RTI #2857 – Hospital Standardised Mortality Ratio (HSMR) for selected Queensland Hospitals

Purpose of report

This report provides Hospital Standardised Mortality Ratio (HSMR) for all hospitals within Gold Coast Hospital and Health Service (HHS), Metro North HHS, Metro South HHS and West Moreton HHS for the first two quarters of 2012, 2013, 2014 and 2015.

Data source

- The data used for the calculation of the HSMRs is the Queensland Hospital Admitted Patient Data Collection and the National Admitted Patient Data Collection.
  - The observed values are from the Queensland Hospital Admitted Patient Data Collection.
  - The expected values are based on the Queensland Hospital Admitted Patient Data Collection and the National Admitted Patient Data Collection to enable benchmarking to the National average.

Data Extracted

- HSMR is the ratio of observed number of deaths, to the expected number of deaths based on the characteristics of the patients, for hospital separations with diagnosis accounting for 80% of in-hospital mortality.

- The HSMR indicator definition is the latest definition from the Australian Commission on Safety and Quality in Health Care obtained in June 2013.

Interpretative Notes

- The value of the HSMR and the confidence level must be interpreted together.

  Value of HSMR

  - The value of the HSMR indicates if the hospital's mortality rate is lower, the same or higher than the expected rate (the national rate).
    - A HSMR of 100 indicates that there is no difference between the hospital's observed mortality rate and the expected rate.
    - A HSMR greater than 100 indicates a hospital's mortality rate is higher than the expected rate.
    - A HSMR lower than 100 indicates a hospital's mortality rate is lower than the expected rate.

  Confidence Interval of HSMR

  - The confidence interval indicates if the HSMR result is statistically significant i.e. if the hospital is truly different to the expected rate.
  - The confidence intervals describe the precision of the HSMR estimate.

- o Smaller hospitals with fewer in scope cases have wider confidence intervals representing less precise HSMR estimates.
- o The result is considered to be statistically different to the expected if the confidence interval doesn't include 100.

- Results that are highlighted red indicate the hospital has an HSMR value significantly higher than expected rate at the 99% confidence intervals ($p<0.01$).

- Results that are highlighted amber indicate the hospital has an HSMR value significantly higher than expected rate at the 95% confidence intervals ($p<0.05$).

- Results that are highlighted green indicate the hospital has an HSMR value that is not significantly higher than expected rate.

- Results are only included for a hospital for a quarter where there are at least 30 separations and at least 3 expected deaths unless there is a result that is significantly high at the 95% significance level.

- Some HSMRS are based on small numbers and care should be taken in interpreting the results.

Results

- The table (Attachment 1) presents for each hospital in the Gold Coast HHS, Metro North HHS, Metro South HHS and West Moreton HHS for the first two quarters of 2012, 2013, 2014 and 2015, the HSMR value, 95% confidence intervals, 99% confidence intervals, observed number of deaths, and expected number of deaths.

- All hospital HSMR results in Attachment 1 are highlighted green i.e. indicates the hospital HSMR value is not significantly higher than the expected rate.

Date Extracted

Data was extracted for each quarter on the following dates:

Quarter	Data extraction date
Jan - Mar 2012	26/08/2013
Apr - Jun 2012	26/08/2013
Jan - Mar 2013	15/05/2013
Apr - Jun 2013	13/08/2013
Jan - Mar 2014	12/05/2014
Apr - Jun 2014	11/08/2014
Jan - Mar 2015	19/05/2015
Apr - Jun 2015	14/08/2015

Specification for the calculation of HSMRs

The HSMR indicator definition is the latest definition from the Australian Commission on Safety and Quality in Health Care obtained in June 2013.

HSMR is the ratio of observed number of deaths, to the expected number of deaths based on the characteristics of the patients, for hospital separations with diagnosis accounting for 80% of in-hospital mortality.

Indicator definition (exclusion and inclusion criteria)
The data used for the calculation of the HSMRs is the Queensland Hospital Admitted Patient Data Collection and the National Admitted Patient Data Collection.

Episodes of care that satisfy the following criteria are included in the calculation of the HSMRs:
- Episodes of care in Queensland public hospitals

- Separations with high-risk diagnosis, accounting for 80% of in-hospital deaths, a list of principal diagnosis is included at the end of this document
- Age at date of admission: 29 days to 120 years
- Hospital service care type:
  - Acute care
  - Geriatric Evaluation and Management
  - Maintenance
- Sex: male, female
- Length of stay: 1-365 days
- Admission urgency status:
  - Emergency admission
  - Elective admission

Calculation of expected deaths

The probability of death for each episode of care is calculated using a logistic regression model. The sum of the probability of death for the episodes of care gives the expected number of deaths.

The outcome being modelled with the Logistic Regression model is if the mode of separation for the episode of care was died in hospital. The independent variables in the model are: age, sex, principal diagnosis, admission urgency status, length of stay, if admitted patient transferred from another hospital and Charlson index

Calculation of the HSMR

$$HSMR = \frac{count\_of\_Observed\_death}{sum\_of\_\Pr obability\_of\_death} x100$$

Note: the HSMRs are only produced when a facility has sufficient episodes of care so some facilities will have a HSMR produced one quarter but not the next.
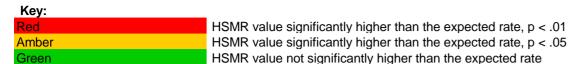
Principal Diagnosis included in HSMR calculations

Below is the list of principal diagnosis that are included in the calculation of the HSMRs.

ICD code	Description
A09	Other gastroenteritis and colitis of infectious and unspecified origin
A40	Streptococcal sepsis
A41	Other sepsis
C15	Malignant neoplasm of oesophagus
C16	Malignant neoplasm of stomach
C18	Malignant neoplasm of colon
C19	Malignant neoplasm of rectosigmoid junction
C20	Malignant neoplasm of rectum
C22	Malignant neoplasm of liver and intrahepatic bile ducts
C25	Malignant neoplasm of pancreas
C34	Malignant neoplasm of bronchus and lung
C45	Mesothelioma
C50	Malignant neoplasm of breast
C61	Malignant neoplasm of prostate
C67	Malignant neoplasm of bladder
C71	Malignant neoplasm of brain
C78	Secondary malignant neoplasm of respiratory and digestive organs
C79	Secondary malignant neoplasm of other and unspecified sites
C83	Non-follicular lymphoma
C85	Other and unspecified types of non-Hodgkin lymphoma
C90	Multiple myeloma and malignant plasma cell neoplasms
C92	Myeloid leukaemia
E11	Type 2 diabetes mellitus
E86	Volume depletion
E87	Other disorders of fluid, electrolyte and acid-base balance
F05	Delirium, not induced by alcohol and other psychoactive substances
G93	Other disorders of brain
I20	Angina pectoris
I21	Acute myocardial infarction
I25	Chronic ischaemic heart disease
I26	Pulmonary embolism
I35	Nonrheumatic aortic valve disorders
I46	Cardiac arrest

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I48	Atrial fibrillation and flutter
I49	Other cardiac arrhythmias
I50	Heart failure
I60	Subarachnoid haemorrhage
I61	Intracerebral haemorrhage
I62	Other nontraumatic intracranial haemorrhage
I63	Cerebral infarction
I64	Stroke, not specified as haemorrhage or infarction
I70	Atherosclerosis
I71	Aortic aneurysm and dissection
J15	Bacterial pneumonia, not elsewhere classified
J18	Pneumonia, organism unspecified
J22	Unspecified acute lower respiratory infection
J44	Other chronic obstructive pulmonary disease
J69	Pneumonitis due to solids and liquids
J84	Other interstitial pulmonary diseases
J90	Pleural effusion, not elsewhere classified
J96	Respiratory failure, not elsewhere classified
K26	Duodenal ulcer
K55	Vascular disorders of intestine
K56	Paralytic ileus and intestinal obstruction without hernia
K57	Diverticular disease of intestine
K63	Other diseases of intestine
K70	Alcoholic liver disease
K72	Hepatic failure, not elsewhere classified
K85	Acute pancreatitis
K92	Other diseases of digestive system
L03	Cellulitis
N17	Acute kidney failure
N18	Chronic kidney disease
N39	Other disorders of urinary system
R55	Syncope and collapse
R57	Shock, not elsewhere classified
S06	Intracranial injury
S22	Fracture of rib(s), sternum and thoracic spine
S32	Fracture of lumbar spine and pelvis
S72	Fracture of femur
T81	Complications of procedures, not elsewhere classified

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RTI #2857 - Hospital Standardised Mortality Ratio (HSMR) for selected hospitals by quarter

This report provides the Hospital Standardised Mortality Ratio (HSMR) for all hospitals within Gold Coast Hospital and Health Service (HHS), Metro North HHS, Metro South HHS and West Moreton HHS for the first two quarters of 2012, 2013, 2014 and 2015.

Key:

Red	HSMR value significantly higher than the expected rate, p < .01
Amber	HSMR value significantly higher than the expected rate, p < .05
Green	HSMR value not significantly higher than the expected rate

HHS	Facility Name	Quarter	HSMR	95% confidence interval		99% confidence interval		Observed deaths	Expected deaths
				lower limit	upper limit	lower limit	upper limit		
GOLD COAST HHS	Gold Coast University Hospital	Jan - Mar 2012	89.2	71.7	109.7	66.8	116.5	90	100.9
	Gold Coast University Hospital	Apr - Jun 2012	96.8	79.8	116.4	74.9	122.9	113	116.7
	Gold Coast University Hospital	Jan - Mar 2013	71.1	54.5	91.1	49.9	97.8	62	87.3
	Gold Coast University Hospital	Apr - Jun 2013	92.9	75.2	113.6	70.1	120.4	95	102.3
	Gold Coast University Hospital	Jan - Mar 2014	60.1	46.4	76.6	42.6	82.2	65	108.1
	Gold Coast University Hospital	Apr - Jun 2014	82	66.5	100	62.1	106	97	118.3
	Gold Coast University Hospital	Jan - Mar 2015	67.8	54.4	83.5	50.6	88.8	88	129.8
	Gold Coast University Hospital	Apr - Jun 2015	80.2	65.5	97.1	61.3	102.8	104	129.7
	Robina Hospital	Jan - Mar 2013	58.9	39.1	85.1	34.1	94.2	28	47.6
	Robina Hospital	Apr - Jun 2013	52.2	35.9	73.3	31.7	80.5	33	63.2
	Robina Hospital	Jan - Mar 2014	48.4	32.4	69.5	28.3	76.8	29	59.9
	Robina Hospital	Apr - Jun 2014	50.1	34.5	70.4	30.5	77.4	33	65.8
	Robina Hospital	Jan - Mar 2015	45.1	30.2	64.8	26.4	71.6	29	64.2
	Robina Hospital	Apr - Jun 2015	42.9	28.5	61.9	24.8	68.5	28	65.3
METRO NORTH	Caboolture Hospital	Jan - Mar 2012	62.5	40.8	91.6	35.4	101.7	26	41.6
	Caboolture Hospital	Apr - Jun 2012	69.5	47.9	97.7	42.3	107.3	33	47.4
	Caboolture Hospital	Jan - Mar 2013	49.8	32.8	72.5	28.5	80.4	27	54.2
	Caboolture Hospital	Apr - Jun 2013	57.8	40	80.8	35.4	88.7	34	58.8
	Caboolture Hospital	Jan - Mar 2014	59.9	40.1	86.1	35.1	95.1	29	48.4
	Caboolture Hospital	Apr - Jun 2014	61.9	43.3	85.7	38.5	93.8	36	58.2
	Caboolture Hospital	Jan - Mar 2015	61.3	44.2	82.9	39.7	90.3	42	68.5
	Caboolture Hospital	Apr - Jun 2015	73.2	54.7	96	49.6	103.7	52	71.1
	Redcliffe Hospital	Jan - Mar 2012	63.3	44.3	87.6	39.3	95.9	36	56.9
	Redcliffe Hospital	Apr - Jun 2012	80	59	106.1	53.3	114.9	48	60
	Redcliffe Hospital	Jan - Mar 2013	59.2	42.7	80	38.3	87.1	42	70.9
	Redcliffe Hospital	Apr - Jun 2013	58	41.2	79.3	36.8	86.5	39	67.3
	Redcliffe Hospital	Jan - Mar 2014	45.9	31.4	64.7	27.6	71.2	32	69.8
	Redcliffe Hospital	Apr - Jun 2014	69.8	52.7	90.6	48	97.6	56	80.3
	Redcliffe Hospital	Jan - Mar 2015	53.4	39.2	70.9	35.4	76.9	47	88.1
	Redcliffe Hospital	Apr - Jun 2015	64.6	49.4	83	45.3	89.2	61	94.4
	Royal Brisbane and Women's Hospital	Jan - Mar 2012	48.3	35.5	64.3	32.1	69.7	47	97.2
	Royal Brisbane and Women's Hospital	Apr - Jun 2012	57.7	43.7	74.7	39.9	80.5	57	98.8
	Royal Brisbane and Women's Hospital	Jan - Mar 2013	60.8	46.9	77.5	43.1	83.1	65	106.9
	Royal Brisbane and Women's Hospital	Apr - Jun 2013	48.5	36.7	62.8	33.5	67.7	57	117.6
	Royal Brisbane and Women's Hospital	Jan - Mar 2014	35.4	24.9	48.8	22.2	53.4	37	104.5
	Royal Brisbane and Women's Hospital	Apr - Jun 2014	50.1	37.9	64.9	34.6	69.9	57	113.8
	Royal Brisbane and Women's Hospital	Jan - Mar 2015	34.4	24.4	47.3	21.7	51.7	38	110.3
	Royal Brisbane and Women's Hospital	Apr - Jun 2015	45.7	34.3	59.6	31.2	64.3	54	118.2
	The Prince Charles Hospital	Jan - Mar 2012	69.4	53.1	89.1	48.6	95.8	61	87.9
	The Prince Charles Hospital	Apr - Jun 2012	82.2	66.5	100.4	62	106.5	95	115.6
	The Prince Charles Hospital	Jan - Mar 2013	58.6	45.1	74.9	41.4	80.3	64	109.2
	The Prince Charles Hospital	Apr - Jun 2013	64.3	51	80	47.2	85.2	80	124.5
	The Prince Charles Hospital	Jan - Mar 2014	65.7	51.2	83	47.2	88.8	70	106.5
	The Prince Charles Hospital	Apr - Jun 2014	55.3	43.2	69.8	39.8	74.6	71	128.4
	The Prince Charles Hospital	Jan - Mar 2015	60	47	75.4	43.4	80.6	73	121.7
	The Prince Charles Hospital	Apr - Jun 2015	58.9	46.2	73.9	42.7	79	74	125.7
METRO SOUTH	Beaudesert Hospital	Jan - Mar 2012	147.7	47.6	344.7	30.8	419.4	5	3.4
	Beaudesert Hospital	Apr - Jun 2012	108.6	39.7	236.4	27.2	284.3	6	5.5
	Beaudesert Hospital	Jan - Mar 2013	83.6	22.5	214	13.3	264.2	4	4.8
	Beaudesert Hospital	Apr - Jun 2013	94.2	34.4	205	23.6	246.6	6	6.4
	Beaudesert Hospital	Jan - Mar 2014	77.1	20.7	197.3	12.3	243.6	4	5.2
	Beaudesert Hospital	Apr - Jun 2014	69.7	22.5	162.6	14.5	197.9	5	7.2
	Beaudesert Hospital	Jan - Mar 2015	57.1	15.4	146.2	9.1	180.5	4	7
	Beaudesert Hospital	Apr - Jun 2015	72.3	23.3	168.8	15.1	205.4	5	6.9
	Logan Hospital	Jan - Mar 2012	59.6	39.6	86.1	34.5	95.2	28	47
	Logan Hospital	Apr - Jun 2012	48.8	31.9	71.5	27.6	79.4	26	53.3
	Logan Hospital	Jan - Mar 2013	66.1	47.5	89.7	42.5	97.8	41	62
	Logan Hospital	Apr - Jun 2013	49.5	34.9	68.3	31	74.7	37	74.7
	Logan Hospital	Jan - Mar 2014	51.4	36	71.1	31.9	77.9	36	70.1
	Logan Hospital	Apr - Jun 2014	66.3	48.5	88.5	43.8	96	46	69.4
	Logan Hospital	Jan - Mar 2015	42.4	28.4	60.9	24.8	67.3	29	68.4
	Logan Hospital	Apr - Jun 2015	36.8	24.6	52.8	21.5	58.4	29	78.8
	Princess Alexandra Hospital	Jan - Mar 2012	78.4	64	95.2	59.9	100.8	102	130
	Princess Alexandra Hospital	Apr - Jun 2012	83.4	68.6	100.3	64.4	105.9	112	134.4
	Princess Alexandra Hospital	Jan - Mar 2013	54.3	43.2	67.3	40.1	71.6	83	152.9
	Princess Alexandra Hospital	Apr - Jun 2013	53.6	43.1	65.9	40.2	70	90	167.9
	Princess Alexandra Hospital	Jan - Mar 2014	42	32.7	53.2	30.1	56.9	69	164.3
	Princess Alexandra Hospital	Apr - Jun 2014	46.9	37.3	58.3	34.6	62	82	174.7
	Princess Alexandra Hospital	Jan - Mar 2015	59.3	48.3	72.2	45.1	76.4	100	168.5
	Princess Alexandra Hospital	Apr - Jun 2015	57.6	46.9	70	43.9	74.1	101	175.4

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HHS	Facility Name	Quarter	HSMR	lower limit	upper limit	lower limit	upper limit	Observed deaths	Expected deaths
	Queen Elizabeth II Hospital	Jan - Mar 2012	65.9	36.8	108.6	30.1	123.9	15	22.8
	Queen Elizabeth II Hospital	Apr - Jun 2012	65.7	40.1	101.4	33.9	114	20	30.5
	Queen Elizabeth II Hospital	Jan - Mar 2013	34.2	17.1	61.3	13.4	71.1	11	32.1
	Queen Elizabeth II Hospital	Apr - Jun 2013	34.2	19.1	56.4	15.7	64.4	15	43.8
	Queen Elizabeth II Hospital	Jan - Mar 2014	31.8	17.4	53.4	14.1	61.1	14	44
	Queen Elizabeth II Hospital	Apr - Jun 2014	14.5	5.8	29.9	4.2	35.7	7	48.2
	Queen Elizabeth II Hospital	Jan - Mar 2015	37.8	23.4	57.8	19.9	64.8	21	55.6
	Queen Elizabeth II Hospital	Apr - Jun 2015	34.5	21.4	52.8	18.1	59.2	21	60.8
	Redland Hospital	Jan - Mar 2012	76.4	47.9	115.7	40.9	129.4	22	28.8
	Redland Hospital	Apr - Jun 2012	58.1	34.9	90.7	29.4	102.2	19	32.7
	Redland Hospital	Jan - Mar 2013	45	25.2	74.3	20.6	84.7	15	33.3
	Redland Hospital	Apr - Jun 2013	23.2	11.1	42.7	8.6	49.8	10	43.1
	Redland Hospital	Jan - Mar 2014	35.2	19.2	59	15.6	67.6	14	39.8
	Redland Hospital	Apr - Jun 2014	41	24.3	64.8	20.3	73.1	18	43.9
	Redland Hospital	Jan - Mar 2015	23.9	10.9	45.4	8.2	53.3	9	37.6
	Redland Hospital	Apr - Jun 2015	43.5	27.2	65.8	23.2	73.6	22	50.6
WEST MORETON	Boonah Hospital	Apr - Jun 2013	0	0	92.2	0	134.5	0	4
	Boonah Hospital	Apr - Jun 2015	0	0	109	0	159	0	3.4
	Esk Hospital	Apr - Jun 2012	93.1	18.7	272	9.4	342.2	3	3.2
	Esk Hospital	Jan - Mar 2013	0	0	80.8	0	117.9	0	4.5
	Esk Hospital	Apr - Jun 2013	0	0	69.7	0	101.7	0	5.3
	Esk Hospital	Apr - Jun 2014	24	0.3	133.4	0	179.5	1	4.2
	Esk Hospital	Jan - Mar 2015	61.1	6.9	220.5	2.3	284.7	2	3.3
	Esk Hospital	Apr - Jun 2015	108.4	34.9	252.9	22.6	307.7	5	4.6
	Gatton Hospital	Jan - Mar 2012	32	0.4	178.1	0	239.6	1	3.1
	Gatton Hospital	Apr - Jun 2012	84.1	16.9	245.7	8.5	309.1	3	3.6
	Gatton Hospital	Jan - Mar 2013	124.3	33.4	318.3	19.8	393	4	3.2
	Gatton Hospital	Apr - Jun 2013	112.9	30.4	288.9	18	356.7	4	3.5
	Gatton Hospital	Jan - Mar 2014	92.1	24.8	235.9	14.7	291.3	4	4.3
	Gatton Hospital	Apr - Jun 2014	43	8.6	125.6	4.4	158	3	7
	Gatton Hospital	Jan - Mar 2015	22.9	0.3	127.4	0	171.4	1	4.4
	Gatton Hospital	Apr - Jun 2015	27.3	0.4	151.9	0	204.4	1	3.7
	Ipswich Hospital	Jan - Mar 2012	66.8	46	93.9	40.6	103.1	33	49.4
	Ipswich Hospital	Apr - Jun 2012	67	45.8	94.6	40.4	104.1	32	47.7
	Ipswich Hospital	Jan - Mar 2013	45.9	30.5	66.4	26.6	73.5	28	61
	Ipswich Hospital	Apr - Jun 2013	55	38.7	75.9	34.5	83	37	67.2
	Ipswich Hospital	Jan - Mar 2014	46.7	30.8	68	26.8	75.3	27	57.8
	Ipswich Hospital	Apr - Jun 2014	57.2	41.2	77.3	37	84.2	42	73.4
	Ipswich Hospital	Jan - Mar 2015	68	49.2	91.5	44.2	99.6	43	63.3
	Ipswich Hospital	Apr - Jun 2015	79.4	56.2	108.9	50.1	119.1	38	47.9
	Laidley Hospital	Jan - Mar 2012	94.6	19	276.3	9.6	347.6	3	3.2
	Laidley Hospital	Apr - Jun 2012	81.6	22	208.9	13	257.9	4	4.9
	Laidley Hospital	Apr - Jun 2013	30.4	0.4	169.3	0	227.7	1	3.3
	Laidley Hospital	Jan - Mar 2014	55.4	6.2	200	2.1	258.3	2	3.6
	Laidley Hospital	Apr - Jun 2014	27.4	0.4	152.3	0	204.8	1	3.7
	Laidley Hospital	Jan - Mar 2015	54.4	6.1	196.3	2.1	253.5	2	3.7

Details:

- Indicator definition: A HSMR is the ratio of observed in-hospital deaths in comparison with expected in-hospital deaths based on the patient's characteristics.

- Data source: Queensland Hospital Admitted Patient Data Collection and the National Admitted Patient Data Collection.

- Data scope: Results are only included for a facility for a quarter where there are at least 30 separations and there needs to be at least 3 expected deaths unless there is a result in the year that is significantly high at the 95% significance level.

Technical Notes:

The value of the HSMR and the confidence level must be interpreted together.

Value of HSMR

The value of the HSMR indicates if the hospital's mortality rate is lower, the same or higher than the expected rate (the national rate).

  A HSMR of 100 indicates that there is no difference between the hospital's observed mortality rate and the expected rate.

  A HSMR greater than 100 indicates a hospital's mortality rate is higher than the expected rate.

  A HSMR lower than 100 indicates a hospital's mortality rate is lower than the expected rate.

Confidence Interval of HSMR

  The confidence interval indicates if the HSMR result is statistically significant i.e. if the hospital is truly different to the expected rate.

  The confidence intervals describe the precision of the HSMR estimate.

  Smaller hospitals with fewer in scope cases have wider confidence intervals representing less precise HSMR estimates.

  The result is considered to be statistically different to the expected if the confidence interval doesn't include 100.

Notes:

 - The Data provided in this report is presented as an information source only and may be subject to change.

 - Some HSMRS are based on small numbers and care should be taken in interpreting the results.