



Technical Supplement

Healthcare in Focus 2011

How well does NSW perform?
An international comparison

Annual Performance Report: November 2011

Summary

This is a supplement to the Bureau of Health Information's second annual performance report, *Healthcare in Focus 2011: How well does NSW perform? An international comparison*.

This supplement describes the methods and technical terms used to compute descriptive statistics and performance indicators reported. The supplement is technical in nature, and is intended for audiences interested in the creation of health information.

To produce the report, the Bureau has relied on the following sources of data:

- The Commonwealth Fund's 2011 International Survey of Sicker Adults in Eleven Countries¹, which is conducted every three years by the Commonwealth Fund, a United States philanthropic organisation. The methods used to conduct that survey are briefly described in this report.
- The Organisation for Economic Co-operation and Development (OECD) health data library. These data reflect mortality, hospitalisation, health system expenditure, capacity and achievements in OECD member countries.²
- Australian Bureau of Statistics (ABS) mortality data for 2007, 2008 and 2009
- Australian Institute of Health and Welfare (AIHW) expenditure data
- Department of Health admitted patient data collection, midwife data collection, population and mortality data.

The Bureau used SAS³ 9.2 for the statistical analysis of data published in the report.

The Commonwealth Fund's 2011 International Survey of Sicker Adults in Eleven Countries

Each year, the Commonwealth Fund commissions an international survey to support the creation of public reports benchmarking the performance of comparable nations. The survey focuses on sicker adults every three years.

'*Sicker adults*' is a term used to describe a group of patients who are likely to have had significant direct experience of the healthcare system in the recent past. It includes patients who met at least one of the following criteria:

- Described overall health as fair or poor
- Received medical care in the previous year for a serious or chronic illness, injury or disability
- Had been hospitalised in the previous two years (for any reason other than childbirth)
- Had surgery in the previous two years.

The Commonwealth Fund provided core funding for an Australian sample of 750 sicker adults, including 250 interviews in NSW. The Bureau funded an additional 750 interviews in NSW to achieve a sample size sufficient for robust estimates to compare the performances of the NSW healthcare system with Australia as a whole and with the 10 comparator countries surveyed.

The 2011 Commonwealth Fund International Health Policy Survey was conducted by survey research firm, Harris Interactive. Telephone interviews were conducted with representative samples of 18,667 sicker adults aged 18 and over in Australia, Canada, France, Germany, the Netherlands, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States. Fieldwork in all countries took place between 17 March and 30 June 2011.

The method used to conduct the survey is similar to the method used for the 2010 Commonwealth Fund International Health Policy Survey of Adults. For details about data collection and survey procedures, please refer to the Bureau's *Technical Supplement - Healthcare in Focus: how NSW compares internationally*, which was published in December 2010.⁴ The main methodological difference between these surveys is the cohort. In 2010, all adults age 18 and over were eligible for the survey, whereas in 2011, eligible respondents had to meet the above-mentioned criteria to be considered a sicker adult.

Full telephone interviews were completed only with respondents who satisfied eligibility criteria. Sampling frame, sampling strategy, sample size (number of eligible respondents) and response rates for each participating country are summarised in [Table 1, Appendix 1](#).

Weighting the data

Final samples were weighted to reflect the distribution of the sicker adult population in each country in the 2011 International Health Policy Survey. The characteristics and population used to calculate weights for each country are summarised in [Table 2, Appendix 1](#). Australian data were weighted by education, age, sex, urbanicity and region, and were weighted to the ABS population estimates for 2006. [Table 3 in Appendix 1](#) shows the weighted and unweighted proportions for the Australian data.⁵

The Bureau received de-identified unit record data from the survey. Bureau staff verified the performance estimates calculated by Harris Interactive for those indicators used in the report.

Statistical analysis

The aim of the report was to set the performance of the NSW healthcare system alongside Australia and 10 comparator countries.

One way to report differences in the estimates for each indicator across jurisdictions participating in the 2011 International Health Policy Survey is to calculate the 95% confidence interval, which provides a range of values that should contain the actual value 95% of the time. If confidence intervals do not overlap, the observed estimates are statistically significantly different. From an interpretation perspective, this means we are almost certain there are true differences between jurisdictions. If confidence intervals overlap slightly, further statistical testing is required to test the degree to which there are important differences between jurisdictions.

This approach found a number of confidence intervals overlapped slightly. To test the difference between NSW estimates and the estimates of other countries, the Bureau used the following approach for each indicator:

- Define a binary variable with “1” as value of interest and “0” as other. For example, for the question *“When you have received care or treatment from specialists, how often did they give you an opportunity to ask questions about recommended treatment?”*, Always (1), often, sometimes, rarely or never (0), or *“In the past two years, have you been given the wrong medicine or wrong dose at a pharmacy or while hospitalised?”*, Yes (1), no (0)

- Fit a logistic regression using proc survey logistic in SAS and above defined binary variable as outcome and country as explanatory variable
- If country comes into the model (i.e. the hypothesis of at least two countries have different estimates), use **contrast** option in proc survey logistic in SAS to test if NSW estimate is statistically significantly different from the estimates of any other countries
- For each contrast, if the p-value is less than or equal to 0.01, reject the null hypothesis that NSW estimate is equal to the other country estimate and show an arrow in the appropriate bar for the graph in the report. If the p-value is greater than 0.01, then unable to reject the null hypothesis of difference between estimates.

Please note null hypotheses are *never* accepted. We either reject them or fail to reject them.⁶ For example, for a specific indicator, failing to reject the hypothesis of a NSW performance estimate being equal to France estimate does not mean that we accept there is no difference between NSW and France. It means that, using the available data, we are unable to reject the null hypothesis that there are not important differences in the performance of these countries.

Reliability of survey estimates

The results from any survey are subject to sampling variation. The magnitude of this variation is measurable and is affected by the number of interviews involved.

The response rate for the 2011 International Health Policy Survey varies from 21% in Netherlands to 42% in Canada (Table 1, Appendix 1) and 24% for Australia. A high response rate may be expected to reduce the risk of bias and increase the likelihood that the sample is representative of the population. However, many studies have looked at the difference in survey estimates resulting from exhaustive effort to increase response rate.^{7, 8, 9} These studies concluded that:

- A high response rate does not substantially affect the level of data representativeness
- It is not valid to focus on response rates alone in determining the quality of survey data
- Cost-effectiveness of high response rate is poor.

In 2007, Statistics Canada included some questions from the 2007 International Health Policy survey in its Canadian Survey of Experiences with Primary Health Care and achieved a 76% response rate compared with 25% for the 2007 International Health Policy survey. Sutherland and Leatherman compared estimates from both surveys in *Quality of Healthcare in Canada: A Chart book*.¹⁰ There were no substantial differences between the estimates from the two surveys.

Organisation for Economic Co-operation and Development (OECD) data library

Definitions of performance indicators used by the OECD are available at www.stats.oecd.org

Data for NSW were obtained for comparison with OECD data in two ways:

- 1) As mortality data for 2008 and 2009 were not released at the time of analysis for this report, the Bureau commissioned the ABS to calculate age-standardised death rates and potential years of life lost (PYLL) for NSW and Australia for 2007-2009 using the same methods as OECD. To be consistent in methodology used for the trends, the Bureau used population and mortality data from NSW Health data collections accessed from the Health Outcomes Information Statistical Toolkit (HOIST)¹¹ to calculate PYLL 1999-2007 for NSW and Australia. Rates were age standardised using the OECD standard population 1980 (Table 1, Appendix 2) to enable fairer comparisons between NSW and countries surveyed. Standardised death rates (SDRs) are expressed per 100,000 persons. SDRs have been calculated using the direct method, age standardised by five-year age groups to 75 years and over. The following mortality rates and PYLL were calculated with corresponding ICD 10 mortality codes:

- Malignant neoplasms (C00-C97)
- Diseases of the circulatory system (I00-I99)
- Diseases of the respiratory system (J00-J98).

The ABS causes of death data for 2007 have undergone two years of revisions; data for 2008 have been revised and are subject to a revisions process; data for 2009 are preliminary and subject to a revisions process. See ABS Causes of Death, Australia, 2009 (cat. no. 3303.0) Technical Note: Causes of Death Revisions and Explanatory Notes 28-32.

- 2) For performance measures involving procedures and hospitalisations, the Bureau calculated the measures for NSW using data from HOIST, Centre for Epidemiology and Research, NSW Ministry of Health.¹¹ Data for Caesarean section rates were obtained from the NSW Midwives Data Collection; data for the other indicators were obtained from the NSW Admitted Patient Data Collection. The following rates were calculated (the details are summarised in Table 2 Appendix 2):

- Caesarean sections per 1,000 live births
- Vaginal hysterectomies per 100,000 females
- Separations for respiratory disease per 100,000 population
- Separations for diabetes per 100,000 population
- Separations for mental health per 100,000 population.

The Bureau commissioned AIHW to calculate health expenditures for NSW, using the OECD System of Health Accounts approach, and converting data to Australian dollars using GDP purchasing power parities. We adopted this approach to place NSW Health expenditure and investment in an international context. Note the periods equating to a financial year differ across countries (for details, see [Table 3, Appendix 2](#)).

Appendix 1: 2011 Commonwealth Fund Survey

Table 1: Sample frame, sampling strategy, sample size and response rate by country, The Commonwealth Fund's 2011 International Survey of Sicker Adults in Eleven Countries⁵

Country	Language(s)	Sampling frame	Sampling strategy*	Sample size (number)	Response rate
Australia	English	Listed residential phone numbers from the most current electronic white pages national database (EWP).	Multi-stage sampling, with lists of numbers drawn randomly for locations.	1,500	24%
Canada	English French	Random Digit Dialing sample supplied by ASDE Survey Sampler Inc. covering all 10 provinces and three territories.	Random respondent selection within the household.	3,958	42%
France	French	Landline (80%) and mobile (20%) phone numbers from national directory of white pages.	The landline sample was randomly drawn, by region. The mobile numbers were randomly generated using special software	1,001	28%
Germany	German	The sample list was generated by GESIS Leibniz-Institut für Sozialwissenschaften in Mannheim, a non-profit institute for social sciences. 55,984 phone numbers were generated according to the Gabler Häder design, i.e. random numbers within ranges of registered landline numbers were created. Consequently, the list also contained numbers without service, business lines, etc.	Numbers were dialed in random order (randomisation was done in a database) in order to achieve regional representativeness without bias.	1,200	29%
Netherlands	Dutch	Landline (80%) from national telephone directory and mobile (20%) phone numbers from a list broker CDfoongids.	The landline sample was randomly drawn based on region.	1,000	21%
New Zealand**	English	National list of phone numbers, based on region.	Randomly selected.	750	22%
Norway	Norwegian	EasyConnect, a directory of telephone subscribers that includes landline and mobile users. The database covers most mobile telephone providers in Norway, including private and smaller companies.	Randomly selected from EasyConnect.	753	16%
Sweden	Swedish	Fieldwork was conducted by IB-IMRI using the PAR registry list of the total population. Telephone numbers were matched via a telephone number index.	The random sample selected by region was based on a list of total population 18 years or older.	4,804	21%

Country	Language(s)	Sampling frame	Sampling strategy*	Sample size (number)	Response rate
Switzerland	German French Italian	Official phone book of Switzerland.	Randomly drawn, by region.	1,500	30%
United Kingdom (England, Scotland, Wales, and Northern Ireland)	English	Official phone book of the United Kingdom.	The RDD sample was randomly drawn, by country.	1,001	28%
United States (excluding Alaska and Hawaii)	English Spanish	The study used a stratified sampling process to produce a representative sample of persons in households with telephones.	Households were selected through computerised RDD provided by Survey Sampling International (SSI).	1,200	26%

(*) In each country screening for eligible respondents started with a cross-section of adults aged 18 and older. Respondents were randomly selected at the household level using the “*most recent birthday*” method.⁵

(**) Due to the catastrophic earthquake in Christchurch prior to the field period, potential respondents in this area were excluded from the study sample.

Table 2: Characteristics and population used for weighting by country, The Commonwealth Fund's 2011 International Survey of Sicker Adults in Eleven Countries⁵

Country	Weighted by
Australia	Education, age, sex, urbanicity and region to reflect the population composition of the 2006 Australian Bureau of Statistics population estimates.
Canada	Education, age, sex, knowledge of official language and region to reflect the demographic composition of the 2006 Canadian census.
France	Age, sex, region and education to reflect the distribution of the National Institute for Statistics and Economic Studies, France, 2007.
Germany	Age, sex, education, region and household size according to the Statistisches Bundesamt 2006.
Netherlands	Age, sex, region and education according to the Statistical Yearbook of the Netherlands 2004.
New Zealand**	Age, sex, education and region based on targets derived from Statistics New Zealand's 2006 census data.
Norway	Age, sex, education and region based on targets derived from Statistics Norway 2008 (education) and 2010 (age and region).
Sweden	Age, sex, education and region based on targets derived from Statistics Sweden 2008 / 2009.
Switzerland	Age, sex, education, region and household size based on targets derived from the Federal Statistical Office, Neuchâtel 2008. (The target for education is from Eurostat.)
United Kingdom (England, Scotland, Wales, and Northern Ireland)	Age, sex, region and education based on targets derived from the 2001 United Kingdom Office of National Statistics census data.
United States (excluding Alaska and Hawaii)	Age, sex, race, education, region and household size to reflect the demographic composition of the United States population using the March 2009 Current Population Survey from the United States Census Bureau. A pre-weighting value for number of telephone lines was also used.

Table 3: Comparison of Weighted and Unweighted Data for Australia in The Commonwealth Fund's 2011 International Survey of Sicker Adults in Eleven Countries⁵

	All respondents		Eligible respondents	
	Weighted	Unweighted	Weighted	Unweighted
Base				
	1,076	3,218	1,500	1,500
Sex				
Male	48%	35%	48%	36%
Female	52%	63%	52%	64%
Age				
18–24	7%	3%	5%	2%
25–34	18%	9%	12%	7%
35–49	30%	27%	26%	22%
50–64	27%	33%	30%	37%
65 plus	19%	25%	27%	33%
Education				
Year 11 or below	51%	29%	59%	44%
Year 12 or Certificates 1–4	21%	17%	21%	25%
Advanced diploma or diploma	27%	23%	20%	30%
Urbanicity				
Major city	65%	67%	47%	46%
Other	35%	33%	53%	54%
Region				
New South Wales	51%	65%	33%	67%
Victoria	17%	12%	25%	11%
Queensland	16%	10%	20%	10%
South Australia	5%	4%	7%	5%
Western Australia	6%	5%	10%	5%
Tasmania	1%	1%	2%	22%
Northern Territory	-	-	1%	-
Australian Capital Territory	2%	1%	2%	1%

Appendix 2: OECD

Table 1: Total OECD Population 1980 - The following standard population was used to calculate age-standardised rates for mortality and for Potential Years of Life Lost (PYLL):

Age (years)	Population (percentage)
0	1.62
1-4	6.32
5-9	8.09
10-14	8.3
15-19	8.56
20-24	8.2
25-29	7.81
30-34	7.63
35-39	6.31
40-44	5.83
45-49	5.56
50-54	5.46
55-59	5.08
60-64	3.89
65-69	3.88
70-74	3.18
75-79	2.26
80-84	1.23
85+	0.77
Total	100

Table 2: Data source and other detailed information about health indicators calculated by the Bureau using OECD definition¹²

Indicator	Data source	Year	Age group	Diagnosis code	Procedure code	NSW Population*	Notes
Caesarean sections per 1,000 live births	MDC Midwives Data Collection (HOIST)	Calendar years 1999–2009	All	N/A	N/A	N/A	Live birth is defined as weight at least 400 grams and gestational age more than 20 weeks. Multiple births are counted as single births.
Vaginal hysterectomy per 100,000 females	Admitted Patients Data Collection (HOIST)	Calendar years 1999–2009	All	N/A	ICD 10: 1269 in any procedure block (up to 20)	1999–2009 ABS mid-year female population estimate	Same-day admissions are excluded
Separation for diseases of the respiratory system, per 100,000 population	Admitted Patients Data Collection (HOIST)	Calendar years 1999–2009	All	ICD-10-AM: J00–J99 in first diagnosis only	N/A	1999–2009 ABS mid-year population estimate	Same-day admissions are excluded
Separation for diabetes, per 100,000 population	Admitted Patients Data Collection (HOIST)	Calendar years 1999–2009	All	ICD-10-AM: E10–E14 in first diagnosis only	N/A	1999–2009 ABS mid-year population estimate	Same-day admissions are excluded
Separation for mental health, per 100,000 population	Admitted Patients Data Collection (HOIST)	Calendar years 1999–2009	All	ICD-10-AM: F00–F99 in first diagnosis only	N/A	1999–2009 ABS mid-year population estimate	Same-day admissions are excluded

(*) Australian Bureau of Statistics Population data (HOIST).

Note 1: N/A = not applicable

Note 2: HOIST = Health Outcomes Information Statistical Toolkit

Note 3: ABS = Australian Bureau of Statistics

Table 3: Periods equating to Australia / NSW financial year 2008–09

Country	Financial year
Australia	1 July 2008 to 30 June 2009
Canada	1 April 2008 to 31 March 2009
France	1 January 2008 to 31 December 2008
Germany	1 January 2008 to 31 December 2008
Japan	1 April 2008 to 31 March 2009
New Zealand	1 July 2008 to 30 June 2009
Sweden	1 January 2008 to 31 December 2008
United Kingdom	1 April 2008 to 31 March 2009
United States	1 October 2007 to 30 September 2008

References

1. The 2011 Commonwealth Fund International Survey of Sicker Adults in Eleven Countries [online] 2011 [cited 10 November 2011]. Available from: www.commonwealthfund.org/Publications/In-the-Literature/2011/Nov/2011-International-Survey-Of-Patients.aspx
2. Organisation for Economic Co-operation and Development. [Health Data 2011](#) [online] 2011 [cited 24 October 2011]. Available from: www.oecd.org/health/healthdata
3. SAS Institute. [The SAS System for Windows, version 9.2](#) Cary (NC): SAS Institute 2005.
4. Bureau of Health Information. [Technical Supplement: Healthcare in Focus 2010, how NSW compares internationally](#). BHI. [online] 2010 [cited 14 Oct 2011]. Available from www.bhi.nsw.gov.au/___data/assets/pdf_file/0014/133403/Annual-Performance-Report-2010_Healthcare-In-Focus_TECHINAL-SUPPLEMENT.pdf
5. Harris Interactive. [International Health Perspectives 2011: Methods Report](#). [Unpublished] 2011.
6. Dallal G. [The Little Handbook of Statistical Practice](#) [online] 2007 [cited 24 October 2011]. Available from: www.tufts.edu/~gdallal/LHSP.HTM
7. Lee S, Brown ER, Grant D, Belin TR, Brick JM. [Exploring nonresponse bias in a health survey using neighborhood characteristics](#). *Am J Public Health*. 2009 Oct; 99(10):1811-7.
8. Davern M, McAlpine D, Beebe TJ, Ziegenfuss J, Rockwood T, Call KT. [Are lower response rates hazardous to your health survey? An analysis of three state telephone health surveys](#). *Health Serv Res*. 2010; Oct; 45(5 Pt 1):1324-44.
9. Bjertnaes OA, Iversen HH, Bukholm G. [International health policy survey in 11 countries: assessment of non-response bias in the Norwegian sample](#). *BMC Health Serv Res*. 2010; 10 (10):38.
10. Sutherland K, Leatherman S. [Quality of Healthcare in Canada: A chartbook](#). Ottawa: Canadian Health Services Research Foundation; 2008.
11. [Health Outcomes Information and Statistical Toolkit \(HOIST\)](#). Centre For Epidemiology and Research, Public Health Division, NSW Ministry of Health.
12. World Health Organization. [International Statistical Classification of Diseases and Related Health Problems, 10th revision](#). Geneva: WHO, 1992.

Download the report

The report, *Healthcare in Focus 2011: How well does NSW perform? An international comparison* and related documents are available at www.bhi.nsw.gov.au

The suite of products includes:

- The main report assesses performance in the healthcare system of NSW, using almost 90 indicators. It sets performance alongside Australia as a whole and 10 comparator countries
- *At a glance* (8 page summary document)
- *Technical Supplement: Healthcare in Focus 2011* (research methods and statistical analyses)
- *Downloadable slide library of key figures*
- *In 2010, Healthcare in Focus: how NSW compares internationally* (full report)



About the Bureau

The Bureau of Health Information provides the community, healthcare professionals and the NSW Parliament with timely, accurate and comparable information on the performance of the NSW public health system in ways that enhance the system's accountability and inform efforts to increase its beneficial impact on the health and wellbeing of the people of NSW.

The Bureau is an independent, board-governed statutory health corporation. The conclusions in this report are those of the Bureau and no official endorsement by the NSW Minister for Health, the NSW Ministry of Health or any other NSW statutory health corporation is intended or should be inferred.

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Please note that there is the potential for minor revisions of data in this report. Please check the online version at www.bhi.nsw.gov.au for any amendments.