Bureau of Health Information

The Insights Series

30-day mortality following hospitalisation, five clinical conditions, NSW, July 2009 – June 2012

Acute myocardial infarction, ischaemic stroke, haemorrhagic stroke, pneumonia and hip fracture surgery

Performance Profile:
Hawkesbury District Health Service

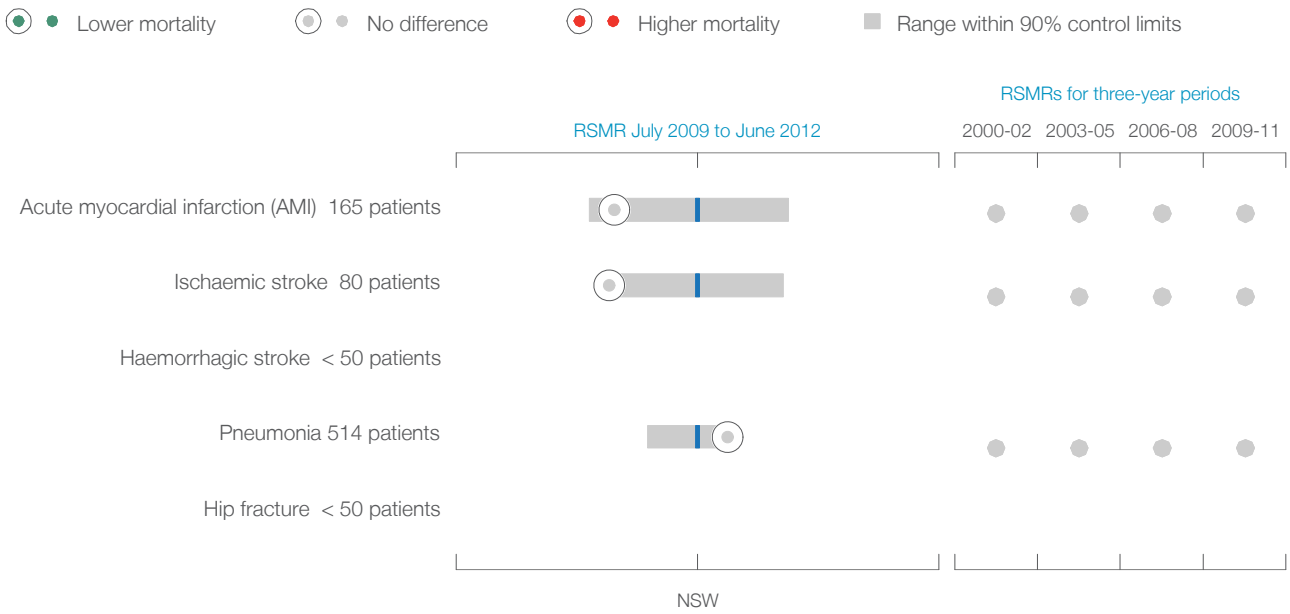
Hawkesbury District Health Service summary dashboard, July 2009 - June 2012

30-day mortality following hospitalisation for five conditions

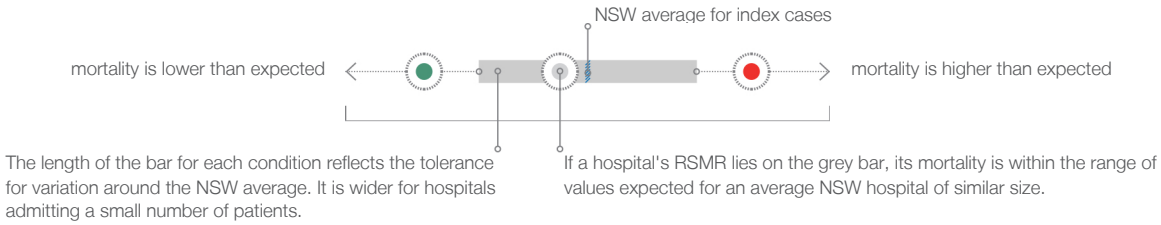
Hospital-specific risk-standardised mortality ratios (RSMRs) report the ratio of actual or 'observed' number of deaths to the 'expected' number of deaths. A hierarchical logistic regression model draws on the NSW patient population's characteristics and outcomes to estimate the expected number of deaths for each hospital, given its case mix. A ratio less than 1.0 indicates lower-than-expected mortality, and a ratio higher than 1.0 indicates higher-than-expected mortality. Small deviations from 1.0 are not considered to be meaningful. Funnel plots with 90% and 95% control limits around the NSW rate are used to identify hospitals with higher and lower mortality.

This measure is not designed to compare hospitals and cannot be used to measure the number of avoidable deaths. RSMRs do not distinguish deaths that are avoidable from those that are a reflection of the natural course of illness. They do not provide, by themselves, a diagnostic of quality and safety of care.

Risk-standardised mortality ratios (RSMRs) for five conditions, dashboard



How to interpret the dashboard



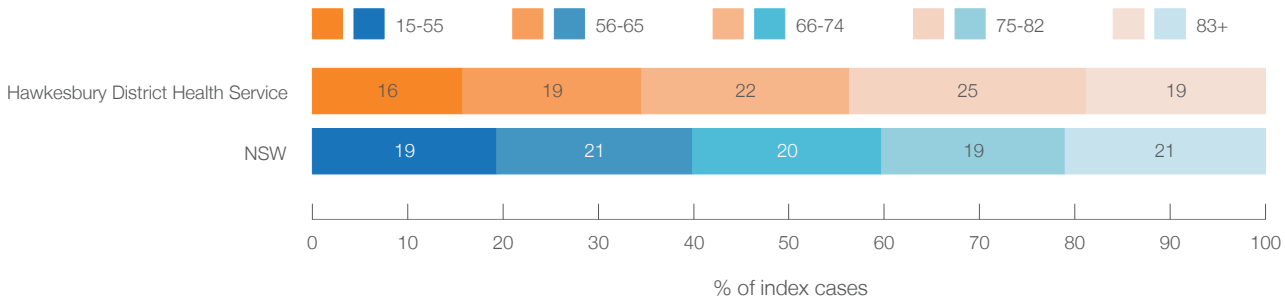
(†) Data for hospitals with an expected mortality of <1 are suppressed.
(◇) Between 90% and 95% upper control limits; (◇◇) Outside 95% upper control limits.
(⌑) Between 90% and 95% lower control limits; (⌑⌑) Outside 95% lower control limits.
Notes: RSMR data are for patients with a hospitalisation noting the relevant condition as principal diagnosis.
Patients include those discharged between July 2009 and June 2012 who were initially admitted to this hospital (regardless of whether they were subsequently transferred) in their last period of care. Deaths are from any cause, in or out of hospital within 30 days of the hospitalisation admission date.
Details of analyses and risk adjustment are available in *Spotlight on Measurement: risk-standardised mortality ratios for five conditions.*
Data source: SAPHaRI, Centre for Epidemiology and Evidence, NSW Ministry of Health.

Hawkesbury District Health Service profile July 2009 - June 2012

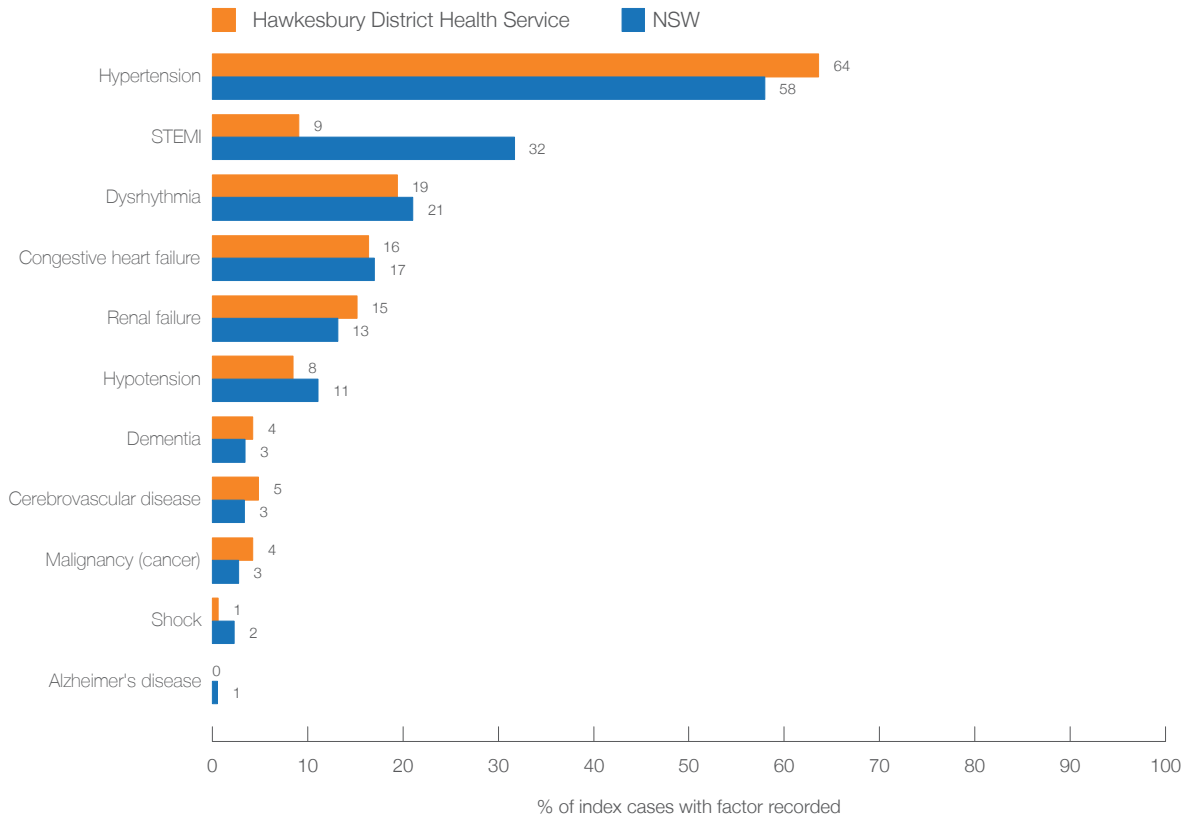
30-day mortality following hospitalisation for Acute Myocardial Infarction (AMI)

	This hospital	NSW
Total Acute Myocardial Infarction (AMI) hospitalisations	187	37,794
Acute Myocardial Infarction (AMI) patients		
Presenting patients (index cases)[1]	165	29,223
Patients not transferred to another hospital	90	18,303
Patients transferred out to another hospital	75	10,920

Age profile, index cases [2]



Significant patient factors and comorbidities, index cases [3]



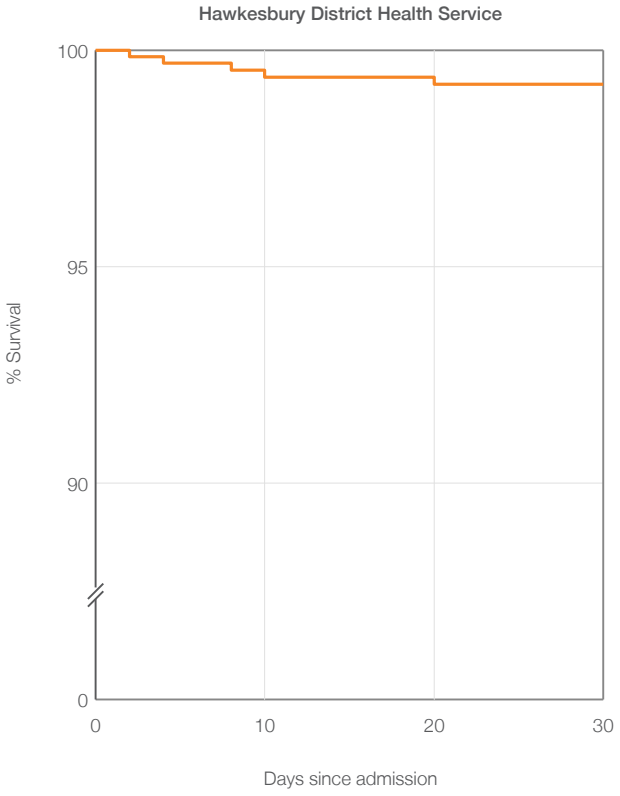
Hawkesbury District Health Service profile July 2009 - June 2012

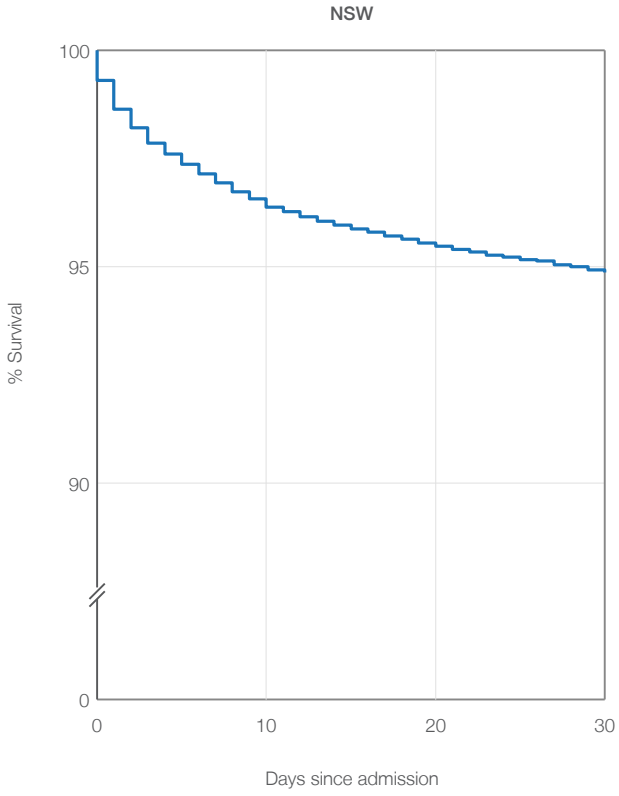
30-day mortality following hospitalisation for Acute Myocardial Infarction (AMI)

Mortality (all causes) among 165 Acute Myocardial Infarction (AMI) index cases [4]	This hospital percentage	NSW percentage
Percentages: index cases who died within 30 days of hospitalisation	3%	
Of all deaths:		
percentage in this hospital	60%	(64%)
percentage in another hospital following transfer	0%	(6%)
percentage after discharge	40%	(31%)
percentage on day of admission	0%	(14%)
percentage within 7 days	40%	(61%)

Survival of index cases following hospitalisation for Acute Myocardial Infarction (AMI) [5]

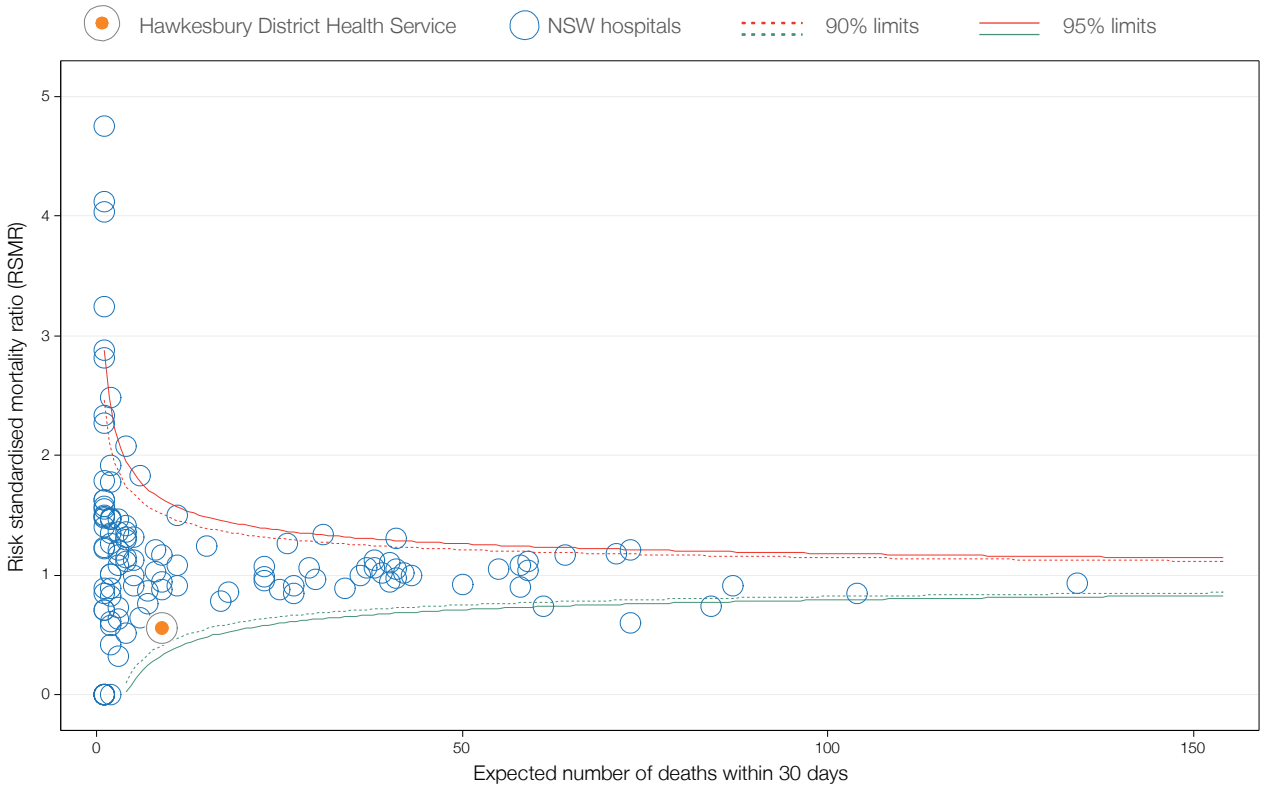
Adjusted for average age and Charlson comorbidity score





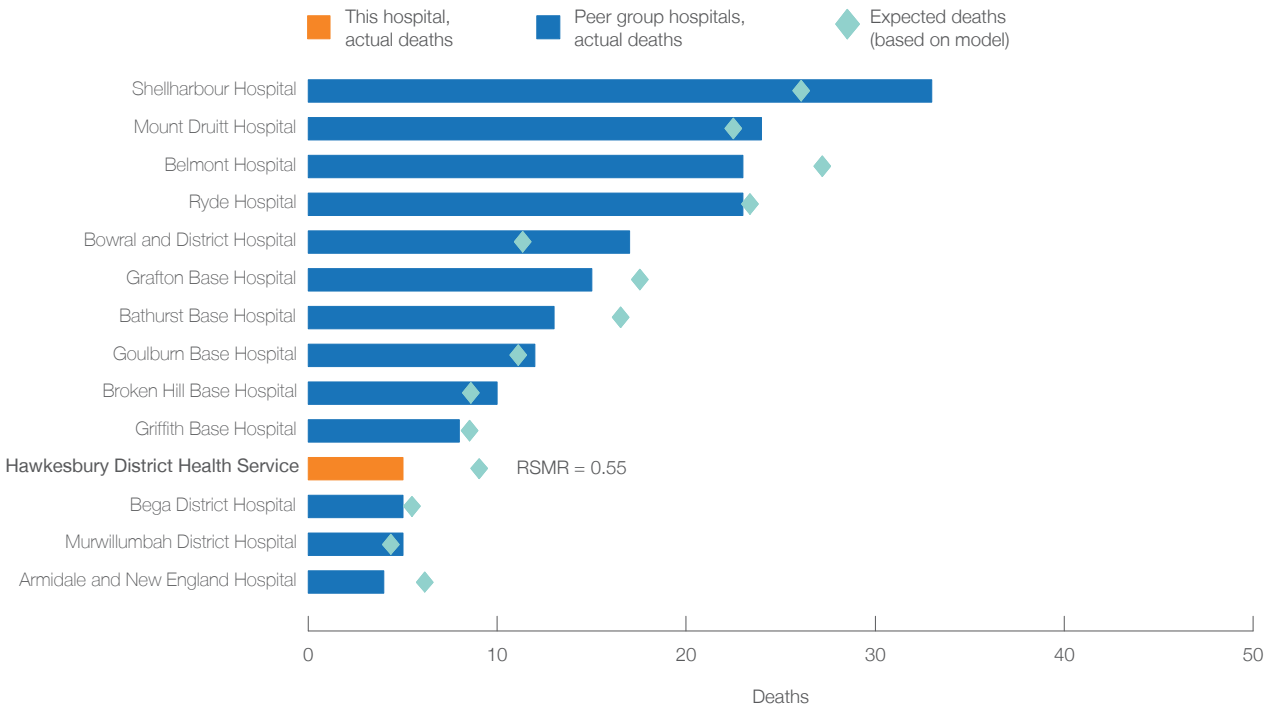
Hawkesbury District Health Service profile July 2009 - June 2012

Hospital-level Acute Myocardial Infarction (AMI) risk-standardised mortality ratio by number of expected deaths, NSW public hospitals



Hospital-specific RSMRs report the ratio of actual or 'observed' number of deaths to the 'expected' number of deaths. A hierarchical logistic regression model draws on the NSW patient population's characteristics and outcomes to estimate the expected number of deaths for each hospital, given the characteristics of its patients.

Actual and expected deaths, compared to local peers



Hawkesbury District Health Service profile July 2009 - June 2012
30-day mortality following hospitalisation for Acute Myocardial Infarction (AMI)

Illustrating the effect of standardisation, July 2009 - June 2012

In order to make fair comparisons, a number of risk adjustments are made to mortality data. These take into account patient level factors that influence the likelihood of dying. The table below illustrates the cumulative effect of the statistical adjustments. For each ratio, hospitals are compared to the average NSW result, given their case mix.

Lower mortality | No difference | Higher mortality

Unadjusted ratio	Age and sex standardised ratio	Risk-standardised mortality ratio
0.40	0.41	0.55

Time series risk-standardised mortality ratio, July 2000 - June 2012 [6]

Lower mortality | No difference | Higher mortality

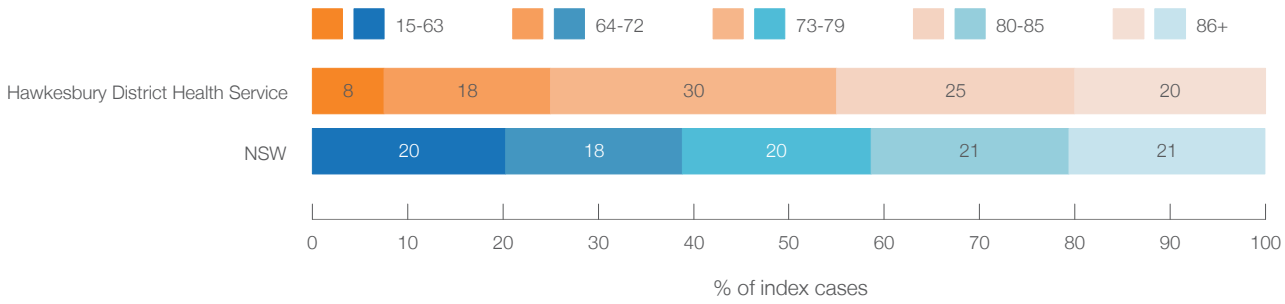
Year (financial years)	2000-02	2003-05	2006-08	2009-11
Risk-standardised mortality ratio	0.71	0.76	0.96	0.55

(1) Index cases refer to patients discharged between July 2009 and June 2012 who were initially admitted to this hospital (regardless of whether they were subsequently transferred) in their last period of care.
(2) Age at admission date.
(3) Only those conditions that were shown to have a significant impact on mortality (P<0.05) are shown. Many are a result of end-organ damage resulting from comorbidities, such as diabetes. A broader set of comorbidities was screened for potential impacts on mortality. Comorbidities as recorded on patient record, with one year look back. STEMI refers to ST-elevation myocardial infarction.
(4) Deaths are from any cause, in or out of hospital within 30 days of the index hospitalisation admission date.
(5) Kaplan-Meier survival curve for 30-day following admission for haemorrhagic stroke, adjusted for average age and average Charlson comorbidity score. Survival curves depict the proportion of patients who were alive, day 0 – day 30.
(6) To make RSMRs comparable over time, a reference population is required. Time series RSMRs for each hospital are based on the reference years (July 2009 - June 2012). Control limits are based on the NSW average within each period.
(†) Data for hospitals with an expected mortality of <1 are suppressed.
(◇) Between 90% and 95% upper control limits; (◇◇) Outside 95% upper control limits.
(⌶) Between 90% and 95% lower control limits; (⌶⌶) Outside 95% lower control limits.
Details of analyses and risk adjustment are available in *Spotlight on Measurement: risk-standardised mortality ratios*
Data source: SAPHaRI, Centre for Epidemiology and Evidence, NSW Ministry of Health.

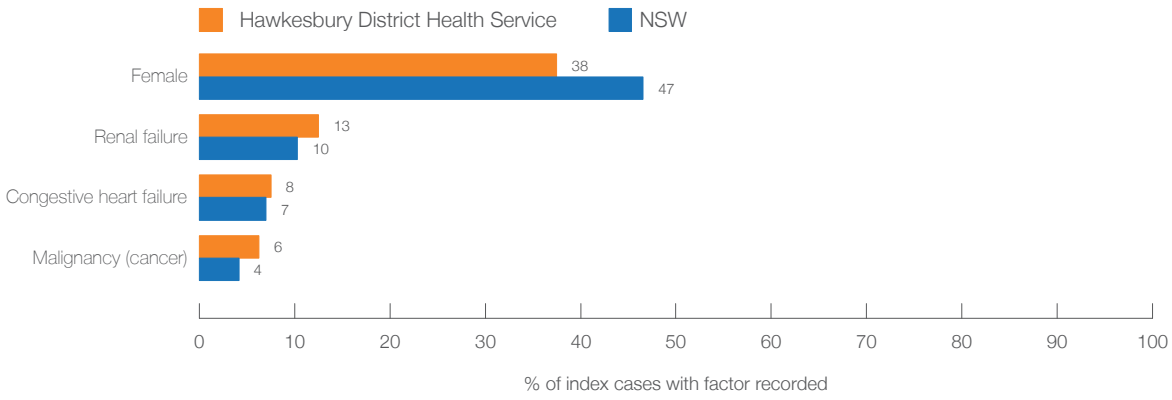
Hawkesbury District Health Service profile July 2009 - June 2012
30-day mortality following hospitalisation for ischaemic stroke

	This hospital	NSW
Total ischaemic stroke hospitalisations	80	15,299
Ischaemic stroke patients		
Presenting patients (index cases)[1]	80	14,205
Patients not transferred to another hospital	64	11,757
Patients transferred out to another hospital	16	2,448

Age profile, index cases [2]



Significant patient factors and comorbidities, index cases [3]



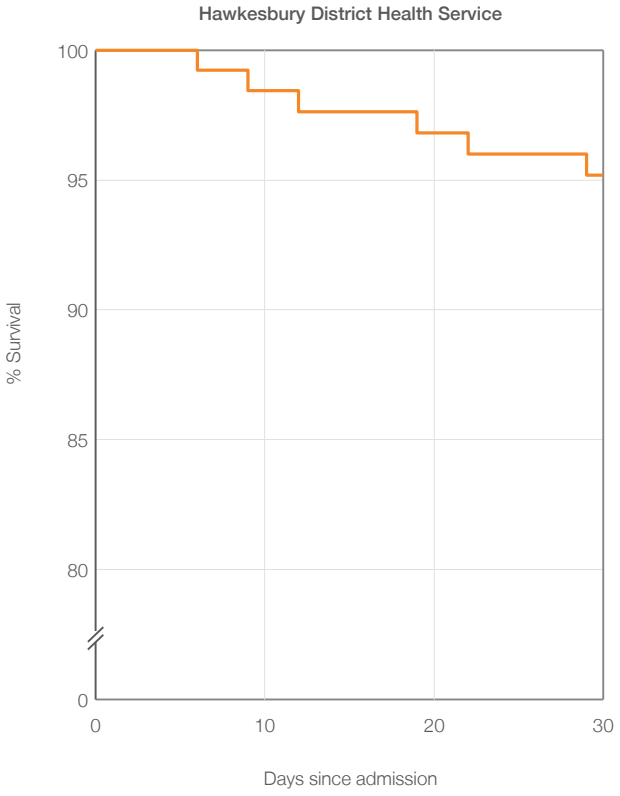
Hawkesbury District Health Service profile July 2009 - June 2012

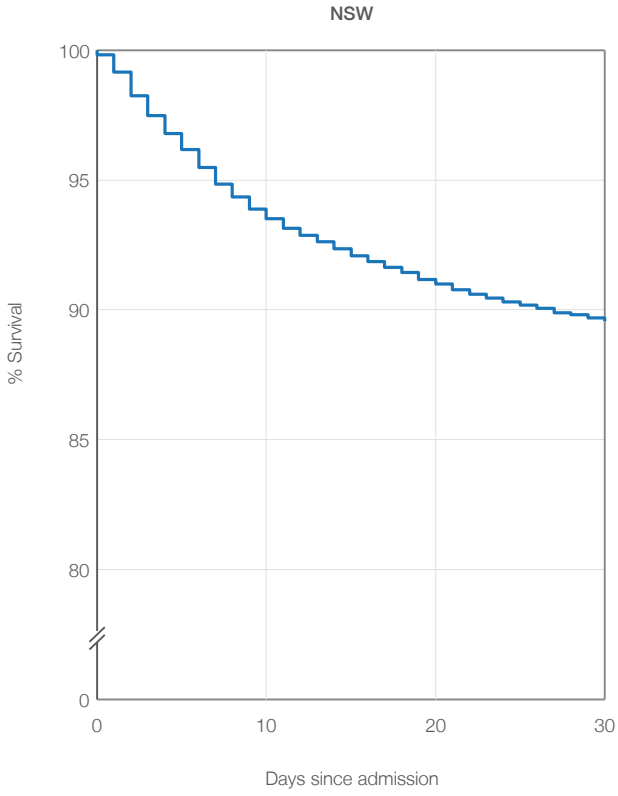
30-day mortality following hospitalisation for ischaemic stroke

Mortality (all causes) among 80 ischaemic stroke index cases[4]	This hospital percentage	NSW percentage
Percentages: index cases who died within 30 days of hospitalisation	8%	
Of all deaths:		
percentage in this hospital	100%	(67%)
percentage in another hospital following transfer	0%	(2%)
percentage after discharge	0%	(31%)
percentage on day of admission	0%	(2%)
percentage within 7 days	17%	(51%)

Survival of index cases following hospitalisation for ischaemic stroke [5]

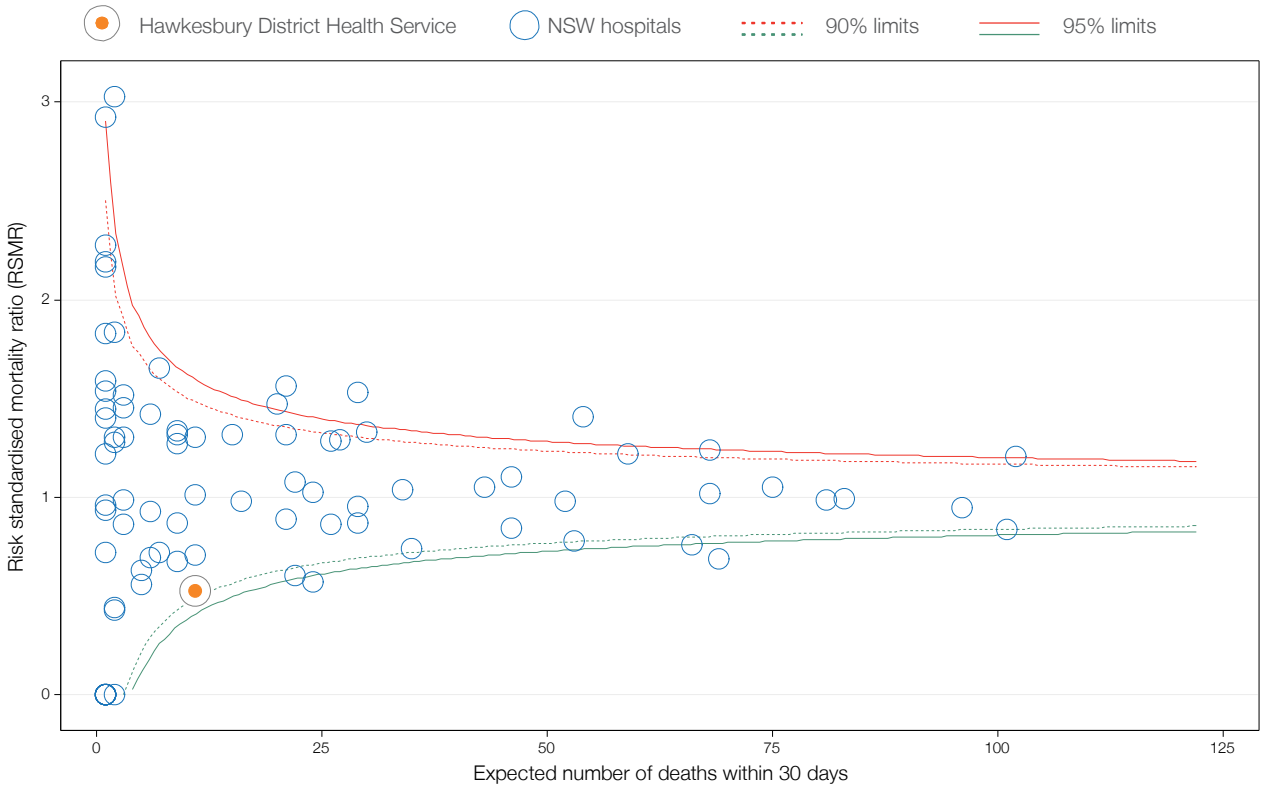
Adjusted for average age and Charlson comorbidity score





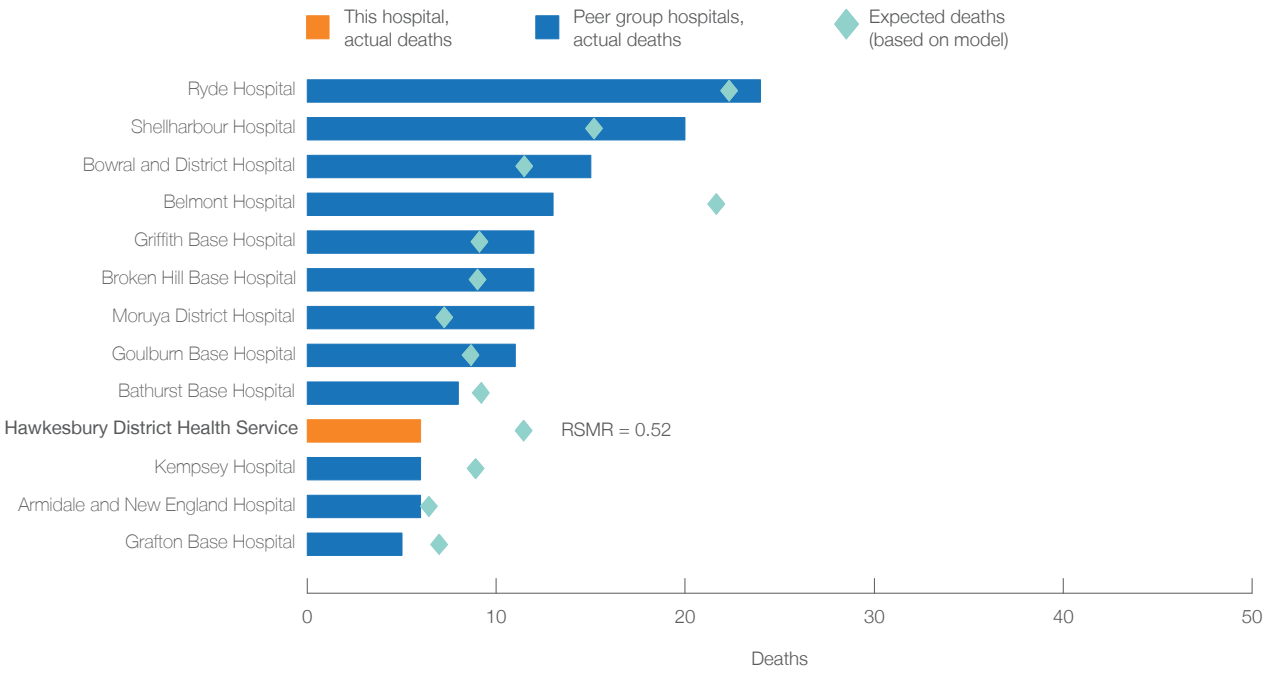
Hawkesbury District Health Service profile July 2009 - June 2012

Hospital-level ischaemic stroke risk-standardised mortality ratio by number of expected deaths, NSW public hospitals



Hospital-specific RSMRs report the ratio of actual or 'observed' number of deaths to the 'expected' number of deaths. A hierarchical logistic regression model draws on the NSW patient population's characteristics and outcomes to estimate the expected number of deaths for each hospital, given the characteristics of its patients.

Actual and expected deaths, compared to local peers



Hawkesbury District Health Service profile July 2009 - June 2012
30-day mortality following hospitalisation for ischaemic stroke

Illustrating the effect of standardisation, July 2009 - June 2012

In order to make fair comparisons, a number of risk adjustments are made to mortality data. These take into account patient level factors that influence the likelihood of dying. The table below illustrates the cumulative effect of the statistical adjustments. For each ratio, hospitals are compared to the average NSW result, given their case mix.

Lower mortality | No difference | Higher mortality

Unadjusted ratio	Age and sex standardised ratio	Risk-standardised mortality ratio
0.56	0.54	0.52

Time series risk-standardised mortality ratio, July 2000 - June 2012 [6]

Lower mortality | No difference | Higher mortality

Year (financial years)	2000-02	2003-05	2006-08	2009-11
Risk-standardised mortality ratio	0.80	1.25	1.18	0.52

(1) Index cases refer to patients discharged between July 2009 and June 2012 who were initially admitted to this hospital (regardless of whether they were subsequently transferred) in their last period of care.
(2) Age at admission date.
(3) Only those conditions that were shown to have a significant impact on mortality (P<0.05) are shown. Many are a result of end-organ damage resulting from comorbidities, such as diabetes. A broader set of comorbidities was screened for potential impacts on mortality. Comorbidities as recorded on patient record, with one year look back. STEMI refers to ST-elevation myocardial infarction.
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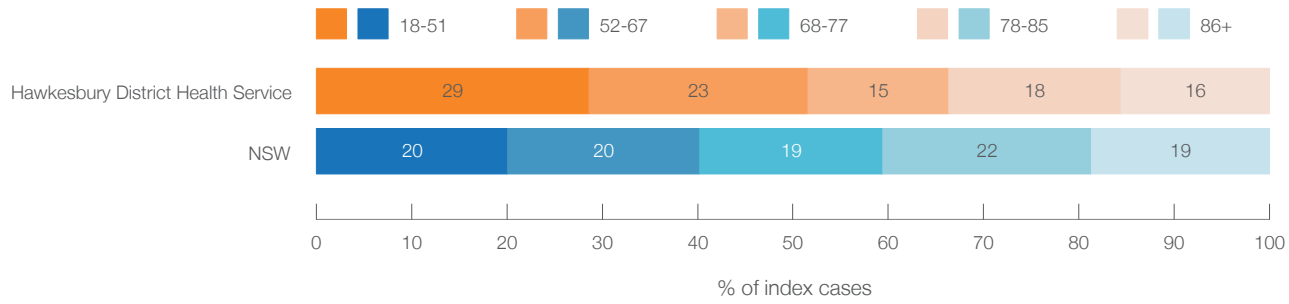
Details of analyses and risk adjustment are available in *Spotlight on Measurement: risk-standardised mortality ratios*
Data source: SAPHaRI, Centre for Epidemiology and Evidence, NSW Ministry of Health.

Hawkesbury District Health Service profile July 2009 - June 2012

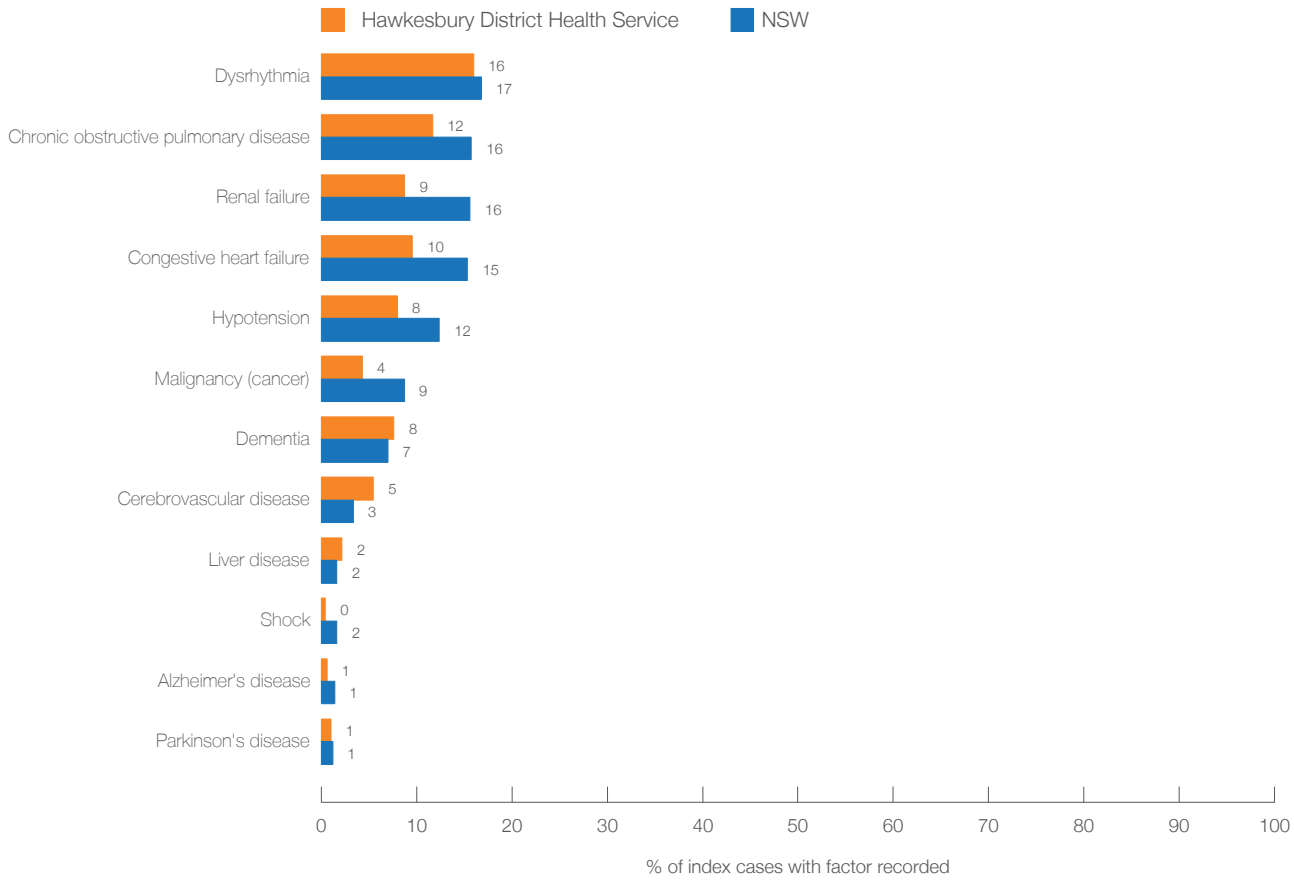
30-day mortality following hospitalisation for pneumonia

	This hospital	NSW
Total pneumonia hospitalisations	579	50,644
Pneumonia patients		
Presenting patients (index cases)[1]	514	44,059
Patients not transferred to another hospital	485	39,655
Patients transferred out to another hospital	29	4,404

Age profile, index cases [2]



Significant patient factors and comorbidities, index cases [3]



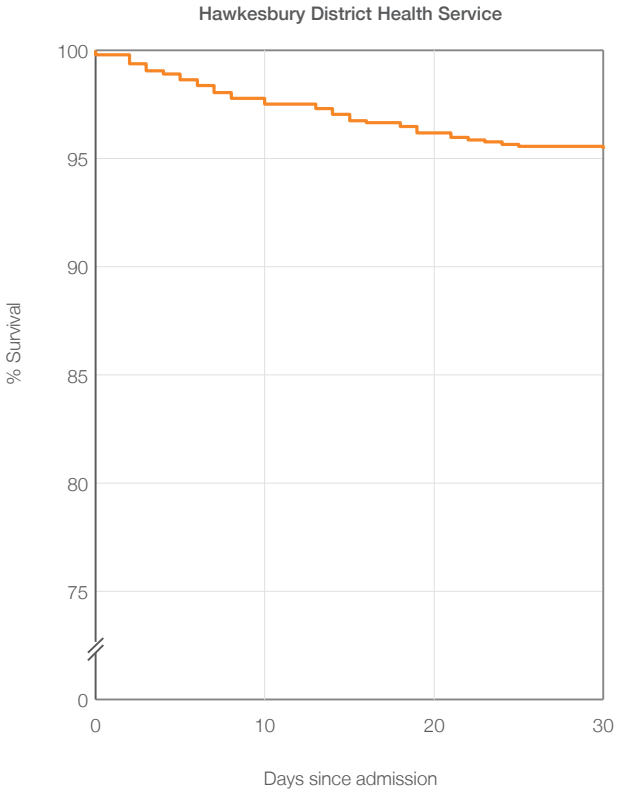
Hawkesbury District Health Service profile July 2009 - June 2012

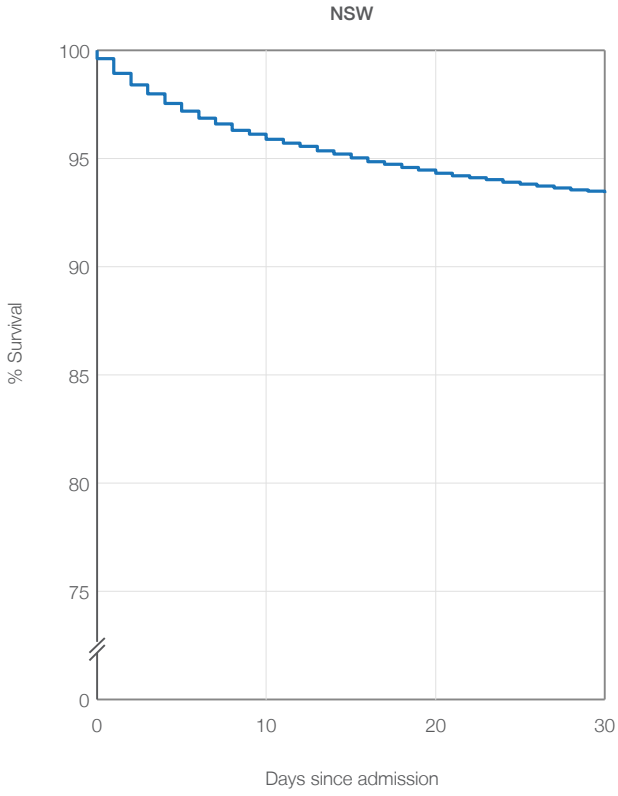
30-day mortality following hospitalisation for pneumonia

Mortality (all causes) among 514 pneumonia index cases [4]	This hospital percentage	NSW percentage
Percentages: index cases who died within 30 days of hospitalisation	10%	
Of all deaths:		
percentage in this hospital	86%	(66%)
percentage in another hospital following transfer	2%	(3%)
percentage after discharge	12%	(31%)
percentage on day of admission	6%	(6%)
percentage within 7 days	47%	(54%)

Survival of index cases following hospitalisation for pneumonia [5]

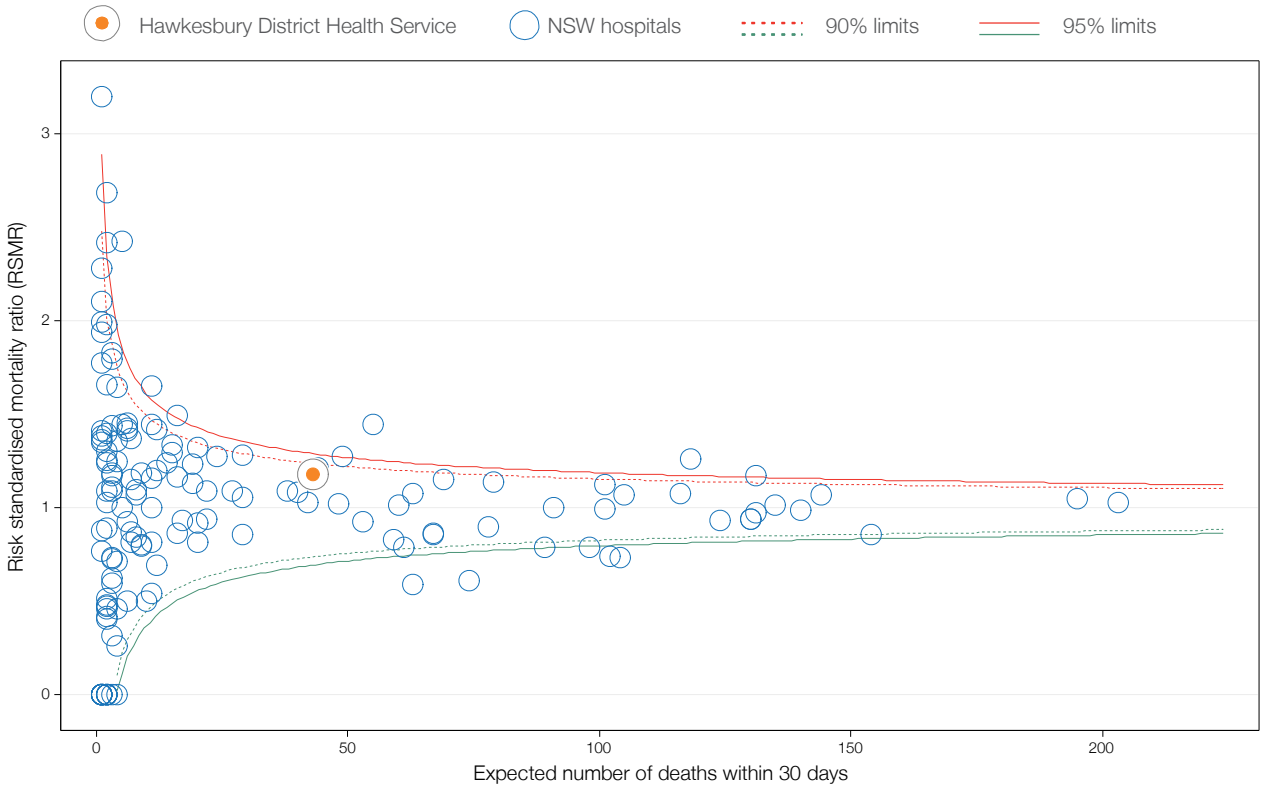
Adjusted for average age and Charlson comorbidity score





Hawkesbury District Health Service profile July 2009 - June 2012

Hospital-level pneumonia risk-standardised mortality ratio by number of expected deaths, NSW public hospitals



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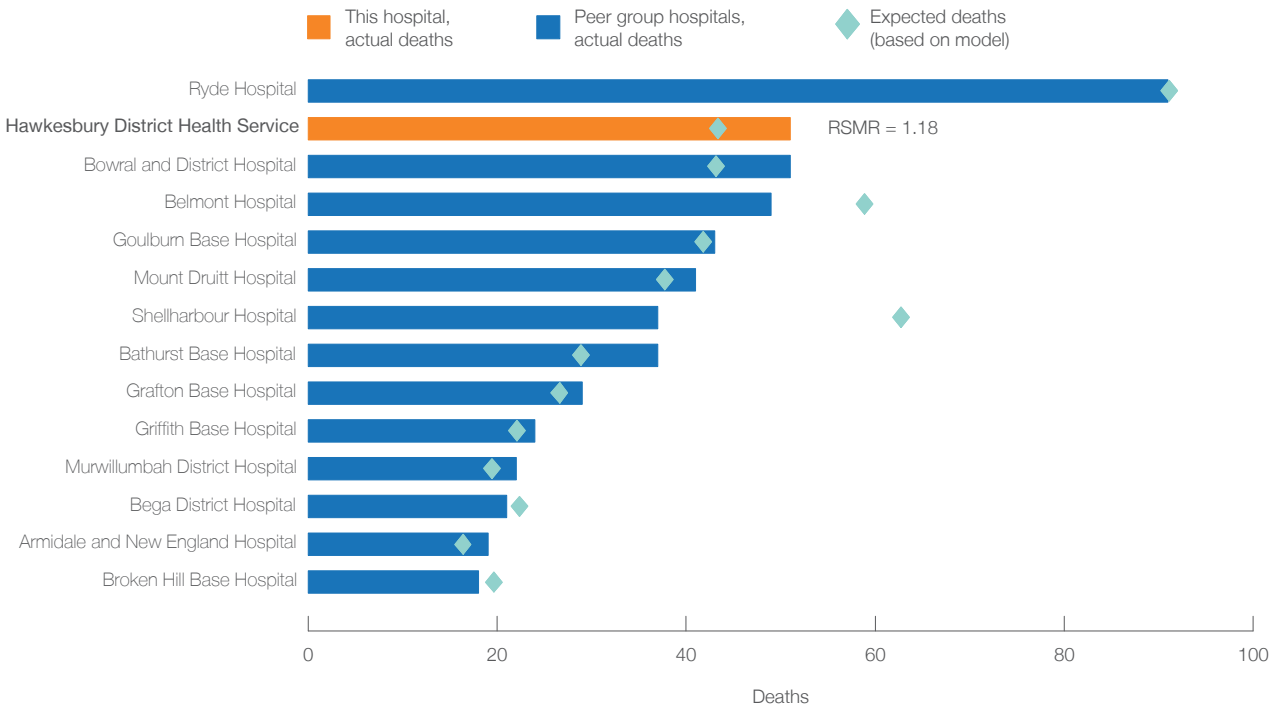

Hawkesbury District Health Service profile July 2009 - June 2012
30-day mortality following hospitalisation for pneumonia

Illustrating the effect of standardisation, July 2009 - June 2012

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Lower mortality | No difference | Higher mortality

Unadjusted ratio	Age and sex standardised ratio	Risk-standardised mortality ratio
0.92	1.13	1.18

Time series risk-standardised mortality ratio, July 2000 - June 2012 [6]

Lower mortality | No difference | Higher mortality

Year (financial years)	2000-02	2003-05	2006-08	2009-12
Risk-standardised mortality ratio	1.36	0.81	0.90	1.18

(1) Index cases refer to patients discharged between July 2009 and June 2012 who were initially admitted to this hospital (regardless of whether they were subsequently transferred) in their last period of care.
(2) Age at admission date.
(3) Only those conditions that were shown to have a significant impact on mortality (P<0.05) are shown. Many are a result of end-organ damage resulting from comorbidities, such as diabetes. A broader set of comorbidities was screened for potential impacts on mortality. Comorbidities as recorded on patient record, with one year look back. STEMI refers to ST-elevation myocardial infarction.
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