Technical Supplement

Healthcare in Focus 2016: How does NSW compare?

Contents

Introduction

This document is a supplement to the Bureau of Health Information's (BHI) seventh annual performance report, *Healthcare in Focus 2016: How does NSW compare?* It contains a description of the data sources, methods and technical terms used to calculate the descriptive statistics and performance indicators included in the report. This supplement is technical in nature, and is intended for audiences interested in the creation and analysis of health performance information.

To produce the report, BHI used the following sources of data:

- The Commonwealth Fund International Health Policy Survey 2016

- The Organisation for Economic Cooperation and Development Health Statistics online database

- Australian Bureau of Statistics Patient Experience Survey 2015–16 and Cause of Death Data 2015

- Australian Institute of Health and Welfare Health expenditure 2014–15

- Australian Department of Health Medical Item Statistics Reports

- Productivity Commission Report on Government Services 2017

- Clinical Excellence Commission Incident Information Management System

- Bureau of Health Information NSW Patient Survey Program 2014–15

- NSW Health linked admitted patient, emergency department presentation and fact of death data and linked admitted patient and perinatal data, accessed via the Centre for Epidemiology and Evidence

- NSW Health admitted patient, emergency department presentation and elective surgery waiting list data collections, accessed via the Health Information Exchange and Waiting List Collection Online System

- NSW Ambulance Computer Aided Dispatch System

- Health and healthcare performance data already published by governments or journal articles. The sources of these data are indicated where appropriate.

For the statistical analysis of data published in the report, BHI used SAS/STAT™ software.[1]

Data sources and methods

The Commonwealth Fund International Health Policy Survey

The Commonwealth Fund is a philanthropic organisation in the United States and it commissions an annual international health survey of 11 countries. The survey supports the creation of public reports that benchmark the performance of comparable healthcare systems.

BHI, as a partner, invested in an additional sample of The Commonwealth Fund's International Health Policy Survey (2016 IHPS) to ensure the number of NSW participants was sufficient to calculate robust estimates of the NSW healthcare system's performance indicators, and to make statistically valid comparisons with the countries participating in the survey.

Fieldwork in all countries took place between March and June 2016. The survey was administered via landline and mobile telephone in each country. Switzerland also provided an online option. The survey assessed people's experiences in the healthcare system including questions of access, cost and quality. Social Science Research Solutions (SSRS) produced a comprehensive methodological report that details the sample design, data collection, data processing and survey procedures used in conducting the survey.[2]

Final samples were weighted to reflect the distribution of the adult population in each country. The characteristics and populations used to calculate weights for each country are summarised in the SSRS methodology report.[2] Australian data were weighted by region, age, gender, education, urban status and phone status. For NSW, the sample was also weighted by Primary Health Networks.

In Australia, 1,000 adults aged 18+ years were surveyed as part of the main sample, including 335 adults in NSW. Additional samples were added in NSW and Victoria – 3,500 and 748 adults respectively. The response rate in Australia was 25%. The response rates for all countries sampled in the 2016 IHPS ranged from 11% in Norway to 47% in Switzerland (Table 1).

Statistical analysis

The performance of the NSW healthcare system is reported alongside Australia and 10 other countries. Reported percentages are the weighted estimates that are intended to reflect the views and experiences of the adult population (whether by NSW, region or country).

Consistent with published reports on The Commonwealth Fund data[3], non-response categories, such as 'not sure', 'declined to answer', and 'not applicable' were excluded from reporting and statistical analyses.

Note that while results are shown for all of Australia, any differences between Australia and NSW are based on comparisons with the rest of Australia. A main response category was determined for each question, and responses were dichotomised so the response value of interest (for example 'always') was coded as 1, and all other values, excluding non-response categories, were coded as 0. Logistic regression was then used to fit this binary variable on an explanatory variable for each respondent country, with appropriate adjustment for survey weights using the SAS procedure SURVEYLOGISTIC for the analysis.[1] Any country values significantly different from the NSW value at a 5% significance level are noted with an asterisk (*) or are shaded in the report. If no differences are flagged, we were unable to detect any statistically significant

differences in performance based on the statistical model with the available data.

Organisation for Economic Cooperation and Development

The Organisation for Economic Cooperation and Development (OECD) is a comprehensive and consistent source of comparable international data on various economic and social topics, including healthcare.

The latest edition of the OECD's biennial report *Health at a Glance* was released in November 2015. The OECD Health Care Quality Indicators included in that report are based on specifications developed by the US Agency for Healthcare Research and Quality and are made available through the website *OECD Health Statistics* (www.oecd-ilibrary.org/social-issues-migration-health/data/oecd-health-statistics_health-data-en).

Statistical analysis

A subset of these healthcare measures are presented in the report, with NSW results calculated based on specifications from the OECD and the Australian Institute for Health and Welfare (AIHW).[4] Details relevant to BHI's calculation of these indicators are provided in Table 2.

Hospital-level results were calculated for some of the measures to provide information on variation within NSW. Hospitals with fewer than 50 episodes (100 for obstetric trauma) were suppressed. Hospitals with 95% confidence intervals not overlapping the NSW 95% confidence interval were flagged as significantly different from NSW. This method is a relatively conservative way of identifying significant differences. The chance of making a type 1 error with this method is less than 0.05. If the data is normally distributed, the variance of both estimates are equal, and the estimates are independent the chance is 0.0056.[5]

Standardised international comparisons

International data comparisons from both survey and administrative data sources present

challenges due to differences in data collection, definition and quality, as well as differences in each country's organisation of healthcare. A synthesis of administrative data measures based on values for international comparisons is provided in the report. NSW results are compared to the range of available country values on a standardised scale.

The standardised scores for each country are calculated using the formula $(x_i - \bar{x})/\sigma_x$ where x_i is the result for country i and $\bar{x}$ and σ_x are, respectively, the mean and standard deviation of the results of all countries. Scores greater than zero indicate better than average performance. The interquartile range of these country scores is shown in the figures in the report.[6,7] The standardised score for NSW is also calculated using the mean and standard deviation of the country results and the NSW score is plotted as a dot against the interquartile range in the figures.

Australian Bureau of Statistics: Patient Experience Survey and Cause of Death Data

The Australian Bureau of Statistics (ABS) conducts an annual Patient Experience Survey, a nation-wide population-based survey of patients' experiences using the Australian healthcare system. The ABS provided BHI with a customised report on NSW results for 2015–16. The sample of 28,276 people aged 15+ years was weighted to represent the estimated population aged 15+ years in private dwellings in each state and territory. Further information on survey and analysis methods can be found in the ABS's survey methods documentation.[8]

The ABS also provided a customised report on causes of death in NSW for the calendar years 2005 to 2015. The report included age-standardised rates of mortality and potential years of life lost for selected causes of death, by sex and year of death registration. Further information can be found in the ABS's methodological

documentation for its *Causes of Death 2015* report.[9]

Australian Institute of Health and Welfare: Health expenditure

The AIHW provided a customised report of health expenditures stratified by finance, provider and function categories according to the OECD's System of Health Accounts definitions. For more information, see the AIHW annual report.[10] Other AIHW reports on hospital statistics[11] and radiotherapy[12] were used throughout the report and referenced in related figures.

Australian Department of Health: Medical item statistics reports

The Australian Department of Health collects data on instances of primary healthcare service that are described by items in the Medicare Benefits Schedule (MBS). Statistics from this data collection are provided through an online tool, accessed at:

www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/connectinghealthservices-factsheet-stats

This data collection is used to report on the number of telehealth services in NSW.

Productivity Commission: Report on Government Services

Each year the Australian Productivity Commission releases a Report on Government Services (RoGS).[13] The report includes information on the performance of healthcare services. Data from the report was included in *Healthcare in Focus 2016* and referenced wherever used.

Clinical Excellence Commission: Incident Information Management System

The Clinical Excellence Commission (CEC) leads safety and quality improvement in NSW public hospitals. It analyses and reports on data from the Incident Information Management System (IIMS).[14] NSW Health staff are required to report all incidents that affect patient safety in IIMS. Data from the CEC's IIMS reports were included in *Healthcare in Focus 2016* and referenced wherever used.

Bureau of Health Information: NSW Patient Survey Program

BHI conducts a regular, comprehensive statewide patient experience survey program. The NSW Patient Survey Program collects information from patients across NSW about their experiences with a variety of healthcare services.

For this report, BHI used de-identified unit record data from the survey program. The most recent Adult Admitted Patient Survey includes responses from 28,391 patients who were admitted to a NSW public hospital between January and December 2015 (adjusted response rate 42%). The Emergency Department Patient Survey includes responses from 23,810 patients who visited an emergency department in a NSW public hospital between April 2015 and March 2016 (adjusted response rate 26%). The Maternity Care Survey includes responses from 4,739 women who gave birth in a NSW public hospital during 2015 (response rate 36%). The Outpatient Cancer Clinics Survey includes responses from 3,706 patients who visited a public outpatient cancer clinic during February and March 2015 (response rate 57%).

Patient population estimates were calculated using sampling weights and the SAS procedure SURVEYFREQ.[1] Where the distribution of results by hospital are provided, hospitals with fewer than 30 respondents are suppressed, and statistically significant differences between a hospital and the NSW result are noted if the 95% confidence intervals of the two estimates do not overlap.

NSW Ministry of Health: Linked admitted patient, emergency department, fact of death and perinatal data

The Centre for Epidemiology and Evidence at the NSW Ministry of Health maintains a data warehouse called Secure Analytics for Population Health Research and Intelligence (SAPHaRI).[15] SAPHaRI holds records of hospital admissions, emergency department presentations, fact of death and perinatal data, each of which has been assigned a unique person identifier. The person identifier is a statistical linkage key generated by the Centre of Health Record Linkage using probabilistic record linkage methods. Data linkage allowed the computation of various statistics at a patient level of analysis, such as unplanned readmission rates. Further information on data linkage can be found at www.cherel.org.au. At the time of analysis, the most recent year of linked data available was the 2015–16 financial year. For the Admitted Patient Data Collection, the most recent complete year of data including private hospitals was 2014–15.

An 'episode' is a single record containing information about a patient admitted to a hospital or emergency department. Information in this record includes patient demographics, date, conditions and treatment or procedure received and the Australian Refined Diagnosis Related Groups (AR-DRGs) code. BHI calculated OECD indicators based on episodes and followed specifications used by AIHW in calculating the Australia values provided to the OECD. The term 'episode' is used interchangeably with 'admission', 'separation', 'discharge' and 'hospitalisation' in other AIHW and OECD reports. A 'period of care' is not the same as an episode. Periods of care combine contiguous hospitalisation episodes within the same or different hospitals into a single period of care in order to follow an outcome of interest. Periods of care are used in 30-day mortality and return to acute care measures.

Statistics based on hospitalisations in NSW exclude episodes at Albury Base Hospital, since this facility is administered by the Victorian Department of Health. Statistics based on the NSW population exclude non-residents of NSW.

Where the distribution of results by hospital are provided, statistically significant differences between a hospital and the NSW result are noted if the 95% confidence intervals of the two estimates do not overlap. The variance is given by the standard variance for a binomial distribution, with the exception of average length of stay estimates where non-parametric ranking tests were performed.

NSW Ministry of Health: Hospital activity data (Health Information Exchange and Waiting List Collection Online System)

The NSW Ministry of Health maintains data warehouses containing the most recent accumulation of NSW hospital and health facility activity data available. Inpatient and emergency department presentation data are uploaded weekly and become available for BHI analysis two weeks later. Elective surgery waiting list data are uploaded monthly and available two weeks later.

BHI, in conjunction with the NSW Ministry of Health and other agencies, has developed various measures of NSW public hospital admissions and emergency department and elective surgery activity and performance for hospitals with electronic data available. These measures are published in the BHI report series *Healthcare Quarterly* and are available on BHI's online data portal Healthcare Observer. The statistics reported have been calculated for the 2015–16 financial year rather than for quarters. *Healthcare Quarterly* activity and performance statistics exclude episodes at Albury Base Hospital, since this facility is administered by the Victorian Department of Health.

NSW Ambulance: Computer Aided Dispatch System

The NSW Ambulance Computer Aided Dispatch (CAD) system is used to manage and record ambulance activity and time points across the entire patient journey. The CAD system contains information from all ambulance local response areas in NSW. Information is recorded using incident, response, transport, emergency department network access, ambulance release teams and calls as the counting units.

Table 1 The Commonwealth Fund International Health Policy Survey of Adults 2016, number of respondents and response rates, by country

Country	Number of respondents	Response rate
Australia (New South Wales (n=3,835)	5,248	25.4%
Canada	4,547	21.4%
France	1,103	25.2%
Germany	1,000	26.9%
Netherlands	1,227	32.4%
New Zealand	1,000	31.1%
Norway	1,093	10.9%
Sweden	7,124	16.9%
Switzerland	1,520	46.9%
United Kingdom	1,000	21.9%
United States	2,001	18.1%

Indicator specifications, by chapter

Table 2 Specifications for indicators calculated by BHI, by chapter

Indicator	Cohort description (numerator, denominator)	Further details (inclusions, exclusions, references)	Data source
Accessibility			
Percentage of ambulance responses arriving on time, by priority	Denominator: The number of incidents where an ambulance arrives at the scene Numerator: Denominator cases where the time between the ambulance call and the first ambulance to arrive at the scene was within 15 or 30 minutes for priority 1 responses, and 30 or 60 minutes for priority 2	For further details, see www.bhi.nsw.gov.au/BHI_reports/technical_supplements	NSW Ambulance Computer Aided Dispatch system
Percentage of ambulance arrivals to emergency departments that had their care transferred within 30 minutes	Denominator: Ambulance arrivals to emergency departments where there is a match between ambulance and emergency department records in the Transfer of Care Reporting System portal Numerator: Denominator cases where the time from ambulance arrival at the ED and transfer of care from ambulance to ED staff is within 30 minutes	For further details, see www.bhi.nsw.gov.au/BHI_reports/technical_supplements	NSW ambulance and emergency department data in the Transfer of Care Reporting System portal
Median time from emergency department presentation to starting treatment and percentage starting treatment on time, by urgency category	Cohort: Emergency presentations to NSW public hospital emergency departments Time to treatment is the difference between presentation time and start of treatment time	Excludes: • Non-emergency presentations • Presentations for which treatment was not started • Presentations that did not have a valid visit type, presentation time, start of treatment time or urgency category. For further details, see www.bhi.nsw.gov.au/BHI_reports/technical_supplements	NSW public hospital activity data
Percentage of emergency department presentations leaving without, or before completing, treatment	Denominator: All presentations to NSW public hospital emergency departments Numerator: Denominator cases where the mode of separation was did not wait or left at own risk	For further details, see www.bhi.nsw.gov.au/BHI_reports/technical_supplements	NSW public hospital activity data
Percentage of emergency department presentations leaving within four hours, by mode of separation	Denominator: All presentations to NSW public hospital emergency departments Numerator: Denominator cases where the time between presentation at and departure from the ED was four hours or less	For further details, see www.bhi.nsw.gov.au/BHI_reports/technical_supplements	NSW public hospital activity data

Indicator	Cohort description (numerator, denominator)	Further details (inclusions, exclusions, references)	Data source
Percentage of emergency department presentations staying more than 24 hours	Denominator: All presentations to NSW public hospital emergency departments Numerator: Denominator cases where the time between presentation at and departure from the ED was more than 24 hours		NSW public hospital activity data
Appropriateness			
Percentage of hip fracture surgery performed within two days of hospital admission, for patients aged 65+ years	Denominator: Hospital episodes with principal diagnosis ICD-10-AM codes S72.0, S72.1 or S72.2 and a procedure performed Numerator: Denominator cases where the procedure date is the same as the admission date or one day after	Excludes: • Patients under 65 years of age	NSW linked admitted patient data; OECD Health Statistics
Number of knee arthroscopy procedures by age and osteoarthritis diagnosis	Cohort: Hospital episodes with a knee arthroscopy ACHI procedure code: 49557-00, 49503-00, 49560-03, 49562-01, 49561-01, 49557-02, 49558-00, 49558-01 Osteoarthritis diagnosis was based on ICD-10-AM code M17 in any diagnosis field (principal or secondary) in any episode with a three-year look back from the date of the knee arthroscopy procedure		NSW linked admitted patient data
Percentage of babies breastfeeding at discharge from hospital	Denominator: All live births in NSW Numerator: Full breastfeeding (babies who were breastfed or received expressed milk), any breastfeeding (babies who received breastmilk and infant formula) or infant formula only	Excludes: • Still births	NSW perinatal data
Effectiveness			
Percentage of emergency department presentations that were followed by a re-presentation	Denominator: Emergency presentations to NSW public hospital emergency departments Numerator: Emergency re-presentations to any NSW public hospital emergency department within two days (48 hours) or seven days (168 hours) of the departure time of the previous presentation. It is only considered a re-presentation if the mode of separation of the previous presentation was admitted to a ward, admitted in and discharged from an ED, departed treatment completed, departed did not wait or left at own risk, admitted to critical care ward, admitted via operating suite or admitted left at own risk	Excludes: • Non-emergency presentations	NSW linked emergency department data
Percentage of patients who presented to hospital with a fracture and returned to	Denominator: Patients with an acute fall-related fracture episode that were	Excludes: • Patients under 50 years of age	NSW linked admitted

Indicator	Cohort description (numerator, denominator)	Further details (inclusions, exclusions, references)	Data source
hospital with a subsequent fracture within two years, for patients aged 50+ years	discharged from hospital between July 2011 and June 2013 Numerator: Denominator cases with a subsequent acute emergency fall-related fracture episode within two years of the index fracture discharge For both the numerator and the denominator, a fall-related fracture episode was defined as fracture principal diagnosis and fall secondary/external diagnosis Transfers and type changes associated with the index fracture episode were treated as part of the same period of care Subsequent fractures were attributed to the facility where patients were last discharged from in their index period of care	• Patients who died during their index period of care or had no subsequent fracture recorded and died within two years of their index period of care. Specifications were based on methods developed by Queensland Health, see www.health.qld.gov.au/__data/assets/pdf_file/0026/144782/statbite63.pdf	patient and fact of death data
Percentage of overnight separations from psychiatric acute inpatient services that were followed by a readmission	Denominator: Overnight acute episodes in a psychiatric unit Numerator: Denominator cases with a subsequent acute episode in a psychiatric unit within 28 days of the index episode discharge date	Excludes: • Private hospitals • Same day index episodes • Episodes where the patient died • Episodes that ended with a transfer to another hospital or a type change • Episodes where the patient left at own risk.	NSW linked admitted patient data; Productivity Commission RoGS
Unadjusted hospitalisation rate, per 100,000 hip and knee surgical episodes, for post-operative pulmonary embolism or deep vein thrombosis	Denominator: Hip and knee surgical episodes for patients aged 15+ years Numerator: Denominator cases with secondary diagnosis ICD-10-AM codes I26.0, I26.9, I80.1, I80.2, I80.3, I80.8, I80.9, I82.8 or I82.9 More information on hip and knee procedure codes available upon request	Excludes: • Episodes with principal diagnosis of pulmonary embolism or deep vein thrombosis • Episodes with procedure code 'interruption of vena cava' (ACHI procedure code 34800-00, 35330-00, 35330-01) • Pregnancy, childbirth and puerperium episodes • Episodes with length of stay less than 2 days.	NSW linked admitted patient data; OECD Health Statistics
Unadjusted hospitalisation rate, per 100,000 abdominal surgical episodes, for post-operative sepsis	Denominator: Abdominal surgical episodes for patients aged 15+ years Numerator: Denominator cases with secondary diagnosis ICD-10-AM codes A40.0, A40.1, A40.2, A40.3, A40.8, A40.9, A41.0, A41.1, A41.2, A41.3, A41.4, A41.5, A41.8, A41.9, R57.2, R57.8, R65.0, R65.1 or T81.1 More information on abdominal procedure codes available upon request	Excludes: • Episodes with principal diagnosis of sepsis or infection • Immunocompromised patients • Cancer patients • Pregnancy, childbirth and puerperium episodes • Episodes with length of stay less than 3 days. Additional diagnosis codes for recording wound infection sepsis are available in the Australia modification of the ICD-10 (T81.42). For comparative purposes, this	Linked admitted patient data; OECD Health Statistics

Indicator	Cohort description (numerator, denominator)	Further details (inclusions, exclusions, references)	Data source
		was excluded for international comparison. The post-operative sepsis cases excluded had minimal impact on the rate published.	
Unadjusted hospitalisation rate, per 100,000 episodes, for foreign body left during procedure	Denominator: Hospital episodes for patients aged 15+ years Numerator: Denominator cases with secondary diagnosis ICD-10-AM codes T81.5, T81.6, Y61.0, Y61.1, Y61.2, Y61.3, Y61.4, Y61.5, Y61.6, Y61.7, Y61.8, Y61.9	Excludes: • Episodes with a principal diagnosis of foreign body left during procedure • Same day discharge.	NSW linked admitted patient data; OECD Health Statistics
Falls resulting in patient harm in hospital	Denominator: All hospital episodes Numerator: Denominator cases with a fall external cause code (ICD-10-AM W00, W01, W03-W11, W13, W14, W16-W19) and a health service area place of occurrence diagnosis code (ICD-10-AM Y92.22)	Excludes: • Episodes with principal diagnosis injury (ICD-10-AM S00-T14) • Episodes with principal diagnosis rehabilitation (ICD-10-AM Z50.9) and secondary diagnosis injury.	NSW linked admitted patient data; AIHW Admitted patient care
Average length of stay by fall status, for patients aged 75+ years	Cohort: All hospital episodes Length of stay was the difference between the episode end date and the episode start date minus any leave days	Excludes: • Patients under 75 years of age	NSW linked admitted patient data
Unadjusted rates of obstetric trauma, per 100 vaginal deliveries, with and without instrument	Denominator: Vaginal deliveries for females aged 15+ years ICD-10-AM diagnosis codes: O80, O81, O83, O84.0, O84.1, O84.81, O84.82, O84.9 Numerator: Denominator cases with ICD-10-AM diagnosis codes O70.2 or O70.3 or ACHI procedure codes 90480-00, 90480-01 or 16573-00	Method based on OECD definition ACHI procedure codes for instrument-assisted delivery: 90468-00, 90468-01, 90468-02, 90468-03, 90468-04, 90468-05, 90469-00, 90469-01, 90470-01, 90470-02, 90470-04, 90474-00, 90475-00	NSW linked admitted patient data; OECD Health Statistics
Efficiency			
Average length of stay for surgical and medical patients	Cohort: All surgical and medical acute hospital episodes Surgical and medical episodes were defined based on the AR-DRG code – further details can be provided on request Contiguous acute episodes were combined into a single period of care Length of stay was calculated as the difference between the start date and end date of the period of care	Excludes: • Non-acute episodes • Newborn episodes • Same day period of care • Length of stay greater than 31 days.	NSW linked admitted patient data
Percentage of vaginal births where the mother was discharged on the same day as the birth	Denominator: Normal vaginal births in NSW Numerator: Denominator cases where the baby's date of birth is the same as the mother's discharge date The birth record in perinatal data was linked to the hospital record in	Excludes: • Instrument assisted vaginal births, vaginal breech births and caesarean section births	NSW linked admitted patient and perinatal data

Indicator	Cohort description (numerator, denominator)	Further details (inclusions, exclusions, references)	Data source
	admitted patient data. All hospital episodes associated with the birth (including transfers) were combined into a single period of care.		
Average length of stay for vaginal births and caesarean section births	Cohort: Normal vaginal births and caesarean section births The birth record in perinatal data was linked to the hospital record in admitted patient data. All hospital episodes associated with the birth (including transfers) were combined into a single period of care. Length of stay was defined as the difference between the baby's date of birth and the mother's discharge date.	Excludes: • Instrument assisted vaginal births and vaginal breech births • Same day birth and discharge • Length of stay greater than 120 days.	NSW linked admitted patient and perinatal data
Percentage of cataract extractions performed same day	Denominator: Hospital episodes with cataract extraction ACHI procedure code: 42698-00 to 42698-05, 42702-00 to 42702-11, 42716-00, 42719-00, 42719-02, 42722-00, 42731-00, 42731-01, 42734-00, 42788-00 Numerator: Denominator cases where the episode start date was the same as the episode end date	Excludes: • Episodes with care type newborn, hospital boarder or posthumous organ procurement	NSW linked admitted patient data; OECD Health Statistics; AIHW Admitted patient care
Equity			
Median waiting times for elective surgery	Cohort: Patients removed from the elective surgery waiting list because they received their surgery Waiting time: in days, the difference between a patient's listing date on the waiting list and date of their removal from the waiting list, excluding any days when the patient was not ready for care	For further details, see www.bhi.nsw.gov.au/BHI_reports/technical_supplements	NSW waiting list online collection system
Percentage of elective surgery procedures not completed within the recommended time	Denominator: Count of elective surgery procedures performed Numerator: Denominator cases with a waiting time more than recommended for the urgency category	For further details, see www.bhi.nsw.gov.au/BHI_reports/technical_supplements	NSW waiting list online collection system
Calculations by socio-economic status	In this report, the NSW population was divided into five groups based on the Index of **Relative Socio-Economic Disadvantage** (IRSD) scores of their postal area of residence. This means that postal areas were sorted by IRSD score and assigned to population-weighted quintiles, each containing close to one-fifth of the total population of NSW.	Excludes: • Postal area is missing • Postal area of the patient is not in NSW. *Note: While the index of disadvantage is not a measure of socio-economic advantage, the language of high SES to represent the least disadvantaged quintile, and low SES to reflect the most disadvantaged quintile was used for ease of communication*	

Indicator	Cohort description (numerator, denominator)	Further details (inclusions, exclusions, references)	Data source
Sustainability			
Population, emergency department presentations and hospitalisations by age group	Cohort: ABS estimated resident population for NSW, emergency presentations to NSW public hospital emergency departments and all public and private hospital episodes	Excludes: • Non-NSW residents • Non-emergency presentations • Baby born in hospital (ICD-10-AM codes: Z38.0, Z38.3, Z38.6).	NSW linked emergency department and admitted patient data; ABS estimated resident population
Frequent user of emergency departments	Emergency presentations to NSW public hospital emergency departments recorded between 1 July 2015 and 30 June 2016 for each patient were categorised into 1, 2 and 3 or more presentations	Excludes: • Non-NSW residents • Non-emergency presentations.	NSW linked emergency department presentation data
Frequent user of overnight hospitalisations	Counts of overnight public and private hospital episodes recorded between 1 July 2014 and 30 June 2015 for each patient were categorised into 1, 2 and 3 or more presentations	Excludes: • Non-NSW residents • Baby born in hospital (ICD-10-AM codes: Z38.0, Z38.3, Z38.6).	NSW linked admitted patient data
Percentage of emergency department presentations arriving by ambulance, by urgency category	Denominator: All presentations to NSW public hospital emergency departments Numerator: Denominator cases where the mode of arrival was ambulance, air ambulance or helicopter		NSW public hospital activity data; Productivity Commission RoGS
Volume of ambulance responses, by priority	Cohort: All ambulance responses Priority is classified as emergency (P1), urgent (P2) time-critical (P3) and non-emergency (P4-9)	For further details, see www.bhi.nsw.gov.au/BHI_reports/technical_supplements	NSW Ambulance Computer Aided Dispatch system
Percentage of ambulance responses that resulted in at least one patient transported to hospital, by priority	Denominator: All ambulance responses Numerator: Denominator cases where at least one patient was transported to a NSW public hospital	For further details, see www.bhi.nsw.gov.au/BHI_reports/technical_supplements	NSW Ambulance Computer Aided Dispatch system
Rate of change in emergency department presentations compared with population growth	Cohort: ABS estimated resident population for NSW and emergency presentations to NSW public hospital emergency departments	Excludes: • Non-emergency presentations	NSW public hospital activity data
Telehealth use (number of services)	MBS telehealth items included: 99, 112, 113, 114, 149, 288, 389, 2799, 2820, 3003, 3015, 6004, 6016, 13210, 16399, 17609, 2100, 2122, 2125, 2126, 2137, 2138, 2143, 2147, 2179, 2195, 2199, 2220, 10983, 10984, 82150, 82151, 82152, 82220, 82221, 82222, 82223, 82224, 82225	For further details, see www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/connectinghealthservices-factsheet-stats	MBS online

Table 3 Definitions and derived data items

Data item	Description
NSW resident	NSW residents are identified in administrative data collections using the data field STATE OF RESIDENCE in SAPHaRI datasets. The data recorded in this field is taken directly from the relevant table in the Health Information Exchange data warehouse. Surveys use sampling methods that ensure persons surveyed are usual residents of NSW.
Period of care	Periods of care combine contiguous hospitalisation episodes within the same or different hospitals (via transfer) into a single period of care in order to follow an outcome of interest.
Same day discharge/day only admission	A same day discharge is identified by equal episode start and end dates.
Length of stay	An episode's length of stay is calculated as the difference between the episode end date and the episode start date minus total episode leave days. This definition is specified in the AIHW Health Minimum dataset. The quantity is derived in SAPHaRI datasets.
Area of usual residence	Area of usual residence is used to attach an index of socioeconomic status and remoteness category to where a patient lives.

Appendix: OECD country comparison data tables

The analysis of *Healthcare in Focus 2016* places NSW in an international context, focusing on Australia and 10 other countries: Canada, France, Germany, Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom and the United States. In addition, data for the remaining 24 of the 35 OECD countries (Austria, Belgium, Chile, Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, Poland, Portugal, Slovak Republic, Slovenia, Spain and Turkey) was obtained for a broader perspective of performance across a range of measures.

A summary of values used in the report summary figures is provided in Tables A.1 and A.2. Country data is available at http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT including detail on years and methods.

Table A.1 Indicator values for NSW and available country comparators, most recent year available for each country out of 2014, 2013 or 2012 (Part 1 of 2)

	Hip replacement surgery median wait (days)	Knee replacement surgery median wait (days)	Cataract surgery median wait (days)	Coronary artery bypass graft surgery median wait (days)	Influenza vaccination 65+ years (%)	Vaccination in children (%)	Breast screening 50–69 years (%)	Hip fracture surgery within two days 65+ years (%)	Caesarean section (% of births)
NSW	207	291	222	28	71.9	90.1	51.3	70	31.5
Australia	109	191	83	14		92	54.2		32.1
Canada	88	98	49	6	63.1	96		92	26.3
France					48.5	99	52.5		20.8
Germany						96		87.6	30.9
Netherlands					72	96	79.4		
New Zealand	87	95	74	34	69	93	72.2	82.3	25.8
Norway	132	165	84	47.5	26.9	93	74.9	89.3	16.5
Sweden					49.7	98		93	16.4
Switzerland						96			
United Kingdom	76	79	61	57	72.8	95	75.3	87.6	23.0
United States						94			32.5
Austria					20.3	83		84.4	28.8
Belgium						99			20.2
Chile	232		88	13	74.9	92			44.7
Czech Rep.						99	60.8	85.4	26.1
Denmark	41	48	61	10	43	94	83.9	95.8	22.2
Estonia	145	229	83		1.4	93	58	80.9	20.1
Finland	91.5	110	114	17	40	98	82.8	85.8	15.8
Greece						99			
Hungary	75	114	39	18	31.2	99	44.5		35.3
Iceland					41	90	60		15.2
Ireland					60.2	96	76.5	82.3	28.5
Israel	56	82	58	7	63.8	94	69.7	84.8	15.4
Italy	50	46	23	9	55.4	94	57	44.8	36.1
Japan					50	98			
Korea					79.8	99	65.5		36.0
Latvia					2.8	92	35.9	49.9	
Luxembourg					41.8	99	60.7		26.8
Mexico					82.3	87	17.5		45.2
Poland	231	345	384			99			34.6
Portugal	84.5	188.3	80.7	3.4	50.9	98		45	35.0
Slovak Rep.					14.1	97	23.1		30.7
Slovenia					11	95	78.5	61.9	19.5
Spain	130	162	97	41	56.2	97		43.3	25.2
Turkey					9	96	30.8		50.4

Table A.2 Indicator values for NSW and available country comparators, most recent year available for each country out of 2014, 2013 or 2012 (Part 2 of 2)

	Deaths from acute myocardial infarction per 100,000 population	Deaths from cerebrovascular diseases per 100,000 population	Post-operative PE/DVT following hip and knee surgery crude rate per 100,000 hospitalisations	Post-operative sepsis following abdominal surgery crude rate per 100,000 hospitalisations	Post-operative retained foreign body crude rate per 100,000 hospitalisations	Obstetric trauma with instrument rate per 100 births	Obstetric trauma without instrument rate per 100 births
NSW	36.6	48.7	2489.6	2516.4	9.6	7.7	2.6
Australia	36	44.9	1,766.6	2,337.9	9.7	7.0	2.5
Canada						17.1	3.1
France	18.3	36.1	2,063.7				
Germany	43.2	46.6					
Netherlands	30.5	51.2				3.7	2.5
New Zealand	59.1	63.3				8.4	2.6
Norway	44.5	47				4.8	1.4
Sweden	45.5	51.3				13.2	2.8
Switzerland	22.7	37.2	548.1	1,103.8	12.3	7.2	2.6
United Kingdom	38.3	53.2	534.6	1,723.0	7.1	7.2	2.8
United States	37.2	40.9	594.4	1,940.6	7.8	10.3	1.5
Austria	42.8	45.4					
Belgium	34.7	49.4					
Chile	48.7	77.1					
Czech Rep.	48.4	86.9					
Denmark	31.9	54.3				13.4	2.6
Estonia	28.9	58.8					
Finland	50.6	63	128.5	740.7	4.4	3.2	0.8
Greece	51.4	105.9					
Hungary	53	111.7					
Iceland							
Ireland	56.9	53.2	577.4	2,959.8	5.9	4.8	1.9
Israel	21.2	39.7	459.6	2,377.8	3.8	1.9	0.5
Italy	32.2	67.2				1.4	0.5
Japan	18.9	54.1					
Korea	26.4	71.6					
Latvia	44.7	185.2					
Luxembourg	29.2	42					
Mexico	124.7	57.9					
Poland	33.8	79.9					
Portugal	34.2	85.4	149.9	3,094.3	5.2	2.3	0.5
Slovak Rep.	44.4	113.5					
Slovenia			938.9	2,009.5	1.5	0.8	0.3
Spain	26.8	44				4.2	0.9
Turkey	97.6	100.8					

Notes: Death rates are age-standardised to the OECD standard population for 2010. PE/DVT = Pulmonary embolism and deep vein thrombosis. For adverse event related measures, post-surgery or obstetric measures, Poland was removed as there were notes suggesting there were underestimation and comparability issues.

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