004).

Findings: The data presented here indicates the age and sex standardised rate of hip replacements performed per 100,000 population aged 65 years and over in NSW public and private hospitals, by area of usual residence. In 2007, a total of 4019 hip replacement procedures were performed in NSW, and the standardised rate was 432 procedures per 100,000 population aged 65 years and over. The 2003-07 data indicates a pattern of declining rates over the past two years, which is consistent across all area health services. There are also significantly different rates between area health services. Outer metropolitan regions (including parts of Sydney South West and Sydney West area health services) and the North Coast have lower rates than the other five areas. In fact, the age and sex standardised rate per 100,000 is highest in major cities (830 per 100,000 population aged 65 years and over) and lowest in outer regional and remote areas (540 and 477 per 100,000, population aged 65 years and over, respectively).

Implications: With an ageing population, it is reasonable to expect that rates of hip replacement procedures will increase. In 2006, there were 945,000 people aged 65 years and over, accounting for 13.8 per cent of the NSW population. This group is projected to increase by 50 per cent by 2021, and will represent 18.4 per cent of the total population (NSW Department of Planning, 2005). Osteoarthritis, of which the principal symptoms are pain and restricted joint movement, affects about one in four people over 65 years and contributes to restricted mobility - the most common form of disability among older people (ABS, 1995; ABS, 2006). It is a primary reason for hip replacement surgery. Data collected by the Australian Orthopaedic Association National Joint Replacement Registry for a pilot study of 260 patients undergoing these procedures, indicated that about 90 per cent were performed for osteoarthritis and about 80 per cent were in people aged 60 years and over (Williamson, 1999). If the expected increase in hip replacement procedures is to be kept to a minimum, the reasons for revision surgery within one year should be investigated and, where possible, addressed.
Chart 6-31  
Access to hip replacement procedures

Hip replacement rate for people aged 65 and over, per 100,000 population by area health service of usual residence, 2003 – 2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
ORTHOPAEDIC CARE

Mortality following hip replacement

Why is this important? Total joint replacement is the most common treatment for advanced osteoarthritis of the hip. The mortality rate for this procedure is low, as would be expected in an intervention designed to improve function, rather than extend life. The patients are often elderly and many have multiple medical conditions. With an ageing population, the rate of increase of this procedure can be expected to continue. While low, the surgery does carry some risk of post-operative mortality. Increased risk factors of an adverse outcome include advanced age, being male, existing health problems (specifically a history of cardiorespiratory disease), race and low income. Several studies have examined the rate of mortality after hip replacement surgery. The American Academy of Orthopaedic Surgeons (2003) reported a one per cent 90-day mortality rate, lower than that in an age-matched general population. Mahomed et al (2003) also reported a 90-day mortality rate of one per cent among Medicare claims made by United States residents aged 65 years and older. Bandolier (2002) reports a declining 30-day mortality rate, from just under one per cent in the 1970s to 0.25 per cent in the 1980s, to 0.15 per cent in the 1990s (about one in 700 operations).

Findings: A total of 14,864 hip replacement procedures were performed during the period 2002 to 2005 for people aged 65 years and over. Across NSW, the age-sex standardised 30-day mortality rate per 100 hip replacement procedures for patients aged 65 or more, was 0.55 for this period. This rate is in line with that reported in the literature. Although the averages ranged from 0.35 to 1.34 per cent, there were no significant differences across area health services. The age-sex standardised mortality rate was lower for regional hospitals. These differences, however, were not statistically significant: metropolitan (0.61), inner-regional (0.47), and outer-regional (0.31). This is may reflect the higher complexity of patients treated in metropolitan hospitals. To assess the effect of existing co-morbidities on patient mortality, the rates were adjusted using the Charlson Index. This assigns a weight to any co-morbidity recorded for a patient. This analysis showed that the severity of patient co-morbidities was associated with 30-day mortality. Patients with the lowest level of co-morbidity make up 79 per cent of the total. Around 0.24 per cent of them died within 30 days of the procedure. Patients with moderate levels of co-morbidity make up 18 per cent of those receiving the procedure and 1.2 per cent of them died within 30 days. Patients with the highest level of co-morbidity account for 2.0 per cent of all patients, and 4.9 per cent of them died within 30 days of the procedure. Overall there are no significant differences between the health services within the three co-morbidity strata.

Implications: In NSW, the 30-day mortality rate for people aged 65 years and over who have undergone a hip replacement was found to be low and comparable to that reported in the literature. It appears, however, that mortality is associated with existing co-morbidities and patient age. Such information can be used to help decide when a total hip arthroplasty is appropriate. In addition, a recent study in the United States reports a trend towards minimally invasive total joint arthroplasty (both knees and hips), with a faster recovery and shorter hospital stay (Parvizi et al, 2007). It suggests that attention be paid to complications often associated with elective total joint arthroplasty, to ensure that early patient discharge is a safe practice.
Chart 6-32

Mortality following hip replacement procedures

Age and sex standardised 30-day mortality rate after index hip replacement procedure for people aged 65 years and over, by area health service of treatment, 2002 – 2005

Source: NSW Admitted Patient Data Collection, Registry of Births, Deaths and Marriages death registration data, Australian Bureau of Statistics (ABS) mortality data linked by the Centre for Health Record Linkage (ChReL) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
ORTHOPAEDIC CARE

Access to knee replacement procedures

Why is this important? Knee replacement procedures improve functional status, relieve pain and result in relatively low perioperative morbidity. The indication for almost all primary knee replacement procedures is osteoarthritis. This is true for all four categories of procedure: unispace, patellar/trochlear, unicompartiment and total. Osteoarthritis affects half of all people aged 75 years and over (Grainger & Cicuttini, 2004). Access to knee replacement surgery is also an important issue. Although the numbers of knee replacement procedures are increasing significantly in the public and private sectors, median waiting time in 2005-06 for surgery in public hospitals was 242 days. Relative to some other countries, the rate of knee replacement surgery in Australia is quite high at 156.8 per 100,000 people in 2004–05 (AIHW, 2008). The prevalence of arthritis is increasing with the ageing of the population and the rate of knee replacements is projected to continue to increase. During the last ten years the number of knee replacements undertaken each year has increased by a factor of 138.4 per cent Australia-wide (AIHW, 2008). This difference is not just a result of ageing. Increasing numbers of younger patients are receiving knee replacement surgery. Primary knee replacements may need to be revised if the artificial joint can no longer provide suitable function. The principal cause for revision knee surgery (i.e., a second knee replacement when the original replacement fails) is aseptic loosening. About 8.6 per cent of knee replacements are revisions (Graves and Wells, 2006). In 2005-06, there were 11.6 total knee revisions per 100,000 population (AIHW, 2008).

Findings: The data presented here indicates the age-sex standardised rate of knee replacements performed per 100,000 population aged 65 years and over in NSW public and private hospitals, by area of residence. In 2007, a total of 6,431 knee replacement procedures were performed in NSW, and the standardised rate was 695 procedures per 100,000 population aged 65 years and over. The number of procedures performed in 2007 decreased slightly compared to the previous trend of year-on-year increase. This pattern is consistent across all area health services. There are also significantly different rates between them, with consistently high rates in Northern Sydney Central Coast, Greater Western, South Eastern Sydney and Illawarra and Hunter New England, and lower rates in Sydney South West and Sydney West. The procedure rate is around 60 per cent higher for residents of major cities than for residents of outer regional and remote areas.

Implications: Although the rate of this type of surgery is high in Australia, available evidence suggests that the clinical severity of patients is comparable to that of those receiving knee replacements elsewhere. The outcomes of joint replacement surgery in Australia are comparable to those being achieved in many other countries. The rate of knee replacements depends on various factors, including the incidence of related diseases and overweight and obesity, changing community expectations, the rate of revisions and the supply of surgical services. By addressing some of these factors it may be possible to influence the rate of knee replacements. The burden of disease from degenerative musculoskeletal conditions in the Australian community is expected to increase substantially with the ageing of the population over the next 15 years. This may lead to a continuing increased rate. One potential opportunity to at least reduce the rate of increase would be to reduce the rate of revisions. In Sweden, there has been considerable reduction in the number of patients requiring revision surgery (Graves and Wells, 2006). This follows the identification by its Joint Registry of the best performing prostheses and techniques, by studying long-term outcomes.
Chart 6-33

Knee replacement rate for people aged 65 and over, per 100,000 population by area health service of usual residence, 2003 – 2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
ORTHOPAEDIC CARE
Mortality following knee replacement

Why is this important? Knee replacement surgery is being performed at an increasing rate in NSW hospitals and is one of the most successful orthopaedic surgical procedures. With an ageing population, this rate increase can be expected to continue. The surgery, however, carries a risk of post-operative mortality. Several studies have examined the issue. Gill et al (2003) found that the rate of mortality for all ages was about 0.46 per cent within 90 days of the procedure, using data collected between 1976 and 1996 from one surgeon in a Texan private practice. Parvizi et al (2001), found the rate to be 0.21 per cent within 30 days for 22,540 procedures performed between 1969 and 1997 in a United States hospital. A smaller study in a London hospital found the all-cause mortality rate during the three-month post-operative period to be 0.64 per cent (6 deaths out of 936 events; 95 per cent confidence interval = 0.26–1.46 per cent) (Khan et al, 2002). The authors noted that the death rate in patients undergoing a total knee replacement appeared to be lower than that in the general population.

Findings: During the period 2002-05, a total of 21,823 knee replacement procedures were performed for people aged 65 years and over in NSW. The age-sex standardised 30-day mortality rate per 100 knee replacement procedures for patients aged 65 or more was 0.25. This rate compares favourably to those found in the literature. There were no significant differences across area health services. There was a significant difference between the age-sex standardised mortality rate in metropolitan (0.11) and inner regional hospitals (0.47). These rates are still low however, and comparable to those found in the literature. In outer regional hospitals, the rate was 0.21. To assess the effect of existing co-morbidities on patient mortality, the rates were adjusted using the Charlson Index. This assigns a weight to any co-morbidity recorded for a patient. This analysis showed that the severity of patient co-morbidities was associated with 30-day mortality, with much higher rates amongst those with a Charlson Index of three or more.

Implications: In NSW, the 30-day mortality rate for people aged 65 years and over who have undergone a knee replacement was found to be low, and comparable to that reported in the literature. It does appear, however, that mortality is associated with existing co-morbidities. In the study by Gill et al (2003), increasing patient age and the presence of associated cardiovascular co-morbidities were identified as risk factors for mortality. Such information can be used to help decide when a total knee arthroplasty is appropriate. In addition, a recent study in the United States reports a trend toward minimally invasive total joint arthroplasty (both knees and hips), with a faster recovery and shorter hospital stay (Parvizi et al, 2007). They suggest that attention be paid to complications often associated with elective total joint arthroplasty, to ensure that early patient discharge is a safe practice.
Chart 6-34

Mortality following knee replacement procedures

Age and sex standardised 30-day mortality rate after index knee replacement procedure for people aged 65 years and over, by area health service of treatment, 2002 – 2005

Source: NSW Admitted Patient Data Collection, Registry of Births, Deaths and Marriages death registration data, Australian Bureau of Statistics (ABS) mortality data linked by the Centre for Health Record Linkage (CHeReL) and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

Notes: Deaths include deaths occurring in hospital and following discharge. Includes public and private hospitals.
Impact/ Burden of Disease: The respiratory system includes the airways, the lungs, the respiratory centre of the central nervous system, the chest wall and the pulmonary circulation. Chronic respiratory diseases are a diverse group of illnesses that affect the process of breathing and oxygen delivery. As a group, they involve many and varied causative pathways, symptoms and outcomes. They are highly prevalent in the community and constitute a significant health problem in NSW. Nevertheless, effective prevention is possible because these diseases have risk factors that are identifiable and avoidable. Respiratory diseases (including lung cancer) were responsible for around 14 per cent of all deaths in NSW in the period 2002 to 2006, and about five per cent of hospital separations in 2006-07 (Population Health Division, 2008). Asthma is a chronic inflammatory disorder of the airways that results in obstruction of airflow in response to specific triggers. In 2007, around nine per cent of adult males and 12 per cent of adult females had asthma in NSW. The prevalence of asthma in the adult population has remained at around 10 per cent over the past 10 years. Prevalence varies regionally between 7.3 in Sydney South West to 15.4 per cent in Greater Western (NSW Health, 2008). Asthma was responsible for 145 deaths in 2004 and around 13,000 hospitalisations in 2006-07 (Population Health Division, 2008). COPD is a long-term lung disease marked by shortness of breath that initially occurs with exertion and becomes progressively worse over time. In most cases emphysema is the underlying condition, although people with COPD often also have chronic bronchitis. COPD was responsible for over 1,500 deaths in 2006 and nearly 18,000 hospitalisations in 2006-07 (Population Health Division, 2008). The burden of COPD is not distributed equally across the population. Prevalence rates for COPD are higher in males, older people, people from lower socio-economic background and Aboriginal and Torres Strait Islander people.

Causal Factors: The cause of most cases of asthma is not known. A large proportion of asthma is developed in early childhood. The major risk factors include a family history of asthma and a genetic predisposition for allergic reactions. There is a range of common triggers for asthma, such as exercise, viral infections and allergens. Tobacco smoking is overwhelmingly the strongest risk factor for COPD. In 1997, 24 per cent of adults in NSW were current smokers. The smoking rate has been reduced to 18.6 per cent in 2007, a substantial reduction in smoking prevalence achieved in 10 years (NSW Health, 2008).

Effective Treatments: Preventive measures, which include the identification and avoidance of risk factors and better management of both asthma and COPD, are the most effective method to reduce the burden of disease from these conditions. Regular review by a general practitioner and the use of a written management plan are effective in reducing hospital admissions and attendance at emergency departments for asthma (Gibson, 1999). The COPD management strategy developed by NSW Health emphasises an integrated, co-ordinated and patient-focussed approach that includes patient education, self-management of exacerbations and pulmonary rehabilitation (NSW Health, 2003). This chapter presents indicators covering hospitalisation rates for both asthma and COPD.
RESPIRATORY MEDICINE
Asthma hospitalisations

**Why is this important?** The prevalence of asthma in children increased during the 1980s and early 1990s but then reached a plateau. The prevalence of asthma is now stable at around 14 to 16 per cent in children and just over 10 per cent in adults, which is high by international standards. Hospitalisation rates have decreased since the early 1990s, but asthma remains an important reason for hospital admission. For children and young adults hospitalisation is higher in late summer and autumn. Asthma mortality has decreased since 1990, but approximately 300 people still die each year from the disease (Marks et al, 2005; Australian Centre for Asthma Monitoring, 2005). Almost 75 per cent of admissions for asthma are avoidable and potentially preventable factors are common in deaths from asthma (Blainey et al, 1991). A wide variety of interventions improve the outcomes and processes of care for children and adults with asthma (AHRQ, 2007a). Education in asthma self-management, which includes self-monitoring, together with regular medical review and a written management plan improves health outcomes for adults with asthma (Gibson et al, 2002a). The 2006 NSW Health Survey found that 37.6 per cent of adults with symptoms of asthma in the previous 12 months had a written asthma plan (NSW Health, 2007). Evidence regarding the contribution of each of these components to improving outcomes is less clear (Gibson et al, 2002b; Toelle et al, 2004). Despite the availability of evidence-based guidelines for the management of asthma, there is a significant gap between best practice and the care delivered. Recent evidence from South Australia indicates that the distribution of asthma management plans, introduced on a population basis in 1992, peaked in 1994 at 42 per cent, but declined to reach half that percentage by 2003 (Wilson et al, 2006). Written asthma management plans are not considered a high priority by general practitioners (Goeman et al, 2005).

**Findings:** There were 3,645 hospital admissions for asthma in 2007, a rate of 133 per 100,000 people aged 5-34 years. Rates are known to fluctuate, with annual peaks related to seasonal conditions and the level of airborne irritants. The hospitalisation rates for asthma have fluctuated between 2003 and 2007 across all area health services. These rates, however, have declined over the past two decades and are lower than the start of this decade (257.2 admissions per 100,000 population) (NSW Health Department, 2008b). Asthma hospitalisation rates are substantially higher in the North Coast and Greater Western area health services. There is a strong association with socio-economic status. People in the least disadvantaged group have a substantially lower age-sex standardised admission rate (101 per 100,000 people) than those in the most disadvantaged groups (approximately 167 per 100,000 for the two lowest quintiles).

**Implications:** Changes in admission rates to hospital for asthma may be due to many factors, including severity and prevalence of the disease, effectiveness of disease management, accessibility of hospital services, changes in admission criteria and availability of primary health care. Regular review by a general practitioner and the use of a written management plan are effective in reducing hospital admissions and attendance at emergency departments for asthma (Gibson, 1999). The aims of an asthma management plan are to prevent the occurrence of asthma attacks, identify trigger factors, minimise the symptoms, maintain the best lung function and minimise side-effects from medication. There is, however, scope to close the gap between recommended practice and the standard of care generally available to the community. This should reduce the need for hospitalisation and reduce mortality.
RESPIRATORY MEDICINE

Chronic obstructive pulmonary disease (COPD) hospitalisations

Why is this important? Chronic obstructive pulmonary disease (COPD) is a major public health problem resulting in significant morbidity and mortality. It is sometimes referred to as emphysema or chronic bronchitis. It is a progressive syndrome caused by chronic inflammation of the airways and lungs, usually due to smoking. In 2004, 73 per cent of all COPD deaths were attributable to smoking (Population Health Division, 2006). In NSW COPD was responsible for 4.3 per cent of all deaths between 2002 and 2006 and for around 18,000 hospitalisations in 2006-07 (Population Health Division, 2008). The prevalence of COPD is difficult to determine, because the term COPD is not commonly used in health surveys. On the basis of self-reports in the National Health Survey, around three per cent of the total population, and about eight per cent of the population aged 65 and over, were estimated to have emphysema and chronic bronchitis in 2004-05 (AIHW, 2008). Over 77 per cent of COPD hospitalisations are for people aged 65 years and over. The trends differ for males and females. For males aged 65 and over, hospitalisation rates decreased by 16.1 per cent between 1998-99 and 2006-07. For females aged 65 and over, hospitalisation rates approximately doubled between 1989-90 and 2003-04, followed by a 7.6 per cent decrease to 2006-07 (Population Health Division, 2008). The increase in female hospitalisation rates and the narrowing of the gap between male and female rates can be explained by the increased prevalence of the disease in females, due to the uptake of smoking. Due to the large volume of potentially avoidable hospitalisations, COPD was identified as one of the Priority Health Care Program areas for NSW Health in 2002. Programs implemented in a number of area health services aimed to reduce hospital admissions through arrange of measures, including improved integration of care between acute services and GPs, self-management programs, pulmonary rehabilitation and smoking cessation.

Findings: There were 18,569 hospital admissions for COPD in 2007, a rate of 244 per 100,000 people. The admission rate for COPD for NSW residents has declined by 9.6 per cent, from 270 per 100,000 people in 2002 to 244 per 100,000 in 2007. There is no consistent pattern over time across area health services. The age-sex standardised admission rates for COPD per 100,000 people are higher in Greater Southern and Greater Western than other parts of NSW, and these differences are statistically significant. The age-sex standardised admission rate is significantly higher in remote areas (325 admissions per 100,000 people) compared to major city and inner regional locations (164 and 134 per 100,000 people, respectively). More than 90 per cent of admissions are to public hospitals and more than 75 per cent are aged 65 years or more. There is a strong association between socio-economic status and admission rate for COPD, with the most disadvantaged having a rate (315 per 100,000) two and a half times that of the least disadvantaged (128 per 100,000).

The smoothed Standardised Separation Ratio (sSSR) for each LGA can be interpreted as a relative risk, and compared to the NSW average which is set to 100. The sSSR for COPD in NSW LGAs ranged from 31 to 446, over the five-year period 2003-2007. The highest sSSR for COPD was estimated for Balranald, which was about 4.5 times higher than the state average (446; 95% CI: 376-517), followed by Narrandera (387; 95% CI: 350-424), and the lowest was for Ku-ring-gai (31; 95% CI: 29-34) followed by Willoughby LGAs (34; 95% CI: 30-38). LGAs in rural areas had higher sSSRs for COPD than the state average, while those in major cities had lower sSSRs as compared to both state average and rural LGAs.

Implications: The ageing of the population, combined with the prevalence of COPD in the population aged 65 years and over, has the potential to result in increased admission rates for this disease. The management of chronic respiratory diseases such as COPD has shifted from reliance on pharmacological treatment to a range of interventions that include patient education, self-management of exacerbations and pulmonary rehabilitation. The declining rate of admissions indicates that these strategies are having some success for COPD management. Hospitalisation will be influenced by many factors, including the severity and prevalence of the disease, the effectiveness of disease management and accessibility to services. Smoking cessation is the most effective and cost-effective way to reduce the risk of COPD, and improve outcomes for those who already have the disease (Zaher et al, 2004). More evidence is required regarding the best way of persuading those with the disease to stop smoking (van der Meer et al, 2001).

There is a need to improve ways of teaching those with COPD how to deal with their physical impairment and carry out activities of daily living. There is strong evidence to support the use of respiratory rehabilitation in the management of COPD (Lacasse et al, 2006). Pharmacological treatment of COPD is less effective, because the condition is, by definition, non-reversible.
CHRONIC OBSTRUCTIVE PULMONARY DISEASE ADMISSION RATE PER 100,000 POPULATION BY AREA HEALTH SERVICE OF USUAL RESIDENCE, 2003–2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
Notes: Rates were standardised by using Australian Population as 30 June 2001.
Chart 7-37

**Chronic obstructive pulmonary disease (COPD) hospitalisations**

**CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) HOSPITALISATIONS (STANDARDISED SEPARATION RATIOS) BY LOCAL GOVERNMENT AREA OF RESIDENCE. NSW, 2003–2007 COMBINED.**

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.

Notes: Standardised Separation Ratios (SSR) were standardised by using Australian Population as 30 June 2001, and mapped for CEC by Centre for Epidemiology and Research.

- significantly lower than the state average,
+ significantly higher than the state average

SSR Ranges
- >2.0
- >1.5-2.0
- >1.35-1.5
- >1.15-1.35
- >1.05-1.15
- >0.95-1.05
- >0.85-0.95
- >0.65-0.85
- >0.5-0.65
- <=0.5
Chapter 8: Endocrinology

Introduction

Impact/ Burden of Disease: Diabetes is a chronic metabolic disease marked by high levels of glucose in the blood, which is a result of too little insulin, insulin becoming ineffective, or both. Diabetes accounted for the second and fourth highest disease burden for males and females respectively in 2003 and as a cause of death was ranked fifth for males and seventh for females in 2005 (AIHW, 2008). While diabetes was the principal cause of 2.2 per cent of all NSW deaths in 2004, 2,419 or 5.2 per cent of all deaths in that year were diabetes-related.

The most accurate source of data on the prevalence of diabetes in the community is the Australian Diabetes, Obesity and Lifestyle (AusDiab) Study. It is estimated that 880,000 Australians aged 25 years and over had diabetes in 1999-2000, or 7.4 per cent of adults (more that 1 in 14), (AIHW, 2008). In 2007, 7.1 per cent of adults (7.8 per cent of males and 6.5 per cent of females aged 16 years and over) reported having diabetes or high blood sugar in NSW (Population Health Division, 2008). It is likely that there are also many people with diabetes who are not yet aware they have it. The prevalence of diabetes in NSW has increased by 51 per cent, from 4.7 in 1997 to 7.1 per cent in 2007.

The most common forms of diabetes are type 1 diabetes mellitus (previously referred to as insulin-dependent diabetes), type 2 diabetes mellitus (previously referred to as non-insulin-dependent diabetes mellitus) and gestational diabetes. In 2003 type 2 diabetes accounted for 92 per cent of the diabetes burden of disease (AIHW, 2008). The prevalence of diagnosed diabetes based on self-reported information more than doubled between 1989-90 and 2004-05 (AIHW, 2008).

Hospitalisations for which diabetes was recorded as a principal diagnosis increased substantially from 1989-90 to 2006-07, however, this was partly due to increasing prevalence and partly to changes in hospital coding practices (Population Health Division, 2008). In 2006-07, there were 25,620 hospitalisations in NSW with diabetes as the principal diagnosis and 138,742 hospitalisations with diabetes as a co-morbidity.

If left undiagnosed or poorly controlled, diabetes can lead to a range of complications, including coronary heart disease, peripheral vascular disease, stroke, diabetic neuropathy, renal failure, amputations and blindness.

Causal Factors: The risk factors for diabetes differ by type of diabetes. Type 1 diabetes is believed to be caused by particular biological interactions and exposure to environmental agents among genetically disposed people. In association with age, genetic disposition and ethnic background, modifiable risk factors such as obesity, physical inactivity and an unhealthy diet contribute to the cause of type 2 diabetes.

The burden of diabetes is not distributed equally across the population. Prevalence rates are higher in males than in females, among people living in remote areas or from lower socio-economic background and Aboriginal and Torres Strait Islander people, whose age standardised prevalence rate is almost three times that of non-indigenous Australians - 11 and 4 per cent respectively (AIHW, 2008).

Effective Treatments: Careful control of blood sugar levels through diet, exercise, medication and, where required, insulin injections, is vital to prevent complications for people with diabetes. Assiduous attention to the monitoring and management of lipids, blood pressure and weight control is required. Continuity of medical care in the form of "shared care" carried out by GPs in collaboration with local diabetes centres and/or private endocrinologists, has been shown to have positive benefits, including reduced risk of complications (Mainous et al, 2004). Control of risk factors for cardiovascular disease is also important for people with diabetes.

This chapter presents indicators related to diabetes care, including hospitalisation rates and amputations, as an example of the complications that can arise.
**ENDOCRINOLOGY**

Diabetes hospitalisations

**Why is this important?** As one of the most prevalent non-communicable diseases worldwide, diabetes has become one of the most challenging public health problems. This high rate of diabetes results in substantial morbidity and mortality, primarily from cardiovascular complications, eye and kidney diseases and limb amputations (Barr et al, 2005) and continues to increase. Patients with diabetes are often admitted because of a complication of their disease, rather than the diabetes itself. This makes it difficult to estimate the true burden of the disease on the hospital system. This burden is underestimated if only primary diagnoses of diabetes are considered, but overestimated if all diagnoses of diabetes are included, because sometimes the diabetes does not affect the management of the patient. While type 2 diabetes accounts for up to 90 per cent of all diabetes cases in the community, it accounts for only 70 per cent of all hospitalisations. Type 1 diabetes accounts for 20 per cent of hospitalisations and gestational diabetes 8.5 per cent. Hospitalisations rates for type 1 diabetes have been stable over the last five years, while those for type 2 diabetes have risen by 78 per cent (Population Health Division, 2008).

**Findings:** In 2007, there were 25,387 admissions to NSW hospitals with diabetes as the principal diagnosis (a rate of 348 per 100,000 population). Annual age-sex standardised rates of admission to NSW hospitals are increasing at a significant rate, from 225 admissions per 100,000 population in 2001 (Chartbook 2007) to 348 per 100,000 in 2007, a 55 per cent increase in seven years. This pattern was found within most area health services, although at the AHS level the increase was not always statistically significant. The exception was Greater Southern where there was a slight, though not statistically significant, reduction in 2006 and 2007. Significant differences were also observed across the different Accessibility/Remoteness Index of Australia (ARIA) categories, with higher admission rates associated with more remote areas. Similarly, there were significant differences in rates of admission between socio-economic groups, being higher in the more disadvantaged groups. These differences are consistent with those found by the AIHW for the whole of Australia. The rate of diabetes hospitalisations for Aboriginal people in NSW is presented in the Aboriginal chapter of this Chartbook (p.154). Admissions for people aged over 65 increased from 48.5 in 2001 to 57.1 per cent in 2005. The data shown in this chart is for diabetes as a principal diagnosis for hospital admission only. Diabetes is more frequently reported as an additional or associated diagnosis than as a principal diagnosis. Among the complications of, or conditions associated with, diabetes, are coronary heart disease, stroke, peripheral vascular disease, digestive diseases, cancer of the pancreas, retinopathy and kidney disease. In 2006-07 there were 138,742 hospitalisations with diabetes as a co-morbidity, a rate of 1,879 per 100,000 people (Population Health Division, 2008).

**Implications:** Overall, the increasing level of hospitalisation was driven by type 2 diabetes, which is predicted to become increasingly prevalent. Type 2 diabetes can be prevented, or at least delayed, through dietary and general lifestyle modification either alone, or in combination with oral therapy. People with diabetes should have access to timely and ongoing care from a diabetes team. Coordinated care can be provided in ambulatory settings such as general practice and diabetes centres. This care aims to prevent complications through maintenance of normal glucose levels, and the early detection and treatment of complications. The aim of integrated management of diabetes is to avoid hospitalisation. Hospitalisation rates for diabetes increase dramatically with age (Dunstan et al, 2001).

Although type 2 diabetes has been a national priority since 1996, its prevalence has doubled. Understanding socio-demographic patterns in hospitalisations for diabetes can assist in focusing policy, programs and service provision for the increasing problem of diabetes.
Chart 8-38

Diabetes hospitalisation rate (primary diagnosis) per 100,000 population by area health service of usual residence, 2003–2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
Notes: Rates were standardised by using Australian Population as 30 June 2001.
ENDOCRINOLOGY
Amputations for people with diabetes

Why is this important? Diabetes is one of our most challenging public health problems. It is estimated that almost one million Australians are currently affected by diabetes and its prevalence is increasing. Among the complications associated with diabetes are increased risk of foot ulceration and lower extremity amputation, which affects up to 15 per cent of all patients with diabetes (Mayfield et al, 1998). Indeed, diabetes is the leading cause of lower limb amputation in Australia (McGill et al, 2005). Many factors may necessitate an amputation, such as a minor trauma to the foot, which is caused by loss of sensation and may lead to gangrene (Pecoraro et al, 1990). However, proper long-term glucose control, diabetes education, and foot care are some of the interventions that can reduce the incidence of infection, neuropathy, and microvascular diseases. In the United States, Healthy People 2010 has set a goal of reducing the number of lower extremity amputations to 1.8 per 1,000 people with diabetes (US Department of Health and Human Services, 2000).

Findings: Between 2002 and 2007, there was a slight increase each year across NSW in the number of lower extremity amputations for people with diabetes, with the age-sex standardised rate remaining fairly steady at around 12 per 100,000. In 2007, 865 amputations were performed in NSW. Each year, approximately 63 per cent of operations are on the toe, foot or ankle, 23 per cent are below, and 14 per cent are above the knee amputations. There were few significant differences in the age-sex standardised rate between area health services, though for most years, this rate tended to be lower in Northern Sydney Central Coast and higher in Sydney West, Sydney South West and Greater Western. Higher age-sex standardised rates were found in more socially disadvantaged groups.

Implications: The incidence of lower-extremity amputation may be reduced by proper and continued treatment and glucose control. People with diabetes should have access to timely and ongoing care from a diabetes team. Coordinated care can be provided in ambulatory settings such as general practice and Diabetes Centres and aims to prevent complications through maintenance of normal glucose levels, and the early detection and treatment of complications. The aim of integrated management of diabetes is to minimise complications, including amputations, for people with diabetes. It is of note that, while the rate of amputations has remained fairly steady at around 12 per 100,000 population, at least there has not been an increase in line with the increased prevalence of diabetes in the community.

Other strategies are also required. For example, Ogrin et al (2006) recommend annual foot screening of all people with diabetes so those at risk can be identified and referred for appropriate management. In the USA, the Department of Health and Human Services recommends that diabetes self-management education be an integral component of medical care (CDC, 2005). Reiber et al (1992) found that providing an outpatient diabetes education program reduced the risk of amputation by a factor of three. Patout et al (2000) found that in a low-income African American population, foot care education, assistance in finding properly fitting footwear, and prescription footwear reduced the risk of amputation. Some of these strategies are in place in NSW and may have helped to maintain a steady rate of lower extremity amputations, despite an increase in the prevalence of diabetes. The relationship between the rate of amputation and socio-economic status could provide an indication of a group that needs to be targeted more directly.
Chart 8-39

AGE AND SEX STANDARDISED RATE OF LOWER EXTREMITY AMPUTATIONS WITH DIAGNOSIS OF DIABETES PER 100,000 POPULATION, BY SITE OF AMPUTATION, AREA HEALTH SERVICE OF USUAL RESIDENCE, 2003–2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
Chapter 9: Maternity services

Introduction

Impact: There were 94,610 births in NSW in 2006. This represents a nine per cent increase compared to the average of around 86,000 births per annum that occurred over the period 2001 to 2004. The vast majority occurred without complications, following a clinically uneventful pregnancy. Out of every ten births, about six women (61.2 per cent) had spontaneous vaginal births, around three in ten (28.1 per cent) had caesarean sections and one in ten had births involving forceps, vacuum extraction or vaginal breech delivery (NSW Health, 2007).

Around one in five mothers in NSW were aged 35 years and over. Maternal deaths are rare, with less than ten deaths per year reported among pregnant women or women who gave birth less than six weeks previously. There were 643 deaths of at least 22 weeks gestation in 2005, a perinatal mortality rate of around nine per 1000 births. About two-thirds of all perinatal deaths were stillborns and one-third were neonatal deaths. The rate of low birth weight (less than 2,500 grams) has been steady at around six per cent. Around 92 per cent of babies are born at term (37-41 weeks gestation). The percentage born prematurely has remained stable at around seven per cent. In 2005 there were 2,257 infants admitted to Neonatal Intensive Care Units, a rate of 23.8 per 1,000 live births. Indicators for these high-risk babies are presented in Chapter 10 of this Chartbook.

Risk Factors: Pregnant women receive screening antenatally to monitor the condition of both the mother and her foetus. Antenatal screening may identify possible maternal risk factors. These may include maternal age over 30 years, family history of diabetes, poor obstetric history, maternal obesity, mental health and drug and alcohol issues. Good quality evidence exists to support the cessation of smoking during pregnancy (Lumley et al, 2001). Mothers may be referred to specialist multidisciplinary clinics to receive education and treatment for these risk factors.

Models of Care: “Best practice” in maternity care can be defined as the care that provides for the best possible outcomes for women and babies in terms of clinical safety and effectiveness. Primary care is usually provided by midwives or general practitioners. Obstetricians usually provide secondary and tertiary care along with other medical colleagues and midwives. Where women have identified risks or have developed complications, they are referred to secondary or tertiary services.

Research has emphasised the need for women to be informed of their options regarding pregnancy care and the implications of each option in terms of cost, continuity and the transition from hospital to home (Three Centres Consensus Guidelines on Antenatal Care project, 2001).

Overall, NSW mothers and babies enjoy very good health, though Aboriginal and Torres Strait Islander mothers and babies, and those from socio-economically disadvantaged areas, continue to have poorer health (Population Health Division, 2008).

While the NSW healthcare system continues to show improvements in the indicators for maternal and child health and is generally good by world standards, challenges remain. These include increasing breastfeeding rates, improving access to antenatal care in rural and remote regions, ensuring an effective continuum of care across the antenatal, intrapartum and post-partum periods and addressing variations in rates of intervention for episiotomies and caesarean sections (Population Health Division, 2006).

This chapter presents a number of indicators related to child and maternal services, including timely initiation of prenatal care, caesarean section rates, episiotomy rates and perineal tears, unassisted vaginal deliveries, infant well-being at birth and breastfeeding.
MATERNITY SERVICES
Timely initiation of antenatal care

**Why is this important?** Antenatal care provides for the screening of asymptomatic pregnant women, with the aim of detecting, and thereby preventing, both maternal and neonatal adverse events. The purpose of antenatal care is to monitor the health of both the mother and baby, provide advice to promote their health, to identify antenatal complications and to identify and manage risk factors in pregnant women and their unborn children, in order to improve the chances of a healthy mother and child during pregnancy, birth, and early childhood. Antenatal care is recommended during the first trimester and throughout pregnancy. For this indicator, timely initiation is regarded as initiation of the first antenatal visit before 20 weeks of gestation. First trimester visits (visits within the first three months) are primarily to assess maternal and foetal well-being, particularly the risk of complication, to date the pregnancy, take a comprehensive history, discuss smoking behaviour and establish care options.

The care during this period is critical for mother and baby, because many deaths, or initiation of the cause of later deaths, occur then. Pregnant women are at risk for high blood pressure, gestational diabetes and other disorders. Late initiation of antenatal care can result in higher risks for the baby, including low birth-weight, stillbirth, or death within the first year of life. The babies of teenage mothers are especially at risk.

**Findings:** In 2006, 88.4 per cent of NSW mothers started antenatal care prior to 20 weeks gestation. This percentage varied from 81.2 in Sydney South West to 93.5 in Northern Sydney Central Coast. Mothers in very remote areas, and the most disadvantaged in socio-economic terms, had the lowest percentages of accessing timely antenatal care. Eighty-one per cent of mothers in the lowest socio-economic quintile started antenatal care prior to 20 weeks gestation, compared to 91.7 per cent in the highest socio-economic quintile. A review of the literature in the UK indicated that women from lower socio-economic areas were more likely to book late for antenatal care and/or make fewer visits than other women (Rowe and Garcia, 2003). This review also reported an association between ethnicity and antenatal attendance.

This data is collected in the Midwives Data Collection by hospital maternity services. Mothers are asked to identify the duration of pregnancy at first antenatal visit. It is possible that the data may not effectively take into account prior visits to the general practitioner, including for shared care. This may partially explain the lower rate of antenatal initiation in Sydney South West, which has a large obstetric shared care program. Data on the initiation of antenatal care for Aboriginal mothers is presented in the Aboriginal chapter of this Chartbook (chapter 12).

**Implications:** This indicator is an important measure of access to essential health services that impact on the health outcomes of the mother and child. It does not tell us the reasons for seeking care, the skills of the provider, or the quality of care received. Women’s use of antenatal care, however, is more strongly associated with improved perinatal survival (McDonagh, 1996). Efforts to improve timely initiation of antenatal care are required, particularly in very remote and disadvantaged areas of NSW.
Chart 9-40

First antenatal visit before 20 weeks' gestation

Percentage of women who have their first antenatal visit before 20 weeks of gestation, by area health service of usual residence, 2002–2006

Source: NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
MATERNITY SERVICES

Caesarean section rates

Why is this important? Caesarean section is the delivery of the foetus by an abdominal incision. It can be either elective (planned or unplanned), performed before the onset of labour, or an emergency caesarean section. Caesarean sections can be life-saving. Appropriate use can reduce both maternal and perinatal mortality and morbidity. Caesarean section, however, exposes women to anaesthesia and surgery, with their associated risks. Over the last 20 years, however, caesarean section has become much safer as an operation, due to improvements in anaesthetic techniques, infection control, thromboprophylaxis and surgical technique. Hospitals typically use more resources to care for a mother who has a caesarean section birth than they do for one who has a vaginal delivery. There is no agreement, however, over what the ideal caesarean section rate should be. The likelihood of requiring a caesarean section is impacted by various clinical factors. Variation in clinical practice can be best identified by examining rates within specific clinical groups, particularly those where the likelihood of requiring a caesarean section for clinical reasons is low. The measure presented below is caesarean section rates observed in women aged 20 to 34 years, having their first birth, where there is single baby, cephalic presentation (head-first) and estimated gestational age is 37 to 41 weeks – generally referred to as the selected primipara. The data is presented by area of usual residence of the mother. Women who deliver by caesarean section in their first birth should be offered an appropriate choice of delivery method for subsequent births. The rate of vaginal births for women who had a caesarean section for their first birth provides one method for monitoring the extent to which women with a history of a primary caesarean section are appropriately managed and offered appropriate choices.

Findings: In 2006, the percentage of elective and emergency caesarean sections among women giving birth for the first time across NSW was 30.3 per cent. The rate has been steadily increasing over the past ten years. Around 38 per cent of these were performed on a non-emergency or elective basis. Based on area of residence of mothers, the rates in 2006 ranged from 27.2 per cent in Sydney South West to 33.5 per cent in Greater Western.

From 2001 to 2006, the rate increased, primarily in metropolitan areas. Over the same period there has been a corresponding, and significant, reduction in the percentage of vaginal deliveries after primary caesarean, from 19.9 in 2001 to 14.3 per cent in 2006. The percentage of vaginal births after primary caesarean section is significantly lower in metropolitan areas and in the least disadvantaged areas.

During the five year period 2002 to 2006, the smoothed Prevalence Ratio for emergency caesarean sections among first time mothers ranged from 52.7 in Bogan to 191.3 in Parramatta LGA (to facilitate comparisons, the sSSR for NSW was set at 100). Within the 153 LGAs, 19 had significantly higher rates of emergency caesarean sections as compared to state average and most of these LGAs are located close to major or small cities. During the five year period 2002 to 2006, the smoothed Prevalence Ratio for elective caesarean sections among first time mothers ranged from 36.5 in Tamworth to 258.9 in Sydney LGA. Similar to emergency caesarean, higher rates of elective caesarean sections has taken place in city areas.

Implications: Although there is no agreed optimal or clinically appropriate rate for caesarean section, current rates for low-risk pregnancies appear high. This indicator, however, ignores the effect of personal birthing choices and the impact it has on care delivery. There are strong health and economic arguments to reduce the rate of elective caesarean sections. The increase in rates of caesarean delivery is not associated with any clear overall benefit for the baby or mother but is linked with increased morbidity for both (Villar et al, 2007). Babies delivered by elective caesarean have an increased risk of overall and serious respiratory morbidity (Hansen et al, 2008). Serious maternal morbidity including risks of hysterectomy, bowel and bladder injury, admission to intensive care and blood transfusion increase progressively with increasing number of caesarean deliveries (Silver et al, 2006). The number of intended pregnancies should be considered during counselling about elective repeat caesarean versus trial of labour when debating the merits of elective primary caesarean delivery.

Areas with an atypical distribution of cases across delivery modes should conduct further investigation of their management of labour and delivery. Users of maternity services may also find value in matching their preferences to the available maternity services. The NSW Department of Health published a guideline in April 2007 requiring area health services to have procedures controlling the timing of elective or pre-labour caesarean sections to beyond 39 weeks gestation (NSW Department of Health, 2007b). This is expected to have resulted in a decrease in the number of elective caesarean sections, a decrease in admissions to the nursery with respiratory problems and a relative increase in emergency caesarean sections, as many will come into spontaneous labour before the planned date for operation.
Chart 9-41

The percentage of elective and emergency caesarean sections among women giving birth for the first time, for selected primapara, by area health service of usual residence, 2002–2006

Source: NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
Chart 9-42

The prevalence ratio of emergency caesarean sections among women giving birth for the first time, by local government area of residence, NSW 2002–2006 combined.

Source: NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health. Mapping by Centre for Epidemiology and Research.

Prevalence ratio:
- Significantly lower than the state average
+ Significantly higher than the state average

Sydney Local Government Areas:
- SWAHS
- NSWAHS
- SSWAHS
- SESIABS
- HIEAH
- HSCAHS

CLINICAL EXCELLENCE COMMISSION
Safety and Quality of Health Care in NSW: Chartbook 2008
Elective Caesarean section rates

The prevalence ratio of elective Caesarean sections among women giving birth for the first time, by local government area of residence, NSW 2002–2006 combined.

Source: NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health. Mapping by Centre for Epidemiology and Research.

Prevalence ratio
- significantly lower than the state average,
+ significantly higher than the state average
Chart 9-44

Vaginal delivery following primary caesarean section

The percentage of vaginal births among women following primary caesarean section, by area health service of usual residence, 2002–2006

Source: NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
MATERNITY SERVICES

Episiotomy rates and obstetric trauma (3rd and 4th degree perineal tears) for first births

Why is this important? Episiotomy is one of the most common surgical procedures in the field of obstetrics. It is designed to facilitate operative delivery and prevent obstetric trauma from uncontrolled perineal tears. The benefits and risks of episiotomy as a means of avoiding more severe damage to the perineum and possible cranial trauma to the neonate, are still matters of research and debate. Perineal tears or wounds, whether traumatic or surgical, are associated with a variety of adverse outcomes, including pain, oedema, infection, and sexual dysfunction (Renfrew et al, 1998).

A Cochrane review indicates that research evidence supports restrictive use of episiotomy (Carroli et al, 1999). A systematic review of randomised control trials of routine episiotomy found no evidence that the practice helped women avoid severe tears, improved long-term sexual function or helped childbirth-related incontinence (Hartmann et al, 2005). These authors indicate that episiotomies are medically warranted in fewer than 10 per cent of cases. Severe perineal tears involve injury to the anal sphincter muscles (3rd degree) and breach of the rectal mucosa (4th degree). Episiotomy is not protective against severe tears, because more than 50 per cent of women who sustain a 3rd or 4th degree tear have had an episiotomy (Hartmann et al, 2005).

Findings: In 2006, one quarter (25.1 per cent) of all vaginal first births in NSW involved episiotomy. There is substantial variation in episiotomy rates between area health services. North Coast has significantly reduced its intervention rate and now, at 14.8 per cent has the lowest rate. This compares with Sydney West which has consistently demonstrated a substantially higher intervention rate, 35.4 per cent in 2006. Over 2002 to 2006, most areas experienced a declining rate, with two demonstrating an increase, from 32.0 to 35.4 per cent in the case of Sydney West and from 17.7 to 22.9 per cent in the case of Hunter New England.

The percentage of vaginal first births with significant tears (3rd or 4th degree) in 2006 was 3.7 per cent across NSW, which had steadily increased from 2.5 per cent in 2001. In 2006, the rate of 3rd and 4th degree tears varied between area health services. Hunter New England was highest at 5.2 and Sydney West lowest at 2.7 per cent.

Implications: Variation in the prevalence of episiotomies between areas is of concern. Ideally, cases associated with an assisted vaginal delivery need to be separately analysed, because episiotomy rates vary depending on assisted deliveries rates. Examination of rates by type of delivery and hospital, indicates significantly higher forceps delivery rates in private hospitals which is a major contributing factor in the higher episiotomy rates in some areas. The episiotomy rate is substantially lower in some countries such as Sweden, where the rate is 9.7 per cent (Hartmann et al, 2005).
### Chart 9-45

**Percentage of Episiotomies for Women Having Their First Baby Vaginally, by Area Health Service of Treatment, 2002–2006**

<table>
<thead>
<tr>
<th>Year</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney South West</td>
<td>25.3</td>
<td>24.4</td>
<td>23.0</td>
<td>21.7</td>
<td>20.4</td>
</tr>
<tr>
<td>South Eastern Sydney and Illawarra</td>
<td>27.1</td>
<td>26.0</td>
<td>25.2</td>
<td>24.3</td>
<td>23.8</td>
</tr>
<tr>
<td>Sydney West</td>
<td>29.0</td>
<td>28.2</td>
<td>27.8</td>
<td>28.5</td>
<td>28.3</td>
</tr>
<tr>
<td>Northern Sydney Central Coast</td>
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<td>28.7</td>
<td>28.3</td>
<td>27.7</td>
<td>26.9</td>
</tr>
<tr>
<td>Hunter New England</td>
<td>28.0</td>
<td>27.3</td>
<td>27.4</td>
<td>27.1</td>
<td>26.3</td>
</tr>
<tr>
<td>North Coast</td>
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<td>27.3</td>
<td>27.5</td>
<td>26.7</td>
<td>26.3</td>
</tr>
<tr>
<td>Greater Southern</td>
<td>26.3</td>
<td>25.4</td>
<td>25.2</td>
<td>24.7</td>
<td>25.1</td>
</tr>
<tr>
<td>Greater Western</td>
<td>27.4</td>
<td>27.5</td>
<td>27.2</td>
<td>26.8</td>
<td>26.6</td>
</tr>
<tr>
<td>NSW</td>
<td>26.4</td>
<td>25.8</td>
<td>25.2</td>
<td>24.7</td>
<td>25.1</td>
</tr>
</tbody>
</table>

**Source:** NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
Chart 9-46

PERCENT OF BIRTHS WITH OBSTETRIC TRAUMA (3RD AND 4TH DEGREE TEARS) FOR WOMEN HAVING THEIR FIRST BABY VAGINALLY, BY AREA HEALTH SERVICE OF TREATMENT, 2002–2006

Source: NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
MATERNITY SERVICES

Normal births (unassisted vaginal births without epidural)

Why is this important? Spontaneous unassisted vaginal deliveries are regarded as ‘normal’ and are the most common form of management of labour for low-risk births. Measurement of the percentage of normal births to other births, particularly for selected primipara - a woman who has given birth to one child or who is giving birth for the first time - is often used as an indicator of safety and quality of maternity care, because of the absence of interventions that increase risk to mother and baby. When deliveries do require assistance, the goal is to imitate spontaneous vaginal birth, thereby expediting delivery with a minimum of maternal or neonatal morbidity. Assisted vaginal births are those where either forceps and/or vacuum extraction are used to aid in the delivery.

Normal births reduce the risk of trauma, including tears and genital tract trauma, relating to forceps and the vacuum extractor (Royal College of Obstetricians and Gynaecologists, 2005). Women having normal births also report better sexual, bowel and urinary functioning than women with assisted vaginal deliveries (Lydon-Rochelle et al, 2001). Assisted deliveries have a greater association with external ocular injuries and facial nerve palsies, an increase in mild scalp lacerations, cephalhematoma and/or retinal haemorrhage.

The data presented in the following tables is for area of usual residence of the mother.

Findings: For selected primipara births in 2006 (women aged 20 to 34 years, having their first birth, singleton pregnancy, cephalic presentation and estimated gestational age of 37 to 41 weeks), excluding augmented and instrumental births, 34.1 per cent were normal births in NSW. North Coast, at 40 per cent, was the highest, while South Eastern Sydney and Illawarra had the lowest with 29.6 per cent. From 2001 to 2006, the percentage of these births across NSW has increased slightly.

Implications: The philosophy underpinning primary maternity services is that birth is a normal, but significant, physiological event and that different women have different needs in relation to pregnancy and childbirth. Maternity services should ensure that women are able to make informed and timely choices regarding their maternity care and feel in control of the birthing experience. Because operative vaginal delivery can be associated with maternal and neonatal morbidity, strategies that reduce the risk of operative vaginal delivery should be used. There is strong evidence which demonstrates that continuity of midwifery care in pregnancy, birth and the postnatal period is as safe as traditional models of care and can result in positive outcomes, including reduced interventions in labour, reduced caesarean section rates and reduced need for neonatal resuscitation at birth (AHMAC, 2008). The community-based Ryde Midwifery Group Practice Program is an example of how the provision of continuity of midwifery care in pregnancy can result in care that is as safe as hospital-based services and has improved outcomes of satisfaction and reduced interventions (Tracey & Hartz, 2006).

System analysis often reveals inadequate training as a key contributor to adverse outcomes and that training is central to patient safety initiatives (Murphy et al, 2003).
**Chart 9-47**

The percentage of spontaneous, unassisted vaginal births without epidural for selected primipara by area health service of usual residence, 2002–2006

Source: NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
MATERNITY SERVICES

Well-being at birth for term infants

Why is this important? This indicator is a measure of the outcome of labour and caesarean births, elective or emergency, with particular emphasis on the assessment of baby well-being. The Apgar score is the assessment of a newborn baby's physical condition—based on skin colour, heart rate, response to stimulation, muscle tone, and respiratory effort. It is a numerical expression of the physical condition of an infant shortly after delivery. Each criterion is rated from zero to two, with a total score of 10 signifying the best possible physical condition. The assessment determines the need for immediate emergency treatment, helps prevent unnecessary emergency intervention and indicates possible brain damage. Because the score corresponds closely to an infant's life expectancy, it is used as a guideline to advise parents on their baby's chances of survival. The Apgar score does not check for all possible complications (such as chromosomal damage), therefore a high number does not guarantee that a child's long-term outlook is completely positive. An Apgar score of less than, or equal to, six at five minutes of age indicates poor infant well-being.

A recent population study of singleton births at term (between 37-41 weeks gestation) in Australia from 2001 to 2004, found that the rate of adverse perinatal outcomes was higher in public hospitals than in private hospitals (Robson et al, 2009). Compared with public hospitals, birth in Australian private hospitals is characterised by a higher rate of obstetric interventions, such as induction of labour, episiotomy, instrumental delivery and caesarean section. They found that term babies born in public hospitals were more likely to require high levels of resuscitation, to have an Apgar score less than 7 at five minutes and to require admission to a neonatal intensive care facility or special care nursery. It should be noted that one of the limitations of this study is that they were not able to control for the presence of co-morbidities or socio-economic disadvantage in each group, factors with significant impact on perinatal outcomes. Women from socio-economically disadvantaged groups are clearly over-represented in the public hospital population.

Findings: Across NSW, the rate of live term infants with an Apgar score of less than, or equal to six (i.e., poor infant well-being) at five minutes was 1.4 per cent in 2006. The NSW rate has been constant at 1.4 per cent of all live births since 2003. In 2006, Sydney South West had the highest percentage of live term infants with an Apgar score of less than, or equal to six, at five minutes, while Sydney West and South Eastern Sydney and Illawarra had the lowest (1.9 compared with 1.1 per cent). The data is based on the definition from the National Core Maternity Indicators, although not with the exclusion of infants with major congenital malformations. This analysis was not possible with data from the Midwives Data Collection.

Implications: Low Apgar scores have remained stable between area health services and for NSW over the last five years.
Chart 9-48

THE PERCENTAGE OF LIVE TERM INFANTS WITH AN APGAR SCORE OF LESS THAN OR EQUAL TO 6 AT 5 MINUTES, BY AREA HEALTH SERVICE OF TREATMENT, 2002–2006

Source: NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
Why is this important? It is well known that the best way to feed an infant is to provide breast milk. Human milk is uniquely adapted to babies’ needs and is immediately available at the right temperature, provides the required nutrients, requires no time for preparation and is free. It is free of contamination, potentially life-saving, does not cause allergy or intolerance and enhances the immune system. It also promotes sensory and cognitive development and has positive psychological advantages for both mother and infant. An Australian review found that breast milk contains all the nutrients, antibodies, hormones, immune factors, and antioxidants that an infant needs to thrive during the first six months of life (Hogan et al, 2007). These include better emotional attachment and promotion of infant health through protection from infections and support for brain development. Infant formula provides a poor substitute of human milk, unable to reproduce the full spectrum of human milk proteins, milk sugars, live white cells and antibodies programmed by infections in the infant’s environment to best meet the needs of the growing infant.

A systematic review of the evidence of the long-term effects of breastfeeding supports the current WHO recommendation that babies should be breastfed exclusively for six months (WHO, 2007). Exclusive breastfeeding gives an infant the best possible nutrition and protection from disease (WHO/UNICEF, 1997) and reduces the risks associated with formula feeding.

Findings: Data from the NSW Population Health Survey for 2005-06 reported that 17.5 per cent of infants had been exclusively breastfed at six months and 27.0 per cent had been breastfed at six months. The proportion of infants who had been fully breastfed at six months has increased from 24.7 per cent in 2003-04 to 27.0 per cent in 2005-06. In 2005-06, the highest rate was in Northern Sydney Central Coast (37 per cent), followed by Hunter New England (35.7 per cent), and Sydney South West (32.6 per cent). Greater Western (15.6 per cent) and Greater Southern (17.5 per cent) had the lowest rates of fully breastfed babies at six months.

Implications: Educating mothers about the benefits of exclusive breastfeeding (that it gives the best chances of good growth and development) may lead to less reluctance to breastfeed. Thus they may be more inclined to breastfeed to give their infants a healthy start, despite social or personal reasons that may make exclusive breastfeeding difficult or undesirable. The NSW Department of Health has issued guidelines to promote, protect and support breastfeeding in the community and among staff (NSW Department of Health, 2006b).

Definitions

Breastfeeding The child receives some breast milk but can also receive any food or other liquid including non-human milk.

Ever breastfed Refers to infants who have ever been put to the breast or received expressed breast milk.

Exclusive breastfeeding The infant receives only breast milk, or expressed breast milk, and no other liquids or solids with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines.

Full breastfeeding An infant is fully breastfed if he/she receives breast milk as the main source of nourishment. This includes infants who are either:

1. exclusively breastfed or
2. predominantly breastfed.

That is, infants can be classified as fully breastfed if:

1. they receive only breast milk with no other liquids or solids (except vitamins, mineral supplements, or medicines) or
2. they receive breast milk and water, water-based drinks, fruit juice, oral rehydration solution, but do not receive breast milk substitutes or solids. The fully breastfed rate is the combined rate of exclusively breastfed and predominantly breastfed.

Predominant breastfeeding An infant’s predominant source of nourishment has been breast milk but the infant may also have received water and water-based drinks (sweetened and flavoured water, teas, infusions etc); fruit juice; oral rehydration solution; drop and syrup forms of vitamins, minerals and medicines; and ritual fluids (in limited quantities). All other food-based fluids are excluded, in particular non-human milk.

Complementary breastfeeding The child has received both breast milk and nutrient-containing foods (this may include any food or liquid including non-human milk).
Chart 9-49


Source: 2005-2006 Report on Child Health from the New South Wales Population Health Survey, Centre for Epidemiology and Research, NSW Department of Health
Chart 9-50

**Percentage Exclusively Breastfed at Six Months by Area Health Service of Usual Residence, Children 0–4 Years, NSW, 2003–2004, 2005–2006.**

Source: 2005-2006 Report on Child Health from the New South Wales Population Health Survey, Centre for Epidemiology and Research, NSW Department of Health
Chapter 10: Neonatal Intensive Care

Introduction

Impact: Specialist neonatal services provide perinatal advice and consultation as well as inpatient care for neonates who are born with, or develop additional needs after birth. This includes pre-term and low birth weight babies, as well as any baby requiring secondary or tertiary neonatal care. In 2006, there were 2155 babies born to mothers usually resident in NSW who met the neonatal intensive care units’ (NICUS) registration criteria and were admitted to neonatal intensive care units, a rate of 23.4 per 1000 live births. The NICUS data collection was established in 1985 to document the outcome of high-risk babies who were admitted to a NICU in NSW.

Risk factors: The current registration criteria for neonatal intensive care units or level 4 special care nurseries include babies who are:

- Born at less than 32 weeks gestation and/or
- Born weighing less than, or equal to, 1500 grams and/or
- Require mechanical ventilation for four hours or more during the first 28 days of life and/or
- Require continuous positive airways pressure for four hours or more during the first 28 days of life and/or
- Require major surgery (opening of a body cavity) during the first 28 days of life and/or
- Require a central line for four hours or more during the first 28 days of life.

Babies are registered in one category only, in descending order. For example, a baby born at 29 weeks requiring mechanical ventilation, is registered as a baby born less than 32 weeks gestation. The registration criteria, data collected and participating hospitals have changed over the past two decades.

NICU services: The ten neonatal intensive care units in NSW and the Australian Capital Territory (ACT), as well as the four of the Level 5 special care nurseries in NSW, contribute data to NICUS. This includes the neonatal intensive care units at the two co-located children’s hospitals and the children’s hospital located within a perinatal centre. The information in this report, for babies registered to the Canberra Hospital in the ACT, pertains only to those who were born to NSW residents.

Thirty-five per cent of babies registered in 2006 were born following a booked tertiary centre birth and 34.8 per cent were born following maternal transfer. Twenty-eight per cent were transferred to a tertiary centre following birth and 3.2 per cent were transferred from one tertiary centre to another during the first day of life.

Wherever possible, high-risk babies are cared for in the closest perinatal centre to the usual residence of the mother. There are occasions, however, when the closest perinatal centre with an available neonatal intensive care cot is not in the area health service of the mother’s usual residence. This situation occurs when babies require surgery, for rural babies and in times of bed shortages. As neonatal intensive care is a Statewide service, babies are transported by the Neonatal and paediatric Emergency Transport Service to the closest perinatal centre with an available cot appropriate for the baby’s condition.
NEONATAL INTENSIVE CARE
Registration of NICUS babies

Why is this important? High-risk babies who are admitted to a neonatal intensive care unit (NICU) or a level 4 special care nursery, have a higher morbidity and mortality rate than those who do not require such care after birth. They consume a higher proportion of health resources, some on an ongoing basis. It is important to know where mothers of high-risk babies reside for planning of health care services, both acute and long-term, and to ensure equity of access to health services.

Findings: In 2006, 2155 babies who were born to mothers usually resident in NSW and met the NICUS registration criteria were admitted to a neonatal intensive care unit or a level 4 special care nursery in NSW or a neonatal intensive care unit in the ACT.

The primary NICUS registration criteria for the babies in 2006 were:

- less than 32 weeks gestational age (newborn)........ 851, ....39.5 %
- birth weight less than, or equal to, 1500 grams ..... 129, ..... 6.0 %
- mechanical ventilation .................................................. 542, ....25.2 %
- continuous positive airways pressure (CPAP) ........ 533, ....24.7 %
- major surgery ................................................................. 28, ..... 1.3 %
- insertion of a central line only ........................................... 72, .... 3.3 %

Although one of the primary NICUS registration criteria was “major surgery” and this occurred for 28 babies, 334, or 15.5 per cent of all babies had a surgical procedure performed.

Of the 2155 babies admitted, 1595 (74 per cent) were premature (less than 37 weeks gestation), 77 (3.6 per cent) were 22-25 weeks gestation, 270 (12.5 per cent) were 26-28 weeks, 504 (23.4 per cent) were 29-31 weeks and 744 (34.5 per cent) were 32-36 weeks gestation. A total of 560 term babies accounted for 26 per cent of overall admissions to neonatal intensive care units or level 4 special care nurseries in NSW or the ACT. NICUS registrants as a percentage of live births were significantly higher in Hunter New England and lower in North Coast. The higher NICUS registration rate in Hunter New England may represent a difference in clinical practice in the use of continuous positive airway pressure (CPAP). The rate in North Coast should be interpreted with caution, because high-risk babies whose mothers live in border towns are appropriately admitted to a Queensland neonatal intensive care unit or a level 4 special care nursery. It should be noted that babies born in Greater Southern, Greater Western and some areas of South Eastern Sydney and Illawarra are preferentially cared for in the NICU of the Canberra Hospital.

Implications: This indicator is an important measure of where mothers whose babies meet the NICUS registration criteria live. It is reassuring to note that there seems to be reasonable equity of access to NICUs throughout the period. This makes it easier for parents to visit their babies during sometimes protracted hospitalisation.

This indicator is also an important measure of inpatient case mix and service utilisation. It has implications for resource planning and funding. The care of babies equal to, or greater than 32 weeks gestation, constitutes the greatest proportion of the workload (1304 newborn, 60.5 per cent). Moderate and extreme prematurity accounted for less than 40 per cent of overall admissions. Extreme prematurity, defined as ‘prematurity less than 29 weeks’, accounts for only 16.1 per cent of overall admissions to a neonatal intensive care unit or level 4 special care nursery in NSW or the ACT.
Chart 10-51

Neonatal intensive care units’ (NICUS) registrants

PERCENTAGE OF ALL LIVE BIRTHS ADMITTED TO NEONATAL INTENSIVE CARE UNIT WHO ARE NICUS REGISTRANTS BY AREA HEALTH SERVICE OF USUAL RESIDENCE, 2002 - 2006

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research, NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
NEONATAL INTENSIVE CARE
Survival of NICUS babies

Why is this important? The survival rate of patients admitted to intensive care units is generally regarded as a primary outcome measure for that unit and of the overall success of the NICUS program. It is therefore important to determine that the survival rate of newborn babies admitted to neonatal intensive care units, to ensure that these survival rates are acceptable and that there is no significant variation in mortality rates between area health services. Premature births accounted for 74 per cent of babies admitted to a neonatal intensive care unit in 2006. Around 11 per cent of NICUS registrations were for babies born before 28 weeks gestation and 38.5 per cent for those born between 28 and 32 weeks gestation. Although the boundary of viability has shifted over the past two decades, there is substantial risk of long-term neurodevelopmental disabilities in very premature babies born before 23 weeks gestation (Lui, Bajuk et al, 2006). Consensus has been reached in NSW that the ‘grey zone’ of viability is between 23 weeks and 0 days, and 25 weeks and 6 days’ gestation, where it is acceptable medical practice not to initiate intensive care during this period if parents so wish, after appropriate counselling.

Findings: Overall in 2006, 94 per cent of babies who met the NICUS registration criteria survived to hospital discharge. Of those who died, most (59.6 per cent), were less than one week of age and a further 25.0 per cent were less than 29 days of age. The six months survival rate for babies born at all gestational ages was similar for those born in tertiary and non-tertiary centres. Survival within different area health services fell within a narrow range from 92.7 to 96.2 per cent. This is within the range of normal variance.

The survival rate for babies born to mothers usually residing in an area health service near NSW borders should be interpreted with caution, as these babies are appropriately admitted to a neonatal intensive care unit in Queensland, South Australia ACT, or Victoria. There is no significant variation in the survival rate of NICUS registrants across the State during the period studied.

Implications: The overall survival rate of NICUS registrants is reassuring, with no significant differences across area health services. These survival rates compare favourably with those for paediatric and adult intensive care units. The data presented here indicates that high-risk babies, whether born in non-metropolitan areas, or their mothers are booked into tertiary centres, have equivalent survival rates. This also reflects on the effectiveness of the NSW Newborn and paediatric Emergency Transport Service (NETS).
Chart 10-52

Survival of NICUS registrants born at less than 32 weeks

Percentage of survival to hospital discharge of NICUS registrants (born at <32 weeks of gestation) by area health service of usual residence, 2002–2006

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research
Why is this important? Five per cent of babies are born with a major or minor congenital anomaly. These are defined as defects present at birth and secondary to any intra-uterine mishap (Wiederholt, 2000). While many of these defects may be small, about half of these babies will have defects that give rise to functional limitations during their lives. Causes of congenital anomalies include genetic factors (e.g., Duchenne muscular dystrophy), chromosomal (e.g., Down Syndrome), environmental (e.g., cytomegalovirus, alcohol, lead, radiation), polygenic/multifactorial (e.g., congenital heart defects), or of unknown origin. The presence of a major anomaly is a primary reason for the admission of high-risk babies to a neonatal intensive care unit or special care unit.

Findings: In 2006, 326 babies who were born with a major congenital anomaly to mothers usually resident in NSW, met the NICUS registration criteria and were admitted to a neonatal intensive care unit or a level 4 special care nursery. This constitutes approximately 15.1 per cent of overall admissions to a neonatal intensive care unit or a level 4 special care nursery in NSW or the ACT.

There is no significant variation in the rate of congenital anomalies of NICUS registrants across NSW during the period studied.

Implications: Babies born with major congenital anomalies generally require admission to a neonatal intensive care unit for investigations and/or surgery in the neonatal period. They generally have higher morbidity and mortality and require increased healthcare support in the long-term.
Chart 10-53

Major congenital anomalies in NICUS registrants

Percentage of babies in NICUS registrants born with major congenital anomaly by area health service of usual residence, 2002–2006

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research
Chapter 11: Other Acute Services

Introduction

**Impact:** This chapter presents a range of indicators related to the appropriateness, access, efficiency and consumer participation dimensions of quality.

The indicators selected for *Chartbook 2008* are:

- Hysterectomy rates
- Myringotomy rates (persons under 15 years)
- Cataract and lens procedure rates
- Laminectomy rates
- Waiting for booked treatment
- Day-of-surgery admission
- Day-only surgery

Variations between area health services in hospitalisation rates for hysterectomy, myringotomy and laminectomy suggest there are important questions to be considered in the appropriateness of current rates of use, particularly for populations in some regions of NSW. Variations in hospitalisation rates for cataract and lens procedures suggest that there are questions relevant for the appropriateness, access and efficiency dimensions of quality. The indicators of waiting times for booked treatment are mainly relevant to questions of access.

Two indicators related to the efficiency dimension are presented: day-of-surgery admission and day-only surgery rates.

These indicators provide valuable insight into the patient experience.
OTHER ACUTE SERVICES

Hysterectomy rates

Why is this important? Hysterectomy is the total removal of the uterus, or much less commonly, its partial removal. The procedure is usually performed to treat a range of conditions, including recurrent uterine bleeding and uterine fibroids. Hysterectomies can also be required to treat uterine cancer - either cancer of the body of the uterus or cancer of the cervix. It is one of the most common surgical procedures performed in Australian hospitals. An estimated one in ten women will undergo a hysterectomy by the age of 40 and one in five before the age of 50 (Graham et al, 2001). In recent years the numbers of women undergoing a hysterectomy have declined. While there is no nationally agreed appropriate rate, there have been concerns that hysterectomies may be overused. Several studies have shown that the variation in rates between regions cannot be explained by the underlying patterns of disease (AHRQ, 2002). Studies in Australia have also shown high variation between regions. Previous studies have found that hysterectomy rates in Australia are lower than for the United States but higher than in the United Kingdom (Reid et al, 2000). There is evidence from randomised controlled trials (RCTs) that modern medical and conservative surgical therapies (including endometrial ablation) are effective treatments for heavy menstrual bleeding (menorrhagia) for many women (Hickey, Farquhar, 2003). Ineffective treatment of heavy menstrual bleeding is likely to lead to a referral and a high chance of hysterectomy (Nixon et al, 2001). The data presented in the following tables is for area of treatment. It excludes women with a cancer diagnosis.

Findings: In 2007, 350 NSW women aged under 35 years had a hysterectomy procedure, compared with 638 in 2002. Age standardised rates declined by 44 per cent over this period. Around 62 per cent of these procedures are performed in public hospitals. Hysterectomy rates for women aged under 35 years are closely correlated with socio-economic status. Age standardised rates for the lowest quintile were 46.6 per 100,000 women, around seven times greater than for women in the highest quintile (6.8 per 100,000). Variations in rates between area health services are statistically significant. They are significantly higher in areas with considerable rural populations – Hunter New England, North Coast, Greater Southern and Greater Western. Rates are steadily falling in these areas, but remain significantly higher than in metropolitan areas. Age standardised rates for major city regions are 13 per 100,000 women aged under 35, compared with over 30 for inner and outer regional locations and around 24 for remote and very remote locations.

In 2007, 6,328 women living in NSW aged 35 to 59 had a hysterectomy procedure, compared with 7,231 women in 2002. Age standardised rates declined by 16 per cent over this period. Variations between area health services in rates for women aged 35 to 59 years are statistically significant. Rates are notably higher in rural-based area health services.

The smoothed Standardised Separation Ratio (sSSR) for each LGA can be interpreted as a 'relative risk', and compared to the NSW average which is set to 100. The sSSR due to hysterectomy for women under 35 years in NSW LGAs ranged from 6 to 525, over the five-year period 2003-2007. The highest sSSR for hysterectomy was estimated for Parkes (525.4), followed by Richmond (507), and lowest was for Mosman (6.2) followed by Northern Sydney LGAs (9.1). The sSSR for Parkes and Richmond are over 5 times higher than the state average while for Northern Sydney and Mosman represents less than 90% of the state average. LGAs in rural areas had higher sSSRs for hysterectomy than the state average, while in major cities had lower sSSRs compared to both state average and rural LGAs.

Implications: There has been a significant decline in hysterectomy rates across all NSW area health services in the last five years, continuing trends from the previous decade. Some of this may reflect initiatives within area health services to address inappropriately high rates. Better informed choices for women and other non-surgical options may also be playing a role. Significant variations in the use of the procedure persist however, reflecting higher rates for women living in rural populations and women in living more disadvantaged regions. Whilst some of this may reflect patient choice, it suggests that hysterectomy may be overused for women living in many parts of NSW. Further analysis, investigation, and strategies are required, particularly to ensure that women are well informed and can access appropriate options wherever they live.
### Chart 11-54

**Hysterectomy rates for women under 35 years**

**Hysterectomy rate per 100,000 women aged under 35 years (excluding cancer), by Area Health Service of usual residence, 2003–2007**

<table>
<thead>
<tr>
<th>Year</th>
<th>Sydney South West</th>
<th>South Eastern Sydney and Illawarra</th>
<th>Sydney West</th>
<th>Northern Sydney Central Coast</th>
<th>Hunter New England</th>
<th>North Coast</th>
<th>Greater Southern</th>
<th>Greater Western</th>
<th>NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>19</td>
<td>15</td>
<td>27</td>
<td>36</td>
<td>76</td>
<td>69</td>
<td>62</td>
<td>68</td>
<td>95</td>
</tr>
<tr>
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<td>16</td>
<td>14</td>
<td>26</td>
<td>57</td>
<td>73</td>
<td>64</td>
<td>57</td>
<td>70</td>
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<td>2005</td>
<td>16</td>
<td>14</td>
<td>26</td>
<td>57</td>
<td>64</td>
<td>57</td>
<td>57</td>
<td>70</td>
<td>98</td>
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<td>2006</td>
<td>19</td>
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<td>73</td>
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<td>57</td>
<td>70</td>
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<td>2007</td>
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<td>26</td>
<td>64</td>
<td>73</td>
<td>64</td>
<td>57</td>
<td>70</td>
<td>98</td>
</tr>
</tbody>
</table>

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health

Notes: Rates were standardised by using Australian Population as 30 June 2001.
Chart 11-55

Hysterectomy for women under 35 years

HYSTERECTOMY RATE (STANDARDISED SEPARATION RATIOS) FOR WOMEN UNDER 35 YEARS (EXCLUDING CANCER), BY LOCAL GOVERNMENT AREA WITHIN AREA HEALTH SERVICE OF USUAL RESIDENCE, NSW 2003–2007 COMBINED

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
Notes: Standardised Separation Ratios were standardised by using Australian Population as 30 June 2001, and mapped for CEC by Centre for Epidemiology and Research.

- significantly lower than the state average,
+ significantly higher than the state average
Chart 11-56

Hysterectomy rates for women 35–59 years

Hysterectomy rate per 100,000 women aged 35–59 years, by area health service of usual residence, 2003–2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
Notes: Rates were standardised by using Australian Population as 30 June 2001.
OTHER ACUTE SERVICES

Myringotomy rates (persons under 15 years)

Why is this important? Myringotomy is a surgical procedure in which a tiny incision is created in the eardrum to relieve pressure caused by excessive build-up of fluid in the middle ear (“glue ear”), or to drain pus. The procedure often includes the placement of ventilation tubes (grommets) to keep the eardrum open and allow air to equalise between the middle ear and outer ear canal. Myringotomy and insertion of grommets is commonly used to improve the hearing of children with chronic otitis media with effusion (OME). OME is a common condition in childhood, and for most, it is a transient problem. It will affect up to 80 per cent of preschool children at some time. It is the most common cause of deafness in children in the western world. The effects of chronic mild to moderate hearing loss due to OME are debated in the literature, with some studies showing language and cognitive delay and others not. Many studies (e.g. Paradise et al., 2001) have included outcomes of unilateral hearing loss, acute intermittent glue ear and studies where hearing loss was not evaluated. Lous et al. (2005) conclude that there is small benefit from grommets in simple glue ear (although some of the papers reviewed did include non-chronic OME without defined hearing loss).

The indications in Australia for myringotomy and insertion of ventilation tubes follows much of the American guidelines of otitis media with effusion (American Academy of Family Physicians 2004). This basically includes bilateral OME present for three months or more, with hearing loss or tympanic membrane changes or ossicular damage from the retracted tympanic membrane, or for recurrent ear infections.

In 1993, concern regarding the extent of myringotomy resulted in the NSW Health Department establishing a working party to develop evidence-based guidelines for the management of middle ear disease, with the aim of reducing the overuse of surgery (NSW Department of Health, 1993). The rate of myringotomy procedures decreased in NSW in each of the three years after the guidelines were disseminated, but six years on, the rates had almost reached the peak of the pre-guideline year (Rob et al, 2004). The data presented in the following tables is for area of usual residence.

Findings: The number of children aged less than 15 years living in NSW who had a myringotomy fell from 7,261 in 2002 to 6,754 in 2007, a reduction of seven per cent. Age standardised rates decreased from 530 per 100,000 in 2003 to 488 per 100,000 in 2005, but have since increased to 510 per 100,000 in 2007. There is substantial variation between area health services. Two areas, Northern Sydney Central Coast and South Eastern Sydney and Illawarra, have higher rates and these differences are statistically significant in most years. In Northern Sydney Central Coast, the rate was 816 per 100,000 children, more than three times the rate of 252 per 100,000 children in North Coast. North Coast has reduced intervention rates by over one-third (37 per cent) over the time period from 400 per 100,000 in 2003. Age standardised rates increase from 381 per 100,000 people aged less than 15 in the most disadvantaged group, to 864 in the least disadvantaged group. Age standardised rates are higher in major cities and inner regional areas than in more remote locations. Data on myringotomy rates for Aboriginal children is presented in the Aboriginal Chapter of this Chartbook.

Implications: The data for NSW show substantial variation between areas and a slight overall increase in rates of myringotomy since 2005. The reasons for variations between area health services and across socio-economic status are not known. Factors that have been suggested include variation in access to hearing tests for young children, that families living in more advantaged socio-economic regions are more proactive in seeking medical management, variations in health insurance and in access to private hospital options, variations in waiting times for surgery and variations in the use of day care facilities and the type of early childhood care used by parents. There is a need for further investigation of these factors.
Chart 11-57

Myringotomy rates

Myringotomy rate per 100,000 population, for people aged less than 15 years by area health service of usual residence, 2003–2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
Notes: Rates were standardised by using Australian Population as 30 June 2001
OTHER ACUTE SERVICES

Cataract and lens procedure rates

Why is this important? A cataract is a clouding that develops in the crystalline lens of the eye. Most are related to age, but can also be influenced by other factors. Cataracts usually grow slowly and do not impede vision until after a number of years have elapsed. Surgery is the only option for treatment once the lens has become opaque and vision is impaired. Surgery involves removal of the natural lens and replacement with an intraocular lens implant. Age-related cataract is the leading cause of blindness globally (Mehta et al, 2006), and cataract extraction accounts for the majority of ophthalmic procedures in Australia (McCarty et al, 2000). By the time people reach the age of 90 most will have developed cataracts and half will have had cataract surgery.

Phacoemulsification is the preferred technique for cataract extraction, resulting in better outcomes than previous techniques (Mehta et al, 2006), but the technology is moderately expensive. Cataract surgery is commonly undertaken as a day-procedure. It is safe and cost-effective and has an enormous impact on quality of life (Fedorowicz et al, 2005). Almost all operations are routinely done under some form of local anaesthetic (Rosha et al, 2006). The data presented in the table is for area of usual residence.

Findings: The number of hospitalisations due to lens and cataract procedures for those aged 65 and over living in NSW increased from 42,006 in 2001 to 51,576 in 2007 (23 per cent). The majority are performed in private hospitals and private day-procedure centres. In 2007, 69 per cent were performed in these private sector settings. In 2007, the rate of lens and cataract procedures was 5,469 per 100,000 people aged 65 years and over in NSW.

Age standardised rates of lens and cataract procedures varied significantly between area health services. The highest rate was for people living in North Coast (7,130 per 100,000 people aged 65 and over) and the lowest in Greater Southern (4,014). In contrast to previous trends, the rates have decreased Statewide in each of the past two years. This may reflect a change of location in treatment from hospital admission to treatment on a non-admitted basis, i.e., in day-procedure clinics, rather than a reduction in procedures performed.

In 2007, the rates of lens and cataract procedures decreased by 15 per cent in Sydney West compared to the previous year, and by 18 per cent in Greater Southern compared to 2005. The rates varied across regions—from 4,906 per 100,000 people aged 65 and over in major city regions, to 5,504 in inner-regional, 5,195 in outer-regional, 4,586 in remote and 2,796 in very remote locations.

Implications: Loss of vision is more of a problem than is usually recognised. When compared with people with normal vision, those with impaired vision have an increased risk of falls and hip fractures, depression, difficulties with activities of daily living and social functioning (Taylor and Keeffe, 2005).

Research data points to the exponential increase in vision loss with increasing age and the increasing ageing of the population will have a significant impact on the number of people with vision loss and blindness in NSW. Those with low vision and blindness are projected to almost double by 2024 (Taylor and Keeffe, 2005). Access to services for cataract surgery has an important part to play in preventing falls and improving quality of life for older people.
Chart 11-58

Cataract and lens procedure rates per 100,000 population for people aged 65 years and over by area health service of usual residence, 2003–2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health

Notes: Rates were standardised by using Australian Population as 30 June 2001
OTHER ACUTE SERVICES

Laminectomy rates

Why is this important? Laminectomy is a generic term used to describe the surgical procedure of gaining access to the spinal canal. The lamina of the vertebra is removed or trimmed to widen the spinal canal and create more space for the spinal nerves. The procedure is performed for the removal of tumours, to gain entry to the dural compartment, or to decompress the spinal cord or nerve roots at one, or several levels. A common reason for laminectomy is to remove a herniated intervertebral disc. Laminectomy is performed when conservative treatment is ineffective, nerve damage is becoming worse, or when the patient is suffering repeated attacks of leg or arm pain. Laminectomy for canal stenosis is primarily due to degenerative disease of the spine, and is the most common operation on the lumbar spine in older people. A Cochrane systematic review (Gibson and Waddell, 2005) concluded that most lumbar prolapses resolve naturally with conservative management and the passage of time. Surgical discectomy provides effective clinical relief for carefully selected patients with sciatica due to lumbar disc prolapse that fails to resolve with conservative management. There is limited evidence to support some aspects of surgical practice for degenerative lumbar spondylosis (degenerative disc disease). Most studies compare different surgical techniques, rather than addressing the more fundamental question of whether they provide effective relief of presenting symptoms (Gibson et al, 2005). Discectomy can provide faster relief from symptoms than conservative management, but long-term effects on underlying disc disease are unclear (Gibson et al, 2005).

Findings: In 2007, 769 people living in NSW had a laminectomy procedure, compared with 273 in 2001, an increase of 182 per cent. Age standardised rates increased from four to 11 per 100,000 people over the same time period (Chartbook 2007). Age standardised rates for major city regions are 8.4 per 100,000 people, compared with 3.4 for inner-regional, 3.0 for outer-regional, 3.5 for remote and 3.1 for very remote locations. The highest socio-economic group has a rate of 13.9 per 100,000 people, whereas the other four socio-economic groups range from 5.6 to 11.7 per 100,000. The data is notable for a rapid increase in the number of laminectomies in Sydney West. In 2007, Sydney West had a significantly higher rate (21 per 100,000 people) than the other seven area health services. The rate has doubled in just six years. Northern Sydney Central Coast has a high, but steady rate at around 13 per 100,000 people. In 2000–01, all area health services had an age-sex standardised rate in the range of two to six per 100,000 people (Chartbook 2007). By 2007 the range across area health services was three (Greater Southern) to 21 (Sydney West) per 100,000 people.

Implications: The increased rate of laminectomies indicates greater availability of this procedure. Surgical techniques and instrumentation continue to develop, increasing the range of options over the last decade. The increased variability in the rate between area health services in 2007, compared with 2001, may be due to many factors, including the availability of surgeons with the expertise to perform the procedure and variations in clinical practice. The data indicates that further investigation is warranted to identify the causes of this variation.

The data presented in the following tables is for area of usual residence.
Chart 11-59

Laminectomy procedure rates per 100,000 population by area health service of usual residence, 2003–2007

Laminectomy rates

Age and sex standardised rate per 100,000

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health

Notes: Rates were standardised by using Australian Population as 30 June 2001
OTHER ACUTE SERVICES
Waiting for booked treatment

**Why is this important?** Elective (or ‘booked’) patients are those who require non-emergency admission to hospital, where admission is required, but need not occur within 24 hours. Elective patients are placed on the hospital's booking (or waiting) list. Elective medical and surgical patients are categorised by clinical priority to ensure they receive care in a timely manner. The ‘urgent’ and ‘high priority’ patients (Category 1 & 2) are those, whose specialist/doctor has recommended that the admission should occur within 30 days. There are several measures of waiting time performance. They can be based on throughput in a given period or a ‘census’ that reflects the situation at a certain point in time. Those presented below are census measures, and include:

- The number of Category 1 & 2 patients who are ready-for-care and have waited longer than 30 days at 31 December
- The number of elective patients who are ready-for-care and have waited longer than one year at 31 December
- The average waiting time of elective patients who are ready-for-care at 31 December.

Better management of hospital services helps patients avoid excessive waits for elective treatment. Improved quality of life may be achieved more quickly, as well as patient satisfaction and community confidence in the healthcare system. Waiting for elective treatment is an important issue for patients and members of the public. Governments have challenged the healthcare system to improve performance. There have been various measures introduced in NSW Health in recent years designed to achieve improvements. They include The Predictable Surgery Program, announced in June 2005 and the Waiting Time and Elective Patient Management Policy (March 2006). Significant additional funds have also been provided to reduce the numbers of patients on the waiting list classified as ‘long-wait’ and ‘overdue’.

**Findings:** The number of Category 1 & 2 patients waiting longer than 30 days at 31 December 2007 was 158. This further continues the dramatic reduction that has been achieved since there were 3,919 on the list waiting more than 30 days at 31 December 2005. The number has fallen dramatically in all area health services. The number of ready-for-care patients in all categories waiting longer than one year at 31 December 2007 was 186. This represents a slight increase on the 75 patients waiting longer than one year at 30 June 2006, but is still a dramatic reduction from 3,889 at 30 June 2005 and 10,176 at 31 December 2004. Numbers waiting longer than 365 days have decreased substantially in all health services in the past two years.

The average waiting time at 31 December 2007 was 2.4 months. This was a further reduction from 31 December 2006, when the average was 2.5 months. As waiting time is calculated at the time surgery is performed, strategies that increase throughput of patients waiting beyond the acceptable maximum time will result in a temporary increase in the average waiting time. Average waiting times vary across area health services. Hospitals in North Coast have the highest average waiting times (3.3 months). The lowest are in Sydney West (1.9 months).

**Implications:** Implementation of a range of measures has contributed to significantly improved performance in waiting times for booked treatment. A major challenge will be to maintain this level of performance.
### Chart 11-60

**Waiting for booked treatment**

**Number of Medical and Surgical Overdue Patients as at End of the Year: C1 & C2 Waiting > 30 Days by Area Health Service of Treatment, 2003–2007**

<table>
<thead>
<tr>
<th>Area Health Service</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
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<tr>
<td>Children's Hospital Westmead</td>
<td>22</td>
<td>36</td>
<td>26</td>
<td>0</td>
<td>*</td>
</tr>
<tr>
<td>Sydney South West</td>
<td>869</td>
<td>1082</td>
<td>1110</td>
<td>155</td>
<td>18</td>
</tr>
<tr>
<td>South Eastern Sydney and Illawarra</td>
<td>800</td>
<td>1006</td>
<td>1030</td>
<td>38</td>
<td>8</td>
</tr>
<tr>
<td>Sydney West</td>
<td>471</td>
<td>680</td>
<td>607</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Northern Sydney Central Coast</td>
<td>172</td>
<td>183</td>
<td>116</td>
<td>93</td>
<td>9</td>
</tr>
<tr>
<td>Hunter New England</td>
<td>266</td>
<td>304</td>
<td>336</td>
<td>164</td>
<td>55</td>
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<tr>
<td>North Coast</td>
<td>562</td>
<td>950</td>
<td>597</td>
<td>21</td>
<td>62</td>
</tr>
<tr>
<td>Greater Southern</td>
<td>97</td>
<td>78</td>
<td>88</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Greater Western</td>
<td>32</td>
<td>66</td>
<td>9</td>
<td>*</td>
<td>0</td>
</tr>
<tr>
<td><strong>New South Wales</strong></td>
<td><strong>3291</strong></td>
<td><strong>4385</strong></td>
<td><strong>3919</strong></td>
<td><strong>482</strong></td>
<td><strong>158</strong></td>
</tr>
</tbody>
</table>

Source: Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health

Note: * Cell count of five or less are omitted
Chart 11-61

Waiting for booked treatment

Number of long-wait patients as at end of the year: Medical and surgical, ready-for-care patients waiting > 12 mths by area health service of treatment, 2003–2007

<table>
<thead>
<tr>
<th>Area Health Service</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children’s Hospital Westmead</td>
<td>115</td>
<td>113</td>
<td>45</td>
<td>0</td>
<td>*</td>
</tr>
<tr>
<td>Sydney South West</td>
<td>1448</td>
<td>2289</td>
<td>520</td>
<td>*</td>
<td>12</td>
</tr>
<tr>
<td>South Eastern Sydney and Illawarra</td>
<td>1412</td>
<td>2353</td>
<td>1111</td>
<td>6</td>
<td>*</td>
</tr>
<tr>
<td>Sydney West</td>
<td>939</td>
<td>1276</td>
<td>623</td>
<td>14</td>
<td>30</td>
</tr>
<tr>
<td>Northern Sydney Central Coast</td>
<td>708</td>
<td>1151</td>
<td>441</td>
<td>38</td>
<td>16</td>
</tr>
<tr>
<td>Hunter New England</td>
<td>442</td>
<td>624</td>
<td>276</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>North Coast</td>
<td>1220</td>
<td>1656</td>
<td>522</td>
<td>*</td>
<td>64</td>
</tr>
<tr>
<td>Greater Southern</td>
<td>372</td>
<td>419</td>
<td>205</td>
<td>*</td>
<td>19</td>
</tr>
<tr>
<td>Greater Western</td>
<td>422</td>
<td>295</td>
<td>146</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td>New South Wales</td>
<td>7078</td>
<td>10176</td>
<td>3889</td>
<td>75</td>
<td>186</td>
</tr>
</tbody>
</table>

Source: Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health
Note: * Cell count of five or less are omitted
Chart 11-62  Waiting for booked treatment

AVERAGE WAITING TIME (MONTHS) MEDICAL AND SURGICAL, READY-FOR-CARE ADMITTED PATIENTS, BY AREA HEALTH SERVICE OF TREATMENT, 2003–2007

Source: Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health

Notes: Confidence intervals are not calculated for this indicator.
OTHER ACUTE SERVICES
Day-of-surgery admission and day-only surgery

Why is this important? A challenge for modern healthcare systems is to ensure that resources available for healthcare are cost-effective. Efficient use of resources enables health services to maximise outcomes for patients and the broader community. Since the report of the NSW Health Council and the Government Action Plan for Health, several opportunities have been pursued to improve the efficiency with which surgery is delivered. These measures have been accelerated in recent years with the introduction of the Clinical Services Redesign Program. Two initiatives reflecting efficient use of surgery resources are day-of-surgery admission and day-only surgery rates. Where surgery is planned, it is typically unnecessary for the patient to be admitted to hospital until the day of the procedure. Achieving high rates of day-of-surgery however, requires effective systems to ensure that patients have been properly assessed and prepared before admission. The provision of day-only surgery is based on the premise that the majority of surgical care can be administered within a 24-hour period in a non-ward environment. Patients can be admitted, prepared for their surgical procedure, then monitored and provided with appropriate pain relief post-surgery before discharge. Day-only surgery is appropriate, safe and efficient for many procedures. The data presented here is the percentage of patients admitted and discharged on the same day.

Findings: In 2007, 91.5 per cent of NSW patients for planned surgery were admitted on the day, achieving the state benchmark of 90 per cent. This represents an increase from 87.8 per cent in 2005 and 77.0 per cent in 2001 (Chartbook 2007). Day-of-surgery rates vary across area health services, which may relate to variation in casemix, but most have rates of over 90 per cent in 2007 except Sydney West (88.4 per cent) and Children’s Hospital Westmead (88.6 per cent).

In 2007, 56.4 per cent of planned surgery cases were day-only. This represents a slight reduction from 58.3 per cent in 2003. This performance is below the benchmark rate of 60 per cent set by NSW Health for public hospitals. Rates vary across area health services although it is not clear whether they are impacted by the mix of patients across services. In general, rural area health services have higher rates of day-only surgery.

Implications: Day-of-surgery admission rates are high and have continued to increase over each of the last five years. Day-only surgery rates are impacted by the classification of patients as either admitted, or non-admitted. Overall, NSW hospitals tend to have a lower proportion of day-only admission compared to other States. A challenge will be to develop measures that control for variation in the mix of patients between hospitals and groups of hospitals.
Chart 11-63

Day-of-surgery admissions

Day-of-surgery admission: percentage of patients admitted to hospital and have surgery on the same day by area health service of treatment, 2003–2007

Source: Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health

Notes: Confidence intervals are not calculated for this indicator, as this is a population-based indicator.
Chart 11-64

Day-only-surgery

Day-only surgery: percentage of patients admitted and discharged on the same day by area health service of treatment, 2003–2007

Source: Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health
Chapter 12: Aboriginal Health

Introduction

**Impact:** Around 134,888 Aboriginal people live in NSW, comprising just over two per cent of the total population. In this respect, the CEC is using the enumeration of Aboriginal people in the 2006 Census. Life expectancy at birth for Aboriginal people is approximately 17 years below that of the total Australian population (AIHW, 2008). For the period 1996-2001, the life expectancy at birth was 59 years for Aboriginal males and 65 years for Aboriginal females. This compares with average life expectancy of 77 years for males and 82 years for females for the non-Aboriginal population (AIHW, 2008). The difference in mortality is especially pronounced between the ages of 35 and 54 years, where the Aboriginal death rates are five times higher (AIHW, 2008). The leading causes of death for Aboriginal people are the same as for non-Aboriginal people – cardiovascular disease and cancer. Aboriginal people are, however, more than twice as likely as non-Aboriginal people to die as a result of diabetes or from injuries (Population Health Division, 2006). The prevalence of chronic health conditions, standardised for age, is significantly higher for Aboriginal people. For example, Aboriginal people experience 3.4 times the prevalence of diabetes and 1.6 times the prevalence of asthma compared to total Australians (AIHW, 2008).

**Risk Factors:** The reasons for the poorer health status of Aboriginal people are multifactorial, an outcome of the interplay of social and physiological determinants of health. These include socio-economic, environmental, social, political and specific health risk factors, as well as relative lack of access to primary care (AIHW 2008). A range of data indicates that Aboriginal people are significantly disadvantaged compared to non-Aboriginal people in relation to a number of socio-economic indices, including lower income, higher rates of unemployment, lower educational achievement and lower rates of home ownership (AIHW, 2008). The socio-economic disadvantage experienced by Aboriginal people compared with non-Aboriginal people, compounded by a sense of reduced capacity for self-determination, places Aboriginal people at greater risk of exposure and vulnerability to health risk factors such as poor nutrition, low physical activity, smoking and alcohol misuse and other risk factors such as exposure to violence. For example, in NSW during 2002-05, Aboriginal people smoked at twice the rate of non-Aboriginal people, obesity rates in Aboriginal populations were significantly higher and nutrition was much poorer (NSW Health Department, 2006).

**Current Initiatives:** NSW Health is committed to working in partnership with Aboriginal people and other government departments to improve the health outcomes for Aboriginal people. Two Ways Together, the NSW Aboriginal Affairs Plan 2003-2012 (NSW Department of Aboriginal Affairs, 2004) adopts a whole-of-government approach to positively improve the lives of Aboriginal people in seven priority areas identified in consultation with Aboriginal communities of NSW. The priority areas are: health, education, economic development, justice, families and young people, culture and heritage, and housing and infrastructure. The focus of NSW Health is on the range of health programs, including maternal and child health, chronic care, health promotion, otitis media, oral health, mental health, drug and alcohol misuse, family violence, healthy housing and living practices and water and sewerage. This chapter presents a selection of indicators including timely initiation of antenatal care, and hospitalisation rates for asthma, chronic obstructive pulmonary disease and diabetes, for Aboriginal people.
ABORIGINAL HEALTH

Timely initiation of antenatal care

Why is this important? Antenatal care provides for the screening of asymptomatic pregnant women, with the aim of detecting, and thereby preventing, both maternal and neonatal adverse events. The purpose of antenatal care is to monitor the health of both the mother and baby, provide advice to promote their health, to identify antenatal complications, to identify and manage risk factors in pregnant women and their unborn children, in order to improve the chances of a healthy mother and child during pregnancy, birth, and early childhood. Antenatal care is recommended during the first trimester and throughout pregnancy. For this indicator, timely initiation is regarded as initiation of the first antenatal visit before 20 weeks of gestation. Earlier visits are primarily to assess maternal and foetal well-being, particularly the risk of complication, to date the pregnancy, take a comprehensive history, discuss smoking behaviour and establish care options. In 2006, 88.4 per cent of all mothers in NSW started antenatal care prior to 20 weeks gestation (page 102). The poor health of the Aboriginal population is well documented and is reflected in perinatal statistics, with rates of preterm birth, low birth weight and perinatal mortality remaining more than twice that of the non-Aboriginal population over the past decade (Panaretto et al, 2005). High quality antenatal care provides opportunities for risk factor intervention. Research has indicated that late antenatal attendance, maternal malnutrition and high rates of tobacco and alcohol use are associated with poor obstetric outcomes (De Costa, Child, 1996). Historically, Aboriginal women have been less likely to visit for antenatal care and check-ups due to a range of factors, such as access to transport, perceptions that pregnancy was seen as normal and women did not feel sick, or that hospital antenatal visits were seen to be intimidating (ABS, 1999) (See also introductory comments on page 102).

In recognition of the importance of providing Aboriginal mothers with continuity of care, including antenatal and postnatal care, NSW Health established the NSW Aboriginal Maternal and Infant Health Strategy (AMIHS) in 2000. This program operates in all area health services, ensuring the provision of a midwife and Aboriginal Health worker to all program participants. An evaluation of this program demonstrated excellent outcomes regarding reduced rates of premature births, increased access to antenatal care and increased breastfeeding rates (AHMAC, 2008). From 2007-08, additional funding was secured to increase the number of AMIHS sites from 14 to 31.5 across the State.

Findings: In 2002-2006, 75 per cent of Aboriginal mothers had started antenatal care prior to 20 weeks gestation. This represents a considerable improvement since 2002-2004, when the rate was 69.5 per cent and 1993-95 when it was 52.4 per cent (Population Health Division, 2006). Rates of timely initiation of antenatal care ranged from 65.8 per cent in Sydney South West to 89.2 per cent in Northern Sydney Central Coast.

Implications: Considerable improvement has been achieved by Aboriginal mothers in timely initiation of antenatal care. Further progress is required to increase this level of engagement to match the rate achieved for the total NSW population. The development of community-based services and culturally appropriate models of care have been important and remain a key factor in achieving greater levels of antenatal engagement.
**Chart 12-65**

**Aboriginal health: antenatal care**

Percent of women who have their first antenatal visit before 20 weeks of gestation for Aboriginal, all other and total population by Area Health Service of usual residence, 2002–2006

Source: NSW Midwives Data Collection (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
Why is this important? Asthma is a chronic inflammatory disorder of the airways that results in obstruction of airflow in response to specific triggers. In the general community the prevalence of asthma is now stable at around 14 to 16 per cent in children and just over 10 per cent in adults, which is high by international standards (Chartbook 2007). In NSW over the period 2002 to 2005, 16 per cent of Aboriginal people aged 16 years and over reported having current asthma, around 60 per cent higher than the rate for adults overall in 2005 (Population Health Division, 2006). Reported asthma prevalence was higher in Aboriginal people than in the general population across all age groups, but this difference was most marked in the 16-24 year age group and those aged 45 years and over. Among Aboriginal adults, the prevalence of asthma was twice as high in females (20.4 per cent) compared to males (11.8 per cent). Levels of current asthma were higher in urban areas (19.6 per cent) than in rural areas (13.5 per cent). In the general community hospitalisation rates have decreased since the early 1990s, but asthma remains an important reason for hospital admission (Population Health Division, 2006) (See also comments and chart on pages 90-91).

Findings: Over the period 2003-2007, 739 Aboriginal people aged between 5 and 34 years old were admitted to hospital in NSW with a primary diagnosis of asthma. This represents an age-sex adjusted rate of 165.4 admissions per 100,000 population, which is around one-third higher than the rate for the total NSW population (123.7 per 100,000 population). The number of asthma admissions for Aboriginal people increased by 39 per cent between 2003 and 2007.

Implications: The higher rate of hospital admissions for asthma for the Aboriginal population mirrors that for respiratory conditions in general, and may be due to many factors. These include environmental factors, availability of primary health care and accessibility of hospital services and the effectiveness of ongoing disease management, including the use of an asthma management plan.
Chart 12-66
Aboriginal health: asthma hospitalisations

Asthma hospitalisations rate per 100,000 population for people aged between 5 and 34 years for Aboriginal, all other and total population by area health service of usual residence, 2003–2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
ABORIGINAL HEALTH

Chronic obstructive pulmonary disease hospitalisations

Why is this important? Chronic respiratory diseases accounted for 8.9 per cent of the total burden of disease, measured in disability adjusted life years for the Aboriginal population in Australia (ABS, 2008). Chronic obstructive pulmonary disease (COPD) is a major public health problem resulting in significant morbidity and mortality. It is sometimes referred to as emphysema or chronic bronchitis. It is a progressive syndrome caused by chronic inflammation of the airways and lungs, usually due to smoking. COPD is a major health problem for Aboriginal people. Over the period 1993-94 to 2004-05 in NSW, age adjusted hospitalisation rates for chronic respiratory diseases for Aboriginal people were around three times higher than for non-Aboriginal people (Population Health Division, 2006). During this period the hospitalisation rate for Aboriginal people increased by 28 per cent, concurrent with a 16 per cent decrease in the rate of hospitalisation for the non-Aboriginal population. The increase in the rate for Aboriginal people reflects, at least in part, an improvement in the recording of Aboriginality in hospital data over this period (Population Health Division, 2006).

The 2004-05 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) found that half of the Aboriginal adult population in Australia were daily cigarette smokers (AIHW, 2008). A similar proportion of males (51 per cent) and females (49 per cent) were smokers, with the highest rates reported by those in the 25-44 years age group. Smoking is much more prevalent in the Aboriginal population, with Aboriginal adults more than twice as likely to be current smokers, after adjusting for age differences, than the general population. Respiratory problems were the most frequently managed problems at GP encounters, representing around 20 per cent of GP encounters with Aboriginal clients (ABS, 2008) (See also comments and chart on pages 92-93).

Findings: Over the period 2003-2007, 3016 Aboriginal people were admitted to hospital in NSW with a primary diagnosis of COPD. This represents an age-sex adjusted rate of 921.4 admissions per 100,000 population, which is over four times that for the total NSW population. It is significantly higher in the three non-metropolitan areas of Greater Western, Greater Southern and North Coast.

Implications: The significantly higher rate of COPD hospitalisation for the Aboriginal population is of concern, particularly as it is increasing at a time when that for the total NSW population is decreasing. Culturally appropriate health promotion and improved access to primary care interventions, such as patient education, self-management and smoking cessation are required to ameliorate the substantial gap in hospitalisation rates.

In 2007-08, NSW Health introduced ‘Smoke Check’ - an innovative training program delivered to Aboriginal Health workers and other health professionals aimed at giving them the cultural-specific skills and expertise they need to encourage and help their patients to quit smoking. A joint partnership with the Cancer Institute NSW, training is delivered by the Australian Centre for Health Promotion, University of Sydney (National Tobacco Strategy: Implementation by States and Territories 2004-2009).
Chart 12-67  Aboriginal health: Chronic obstructive pulmonary disease hospitalisations

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) ADMISSION RATE PER 100,000 POPULATION FOR ABORIGINAL, ALL OTHER AND TOTAL POPULATION BY AREA HEALTH SERVICE OF USUAL RESIDENCE, 2003–2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
Why is this important? As one of the most prevalent non-communicable diseases worldwide, diabetes has become one of the most challenging public health problems. This high rate of diabetes results in substantial morbidity and mortality, primarily from cardiovascular complications, eye and kidney diseases and limb amputations (Barr et al, 2005). Diabetes is a significant health problem for Aboriginal people in Australia. In 2003 diabetes accounted for 8.9 per cent of the total burden of disease, measured in disability adjusted life years for the Aboriginal population in Australia (ABS, 2008). Aboriginal people are more than twice as likely as non-Aboriginal people to die as a result of diabetes. While type 1 (early onset, insulin dependent) diabetes is rare among Aboriginal people, type 2 diabetes mellitus (later onset, non-insulin dependent) has a high prevalence among Aboriginal people. In NSW over the period 2002-2005, 10.5 per cent of Aboriginal people aged 16 years and over reported having diabetes or high blood sugar (Population Health Division, 2006). This compares with 7.6 per cent of the overall NSW adult population. The onset of diabetes occurs earlier among Aboriginal people. The prevalence of diabetes or high blood sugar increased with age from 4.5 per cent in the 16-24 year age group to 27.9 per cent in the 65 year and over age group. This compares with 3.0 and 16.8 per cent for the same age groups in the general population (Population Health Division, 2006). This earlier onset leads to a greater burden of illness associated with the complications of diabetes, including kidney damage, loss of vision, peripheral nerve damage and peripheral vascular disease (See also comments and chart on pages 96-97).

Findings: In 2007, in the total NSW population, the age and sex standardised rate of admissions to hospital with diabetes as the principal diagnosis was 310 per 100,000 people. By comparison, the rate for Aboriginal people was double that, with 805.5 diabetes hospitalisations per 100,000 people. The rate was highest in non-metropolitan area health services, ranging from 776 to 1240 per 100,000 for people in Hunter New England, North Coast, Greater Southern and Greater Western. It is notable that the hospitalisation rate for Aboriginal people is significantly higher than for the total NSW population, as compared to some of the metropolitan areas, where the rate is higher but not as proportionately higher.

The data shown in this chart is for diabetes as a principal diagnosis for hospital admission only. Diabetes is more frequently reported as an additional or associated diagnosis than as a principal diagnosis. Among the complications of, or conditions associated with, diabetes, are coronary heart disease, stroke, peripheral vascular disease, digestive diseases, cancer of the pancreas, retinopathy and kidney disease. In 2004-05, around 20 per cent of hospitalisations for Aboriginal people for care involving dialysis had diabetes as an associated diagnosis, compared with 5 per cent for other Australians (ABS, 2008).

Implications: These findings underscore the importance of focussing on chronic disease care and addressing the underlying, antecedent causes (i.e., obesity, physical inactivity, unhealthy diet) of type 2 diabetes in the Aboriginal community. From 2007-08, NSW Health significantly increased funding for the NSW Chronic Care for Aboriginal People strategy and the NSW Aboriginal Health Promotion Program.
Chart 12-68

Aboriginal Health: Diabetes hospitalisations

Diabetes hospitalisation rate per 100,000 population for Aboriginal, all other and total population by area health service of usual residence, 2003–2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health.
ABORIGINAL HEALTH

Myringotomy

Why is this important? Myringotomy is a surgical procedure in which a tiny incision is created in the ear drum to relieve pressure caused by excessive build-up of fluid in the middle ear (“glue ear”), or to drain pus. The procedure often includes the placement of tubes (grommets) to keep the eardrum open and allow fluid caught behind the eardrum to drain out. Myringotomy and insertion of grommets is commonly used to improve the hearing of children with otitis media with effusion (OME). OME (middle ear infection) is a common condition in childhood following an upper respiratory tract infection, and for most, it is a transient problem. Repetitive unresolved episodes of otitis media can lead to perforations of the ear drum and hearing loss. The latter can have a lifelong impact as it affects speech and language development which can negatively impact on educational attainment. The World Health Organization has indicated that a prevalence rate of greater than four percent for OME is indicative of a massive public health problem requiring urgent attention (WHO, 1996). A study conducted in 2001 found that the rate was ten times this proportion of children in many Aboriginal communities (Coates et al, 2002). These results may not be able to be generalised to the Aboriginal population in NSW. Often Aboriginal children experience a vicious cycle that may persist throughout childhood, of early exposure, persistent bacterial colonisation and chronic mucosal disease. A systematic review of existing evidence and primary care guidelines for the management of otitis media in Aboriginal and Torres Strait Islander people identified effective primary prevention strategies, including improved nutrition and the home environment, increasing breastfeeding and reducing passive smoking (Couzos et al, 2001) (See also comments and chart on pages 134-135).

Findings: Over the five years from 2003 to 2007, 1201 Aboriginal children aged less than 15 years had a myringotomy procedure in NSW, an age and sex standardised rate of 372 per 100,000 children. This is lower than the rate of 516 per 100,000 in the total NSW population aged less than 15 years.

Implications: Although hospitalisation rates for myringotomy are lower for Aboriginal children, the prevalence of otitis media in Aboriginal communities, notably in non-metropolitan areas, is significantly higher, with more severe impacts (Population Health Division, 2006). This may be due to reduced access to treatment services for Aboriginal families. The NSW Health Otitis Media Screening Program for 0-6 years old Aboriginal children was introduced in 2004-05 and provided approximately 60,000 free otitis media checks in the four years to 2007-08. The program focused on early detection, treatment and management of otitis media, as well as community education and awareness. An independent evaluation of the program in 2008 identified the need for change from near-universal screening to a comprehensive public health approach to the problem of otitis media and hearing loss in young Aboriginal children, including incorporation of screening into existing health programs for children. NSW Health has convened an expert advisory committee to provide advice on implementation of the evaluation recommendations and to assist in the development of performance indicators for a broad public health approach to addressing otitis media.
Chart 12-69

Aboriginal Health: Myringotomy procedures

Myringotomy rate per 100,000 population, for people aged less than 15 years for Aboriginal, all other and total population by area health service of usual residence, 2003–2007

Source: NSW Admitted Patient Data Collection and ABS population estimates (HOIST). Centre for Epidemiology and Research, NSW Department of Health
Chapter 13: Mental Health Services

Introduction

Impact/ Burden of Disease: Mental health problems and illnesses affect the perceptions, emotions, behaviour and resulting well-being of individuals. There are numerous types of mental illnesses, with varying degrees of severity. These include anxiety, depression, bipolar disorders and schizophrenia. Mental illness is one of the leading causes of non-fatal burden of disease and injury in Australia. Mental health problems are also associated with higher rates of health risk factors, poorer physical health, and higher rates of deaths from many causes, including suicide (Population Health Division, 2006). Mental illness is estimated to account for 13 per cent of the disease burden in Australia in 2003, with anxiety and depression, alcohol abuse and personality disorders accounting for almost three-quarters of this burden. Only seven per cent of the burden from mental disorders is due to mortality, most of which is accounted for by fatal outcomes associated with substance abuse (Begg et al, 2007). In 2005-06, there were approximately 1.1 million people who experienced a mental illness in NSW (NSW Department of Health, 2006c). The 2007-08 national household survey of mental health has indicated that only 35 per cent of those who experience mental health problems receive any professional help (ABS, 2008). Alongside clinical care, mental health initiatives in NSW are focused on promotion, prevention and early intervention strategies. Improving mental health services is a priority in NSW, as indicated in the Interagency Action Plan for Better Mental Health (2005). It aims to improve the responsiveness and co-ordination of relevant supports from government services to enhance the mental health outcomes of people at risk of, or affected by, mental illness. NSW: Future Direction for Mental Health was released in 2006 as a five-year plan designed to boost efforts in a range of programs across government, comprising prevention, promotion and early intervention.

Causal Factors: There is a broad range of biological, genetic and environmental (psycho-social) factors whose interplay may create vulnerability to various forms of mental illness. Additional environmental exposures, such as frequent or ongoing social stress and/or isolation during childhood and drug abuse, further increase the triggers for onset of conditions such as psychosis and schizophrenia.

Effective Treatments: Effective therapies for mental health conditions include antidepressant medication and counselling therapies, such as cognitive behaviour therapy. In Australia the Australian and New Zealand clinical practice guidelines for the management and treatment of depression were developed by the Royal Australian and New Zealand College of Psychiatrists (RANZCP) for depression and funded under the National Mental Health Strategy (Australia) and the New Zealand Ministry of Health (RANZCP, 2004). They is similar to guidelines developed in other countries, e.g. in the UK, the NHS’ National Institute for Clinical Excellence (NICE) guidelines for Management of depression in primary and secondary care. These guidelines have shown that psychological interventions, such as cognitive behaviour therapy and interpersonal therapy, are clinically effective and cost-effective (NICE, 2004).

To determine whether mental health services’ quality and safety is improving, there is a need to measure them to track progress. To this end, the NSW Department of Health has been involved in inter-jurisdictional work under the 3rd National Mental Health Plan which aims to establish a core set of national, sustainable mental health and well-being indicators. These indicators provide a way of monitoring the state of mental health services in NSW and allow national comparisons.

Of the three mental health indicators in this Chartbook, two are included that have been agreed under the National Mental Health Performance Framework. These are self-sufficiency and re-admissions. The third is a measure of performance in the emergency admission of mental health patients.
MENTAL HEALTH SERVICES
Regional self-sufficiency for mental health services

Why is this important? This indicator measures the self-sufficiency of each area health service in providing inpatient mental health care to its local residents and is a National Mental Health Key Performance Indicator. People are mobile and sometimes present to hospitals outside their area. Local access to services has been a key principle underpinning mental health reforms nationally over many years and is a proposed performance indicator for use in Australia’s public sector mental health services (NMHWG, 2005). The principles on which the original area health services were created were that each area should be capable of meeting the majority of the health care needs of its resident population and be expected to meet an acceptable level of self-sufficiency in providing a full range of health services, including mental health. Local access minimises dislocation of the patient from family and local support. Admission of residents from other area health services may occur for several reasons. For example, specialist units exist at a limited number of locations - providing non-acute care, neuropsychiatry or intensive psychiatric care and they may have network or referral arrangements with other area health services. In general, however, the principle when planning mental health services, such as used in the NSW Health Mental Health Clinical Care and Prevention Service Planning Model (MH-CCP), is that area health services should be self-sufficient in the provision of primary and secondary level mental health services. Some level of residual flow for specialised acute services might remain (NSW Department of Health, 2001).

Findings: The data shows a consistently high level of self-sufficiency for mental health inpatient care across all area health services over the time period 2003 to 2007. The overall self-sufficiency for NSW in 2007 was 93 per cent. In 2007, all area health services provided a minimum of 91 per cent to maximum of 96 per cent self-sufficiency for inpatient mental health care. Notably, Greater Western increased its self-sufficiency from 88 per cent in 2005 to 94 per cent in 2007, primarily as a result of the opening of a new acute mental health inpatient unit at Dubbo Base Hospital on 18 August 2005.

Implications: The consistently high level of self-sufficiency needs to be maintained to ensure ease of access and minimal dislocation of patients from family and other support. It is important to note, however, that most area health services are geographically large and this measure does not capture flows within areas, which may result in some patient dislocation. Future consideration could be given to the development of measures of access to public sector community mental health care for both residential and ambulatory services (NMHWG, 2005). An example may be population coverage, i.e., the percentage of a area health service’s population accessing care.
Chart 13-70

**Regional self-sufficiency for Mental Health Services**

**Self-sufficiency in providing inpatient mental health care to its own residents, by area health service of usual residence, 2003–2007**

<table>
<thead>
<tr>
<th>Year</th>
<th>Sydney South West</th>
<th>South Eastern Sydney and Illawarra</th>
<th>Sydney West</th>
<th>Northern Central Coast</th>
<th>Hunter New England</th>
<th>North Coast</th>
<th>Greater Southern</th>
<th>Greater Western</th>
<th>NSW</th>
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<td>95</td>
<td>93</td>
<td>93</td>
<td>93</td>
</tr>
</tbody>
</table>

Source: InforMH, Centre for Mental Health, NSW Department of Health
MENTAL HEALTH SERVICES
Re-admissions for mental health patients

Why is this important? High levels of unplanned overnight re-admissions following recent inpatient treatment are a potential reflection of deficiencies in treatment and/or follow-up care, including by primary care and community-based services (NMHWG, 2005). This is a National Mental Health Key Performance Indicator. Re-admission to hospital within 28 days reflects the effectiveness of both inpatient care and post-discharge community care. Not all re-admissions are inappropriate. Mental health services deal with chronic and fluctuating illnesses and some re-admissions may reflect appropriate response to new exacerbations of illness, or rehospitalisation after reasonable and assertive attempts at community care. According to the Canadian Institute for Health Information (CIHI, 2006), hospital re-admission has been analysed in the context of availability of outpatient services and discharge planning (Nelson et al, 2000), community treatment orders (Burgess et al, 2006; Kisely et al, 2005) and the adequacy of services provided to patients (Appleby et al, 1993). From a patient perspective, re-admissions have been linked to a lack of compliance with prescribed medications, alcohol and drug use (Haywood et al, 1995), co-morbid personality disorders (Bobo et al, 2004) and inadequacy of social supports (Dyck et al, 2002). This indicator is currently an Australian Council on Healthcare Standards (ACHS) clinical indicator.

Findings: The data shows the percentage of separations from NSW acute mental health units that result in unplanned overnight re-admission for any condition to a mental health facility within 28 days of discharge. In line with national definitions, this indicator now covers both acute and non-acute units, and captures re-admissions to other hospitals as well as to the same unit. This data has been collected utilising the new State Unique Patient Identifier (SUPI). Across NSW the trend over 2003–2007 is steady at around 15 per cent of separations from mental health units. Across area health services there is variation from 13 to 19 per cent in 2007. Greater Western had a substantially higher rate of 23 per cent re-admissions in 2006, which has decreased to 19 per cent in 2007. The apparent high rate in Greater Western is largely a statistical artefact caused by the implementation of a new patient administration system which resulted in the discharge and re-admission of all inpatients at the Bloomfield Psychiatric Hospital. Other studies suggest that risk of re-admission increases with age and longer initial general hospital stay (CIHI, 2006). The provisional threshold for unplanned re-admissions recommended by the Australian Council on Healthcare Standards (ACHS) and the Royal Australian and New Zealand College of Psychiatrists (RANZCP) is 10 per cent (ACHS, 1998, Pirkis et al, 1999).

Implications: The aim of psychiatric inpatient services is to provide treatment that enables people to return to the community as soon as possible. Unplanned admissions to a psychiatric facility following recent discharge are a potential indication of incomplete or ineffective treatment. It is also a reflection of the adequacy of follow-up care to support people who return to living in the community after being admitted to a mental health acute facility. The NSW Government is implementing strategies to enhance the planning, co-ordination and delivery of support to patients when they are discharged from a mental health acute facility (NSW Department of Health, 2006c).
Chart 13-71

Mental Health readmission within 28 days

Percentage of overnight re-admissions (within 28 days) for mental health patients to the same hospital, by area health service of usual residence, 2003–2007

Source: InforMH, Centre for Mental Health, NSW Department of Health
MENTAL HEALTH SERVICES
Emergency admission performance for mental health patients

**Why is this important?** Emergency admission performance for mental health units is defined as the percentage of persons admitted to a designated mental health unit in the same facility after a wait of less than, or equal to, eight hours within the emergency department (i.e., time from initial emergency department arrival to departure from the emergency department). The indicator does not include people admitted directly to mental health units or transferred for admission in other facilities. Expediting the transfer of mental health patients from the emergency department to the specialised care provided in a designated mental health bed is important. It reduces the delay in the provision of specialised care. The emergency department environment is not an ideal one for the treatment of mental health conditions. The NSW health system has a Statewide target that 80 per cent of persons being admitted to hospital via the emergency department spend no longer than eight hours in the ED. Delays in admitting mental health patients from the ED to specialist mental health beds have been greater within metropolitan Sydney than rural areas, although some major rural centres, such as Lismore and Wagga Wagga, have also experienced significant service pressures. A major impact in reducing waiting times was achieved between 2005 and 2007 with several initiatives, including the opening of Psychiatric Emergency Care (PECC) Units adjacent to emergency departments in seven hospitals (St Vincent’s, St George, Wollongong, Liverpool, Nepean, Hornsby and Wyong).

**Findings:** In 2005, 68 per cent of mental health admissions from emergency departments in NSW occurred within eight hours. Performance has improved to 76 per cent in 2007, but is still below the target of 80 per cent. In three of the four non-metropolitan area health services, performance was 85 per cent or better in 2007. All area health services performed at 75 per cent or higher, with the exception of Sydney South West where only 62 per cent of mental health emergency presentations were admitted to a mental health bed within eight hours. North Coast performance has deteriorated over the reference period, with 72 per cent of mental health admissions occurring within eight hours in 2007, down from 95 per cent in 2003. The deterioration in access performance is attributable to the increasing volume of mental health presentations and the area’s relatively low number of mental health beds, compared with its estimated need. Access performance has improved in all four metropolitan areas over the past three years, with significant improvement in both Sydney West and Sydney South West. This is attributable to many factors, including the opening of the PECC units, opening of additional acute and non-acute mental health beds, the enhanced provision of mental health consultation liaison services in emergency departments and ongoing clinical redesign processes.

**Implications:** Mental health presentations within NSW emergency departments are increasing in line with the general upward trend in presentations of around 4.5 per cent per annum over the past four years. This is placing greater demand on specialist mental health capacity, including inpatient beds and workforce. Ongoing improvement in systems and capacity is required to maintain and improve current performance in the timely admission of emergency mental health patients to specialist mental health units.
Emergency admission performance for Mental Health patients

**Percentage of Mental Health Presentations Admitted to a Designated Mental Health Unit in the Same Facility After a Wait Less Than or Equal to Eight Hours by Area Health Service of Usual Residence, 2003–2007**

Source: InforMH, Centre for Mental Health, NSW Department of Health
Chapter 14: Ambulance Services

Introduction

About Ambulance: The Ambulance Service of New South Wales (Ambulance) is an integral part of the New South Wales health system and one of the largest ambulance services in the world. It is committed to providing high quality clinical care and health related transport services to 6.89 million people in NSW, distributed across an area of 801,600 square kilometres. In 2007-08 Ambulance provided over 1,118,000 total responses (both emergency and non-emergency), equivalent to a call for assistance every 28 seconds. This represents an increase of 5.9 per cent compared to 2006-07. The workload of Ambulance is increasing, with the Service recording a 21.3 per cent increase in demand for ambulance services since 2002.

Emergency Operations: Responding to triple zero calls and providing emergency medical assistance is Ambulance’s primary responsibility. Teams of paramedics provide pre-hospital care, medical retrieval and health related transport.

There are also special operational units including aeromedical and medical retrieval services (including doctors and nurses, counter disaster, specialised operations, rapid response, rescue, snow and special casualty access teams assist in providing emergency responses.

Staff and Operations Centres: Ambulance currently employs over 3,700 staff, operates from 266 different locations across the state, and maintains over 800 ambulances, 300 support vehicles, four fixed wing aircraft and tasks nine helicopters.

Ambulance has four operations centres which receive emergency triple 000 and non-emergency telephone requests for ambulance services. Operations centres are located in Sydney, Newcastle, Wollongong and Dubbo and coordinate ambulances within their respective geographic area. There is also an Aeromedical Operations Centre, located in Sydney, which coordinates both urgent and routine aeroplane and helicopter transfers within NSW.

Operations centre personnel use sophisticated software to prioritise calls based on information from the caller. They then assign the most appropriate ambulance vehicle utilising GPS tracking technology.

Details of emergency and non-emergency calls are transmitted to a mobile data terminal located in the front cabin of the ambulance. This provides paramedics with relevant patient information before they reach their destination.

Stations: The 266 ambulance stations throughout the State are located within four separate divisions. Each Division is responsible for service delivery, administrative and business support functions, while the operation centres coordinate all resources in their particular geographical areas.

Challenges: The major challenges facing Ambulance are similar to those facing health generally, such as the ageing population and an anticipated increase in chronic illness. Ambulance is working closely with other healthcare providers to use new treatments, technology and paramedic skills to provide the best possible care for patients.

Increasing use of emergency ambulances for non-emergency inter-hospital movements decreases emergency cover which in turn increases the time to respond to emergencies.

Additional information, along with maps of the divisions and station sites can be found at http://www.ambulance.nsw.gov.au.
AMBULANCE SERVICES

Ambulance Cardiac Emergency Responsiveness

Why is this important? The rapid responsiveness of ambulance services to potentially life-threatening cases is critical in the success of patient outcomes. Of the three main emergency conditions attended by Ambulance (cardiac, stroke and major trauma) this chapter examines data for Ambulance cardiac responsiveness times. The six stages of high quality pre-hospital care have been described as early detection, early reporting, early response, appropriate on-scene care, care in transit and transfer to definitive care.

Optimal ambulance responsiveness is considered to comprise around ten minutes or less of this period (reference). Ambulance collects response time data via the Computer Aided Dispatch (CAD) system, introduced in 1999. Ambulance also collects data for six key time periods and regional (four Ambulance Divisions) performance for these is presented in the attached charts. The six categories of responsiveness are:

- Average activation time (ACT) – the time between a call being recorded and a vehicle assigned
- Average turn out time (TUR) – the time between a call being recorded and the vehicle being en route
- Average travel time (TRV) – the time between a call being recorded and arrival of the vehicle at scene
- Average scene time (SCE) – the time from arrival at scene to depart scene
- Average transport time (TRS) – the time from depart scene to arrival at hospital or destination

The four Ambulance divisions for NSW are Northern, Southern, Western and Sydney. These divisions do not align with the eight area health services. Data are presented in the accompanying charts for both "emergency" (coded as 1A, 1B or 1C) immediate response under lights and sirens – incident is life threatening. In 2005 a new system for directing ambulances to the nearest and most appropriate emergency department including the use of a hospital clinical services matrix and hospital diversion thresholds and Ambulance status board was introduced.

Findings: The time interval, from recording a call for ambulance assistance to when an ambulance arrives at the scene, is known as Response Time. In 2007-08, the average ambulance response time in NSW for emergency cardiac cases was 683 seconds, or 11.4 minutes. Response time across the four divisions ranged from 10.5 minutes in Sydney Division to 12.7 minutes in Northern Division. This is reflective of the variety of operational environments in which Ambulance provides emergency care. The rural operations contend with a large proportion of the workload occurring after normal roster hours, which involves the turn out of on call crews. Likewise, a large proportion of emergency workload in remote communities occurs within the town limits.

Average time on scene time for 2007-08 was fairly consistent across the four divisions, averaging 15 minutes across NSW. Average transport time varied between 9.4 minutes in Western, Division to 16.7 minutes in Northern Division, with a Statewide average of 14.1 minutes. The response times for emergency cardiac cases are stable over time without substantial fluctuation between years.

Implications: Ambulance responsiveness for cardiac emergency cases in NSW showed a good performance for a service with divisions covering both broad geographic areas and congested road arteries such as those in the Sydney metropolitan area.
Chart 14-73
Ambulance: average cardiac emergency responsiveness

Average ambulance cardiac emergency case cycle times (in minutes) by emergency or medical categories and NSW ambulance operational divisions, 2006-07 – 2007-08

Source: Ambulance Service of New South Wales. “Emergency” (coded as 1ABC) immediate response under lights and sirens – incident is life threatening.

Note: (ACT = activation time; TUR = turn out; TRV = travel time; SCE = scene time; and TRS = transport time. These are further defined overleaf.)
AMBULANCE SERVICES
Ambulance Response Times Definitions and Performance Time Intervals

Call Answer: The point of time the first keystroke is undertaken.

Call Recorded: The point of time that sufficient details are recorded (i.e., location of incident and type of incident) and details are sent to dispatch for action.

Call Complete: The point of time all details are recorded and the call is terminated.

Vehicle Assigned: The point of time when an ambulance crew is alerted to respond to an incident.

Vehicle Responding: The point of time when the ambulance crew acknowledges and responds to an incident.

Arrive at Scene: The point of time when an ambulance crew arrives at the location of the incident.

Depart Scene: The point of time when the ambulance crew departs the incident location and undertakes transport.

Arrive Hospital/Destination: The point of time when an ambulance crew arrives at a health facility or other patient destination point.

Off Stretcher Time: The point of time when an ambulance crew transfers a patient onto a hospital bed and hands over the care of the patient to the Emergency Department.

Incident Complete: The point of time when an ambulance crew completes an incident and is ready to respond to further incidents. (Note: This time point will vary depending upon transport or non-transport circumstances)

Pick Up/Appointment Time: The time of requested or promised pick up of patient and time of patient’s appointment.
## AMBULANCE SERVICES

### Ambulance Performance Time Intervals

#### Emergency Cases
- **Call Response Time**: Time from Call Answer to Call Entered Queue
- **Call Taking Time**: Time from Call Answer to Call Closed
- **Activation Time**: Time from Call Recorded to Vehicle Assigned
- **Turnout Time**: Time from Vehicle Assigned to Vehicle Enroute
- **Mobilisation Time**: Time from Call Recorded to Vehicle Enroute
- **Travel Time**: Time from Vehicle Enroute to Arrive at Scene
- **Response Time**: Time from Call Recorded to Arrive at Scene
- **Scene Time**: Time from Arrive at Scene to Depart Scene
- **Transport Time**: Time from Depart Scene to Arrive Hospital/Destination
- **Off Stretcher Time**: Time from Arrive Hospital to Delayed Available
- **Turn Around Time**: Time from Arrive Hospital to Case Cleared
- **Case Cycle Time**: Time from Call Recorded to Clear Case

#### Non Emergency Cases
- **Call Taking Time**: Time from Call Answer to Call Closed
- **Travel Time**: Time from Vehicle Enroute to Arrive at Scene
- **Pick Up Time Response**: Time from Pick Up/ Appointment Time and Arrive at Scene
- **Scene Time**: Time from Arrive at Scene to Depart Scene
- **Transport Time**: Time from Depart Scene to Arrive Destination
- **Appointment Time Response**: Time from Pick Up/ Appointment Time to Arrive Destination
- **Turn Around Time**: Time from Arrive Destination to Case Cleared
- **Case Cycle Time**: Time from Vehicle Assigned to Clear Case
Chapter 15: Initiatives In Safety And Quality

Introduction

In NSW the Patient Safety and Clinical Quality Program (PSCQP) was established in 2004, following the Inquiry into Campbelltown and Camden hospitals (Walker, 2004). The cornerstones of the PSCQP are:

- A standardised system for managing, reporting and investigating incidents to ensure risks are identified and steps are taken to prevent recurrence of incidents
- An electronic incident information management system (IIMS) to support centralised reporting and recording of incidents
- Establishment of clinical governance units in each area health service
- Development of a quality systems assessment (QSA) framework
- Establishment of the Clinical Excellence Commission (replacing the Institute for Clinical Excellence) to support and promote systemic improvements.

The measurement and reporting of patient safety and clinical quality indicators is a key component of a quality health system. Commissioner Garling stated in his recent review of acute care services in NSW public hospitals that

“Public reporting of information about the health system and hospital performance...is the single most important driver for the creation of public confidence in the health system, engagement of clinicians, improvement and enhancement of clinical practice and cost-efficiency.” (Garling, 2008).

This viewpoint is supported by international evidence which indicates that the disclosure of quality information results in hospitals and clinicians reviewing their own performance in their own environment and making decisions to improve outcomes in comparison with reliable benchmarks (Marshall MN, 2002).

The Chartbook on Safety and Quality in Healthcare in NSW represents a key initiative of the Clinical Excellence Commission in the presentation of clinical indicators in a variety of specific specialty areas. Chartbook 2008 has been enhanced with the inclusion of a small set of hospital-wide indicators of safety and quality. The Clinical Excellence Commission has taken a lead role in promoting the collection and reporting of hospital-wide indicators in areas where international evidence has identified the highest vulnerabilities and/or the greatest potential for health gain. These include healthcare acquired infections, management of the deteriorating patient, medication safety and effective use of blood products. As with the more specific specialty-level clinical indicators, these hospital-wide measures will highlight issues that require further investigation to accurately diagnose the nature of the problems and commitment to implement changes to address them.

Data presented in this chapter are: notification of clinical incidents within the Incident Information Management System (IIMS), safety and quality indicators for intensive care units, data on healthcare acquired infections and safety practices and effective and efficient use of blood products.
INITIATIVES IN SAFETY AND QUALITY

IIMS notifications: Strengthening the learning and reporting culture in healthcare

Why is this important? The Incident Information Management System (IIMS) was established in 2005 as a key component of the NSW Patient Safety and Clinical Quality Program. Gathering information on all incidents that might affect patient safety, whether or not harm occurred, enables contributory factors to be analysed and system-wide lessons learned. All NSW Health staff are responsible for notifying all incidents, near-misses and complaints, using IIMS. Each incident notified in IIMS requires an investigation, in accordance with the level of risk it presents. The Severity Assessment Code (SAC) is used to rate incidents by assessing the consequences of the incident and the likelihood of it occurring again. Of the four ratings, SAC1 is the most serious:

- Clinical SAC1 incidents must be reported to the Department of Health within 24 hours and are investigated using root cause analysis (RCA). This category includes the unexpected death of patients, suspected suicide of mental health patients and procedures involving the wrong patient or body part.
- SAC2 incidents require investigation at the area health service level.
- SAC3 and SAC4 require local action, including assigning management responsibility.

Area health services are responsible for ensuring monitoring and risk rating of all incidents. The Clinical Excellence Commission is responsible for reviewing trends in incidents and providing information on clinical risks. This information also informs Statewide projects aimed at improving the safety and quality of clinical care. The NSW Health Department oversees SAC1 incidents, develops Statewide policies and strategies and disseminates lessons learned from incident management.

Findings: The number of IIMS notifications has increased each six-monthly period since the system was established in July 2005. As the majority of incidents are reported by hospitals, the volume of notifications has been converted to a rate by relating the number of notifications to the volume of hospital separations in the accompanying chart. There were 58,573 clinical incident notifications made between January and June 2008, of which 281 were classified as SAC1. During this period 13,586,959 patients attended outpatient services, 1,187,512 attended emergency departments and 732,274 were hospital inpatients within the NSW health system.* SAC1 incidents continue to comprise well under one per cent of all notifications made (CEC, 2008). The increase in notifications has consistently been among events classified as SAC3 and SAC4, where there has been minimal or no harm to the patient, but where staff have identified risk. The increase in notifications indicates that staff are increasingly aware of safety issues and are comfortable with notifying them.

There is substantial variation in IIMS reporting rates. At the high end, Northern Sydney Central Coast is reporting around 11 clinical incidents per 100 separations, compared to around 6 per 100 in the other three metropolitan area health services. High-reliability organisations (those with the best safety records) recognise the importance of no-blame incident reporting systems as a method of learning about the types of errors which may occur. This enables systems to be put in place to mitigate the risk of these errors recurring. (Reason, 2000). In health, a high rate of reporting is a positive situation and may suggest that staff are more vigilant in identifying anything that may constitute a risk to patient safety.

Implications: The increase in the notification rate for clinical incidents suggests that staff confidence in the system is improving and the culture of safety is becoming more robust. The compilation and review of data on the underlying themes and trends will enable the identification of local or system-wide safety and clinical quality issues. Analysis of these issues and contributing factors provides the opportunity to improve the management in the environment where they occurred. Where appropriate, lessons learned are used to develop and inform projects at a Statewide level. This process cultivates system-wide learning and drives quality improvement at both local and strategic levels.

The NSW healthcare system must continue to report regularly, report serious incidents quickly and work together to make reporting matter. A high reporting rate indicates a stronger reporting and learning culture.

* NSW Emergency Department Data Collection, Demand and Performance Evaluation Branch, NSW Health System Performance, NSW Department of Health.
Chart 15-74

Rate of IIMS notifications by SAC classification per 100 separations by area health services of treatment, 2005-06–2007-08

Source: Incident Information Management System (IIMS), Clinical Excellence Commission and Department of Health NSW
Chart 15-75

Relative rate of IIMS notifications by SAC classification per 100 separations by Area Health Services of Treatment, 2005-06 – 2007-08

Source: Incident Information Management System (IIMS), Clinical Excellence Commission and Department of Health NSW
INITIATIVES IN SAFETY AND QUALITY

Hand Hygiene Compliance

Why is this important? Hand hygiene is well recognised as the single most important strategy to reduce the spread of harmful infectious agents to patients in hospitals. This issue is one with which every state in Australia and many countries internationally, are grappling with. The importance of hand hygiene was first recognised by scientists in the 1840s and was confirmed by the work of Florence Nightingale in improving survival rates for soldiers injured in the Crimean War in 1854.

Nowadays, infections with Multi-Resistant Organisms (MROs) can cause serious illness and avoidable deaths in hospital patients in Australia and these germs are often inadvertently transmitted on the hands of healthcare workers. Significant savings are possible in the form of reduced morbidity and mortality, reduced length of stay and reduced costs associated with hospitalisation for individual patients, the community and the health system if MROs are adequately controlled and prevented where possible.

In October 2005, the World Health Organization (WHO) launched the first Global Patient Safety Challenge "Clean Care is Safer Care". During 2006 – 2007 the Clinical Excellence Commission in partnership with the NSW Health Department conducted a statewide campaign to improve compliance with hand hygiene. During this campaign the hand hygiene practices of clinical and other staff were observed in a systematic fashion in hospitals across the state. Compliance rates were re-audited in July 2008 to measure how well the changes in hand hygiene during the campaign were sustained.

Findings: Compliance with hand hygiene varied according to professional group. While nursing staff had the most opportunities they also had the highest compliance, medical staff was poor overall, a phenomenon recorded worldwide.

Area health services reported between 39.1 per cent and 85.2 per cent hand hygiene compliance. Of nine area health services submitting data in July 2008, six area health services reported lower levels of hand hygiene compliance since February 2007. Most notably three area health services reported an approximately 30 per cent decline in hand hygiene compliance. North Coast reported the lowest overall hand hygiene compliance (39.1 per cent), closely followed by Northern Sydney Central Coast (39.3 per cent). The Children’s Hospital at Westmead reported the greatest improvement in hand hygiene compliance between February 2007 (51.0 per cent) and July 2008 (85.2 per cent).

The Children’s Hospital at Westmead have continued to implement the hand hygiene audits after the completion of the Clean Hands Saves Lives Campaign. Comprehensive and contemporaneous feedback was provided to all staff through various media, enabling regular monitoring of ward performance and additionally instilled a recognition and reward process for high performing areas. Furthermore the area health service reported eight consecutive months with hand hygiene compliance over 80 per cent.

Implications: Further work to continue improvements in hand hygiene compliance will be to embed hand hygiene into policy, ensuring regular auditing of compliance and feedback, data driven education and mandatory alcohol hand rub at patient bedside.
Chart 15-76  
Hand Hygiene compliance: Nurses’ hand washing before patient contact

Percentage of hand hygiene compliance before patient contact by nurses and area health services of treatment: Pre-campaign, August 2006–July 2008

Source: Hand Hygiene Data, Clinical Excellence Commission and Department of Health NSW
Chart 15.77  
Hand Hygiene Compliance: Nurses’ hand washing after patient contact

PERCENTAGE OF HAND HYGIENE COMPLIANCE AFTER PATIENT CONTACT BY NURSES AND AREA HEALTH SERVICES OF TREATMENT: PRE-CAMPAIGN, AUGUST 2006–JULY 2008

Source: Hand Hygiene Data, Clinical Excellence Commission and Department of Health NSW
Chart 15-78  
Hand Hygiene Compliance: Medical Staff Hand Washing Before Patient Contact

Percentage of hand hygiene compliance before patient contact by medical staff and area health services of treatment: Pre campaign, August 2006–July 2008

Source: Hand Hygiene Data, Clinical Excellence Commission and Department of Health NSW
Chart 15-79  Hand Hygiene Compliance: Medical Staff Hand Washing After Patient Contact

PERCENTAGE OF HAND HYGIENE COMPLIANCE AFTER PATIENT CONTACT BY MEDICAL STAFF AREA HEALTH SERVICES OF TREATMENT: PRE-CAMPAIGN, AUGUST 2006–JULY 2008

Source: Hand Hygiene Data, Clinical Excellence Commission and Department of Health NSW
**SPOTLIGHT ON INITIATIVES IN SAFETY AND QUALITY**

Hand Hygiene, Healthcare Associated Infections and The Children’s Hospital at Westmead

**Outcomes:** Whilst all NSW health facilities are yet to compare outcome data, The Children’s Hospital at Westmead (CHW) have analysed hand hygiene compliance and healthcare associated infection rates (including Multi-Resistant Organisms, Bacteremia and Rota virus).

Since 2006, CHW demonstrated a significant improvement in hand hygiene compliance from 23% in 2006 to 85% in 2008 ($p < 0.001$). This correlates with the amount of alcohol-based hand rub used and reduced rate of hospital associated infections.

Monitoring of hand hygiene compliance is well documented in the literature as a good means to sustain improvements. CHW conducts over 1000 observations each month. This investment in observing hand hygiene practice, but most importantly feeding performance back to staff, has been reported as one of the keys to their success.

Three measures are regularly monitored at the CHW, those include:

1. **Compliance to Hand Hygiene:** The overall compliance to hand hygiene practice (HHP) at CHW has increased from 23% to 85% ($p < 0.001$).

2. **Healthcare Associated Infections:** A set of Healthcare Associated Infections which includes Rota virus, MROs and Bacteremia has now been monitored. A downward trend in Healthcare Associated Infections is noted as the hand hygiene rates have improved. This data is very important for clinical staff to see the direct effect of their efforts to keep children safe.

3. **Use of alcohol-based hand rub (ABHR):** Use of ABHR is providing a good indication of compliance with HHP. The average monthly use at CHW in 2008 is over 35 L/1000 patient days.

This result was achieved through strong leadership, good stakeholder engagement, accessible alcohol-based hand rub at the point of patient care, a multifaceted education program, monitoring of adherence to hand hygiene policy and contemporaneous feedback of performance data.
INITIATIVES IN SAFETY AND QUALITY

Intensive Care Unit Mortality (ANZICS APACHE III-J Mean Score and SMR)

**Why is this important?** The sickest patients in the hospital are managed in the intensive care unit (ICU). Variations in ICU mortality largely occur due to differences in type of conditions treated (casemix) which might result from different services provided by the hospital, the role of the ICU in the hospital and the relationship with the hospital’s high dependency unit (HDU) and ward beds. This complexity makes direct comparisons of mortality problematic. In order to account for this, we need to a risk adjust based on casemix. There are a number of scoring systems used to predict death. The most common score used is the Acute Physiological And Chronic Health Evaluation (APACHE) Score, of which there are a number of different versions. The APACHE III-J most closely approximates Australian and New Zealand ICU patients. The Standardised Mortality Ratio (SMR) for an ICU – or group of ICUs – is calculated by comparing the number of observed deaths to the number of predicted deaths by the APACHE III-J score. The SMRs can then be compared.

The Australian and New Zealand Intensive Care Society (ANZICS) is the peak professional and advocacy body for medical practitioners specialising in the treatment and management of critically ill patients in public and private hospitals. ANZICS leads the world in intensive care research through its Clinical Trials Group and patient databases, including the Adult Patient Database, the Paediatric Intensive Care Registry and the Research Centre for Critical Care Resources. The Society is devoted to all aspects of intensive care medical practice through ongoing professional education, the provision of leadership in medical settings, clinical research and analysis of critical care resources. The ANZICS database (the source of this data) exists to provide a peer review mechanism for contributing ICUs.

**Findings:** The ANZICS results for NSW are presented by hospital peer group not area health service (in order to compare the performance of like intensive care units) and by financial year.

Chart 1 is the APACHE III-J mean score. The severity of illness compared with pooled Australian data is essentially the same, meaning that care in NSW ICUs. The APACHE III-J score is higher, but not statistically significant in NSW metropolitan hospital settings. The wide confidence interval bands across Australia, NSW and NSW peer groups, means that there is in fact statistically no difference in the severity of illness in any of these different settings. Variation between different hospital groups more likely reflects the differences in casemix between those hospitals’ groups of patients (i.e. higher surgery rates in private hospitals).

The second chart represents the SMR. NSW data follow the trend of the pooled Australian data. In both cases the drop in mortality over five years has been significant. The large drop in rural & regional mortality rates three years ago may reflect considerable effort by NSW Health and the intensive care clinical community to develop these services.

**Implications:** NSW intensive care services perform comparably to the rest of Australia and there have been improvements during the five financial years shown. The APACHE III-J methodology does allow statistical outliers to be identified and therefore action to be taken. This is however a rare event and there is a high consistency of care delivered in NSW ICUs.
Chart 15-80

Intensive Care Unit Performance (ANZICS APACHE III-J Mean Score)

APACHE III-J MEAN SCORE INTENSIVE CARE UNITS (ICU) BY AUSTRALIA, NSW AND NSW HOSPITAL PEER GROUP, 2002-03–2006-07

Source: Intensive Care Resources & Activity: Australia and New Zealand, Australia and New Zealand Intensive Care Society (ANZICS)
Chart 15-81

Intensive Care Unit Performance (ANZICS APACHE III-J SMR)

APACHE III-J STANDARDISED MORTALITY RATIO: INTENSIVE CARE UNITS (ICU) BY AUSTRALIA, NSW AND NSW HOSPITAL PEER GROUP, 2002-03–2006-07

Source: Intensive Care Resources & Activity: Australia and New Zealand, Australia and New Zealand Intensive Care Society (ANZICS)
INITIATIVES IN SAFETY AND QUALITY

Blood Watch Program

Why is this important? A study of the appropriateness of red cell transfusion (Rubin et al. 2001) showed that up to 30 per cent were inappropriately transfused in adult patients. This led to a number of initiatives being undertaken in NSW to improve transfusion practice. Further, blood is a precious resource which is freely donated. This fact, combined with a shrinking donor pool, has been the impetus for a state-wide approach to improve transfusion medicine practice in NSW.

In 2006, at the request of the NSW Health Department’s Fresh Blood Products Advisory Committee, the Clinical Excellence Commission (CEC), in collaboration with the NSW Department of Health, undertook an initiative, known as the Blood Watch program. This program has as its vision to have a world-class transfusion medicine practice in NSW. During its first two years the program has focused on red cell utilisation in haemodynamically stable patients with normal bone marrow. This has involved working closely with haematologists, clinical nurse consultants in transfusion medicine, blood bank scientists and surgeons. In those two years the program has reduced the number of red cell transfusions in NSW public hospitals. This in turn had led to a reduction in expenditure in the direct and indirect costs associated with transfusion in NSW.

The emerging evidence relating to the effects of red cell transfusion on the immune system and its direct link to increased wound infection and increase in length of stay, demonstrates the importance of ensuring appropriate transfusion practice. The impact of the Blood Watch program on improving clinical practice is, in part, due to the information gathered through local audits and data linkage. However, data alone is not a catalyst for change. The Blood Watch program has used a number of innovative approaches to reduce variation in practice and engage all clinicians in the issues of blood management.

Findings: For the first time in Australia, the CEC linked data from NSW Health’s Health Information Exchange (HIE), local pathology and blood bank databases which allowed comparison of red cell usage and dosage amongst NSW public hospitals. The charts below by area health service, show variation in relative usage and dose for NSW for a set of overnight hospital admissions. This has been done to reduce any artefact due to administrative counting changes for same day admissions.

Following on from the collection of base-line data of 2004-2005 which was indicative of blood usage in NSW, the relative number of transfusion episodes, and relative number of units transfused across all area health services shows an overall reduction of ten percent. (This figure might be an underestimate due to only hospital overnight admissions being included.) Two area health services, Hunter New England and Sydney West have consistently performed below the state average. These two areas health services have used restrictive thresholds as part of their blood policies over many years which may account for their improved performance when compared to the other areas health services. Both Greater Southern and The Children’s Hospital Westmead are relatively small users of blood products hence their average usage is also below the state average.

Other area health services’ relative use (Greater Western, Northern Sydney, Sydney South West), was above the state average prior to the establishment of the Blood Watch program, however these three health services have used a series of interventions to bring utilisation levels below the state average as measured when the program commenced. The interventions included regular audit and feedback to specific clinical specialties, tightening of ordering processes, minimal vetting of transfusion request, and the rollout of targeted education sessions to relevant staff. The overall ten percent reduction in utilisation in 2006-07 indicates that the Blood Watch program had gained momentum at the ground level and the clinical practice improvement initiatives were having an impact.

With this dataset it was possible to calculate that the 10% reduction in total red blood cell transfusion (9168 units) equates to a direct product cost of approximately $2,383,855 savings across the State (based on AUD$260 per unit). This figure is inclusive of the Australian Government’s 63 per cent contribution to the State’s blood budget.

Implications: Reductions in red cell usage have two significant implications for NSW: i) an overall improvement in appropriate transfusion practice with positive outcomes for patients; and, ii) considerable cost reductions for area health services’ blood budgets.
RED CELL UTILISATION RATE: RELATIVE RATE OF RED CELL TRANSFUSION OCCURRING IN NSW PUBLIC HOSPITALS (AREA HEALTH SERVICE OF TREATMENT PLUS THE CHILDREN’S HOSPITAL WESTMEAD): CALCULATED AS CASE MIX ADJUSTED RELATIVE USE INDEX, FOR OVERNIGHT SEPARATIONS WHERE THE BENCHMARK IS NSW 2004-05 BASELINE

Source: NSW Health Information Exchange (HIE), pathology and blood bank data collected from local service providers.

Note: not all area health services were able to provide data for each of their facilities.
Chart 15-83

**BloodWatch: Relative Units of Blood Used**

**Red Cell Utilisation Rate:** Relative rate of red cell units (dose) transfused in NSW Public Hospitals (Area Health Service of Treatment plus The Children’s Hospital Westmead): Calculated as Case Mix Adjusted Relative Use Index, for Overnight Separations where the benchmark is NSW 2004-05 Baseline.

Source: NSW Health Information Exchange (HIE), pathology and blood bank data collected from local service providers.

Note: not all area health services were able to provide data for each of their facilities.
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Appendix: Data Sources and Methods

Collections
Details of the derivation of indicators presented in this report are provided in Volume 2 of this publication, which is available on request from the CEC or at www.cec.health.nsw.gov.au. Analysis was undertaken by the CEC, unless otherwise indicated.

The data on which these indicators have been based is derived from a number of sources. Many of the NSW Department of Health data collections were accessed through the Health Outcomes Information Statistical Toolkit (HOIST), which is a SAS-based ‘data warehouse’ operated by the Centre for Epidemiology and Research of the NSW Department of Health. HOIST brings together most of the data collections used in population health surveillance in NSW, and contains all the available historical data for each collection. HOIST provides a common data analysis environment across the public health network in NSW [e-CHO]. The main data collections accessed through HOIST are described below.

NSW Admitted Patient Data Collection
The Admitted Patients Data Collection was previously known as the NSW Inpatient Statistics Collection (ISC), and is commonly referred to as the ISC. The collection is a census of all services for admitted patients provided by public hospitals, public psychiatric hospitals, public multi-purpose services, private hospitals and private day-procedure centres in NSW. The ISC is a financial year collection from 1 July through to 30 June of the following year. The information it contains is provided by patients, health service providers, and hospitals’ administration. The information reported includes patient demographics, source of referral to the service, service referred to on separation, diagnoses, procedures, and external causes.

The CHeReL, linked ISC/APDC and Deaths Data
For some indicators a special data set linking the ISC/APDC data to data on deaths has been analysed. It was originally created by the Centre for Epidemiology and Research and is referred to as the internally linked ISC data linked to NSW Registry of Births, Deaths and Marriages death registration and Australian Bureau of Statistics (ABS) mortality data.

These analyses are now based on data from The Centre for Health Record Linkage (CHeReL), which is a collaborative venture established by the NSW Department of Health and the Cancer Institute NSW, with key partners, including the CEC, University of Sydney, University of New South Wales, University of Newcastle, ACT Health and The Sax Institute. The purpose of CHeReL is, through data linkage, to enable routinely collected health data and information to be transformed into a powerful resource for planning, monitoring and evaluation of health services and outcomes. The routine availability of linked data will provide the CEC with significantly enhanced capacity to report on factors related to deaths associated with surgical and anaesthetic mortality. To April 2009, the CHeReL has linked 23.4 million records for 6.5 million individuals (see appendix two and www.cherel.org.au).

NSW Midwives Data Collection
The NSW Midwives Data Collection (MDC) is a population-based collection covering all births in NSW public and private hospitals, as well as home births. It does not receive notifications of interstate births where the mother is resident in NSW. The data collection has operated continuously since 1990. It encompasses all live births and stillbirths of at least 20 weeks gestation or at least 400 grams birth weight. The MDC relies on the attending midwife to complete a notification form when a birth occurs. The form includes demographic details, and items on maternal health, the pregnancy, labour, delivery, and perinatal outcomes.

NSW Population Health Survey
Since 2002, the NSW Department of Health has conducted the NSW Population Health Survey, an ongoing survey of the health of people in NSW using computer-assisted telephone interviewing (CATI). Its main aims are to provide detailed information on the health of the people of NSW, and to support the planning, implementation, and evaluation of health services and programs. The target sample is 1,500 people in each area health service (total sample of 12,000). When households are contacted, one person is selected, using random numbers generated by the CATI system. Trained personnel at the NSW Population Health Survey CATI facility carry out interviews between February and December each year. When a child under 16 years is selected, the main carer, known as the proxy respondent, is interviewed on behalf of the child. Most respondents are interviewed in English. Other interviews are conducted in Arabic, Chinese, Greek, Italian, and Vietnamese. In 2007, 16,046 interviews were conducted, with at least 1,550 interviews in each area health service and 13,178 with adults aged 16 years and over. The overall response rate was 63.6 per cent (completed interviews divided by completed interviews and refusals) (Centre for Epidemiology and Research, 2008).

Prior to the introduction of the continuous survey in 2002, the Centre for Epidemiology and Research conducted adult health surveys in 1997 and 1998, an older people's health survey in 1999, and a child health survey in 2001.

**NSW Emergency Department Data Collection**

The NSW Emergency Department Data Collection is a database of information collected from approximately one-third of NSW emergency departments. It represents approximately two-thirds of all NSW emergency patients. For this report, analysis of the Emergency Department Data Collection was undertaken by the NSW Department of Health.

**NSW Elective Surgery Waiting Times Data Collection**

The Elective Surgery Waiting Times Data Collection is a database of information collected on patients booked for surgery and selected medical procedures. For this report, analysis of the Emergency Department Data Collection was undertaken by the NSW Department of Health.

**Cancer Institute NSW**

Cervical cancer screening data were obtained from Cancer institute NSW. The primary source of data for cervical screening was NSW Pap Test Register. The NSW Cervical Screening Program (the ‘Program’) is a jointly funded Commonwealth/State and Territory initiative under the Public Health Outcomes Funding Agreement to implement the National Cervical Screening Policy in NSW. The Program is part of the National Cervical Screening Program. Since July 2005, the Cervical Screening Program (including Pap Test Register) has been managed by the Cancer Institute NSW, with an aim to implement an organised approach to cervical screening in NSW. The NSW Pap Test Register (‘PTR’ or the ‘Register’) was established in 1996. It is a central and confidential database of NSW women’s Pap tests and cervical biopsy test results. It provides a follow-up and reminder service to women to encourage them to have regular Pap tests every two years, or as recommended by their
doctors or nurses. PTR processes Pap tests and cervical histology tests results undertaken by pathological laboratories in NSW and some interstate laboratories located in areas bordering NSW. The PTR operates a free ‘Information Line’ (56), which provides information to the general public, women who have had Pap tests and health practitioners. Information provided includes Pap test and cervical biopsy history to assist in clinical management and answers to queries regarding the role of the PTR. Women also contact the ‘Information Line’ to provide details of change of name and/or address.

**Mental Health Services (InforMH)**

Data were obtained from InforMH team and analysed by the CEC. The proportion of separations from acute adult mental health units which were the result of a readmission within 28 days to the same facility, included:

- Mostly adults and older people in acute public psychiatric units in general hospitals
- Patients who are admitted to a mental health unit on a same day basis are excluded
- Children’s units are excluded except Redbank and Gna Ka Lun because they cannot be separately identified from the adult unit.
- Patients with a mental health diagnosis in a general ward are excluded.

The original data source is NSW Department of Health, inpatient statistics collection extracted via NSW Health Information Exchange and HOIST and forwarded it to CEC. It excludes stand-alone psychiatric hospitals.

**Towards a Safer Culture (TASC)**

Data were obtained from the TASC team and analysed by the CEC. Towards a Safer Culture (TASC) is a Statewide initiative supported by the Clinical Excellence Commission (CEC) and the Royal Australasian College of Physicians (RACP). TASC seeks to improve the quality of clinical practice for treatment of patients who present with Acute Coronary Syndrome (ACS) and Stroke in a continuous improvement cycle using the best available evidence.

In a clinical sense, the TASC program hopes to achieve the following:

- All patients will be assessed, diagnosed and treated according to the best available evidence.
- More people will survive coronary syndromes and stroke.
- There will be better functional outcomes after coronary syndromes and stroke and that dangerous discharges will be avoided.
- Inappropriate admissions will be avoided reducing demand on emergency beds in the hospital.

TASC is now in phase 2 and aims to deliver standardised care in the Emergency Departments of participating hospitals across the State. Participating hospitals / Area Health services have implemented the use of new clinical forms as well as a process to collect, collate and amalgamate the Form data into the central TASC database.

Data is collected and processed from two sources:

- hospital scanned clinical ACS and Stroke forms; and
- Department of Health Information Exchange

The following describes the main steps of data collection and processing from hospital clinical forms:

- Hospitals Emergency Department Staff capture Patient ACS and Stroke details on Forms that follow specific clinical pathways.
- The forms are then scanned and converted into data export files.
- The data export files are then transferred to the Department of Health.

Usually, this would be done by an automated process at the Hospital / AHS. However, this online service can also be used to transfer the files manually if required. The transferred data export files are then processed and data is updated to the central TASC database. This online service
also provides the facility for users to correct / edit records and inquire on
the status of file transfers / processing. Source: TASC online at:

Australian and New Zealand Intensive Care Society (ANZICS)
Data were obtained from ANZICS and analysed by the CEC.

The ANZICS Research Centre for Critical Care Resources (ARCCCR)
designs and distributes surveys to all ICUs to obtain this information. As a
result of its research activities, the ARCCCR holds a significant collection
of data on intensive care resources. This research is quality-oriented and
is directed toward intensive care infrastructure, workforce profiles and
processes of care. The annual surveys completed by intensive care unit
(ICU) staff assist in monitoring trends in intensive care service delivery.
The surveys conducted by ARCCCR focused on the distribution and
features of critical care units, medical and nursing workforce data, as well
as selected quality indicators and mass casualty disaster planning. The
ARCCCR surveyed Australian and New Zealand critical care units in both
the public and private sectors. The ANZICS reports is intended to be an
information resource for intensive care staff, public and private health
care providers, policy makers and relevant statutory bodies.

NSW Ambulance
Data were obtained from the NSW Ambulance Service and analysed by
the CEC. Analysis and interpretation had significant input from senior
staff at the NSW Ambulance Service.

Blood Watch
Data for Blood Watch are maintained and analysed by the CEC.

Blood Watch is a NSW state-wide transfusion medicine improvement
program and its’ primary goal is to improve the safety and quality of fresh
blood product transfusion in all NSW Public Hospitals. The program has
been in place since 2006 and is centrally coordinated through the
Clinical Excellence Commission. In keeping with national trends in
improvements in transfusion medicine, the Blood Watch program has
focused on six priority areas: appropriateness of blood component
therapy; reporting of adverse transfusion related events; clinical
governance issues; accurate costing of transfusion medicine; ongoing
education of health care professionals; and communication of policy to
address supply and demand issues. The Blood Watch program is
supported by all NSW Area Health Services and the Australian Red Cross
Blood.

Hand Hygiene
Data for Hand Hygiene are maintained and analysed by the CEC.

Hand Hygiene Compliance was used as both an evaluation measure and
opportunity for education and promotion of hand hygiene at the coal
face. The project evaluation sought to determine whether the ‘Clean
Hands Save Lives’ Campaign improved hand hygiene compliance in
NSW health facilities and reduced MRO infections.

The Clinical Excellence Commission developed standardised tools for use
in area health services to ensure consistency of data collection. Hand
Hygiene Project Officers were responsible for the co-ordination and
submission of de-identified data from the hand hygiene campaign
evaluation in their area health service. Observations were undertaken by
staff on the ward who had been identified by Hand

Hygiene Project Officers, Nurse Unit Managers, Facility Directors of
Nursing or Nurse Managers. The tool provided examples of opportunities
for high, medium and low risk. All hand hygiene opportunities were to
include hand washing or use of alcohol rub both before and after patient
contact. Compliance can be defined as either washing hands with soap
and water or rubbing with an alcohol rub in accordance with a hand
hygiene opportunity.

Incident Information Management System (IIMS)
Data for the Incident Information Management System (IIMS) are jointly
maintained by the CEC and NSW Health and analysed by the CEC.

The objective of IIMS is to provide an electronic system that: records all
healthcare incidents, adverse events and near-misses, in four categories:
clinical (patients)
complaints
staff/visitor/contractor (occupational health and safety)
property/hazard/security.

This data assists managers to manage the incidents that occur in their area, records the results of reviews or investigation of incidents, provides reports on all incidents that have been recorded in the system. The system was deployed to each area health service in November 2004 and collects information from the 11 area health services within NSW (including Justice Health, The Children’s Hospital at Westmead and Ambulance Service NSW) for clinical incidents that occurred in the period under review.

Other Issues

Age-adjusted Rates

Where indicators have been standardised for age and sex, the direct standardisation method has been used. This method adjusts for effects of differences in the age composition of populations across time or geographic regions. The directly age-standardised rate is the weighted sum of age-specific (five-year age group) rates, where the weighting factor is the corresponding age-specific standard population. For this report, the Australian estimated residential population (persons) as at 30 June 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. Ninety-five per cent confidence limits around the directly standardised rates were calculated using the method described by Dobson et al. (1991). Where an indicator relates to mortality following a particular event or procedure, the standard population used is a relevant population experiencing the event or procedure. Details are provided in Volume 2.

Socio-economic status measures

Many of the indicators were analysed to determine whether there were systematic variations across socio-economic status groups. The analysis was based on the Statistical Local Areas (SLA) of patients’ residence. The ABS has assigned all Australian SLAs with an index of relative socio-economic disadvantage (IRSD), one of the socio-economic indices for areas (SEIFA) produced by the ABS (ABS, 1998; ABS, 2003; ABS, 2008). Non-overlapping geographical areas covering all NSW are assigned an IRSD score calculated from ABS census data on various socio-economic characteristics of the people living in the areas. These characteristics relate to occupation, education, non-English speaking background, Indigenous origin, and the economic resources of the household. In this report, the NSW population was divided into five groups based on the IRSD scores of their SLA of residence. This means that SLAs were sorted by IRSD score and assigned to population-weighted quintiles, each containing close to one-fifth of the total population.

Rurality

Many of the indicators were analysed to determine whether there were systematic variations across a rurality dimension. The analysis was based on the SLA of patients’ residence. Each SLA is assigned an ARIA+ score. ARIA+ is the new enhanced Accessibility-Remoteness Index of Australia classification. In ARIA+ the remoteness index value is based on road distance to each of five categories of ‘service centre’. The service centre categories are based on population size, with the smallest centres having populations of 1,000-4,999. Localities with populations of greater than 1,000 persons are considered to contain at least some basic level of services (e.g. health, education, or retail) (GISCA, 2001). Service centres with larger populations are assumed to contain a greater level of service provision. ARIA+ scores range from 0 to 15, and are grouped into remoteness categories. There are five classes of remoteness: major cities, inner regional, outer regional, remote and very remote (AIHW, 2004).

Thematic Maps

Data for selected indicators are thematically mapped to identify and visualise outliers in rates or proportions by local government area (LGA). LGAs are the smallest level at which data are analysed in this report. There were 153 LGAs in NSW and populations ranges from 756 to
almost 280,000 (based on population estimates as at June 2006). Mapping cases or rates of events of interest, such as rates of hysterectomy procedures, rates emergency and elective caesarean deliveries are very informative in understanding the geographical distribution of the events particularly at LGA level. To get reliable estimates at LGA level (which has been used for mapping) 'statistical smoothing (Bayesian smoothing)' methods used to stabilise the resulting small area estimates.

In this report, Bayesian smoothing was used to adjust raw estimates by taking into account information from adjacent areas (local or spatial variability) and from the whole state (global or non-spatial variability). For population-based indicators such as rates of hospitalisation and rates of death, Bayesian smoothing was performed using the convolution or Besag, York and Mollie (BYM) model (Lawson et al, 2003). This model is widely used for disease mapping. The smoothed estimates calculated are the age-standardised relative risk for each area compared to NSW. That is, the standardised incidence ratio (SIR) for hospitalisations and the standardised mortality ratio (SMR) for deaths. All models were fit using WinBUGS 1.4.3 (WinBUGS, 2007).

For indicators such elective and emergency caesarean, which are based on binary outcomes, smoothing was obtained by modelling the data using a binomial distribution with a logit link function. Smoothed proportions incorporate both local and global information, but are not age standardised. The results of the Bayesian smoothing were used to determine whether the results obtained from individual areas are significantly different from the estimate of the average for all areas. Smoothed estimates are displayed on maps. The intensity of the colour of a LGA increases as the ratio increases, and the same scale is used for all maps. The level of significance and the direction of difference from the state average is shown using '+' and '-' signs. One plus sign means that the smoothed estimate for a LGA is significantly greater than the state average at the 5% level of significance and two minus signs refer to the 1% level of significance. If an area does not differ from the state, then no symbol is shown. All maps were produced using SAS V9.1.3 (SAS, 2005). The success of the Bayesian smoothing method depends largely on the degree of similarity between areas that are used in the calculations. In the case of Local Government Areas in NSW, similarity is very high and the method works well. Details are provided in Volume 2.