



Queensland Government
Queensland **Health**



Technical Supplement



*An investment in health: Queensland Public
Hospitals Performance Report 2005-06*

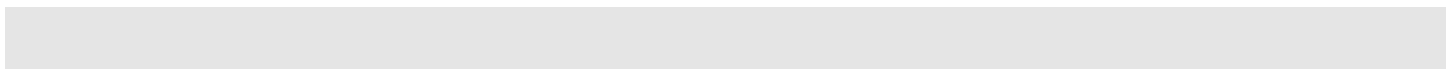


TABLE OF CONTENTS

CHAPTER 1 - INTRODUCTION	4
1.1 Overview	4
1.2 Peer Grouping	4
CHAPTER 2 – ELECTIVE SURGERY / SURGICAL OUTPATIENTS	5
2.1 Overview	5
2.2 Categories	5
2.3 Data	5
2.4 Peer Grouping	5
CHAPTER 3 – PATIENT SATISFACTION	6
3.1 Data source	6
3.2 Data presented	6
3.3 Calculation of Indicators	6
3.3.1 Overall Satisfaction	6
3.3.2 The Overall Care Index (OCI)	6
CHAPTER 4 – CLINICAL PERFORMANCE	8
4.1 Overview	8
4.2 Data	8
4.3 Additional Criteria	9
4.4 Outcome Indicators	9
4.4.1 In-Hospital Mortality Rate:	9
4.4.2 Long Stay Rate:	10
4.4.3 Complications of Surgery Rate:	10
4.4.4 Under 35 Years of Age – Rate:	11
4.4.5 Caesarean Section Rate:	11
4.4.6 Induction Rate:	12
4.4.7 Severe Perineal Tear Rate:	12
4.4.8 Readmission Rate:	12
4.5 Comorbidities	13
4.6 Data Verification and Validation	15
4.7 Methods	15
4.8 Criteria for Determining Outliers for Indicators in the Clinical Quadrant	20
4.8.1 Outlier Identification:	20
4.8.2 Outlier Interpretation:	20
4.8.3 Methodological notes and limitations:	20
4.8.4 Limitations	21
4.8.5 Table of Results	22

4.9	Definition of Clinical Indicators.	24
CHAPTER 5 - SYSTEM INTEGRATION & CHANGE		45
5.1	Overview	45
	<i>5.1.1 Review process</i>	45
5.2	Data Sources	46
	<i>5.2.1 State-wide data collection</i>	46
	<i>5.2.2 Data Collection Instrument</i>	46
	<i>5.2.3 Data Verification</i>	47
	<i>5.2.4 Statistical Analysis</i>	47
	<i>5.2.5 Performance Allocations</i>	48
	<i>5.2.6 Data Presentation</i>	48
5.3	Definition of System Integration and Change Indicators	48
CHAPTER 6 – EFFICIENCY – AVERAGE COST PER WEIGHTED SEPARATION		52
6.1	Data Sources	52
	<i>6.1.1 Clinical Benchmarking System</i>	52
	<i>6.1.2 NHCDC</i>	52
6.2	Weighted Separations	52
CHAPTER 7 - GLOSSARY OF TERMS		54
APPENDIX A		58

Chapter 1 - Introduction

1.1 Overview

This Technical Supplement has been developed for the purpose of supplementing the *an investment in health: Queensland Public Hospitals Performance Report 2005-06*. Feedback on this Technical Supplement is welcome via QMSU@health.qld.gov.au

1.2 Peer Grouping

Forty-two public hospitals are reported on in the Queensland Public Hospitals Performance Report 2005/06. The 42 hospitals were determined on the criteria of size of hospital activity, with hospitals having 2000 or more separations (2004-05) being included.

Hospitals are grouped based on their size and range of services provided so that scores for different hospitals better represent differences in patient views and hospital performance and not just differences in the range of services that different hospitals provide. The 42 hospitals included have been allocated into one of the following peer groups:

- Principal Referral and Specialised
- Large
- Medium and Small

This creation of peer groups allows for undertaking of valid comparisons, including benchmarking, between hospitals within the peer groups. This benchmarking and more detailed investigation of differences within peer groups is most relevant for informing action required at the individual hospital level. The clinical indicators reported in the Report 2005/06 provide information on whether the individual hospitals are significantly higher or lower compared to their peer group or state overall.

Chapter 2 – Elective Surgery / Surgical Outpatients

2.1 Overview

Elective Surgery is surgery that, in the opinion of the treating clinician, is necessary and admission for which can be delayed for at least 24 hours. It does not cover emergency surgery or treatment, nor does it cover medical treatments.

2.2 Categories

Categorisation is based on a clinical assessment of the need with which a patient requires elective surgery. There are 3 main categories of urgency:

- Category 1 - Urgent
Admission within 30 days desirable for a condition that has the potential to deteriorate quickly, to the point that it may become an emergency.
- Category 2 - Semi-urgent
Admission within 90 days desirable for a condition causing some pain, dysfunction or disability, but which is not likely to deteriorate quickly or become an emergency.
- Category 3 - Non-urgent
Admission at some time in the future acceptable for a condition causing minimal or no pain, dysfunction or disability, which is unlikely to deteriorate quickly and which does not have the potential to become an emergency.

2.3 Data

There are 31 Queensland Reporting Hospitals, representing approximately 95% of elective surgery undertaken in Queensland public hospitals.

The number of patients treated is counted from the throughput of patients removed from the waiting list for treatment. This data was collected from the Admitted Patient Data Collection.

Specialist surgical outpatient services are those provided by health practitioners in the 31 Queensland reporting public hospitals. The number of patients waiting at 1 March was collected manually from these hospitals via a survey. The number treated is provided by the Queensland Health Monthly Activity Collection.

2.4 Peer Grouping

For the purposes of comparison hospitals have been grouped into peer hospital groups. Peer group scores indicate the median score of hospitals included in the peer group and Queensland State score is the median of all hospitals reported.

Chapter 3 – Patient Satisfaction

3.1 Data source

Data on patient satisfaction with hospital services was collected through a state-wide, random survey of recently discharged patients. The survey of 16,705 patients from 74 public hospitals was conducted from March to August 2005 by a Queensland Health commissioned independent organisation. Full details of the survey and results can be found in the State-wide Report published on the Queensland health website at: http://www.health.qld.gov.au/quality/publications/pss_feb2006.pdf

3.2 Data presented

Individual hospital scores for the 42 in-scope hospitals, peer group and state-wide scores have been calculated and presented in the report. Peer group scores indicate the average score for all patients who attended the hospitals in the peer group and state-wide scores are inclusive of all patients from across the state who responded to the survey.

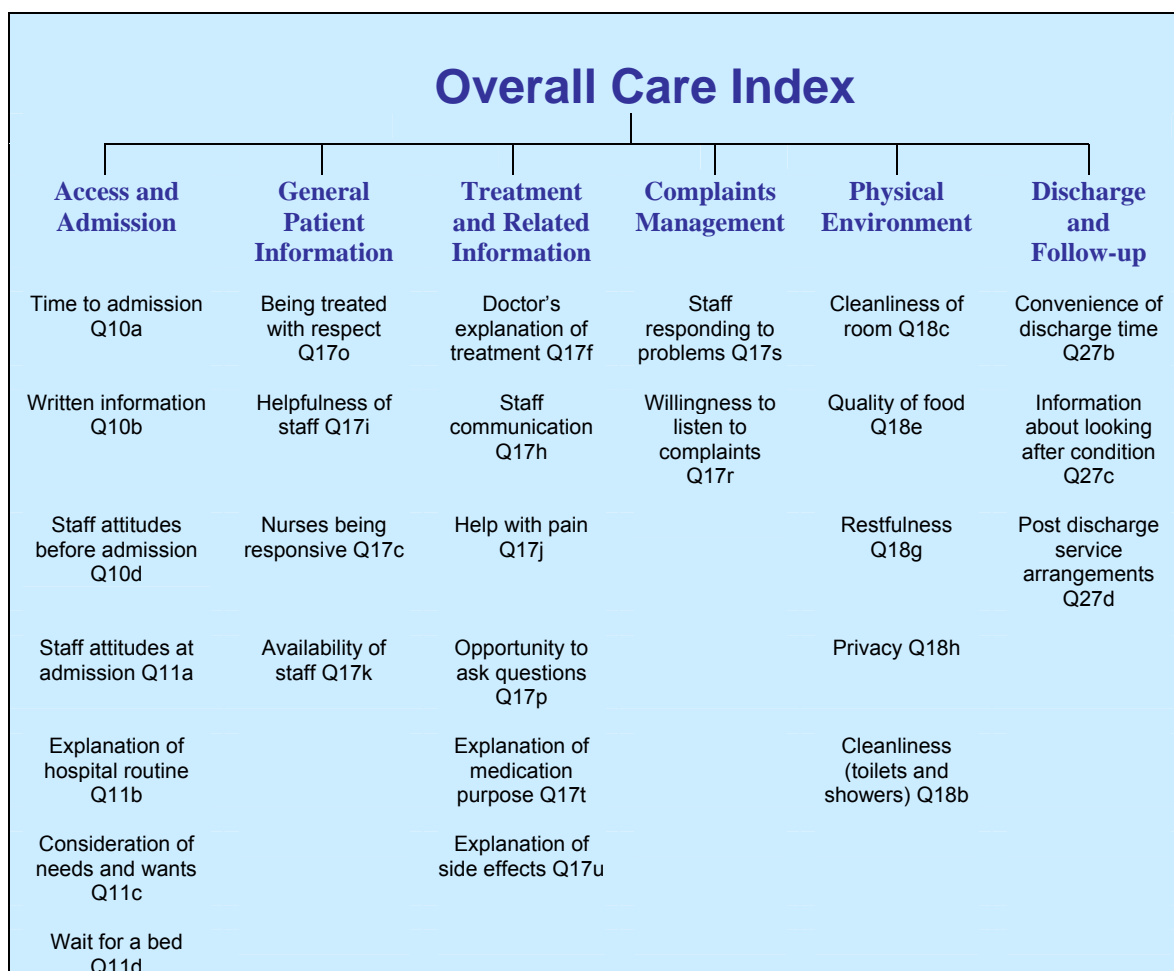
3.3 Calculation of Indicators

The report shows scores for two measures of patient satisfaction; Overall Satisfaction and the Overall Care Index (OCI).

3.3.1 Overall Satisfaction is reported as a percentage and indicates the proportion of patients who responded as being either ‘very satisfied’ or ‘fairly satisfied’ with their overall hospital stay.

3.3.2 The Overall Care Index (OCI) is a more sensitive and comprehensive measure of patient satisfaction covering the full continuum of a hospital stay. It is a mathematical construct created from 27 individual measures of performance within the Patient Satisfaction Survey questionnaire. (Questionnaire adapted from the Victorian Patient satisfaction Monitor © 2000 State of Victoria, under licence from the State of Victoria). These questions have been clustered into six sub-indices as shown in the table below. Each question is given an equal weighting in the overall index and has been included based on previous research into drivers of satisfaction. Index scores are calculated by adding results from the 27 individual items, and then converting this figure to obtain a score out of 100

Figure 1 – Construct of the Overall Care Index



Details of methodology for scoring of these two measures, along with further information about the survey methodology and data collation and analysis are provided in the Technical Report published at:
http://www.health.qld.gov.au/quality/publication/technical_report.pdf

Chapter 4 – Clinical Performance

4.1 Overview

This chapter details the statistical methodology used to investigate how individual hospitals and groups of similar hospitals performed in relation to measures such as in-hospital mortality, length of stay, complications of surgery and re-admissions. In applying these measures patient cohorts were identified from within medical, surgical, gynaecology, obstetrics and mental health specialties.

4.2 Data

Data were obtained from the Queensland Hospital Admitted Patient Data Collection (QHAPDC) and the Perinatal Data Collection (PDC). Both of these collections contain data for all public and private hospitals in Queensland. They are similar in content to administrative databases in the other States and Territories of Australia and are routinely maintained by Queensland Health.

The format of the QHAPDC has remained relatively constant since the early 1990's. It contains information under the general topics of demographic characteristics of patients, admission details, patient activity and morbidity details (including conditions treated and procedures performed). It is based on separations (an inclusive term meaning discharged, died, transferred or changed episode-type). That is, persons admitted and discharged more than once are included more than once in the collection.

The PDC began in November 1986, and was established to provide a source of information for research into obstetric and neonatal care. It contains key data on the mother's details, previous pregnancies, present pregnancy, labour and delivery, birth and postnatal details for the baby and discharge details for both mother and baby. Congenital anomalies and information regarding neonatal morbidity are also recorded. The collection is supplemented by information from Medical Certificates of Cause of Perinatal Death from the Registrar-General's Office.

Each record in both collections contains a unit record (or UR) number. It is important to note that the UR number is only unique for a given person within a given health facility i.e., a patient will most likely have different UR numbers if they are admitted to different facilities. Furthermore, the same UR number may be used for different people by different facilities. As a result, it is difficult to trace a patient from one hospital to another for the purposes of establishing outcome indicators across hospitals, such as readmissions.

The majority of conditions and procedures were selected based on criteria developed by the Victorian Department of Health (1999). In brief, the condition or procedure should have the following characteristics: clinical significance (in terms of burden, validity and relevance), data value (clearly defined, accessible, reliable and meaningful) and responsiveness (adverse outcomes are amenable to change through systematic improvements).

Reference groups of clinical experts from the various service areas were convened to provide specialist assistance in the selection of the final conditions/procedures and corresponding outcomes. These indicators were chosen from a set consisting of existing or potentially available Queensland Health indicators and indicators that were currently in use in other States and Territories or internationally.

4.3 Additional Criteria

To reduce variation in diagnostic and coding accuracy between hospitals, a variety of inclusion and exclusion criteria were applied for each condition or procedure of interest. These criteria were based on evidence from the literature and local clinical experience. For most of the conditions/procedures, inclusions and exclusions were based on the following data items: age group, length of stay, episode type, admission source, separation mode and state of usual residence. Criteria based on co-existing conditions, external causes and procedures performed were also used for some of the conditions/procedures.

All conditions and procedures were limited according to the date on which the separation occurred and acute (see next paragraph for definition) episodes of care (or hospital stays that began with an acute episode of care and then went on to non-acute care). For readmission and long stay indicators only patients who were Queensland residents were included, for other indicators (mortality, complications, caesarean section, induction, perineal tear and under 35) all patients treated in Queensland were included. With the exception of paediatrics indicators, laparoscopic cholecystectomy and deaths due to Acute Myocardial Infarction (AMI – heart attack) and stroke, conditions and procedures were also limited to overnight stay patients.

The Queensland Hospital Admitted Patient Data Collection (QHAPDC) describes **acute care** as *care in which the principal clinical intent or treatment goal is one or more of the following:*

- *manage labour (obstetrics)*
- *cure illness or provide definitive treatment of injury*
- *perform surgery*
- *relieve symptoms of illness or injury (excluding palliative care)*
- *reduce severity of an illness or injury*
- *protect against exacerbation and/or complication or an illness and/or injury which could threaten life or normal function; and or*
- *perform diagnostic or therapeutic procedures.*

4.4 Outcome Indicators

Outcome indicators were selected on the basis of providing a meaningful measurement of quality of care for the associated condition/procedure and also being readily available from the routine data sources. Each outcome indicator is defined and discussed in more detail below.

4.4.1 In-Hospital Mortality Rate:

Defined as the number of records where separation mode = “05” (death) and length of stay was less than or equal to 30 days (pat_day <= “30”), divided by the total number of records.

In most instances, same day deaths have been excluded by definition, as the scope of the project was overnight stay patients only. However, note that same day deaths have been included for AMI (heart attack) and stroke because they accounted for a significant number of the total deaths.

Table 4-1 shows the 30-day in-hospital mortality rate for the study cohorts for each of the relevant conditions/procedures of interest.

Table 4-1 Selected Conditions/Procedures by 30-Day In-Hospital Mortality Rate for All Queensland Public Hospitals, 2005/2006

<i>Condition/Procedure</i>	<i>Mortality Rate (%)</i>
Acute Myocardial Infarction (heart attack)	13.6
Heart Failure	6.1
Stroke	21.7
Pneumonia	5.7
Fractured Neck of Femur	4.7

4.4.2 Long Stay Rate:

Defined as the number of records for Queensland residents where the number of patient days *equalled or exceeded* the long stay point, divided by the total number of records for Queensland residents. Cases of in-hospital mortality prior to the long stay point were excluded from the calculation of the long stay rate, but patients who died on or after the long stay point were included for this indicator.

For the majority of indicators, the long stay point was chosen as the day closest to the 90th percentile of all eligible length of stays. However, Mental Health long stay indicators have been set to 35 days as acute care certificates are 35 days. Long stays were used as the outcome rather than average length of stay because long stays were thought to be a more sensitive indicator of quality of care. Additionally, long stays are expressed as a rate making this indicator consistent with all of the other indicators used. The long stay points for each of the selected conditions/procedures are shown in the specific indicator definitions.

4.4.3 Complications of Surgery Rate:

Defined as the number of records where **any** of the external cause codes was between “Y60”-“Y6999” (misadventures to patients during surgical and medical care) or “Y83”-“Y8499” (surgical and other medical procedures as the cause of abnormal reaction of the patient, or of later complication, without mention of misadventure at the time of the procedure), divided by the total number of records.

Table 4-2 shows the complications of surgery rate for all public hospitals for the procedures of interest.

Table 4-2 Selected Procedures by Complications of Surgery Rate for All Queensland Public Hospitals, 2005/2006

<i>Procedure</i>	<i>Complications of Surgery Rate (%)</i>
Fractured Neck of Femur	14.5
Knee Replacement – Primary	9.6
Hip Replacement – Primary	9.4
Abdominal Hysterectomy	10.1
Vaginal Hysterectomy	5.8
Prostatectomy	8.5
Colorectal Carcinoma	27.0
Laparoscopic Cholecystectomy	2.8

4.4.4 Under 35 Years of Age – Rate:

Defined as the number of records where age group was between “05” and “07” (i.e. 20-34 years), divided by the total number of records. The table below (Table 4-3) shows the rate of patients aged less than 35 years for the hysterectomy cohort.

Table 4-3 Selected Procedure by Rate of Patients Aged Less Than 35 Years for All Queensland Public Hospitals, 2005/2006

<i>Procedure</i>	<i>Rate of Patients Aged Less Than 35 Years (%)</i>
Hysterectomy	7.5

4.4.5 Caesarean Section Rate:

Defined as the number of records where the method of delivery was a lower section Caesarean section or classical Caesarean section (deliv_code = “4” or “5”), divided by the total number of records. This outcome was only used for ‘low risk’ women, and so all records relate to singleton, term births where no serious complication of pregnancy or delivery was recorded. Social Caesarean sections are a subset of all Caesarean sections, and were included in the numerator. The rate of Caesarean sections within the low risk cohort is shown in Table 4-4.

Table 4-4 Selected Cohort by Rate of Caesarean Sections for All Queensland Public Hospitals, 2005

<i>Cohort</i>	<i>Caesarean Section Rate (%)</i>
Selected Primiparae (first-born) – Caesarean Section	22.8

4.4.6 Induction Rate:

Defined as the number of records where the onset of labour was induced (labour_onset = "2"), divided by the total number of records. This outcome was only used for the selected primiparae (first-born) cohort, and so all records relate to singleton births. Social inductions are a subset of all inductions, and were included in the numerator. The rate of inductions within the selected primiparae cohort is shown in Table 4-5

Table 4-5 Selected Cohort by Rate of Induced Births for All Queensland Public Hospitals, 2005

<i>Cohort</i>	<i>Induction Rate (%)</i>
Selected Primiparae (first-born) – Induction of Labour	28.0

4.4.7 Severe Perineal Tear Rate:

Defined as the number of records where there was a 3rd or 4th degree laceration of the perineum (perinm = "4" or "5"), divided by the total number of records for vaginal births. Births by Caesarean section were excluded. This outcome was only used for the selected primiparae (first-born) cohort, and so all records relate to singleton births. The rate of third or fourth degree perineal tears within the selected primiparae cohort is shown in Table 4-6.

Table 4-6 Selected Cohort by Rate of Severe Perineal Tears for All Queensland Public Hospitals, 2005

<i>Cohort</i>	<i>Severe Perineal Tear Rate (%)</i>
Selected Primiparae (first-born) – Perineal Tears	4.6

4.4.8 Readmission Rate:

Defined as the number of records for Queensland residents where a readmission was identified divided by the total number of records for Queensland residents. Readmissions were identified using probabilistic matching of identified data to allow inclusion of readmissions to a different facility as well as readmissions to the same facility. Episodes were matched using patient name (first name, surname and phonetic version of surname), date of birth, address (street, suburb and postcode), age and sex. To be considered a match, patients were required to be of the same sex and to have at least four of the other eight variables matching. A manual check was also conducted of potential matches to eliminate any false matches. Records were matched for acute episodes only to avoid counting hospitalisation for rehabilitation as a readmission and were matched on Queensland residents only. Transfers in and out were also excluded from the set to avoid counting transfers as a readmission.

Readmissions were considered for seven indicators – depression, schizophrenia, AMI (heart attack), heart failure, knee replacement, hip replacement and paediatric tonsillectomy/adenoidectomy. Section 4.9 details the time period between the original admission and readmission and further criteria an episode must meet to be classified as a readmission for all clinical readmission indicators.

Table 4-7 shows readmission rates for each cohort.

Table 4-7 Selected Conditions/Procedures by Rate of Readmission for All Queensland Public Hospitals, 2005/2006

<i>Condition/Procedure</i>	<i>Readmission Rate(%)</i>
Depression	13.5
Schizophrenia	17.7
AMI (heart attack)	8.5
Heart Failure	12.6
Knee replacement - primary	7.6
Hip replacement - primary	4.5
Paediatric tonsillectomy/adenoidectomy	3.4

4.5 Comorbidities

In an attempt to risk-adjust for illness severity and co-existing conditions, a range of comorbidities were considered for each of the main conditions/procedures of interest. The aim of the risk adjustment is to adjust for the difference in the patient mix that occurs at different hospitals. These comorbidities were chosen based on a number of criteria, including their frequency of occurrence within the various cohorts (based on diagnosis codes other than the principal diagnosis), specialist medical advice, statistical relationship to outcome and evidence from the literature (where it existed).

Table 4-8 shows the ICD-10-AM definitions for the comorbidities (including selected complications of pregnancy). Specific comorbidities used in the risk-adjustment process for each condition are shown with indicator definitions, below. Further explanation of the risk-adjustment process is contained in section 4.7 “Methods”.

Table 4-8 ICD-10.4-AM Codes for the Comorbidities Used for Risk-Adjustment

<i>Comorbidity</i>	<i>ICD-10.4-AM Code</i>
Septicaemia	A40-A41
Sexually transmitted diseases	A50- A64
Herpes	A60
Viral Infection – unspecified	B349-B34
Respiratory syndrome	B974-B974
Malignancy	C00-C97
Anaemia	D50-D64
Disorders of Thyroid Gland	E00-E07
Diabetes	E10-E14
Hyponatremia	E871
Dementia (inc. Alzheimer’s Disease)	F00-F03, G30-G311
Parkinson’s Disease	G20
Epilepsy	G40-G41
Migraine	G43
Polyneuropathy (unspecified)	G629
Hemiplegia	G81
Other Retinal Disorders	H35
Diseases of the circulatory system	I00-I99
Valvular Disorders	I05-I08, I33-I39
Hypertension	I10-I15
Ischaemic Heart Disease	I20-I25
Cardiomyopathy	I42, I43
Conduction Disorders	I44, I45
Dysrhythmias	I46-I49
Heart Failure	I50
Cerebrovascular Disease	I60-I69
Peripheral Vascular Disease	I70-I74
Hypotension and Shock	I95, R57
Acute upper RTI	J00-J0699
Acute LRTI and Influenza	J10-J22
Upper Respiratory Disease	J399
Asthma	J45, J46
Other Chronic Obstructive Pulmonary Disease	J40-J44, J47
Intestinal disorders	K21, K52-K59
Peritoneal Adhesions	K660
Liver Disease	K70-K77
Cellulitis	L03
Ulcer of lower limb or decubitus ulcer	L89, L97
Dorsalgia	M54
Renal disease	N00-N39

<i>Comorbidity</i>	<i>ICD-10.4-AM Code</i>
Renal Failure	N17-N19, R34
Urinary Tract Infection (site not specified)	N390, T835
Pre-existing Hypertension complicating Pregnancy	O10
Pre-existing hypertension complicating pregnancy with superimposed proteinuria	O11-O1199
Gestational Hypertension without significant Proteinuria	O13
Gestational hypertension/pre-eclampsia	O13-O1699
Gestational Hypertension with significant Proteinuria	O14
Haemorrhage in Early Pregnancy	O20
Gestational diabetes	O2441, O2442, O2449
Prolonged rupture of membranes	O4211, O4212 or O429
Placenta Praevia with Haemorrhage	O44 – O46
Premature Separation of Placenta	O45
Antepartum Haemorrhage, nec	O46
Gangrene (nec)	R02
Other urinary symptoms	R30-R39
Oedema	R60
Open wound of wrist or hand	S61
Burns	T20-T31
Poisoning	T36-T50
Social issues	Z55-Z78
Gestational weeks	Collected in Perinatal Data Collection
Baby weight group	Collected in Perinatal Data Collection
Plurality	Collected in Perinatal Data Collection
Delivery code	Collected in Perinatal Data Collection
Congenital anomalies	Collected in Perinatal Data Collection

4.6 Data Verification and Validation

To ensure that the data extracted from the QHAPDC and PDC agreed with the source information available at the hospital sites, the indicators were distributed to public hospitals prior to public release and any queries raised by the hospitals were investigated.

4.7 Methods

The statistical methods used in this study are an adaptation of those developed at the Health Services Research Group, University of Newcastle (*Determining the Potential to Improve the Quality of Care in Australian Health Care Organisations: Results from the ACHS Clinical Indicators Data 1998 and 1999, The Australian Council of Healthcare Standards, 2000*) and those employed in the Ontario Hospital Report (*Baker et. Al., 1999*). In brief, these methods involve adjusting the data for potential risk factors and then correcting for random variation in the outcome indicator. The degree of systematic variation over and above that due to chance can then be determined.

For each indicator, the first stage of the analysis involved calculating the risk-adjusted expected value for every hospital. The risk-adjustment was primarily based on age, sex and the selected comorbidities described earlier (refer to section 2.5 “Comorbidities” of this report). Some other factors were also included for particular cohorts.

The expected values were obtained by fitting a logistic regression model to all of the relevant records in the cohort. The estimate of expected outcome for each record was then summed to the hospital level. Main effects only were defined in the models.

The predictive capability of these models was assessed using the c-statistic, which is equivalent to the area under the receiver operating characteristics (roc) curve, while the goodness-of-fit was determined using the Hosmer-Lemeshow test (*Hosmer DW Jr, Lemeshow S. Applied Logistic Regression. New York: John Wiley & Sons Inc; 1989*). The c-statistic ranges between 0 and 1, with a value of 0.5 indicating a predictive capability equivalent to chance. Models giving values of around 0.65 or higher are considered to have acceptable predictive power. Results of the Hosmer-Lemeshow test are reported in terms of a p-value. A p-value greater than 0.05 indicates that the model provides a good fit for the data. Results of these diagnostic statistics are shown below in Table 4-9.

Table 4-9 Diagnostic Statistics from the Logistic Regression Models Used to Calculate Risk-Adjusted Expected Values by Condition/Procedure-Outcome Pairings and All Queensland Public Hospitals 2005/2006 & 2005

Condition/Procedure	Outcome Indicator	Statistics
Acute Myocardial Infarction (heart attack)	In-Hospital Mortality	c=0.757 p=0.016
	Long Stays	c = 0.758 p = 0.761
	Readmissions	c=0.556 p=0.960
Heart Failure	In-Hospital Mortality	c=0.765 p=0.567
	Long Stays	c = 0.752 p = 0.609
	Readmissions	c = 0.616 p = 0.974
Stroke	In-Hospital Mortality	c = 0.651 p = 0.916
Pneumonia	In-Hospital Mortality	c = 0.853 p = 0.116
Fractured Neck of Femur	In-Hospital Mortality	c = 0.840 p = 0.715
	Comp. of Surgery	c = 0.643 p = 0.363

Condition/Procedure	Outcome Indicator	Statistics
Knee Replacement - Primary	Long Stays	c = 0.738 p = 0.364
	Comp. of Surgery	c = 0.777 p = 0.666
	Readmissions	c = 0.534 p = na
Hip Replacement - Primary	Long Stays	c = 0.767 p = 0.989
	Comp. of Surgery	c = 0.677 p = 0.952
	Readmissions	c = 0.605 p = 1.000
Hysterectomy	Under 35 Years of Age	c = 0.568 p = 0.890
Abdominal Hysterectomy	Comp. of Surgery	c = 0.661 p = 0.510
Vaginal Hysterectomy	Comp. of Surgery	c = 0.856 p = 0.656
Selected Primiparae (first-born)	Caesarean Section	c = 0.630 p = 0.943
	Induced Births	c = 0.679 p = 0.060
	Severe Perineal Tears	c = 0.597 p = 1.000
Colorectal Carcinoma	Comp. of Surgery	c = 0.690 p = 0.847
Laparoscopic Cholecystectomy	Comp. of Surgery	c = 0.662 p = 0.111
Prostatectomy	Comp. of Surgery	c = 0.736 p = 0.320
Paediatric Tonsillectomy/ Adenoidectomy	Long Stays	c = 0.636 p = 0.919
	Readmissions	c = 0.543 p = 0.647
Schizophrenia	Long Stays	c = 0.575 p = 0.754
	Readmissions	c = 0.512 p = 1.000
Depression	Long Stays	c = 0.591 p = 0.815
	Readmissions	c = 0.511 p = 1.000

Just over a half of these models (17 out of 31) returned results showing an acceptable level of predictive capability, based on c-statistics ranging between 0.65 to 0.90. The remaining c-statistics were between 0.51 and 0.649, reflecting only moderate powers of prediction. This indicates that the factors included in the logistic regression models are not having wildly varying effects on the risk-adjustment.

The majority of the c-statistics lower than 0.65 were reported for the outcomes associated with the hysterectomy, selected primiparae (first-born), mental health and paediatric tonsillectomy/adenoidectomy. This suggests that for these models there may be other factors responsible for the variation which are not captured in the routine data set. In particular, no comorbidities were included in the model for paediatric tonsillectomy/adenoidectomy - the risk-adjustment was limited to factors such as the age and sex.

The lack of predictive capability of the models with lower c-statistics is not of great concern because the risk-adjustment is simply an attempt to allow for differences in casemix between the hospitals, and from that viewpoint it is only a secondary component of the data analysis. For example, the comorbidities that have been used are only a proxy in the absence of information about the severity of the condition being investigated. In any instance, risk-adjustment could never be expected to completely compensate for casemix differences between hospitals.

The Hosmer-Lemeshow test statistics indicated that most of the models provided a good fit for the data; in all but one of the models the p-value exceeded 0.05. For each of the models where $p < 0.05$, the observed and expected values within most partitions still showed reasonable agreement. Therefore, it would seem that the low p-values for these models could be attributed more to the relatively large number of observations rather than that the models provided a particularly poor fit to the data.

Conversely, a large p-value from the Hosmer-Lemeshow test may indicate over-fitting of the model, hence removing real variation that exists between hospitals. Despite many of the models returning p-values greater than 0.4, over-fitting is unlikely to be a concern in this situation because the risk-adjustment was carried out at the level of individual patients rather than for aggregated hospital data. Thus, compared to the overall sample size, the number of predictors used for any particular model was small. Over-fitting is also typically characterised by unrealistically large standard errors for the regression variables (*Hosmer DW Jr, Lemeshow S; 1989*). Where a predictor was found to have large standard errors, it was either removed from the model or the levels of the predictor were collapsed if appropriate.

The next step in the analysis involved calculating risk-adjusted rates of the outcome indicator per 100 separations for each hospital where there was sufficient data to produce reliable results. Data was analysed separately for each year.

The analysis of data for individual hospitals was restricted to 42 public hospitals where they had at least 20 separations for the reference year. The 42 hospitals were determined on the criteria of size of hospital, with hospitals having a budget of \$2m and greater being included.

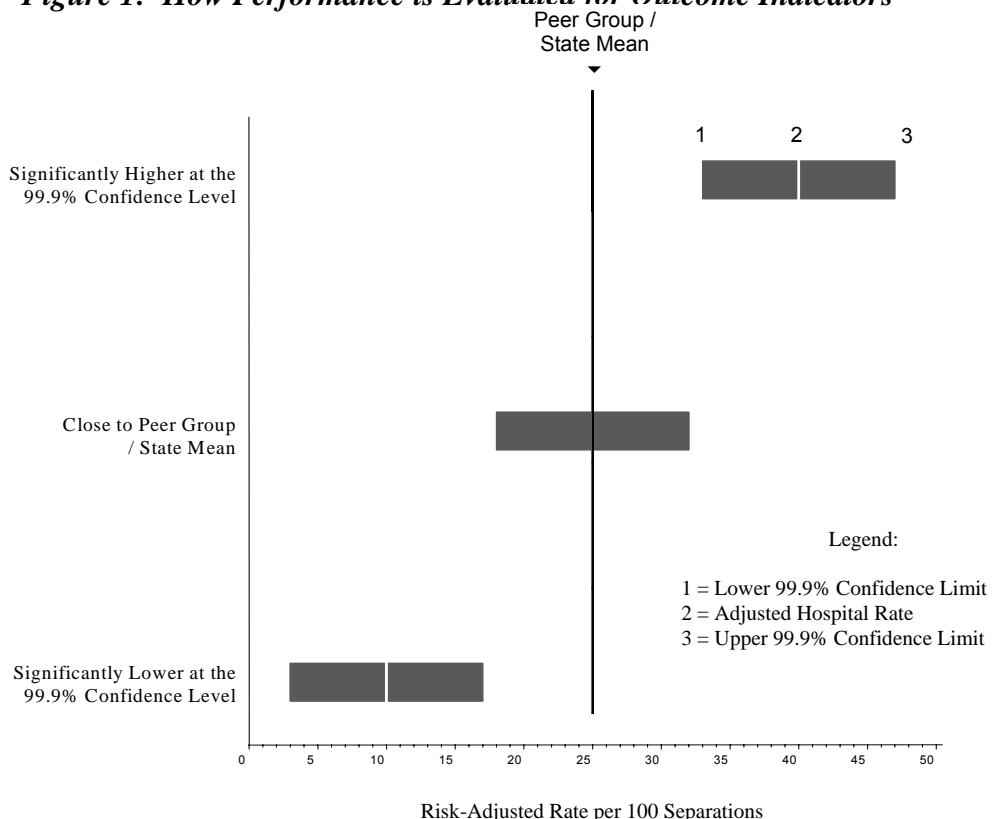
The risk-adjusted rate for each indicator within each hospital was calculated by dividing the observed number of outcomes (i.e., in-hospital mortality, long stays etc.) by the risk-adjusted expected number of outcomes (obtained from the logistic regression process described earlier). This was then multiplied by the total rate of outcomes per 100 separations for the entire cohort to give the risk-adjusted rate of outcomes per 100 separations for that hospital.

Confidence intervals were calculated for the risk-adjusted rates. In general, the narrower the confidence interval the more likely the adjusted score is to be an accurate reflection of the true indicator status for a hospital. These confidence intervals can also be used to determine the extent to which each hospital conforms within a selected group with acceptable results.

For this purpose, accompanying 99.9% confidence intervals were computed for the risk-adjusted rates. Confidence intervals were calculated because the observed rate of adverse outcomes was for a given period of time (usually a single year), and therefore could be assumed to form a representative sample of the true long-term performance of that hospital (providing that other influencing factors remain unchanged). The confidence intervals also take into account any variability that may be introduced to the results as part of the risk-adjustment process. Therefore, there was a 99.9% chance that the confidence interval would include the actual risk-adjusted rate.

The evaluation of the performance of each hospital for the various indicators was based on how the mean rate for the peer group and state compared against the confidence interval for the hospital-specific rate. Three levels of performance were defined, as explained below. The graphical representation of these performance levels is shown below in Figure 1.

Figure 1: How Performance is Evaluated for Outcome Indicators



1. ***Significantly Higher at the 99.9% Confidence Level:*** The lower bound for the 99.9% confidence interval is greater than the peer group or state mean. It is very likely that the true, underlying risk-adjusted rate for these hospitals is higher compared to the mean of all of the hospitals in their peer group or the state.
2. ***Close to Peer Group Mean:*** The peer group or state mean falls within the 99.9% confidence interval. There is no evidence to suggest that these hospitals are performing differently to the mean for all hospitals in their peer group or the state.
3. ***Significantly Lower at the 99.9% Confidence Level:*** The upper bound for the 99.9% confidence interval is less than the peer group or state mean. It is very likely that the true, underlying risk-adjusted rate for these hospitals is lower compared to the mean of all of the hospitals in their peer group or the state.

4.8 Criteria for Determining Outliers for Indicators in the Clinical Quadrant

4.8.1 Outlier Identification:

Any report of an indicator whose result was either higher than or lower than the peer group or state mean at the 99.9% confidence level (see Figure 1) was considered to be an outlier.

4.8.2 Outlier Interpretation:

After verification of the data by the hospital, Outliers reported after application of the first test may indeed be models of best practice (where the rate is lower than the comparison group) or have problems within the service of the indicator (where the rate is higher than the comparison group) as long as the numbers for the indicator have been sufficient to acquire statistical significance.

4.8.3 Methodological notes and limitations:

The peer group mean was based on the results for all hospitals within that particular peer group, irrespective of whether individual hospitals within the peer group had sufficient numbers of separations for each condition/procedure to be analysed separately.

For the purposes of this project, the peer group mean was treated as an exact value. However, in reality it is also only a point estimate (similar to the individual hospital rates) and therefore could also be represented with corresponding confidence intervals. This approach was not used for a number of reasons. First, the relatively large number of separations used to calculate the peer group mean would result in much smaller confidence intervals than those associated with individual hospital estimates, ie it was possible to measure the peer group mean more exactly. Second, the confidence interval for the peer group mean would not be independent of the confidence interval for an individual hospital that was part of that peer group, and so a comparison of the two confidence intervals would be inappropriate. Even if this were not the case, it would be more complicated to assign performance into the above categories should the confidence intervals for the individual hospital and peer group mean overlap. Third, the chosen confidence levels used were rather extreme. For

example, if the hospital rate was different from the peer group mean at the 99.9% level based on the confidence interval for the hospital only, then this comparison is likely to still be highly significant even if there was some overlap with the confidence interval for the peer group mean. Last and most importantly from a practical viewpoint, the assignment of performance was not meant to be statistically definitive but merely to provide a guide as to how the individual hospital was performing in relation to other hospitals within its peer group.

The performance of individual hospitals was evaluated against the relevant peer group mean to ensure that the hospital was benchmarked against other hospitals with similar characteristics. However, the risk-adjustment procedure outlined earlier was done for all public hospitals combined. It would have been more technically correct for the risk-adjustment to also have been carried out at the peer group level. The main reason for risk-adjusting at the level of the entire cohort was that there were not always sufficient numbers at the peer group level for the logistic regression models to converge. Further, a comparison was made previously between the risk-adjusted results at both the peer group and entire cohort level for some of the indicators where the peer group models did converge. In nearly all instances, there were only minor differences between the risk-adjusted rates and associated confidence intervals that were obtained using the different populations for risk-adjustment.

4.8.4 Limitations

There are several caveats that should be kept in mind when interpreting the results of the analyses performed in this study. First, while every effort has been made to risk-adjust the data presented in the report, it is important to realise that risk-adjustment can only reduce, rather than completely remove, the effects of differences in the patient populations across hospitals. For example, hospitals that have the services to treat more complicated or specialised cases may appear to perform poorly in comparison to other hospitals, even after risk-adjustment, simply because they treat sicker patients in general.

Second, the number of cases used in the calculation affected the size of the confidence intervals for each hospital. Hospitals with greater volume will have smaller confidence intervals, and using the criteria outlined in section 2.7 “Methods”, will therefore be more likely to be rated as performing either above or below the peer group mean than smaller hospitals which have similar outcome rates. While this effect will not be quite as obvious within a particular peer group, it will still exist when comparing hospitals belonging to different peer groups.

Third, it must be remembered that the analyses were based on a single year of data, which assumes that this data provides a reasonable representation of the usual happenings at each hospital. Yearly hospital comparisons are often found to be inconclusive due to the variation across time that inevitably occurs when outcomes for individual hospitals are measured. Other studies have found that the ranking of hospitals by outcome indicators similar to those used in this project are subject to considerable random variation from year to year (*Goldstein and Spiegelhalter, Journal of the Royal Statistical Society, Series A, 1996;159:385-409*). While confidence intervals have been used to reflect the possible extent of this variation, the results for individual hospitals should still be interpreted with some caution as there

may be issues (such as organisational change, new technology etc.) which were not captured in the data.

4.8.5 *Table of Results*

The following table details the clinical results for each facility where the condition had a suitable number of outcomes to be statistically reliable to report. The result is shown as a risk adjusted rate per 100 separations. Note that a higher or lower score does not necessarily reflect upon the clinical practice at the facility. The report displays Confidence Intervals have been determined at the 99.9% limit to identify where results are statistically significantly different from the peer or State as discussed in section 4.8.

HOSPITAL PERFORMANCE - CLINICAL (TABLE)

Risk Adjusted Rate per 100 Separations

Hospital Name	Surgical										Medical										Gynae/Obstetric						Mental Health					
	Fractured neck of femur in-hospital mortality	Fractured neck of femur - whole admission complications of surgery	Laparoscopic cholecystectomy complications of surgery	Colorectal carcinoma - whole admission complications of surgery	Hip replacement (primary) - whole admission complications of surgery	Hip replacement (primary) readmissions	Hip replacement (primary) / long stay	Knee replacement (primary) - whole admission complications of surgery	Knee replacement (primary) readmissions	Knee replacement (primary) long stay	Prostatectomy complications of surgery	Paediatric tonsillectomy and adenoidectomy long stay	Paediatric tonsillectomy and adenoidectomy readmission	AMI (heart attack) in-hospital mortality	AMI (heart attack) readmission	AMI (heart attack) long stay	Heart failure in-hospital mortality	Heart failure readmission	Heart failure long stay	Stroke in-hospital mortality	Pneumonia in-hospital mortality	Selected primiparae (first-born) caesarean section	Selected primiparae (first-born) induction of labour	Selected primiparae (first-born) perineal tears (third or fourth degree)	Abdominal hysterectomy complications of surgery	Vaginal hysterectomy complications of surgery	Hysterectomy performed on women less than 35 years of age	Depression readmission	Depression long stay	Schizophrenia readmission	Schizophrenia long stay	
Cairns Base Hospital	10.15	15.58	3.20	40.82	11.12	3.44	10.26	11.57	4.66	10.97	6.93	4.89	5.57	12.24	20.02	16.86	2.80	9.87	11.65	20.18	6.43	20.93	24.04	9.52	16.42	2.64	9.19	7.23	8.80	8.08	24.65	
Gold Coast Hospital (including Robina)	3.46	24.53	3.28	20.88	6.67	0.00	17.83	10.83	5.35	13.15	8.58	2.48	0.75	15.49	8.46	18.68	4.74	8.98	8.91	21.99	4.61	23.22	26.37	3.75	9.88	2.98	11.60	3.88	10.11	9.74	35.04	
Mater Children's Public Hospital												4.41	3.54																			
Mater Mother's Public Hospital																							27.09	30.98	4.57	11.00	11.09	6.25				
Nambour General Hospital	6.85	8.09	2.05	21.90	1.61	5.07	3.16	10.22	3.11	9.00	8.45	1.74	0.00	16.26	8.18	16.28	6.38	12.19	10.19	28.90	9.62	18.82	31.24	3.72	12.85	3.27	6.86	10.28	5.36	18.17	6.81	
Princess Alexandra Hospital	2.72	10.02	4.17	18.16	8.29	11.83	22.62	4.74	11.30	26.15	7.88			16.96	3.78	18.64	3.78	8.49	8.55	17.73	3.93							9.85	14.06	13.13	25.19	
Royal Brisbane and Women's Hospital	4.24	10.41	2.29	35.46	20.17	7.23	20.21	21.95	10.29	13.97	7.21			12.88	5.97	15.63	4.66	7.68	12.43	19.12	4.43	24.74	29.61	5.54	8.17	7.01	3.94	11.04	5.67	20.22	12.99	
Royal Children's Hospital												3.96	4.32																			
The Prince Charles Hospital			4.16		10.42	3.43	5.15	9.97	11.92	6.28				6.34	8.10	6.35	2.13	10.30	6.84		3.83							12.83	4.80	15.16	11.50	
The Townsville Hospital	6.47	11.99	3.29	30.54	11.52	3.33	17.65	8.29	8.80	0.00		2.45	1.04	13.33	16.53	21.61	10.78	11.32	12.83	19.02	6.91	21.55	30.95	4.27	10.20	4.36	6.54	9.95	9.03	17.55	14.06	
Principal Referral and Specialised Rate	5.24	14.12	3.53	27.31	9.85	3.85	11.06	10.68	8.55	9.95	8.05	3.94	3.39	12.38	9.48	19.54	4.89	9.78	10.43	19.38	6.60	23.81	28.84	5.07	10.82	6.57	6.60	9.72	8.00	15.58	17.69	
Bundaberg Hospital	0.00	16.08	4.65											11.51	5.16	17.70	4.76	6.66	19.71	19.10	9.74	19.49	30.72	3.27	13.37		7.80	28.15	0.00	34.91	4.89	
Caboolture Hospital			0.52											15.67	6.70	12.83	11.40	15.44	4.58	27.04	9.05	14.63	25.56	5.52	16.83	7.28	10.66	8.66	2.18	14.14	10.06	
Hervey Bay Hospital			0.00	38.15										11.56	11.20	0.00	3.90	12.21	8.27	26.14	6.07	15.32	21.53	1.00	7.01	0.00	8.18					
Ipswich Hospital	2.81	21.07	3.19	34.41	5.08	2.33	2.75	5.73	6.54	8.43	8.64	3.51	5.81	13.83	8.87	14.75	6.12	15.12	5.83	14.25	0.75	21.91	22.81	6.72	6.37	8.29	8.67	5.34	7.82	17.19	15.29	
Logan Hospital	1.84	13.25	2.57	22.37	8.03	0.00	5.09	10.93	13.78	16.27				9.19	10.13	4.74	6.89	19.57	10.99	16.68	5.54	24.26	29.30	1.27	8.54	8.84	6.73	8.56	2.44	13.54	14.27	
Mackay Base Hospital	6.58	15.25	4.52		23.44	3.64	31.09	5.22	9.67	2.38				9.85	22.97	29.12	4.19	12.12	18.33	19.36	2.99	33.27	37.41	4.40	13.50		3.22	6.68	3.01	14.59	10.39	
Maryborough Hospital			6.66																										7.40	1.77	13.60	9.52
Mater Adult Public Hospital	9.00	22.79	3.80	21.58	10.19	7.29	0.00	10.18	6.39	1.61	13.38			7.83	4.64	10.16	5.15	6.23	5.81	16.51	6.04											
Mount Isa Hospital			3.55														11.25	29.58	7.50		2.03	45.44	28.81	6.75	11.82			27.11				
Queen Elizabeth II Jubilee Hospital	3.42	11.86	2.29	24.50	11.26	4.60	12.11	8.87	4.56	13.15	6.83			10.80	5.96	11.42	9.23	12.80	4.97	18.19	12.98				6.35	5.04	4.50					
Redcliffe Hospital	7.98	11.35	3.85	25.88	6.25	7.24	2.57	10.64	6.60	6.31	6.01			22.61	13.31	11.08	8.63	10.98	11.39	26.27	4.72	36.19	34.08	5.97	15.88	3.76	10.80					
Redland Hospital			2.47											12.29	5.47	13.15	9.62	10.55	7.32	12.08	5.46	19.11	31.11	3.65	6.19	3.14	5.58	43.41	1.45	40.40	5.47	
Rockhampton Base Hospital	6.92	12.62	2.73	24.44	7.40	4.61	5.97	7.84	2.69	4.19	0.00	0.78	0.56	11.74			4.96	3.50	10.24	23.87	3.91	17.39	26.72	3.91	9.77		10.05	13.00	2.20	12.28	3.90	
Toowoomba Hospital	4.27	9.58	2.47	21.84	7.00	11.21	7.61	8.27	11.22	3.84	15.52	2.46	0.63	5.71	3.37	7.09	4.45	11.16	12.74	10.98	7.95	19.34	25.49	4.89	5.92		10.31	26.31	6.59	29.94	10.62	
Large Rate	4.24	14.95	2.72	27.46	9.22	5.31	7.96	8.50	6.62	7.62	8.95	2.37	3.00	12.15	8.58	9.59	6.94	13.72	10.14	19.77	6.25	22.41	28.11	4.05	9.37	5.41	8.39	17.66	3.40	20.76	10.44	
Atherton Hospital			3.55														15.83	7.57	7.14		11.64	32.05	16.97	5.37								
Ayr Hospital																	17.03					3.44	22.38	31.58	8.03							
Beaudesert Hospital																						3.21										
Caloundra Hospital			2.08														4.79	18.10	7.26			0.00										
Dalby Hospital																						3.89	13.33	19.53	6.49							
Emerald Hospital																						9.59	14.50	29.82	4.27							
Gladstone Hospital			0.00														0.00	2.93	0.00	10.47	9.73	27.28	25.69	4.45								
Goondiwindi Hospital																						7.52										
Gympie Hospital			0.00									0.00	2.95				8.35	28.91	4.53	34.71	4.42	33.41	29.24	0.00								
Ingham Hospital																	12.62	23.03	4.94			12.91										
Innisfail Hospital																	5.51	4.21	6.03			0.00	19.21	16.32	0.00							
Kingaroy Hospital			0.00														0.00	12.90	0.00			22.82	20.75	9.12								
Mareeba District Hospital																	0.00	10.99	0.00			2.28	15.46	19.99	0.00							
Mossman Hospital																						6.40										
Proserpine Hospital																19.25						6.61	18.51	26.12	4.92							
Roma Hospital																						0.00	20.80	20.61	0.00							
Thursday Island Hospital																						0.00	30.81	19.77								
Warwick Hospital			0.00								0.00						12.54	3.17	26.07			0.00	19.64	24.63	8.37							
Medium and Small Rate			0.96	7.14							8.62	4.35	4.35	17.12	1.16	12.79	6.36	15.18	7.14	34.91	3.78	22.51	25.00	4.63	9.84	2.70	7.00					

Public and Private Hospital Comparison

All QLD Public Hospitals Rate	4.82	14.47	2.81	27.01	9.45	4.54	9.58	9.57	7.56	8.75	8.47	3.72	3.41	13.59	8.54	12.77	6.06	12.59	9.51	21.70	5.68	22.82	28.00	4.64	10.08	5.75	7.48	13.47	5.83	17.73	14.68	
All QLD Private Hospitals Rate	7.55	15.52	3.30	28.84	10.36		8.83	9.41		10.85	7.41			16.29		22.22	7.06		15.48	16.64	7.92	40.03	33.84	3.08	6.40	6.04	5.03					
	■	■	■	■	■		■	■		■	■			■		■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■

Legend	
Public Hospitals that have a statistically significantly lower rate than Private	↓
Public Hospitals that have a statistically significantly higher rate than Private	↑
Variation is not statistically significantly different	■
Not applicable	■

Notes:

- This is a state-wide comparison of Public and Private Hospital clinical performance results
- A comparison of the Upper and Lower 99.9% Confidence Limits has been made, with significant variations highlighted where there is a 99.9% statistical certainty that public and private results are different - see the Legend
- No risk adjustment for age, sex or comorbidities/complications has been made in this comparison
- Please note that Public Hospitals tend to treat higher than average complexity of cases than in Private Hospitals. Patients also generally have a different demographic that cannot be adjusted for in these comparisons

4.9 Definition of Clinical Indicators.

<u>Acute Myocardial Infarction (heart attack)</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	I21, I22
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Age	30 – 89 years (age_grp >= "07" and age_grp <= "18")
Length of stay	4 - 30 patient days (pat_day >= "4" and pat_day <= "30"), unless the patient had a length of stay from 1 - 3 patient days and died in hospital (pat_day <= "3" and sepn_mode = "05")
Admission source	Admissions through the emergency department only (orig_ref_code = "02")
Separation mode	Exclude transfers out (sepn_mode ≠ "16")

<u>Acute Myocardial Infarction (heart attack) In-Hospital Mortality</u>	
Definition	Defined as the number of records where separation mode = "05" (death) and length of stay was less than or equal to 30 days (pat_day <= "30"), divided by the total number of records. Same day deaths have been included in this indicator.
Additional Criteria	Separation between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Risk Adjustment	Sex, Age, Malignancy, Diabetes, Dementia (inc. Alzheimer's Disease), Hypertension , Dysrhythmias, Heart Failure, Hypotension and Shock, Cerebrovascular Disease, Renal Failure

<u>Acute Myocardial Infarction (heart attack) Readmissions</u>	
Definition	Defined as the number of records where a readmission was identified divided by the total number of records. Readmissions were identified using probabilistic matching of identified data to allow inclusion of readmissions to a different facility as well as readmissions to the same facility within 30 days. Episodes were matched using patient name (first name, surname and phonetic version of surname), date of birth, address (street, suburb and postcode), age and sex. To be considered a match, patients were required to be of the same sex and to have at least four of the other eight variables matching. A manual check was also conducted of potential matches to eliminate any false matches. Records were matched for acute episodes only to avoid counting hospitalisation for rehabilitation as a readmission.
Additional Criteria	Include Queensland residents only (state_id = "3")
Additional Criteria	Initial admission must occur between 1 July 2005 and 31 May 2006 inclusive
Additional Criteria	Records with the following procedure codes (invasive coronary procedures) were excluded

	from the analysis (“35304-00”, “35304-01”, “35305-00”, “35305-01”, “35310-00”, “35310-01”, “35310-02”, “35310-03”, “35310-04”, “35310-05”, “38215-00”, “38218-00”, “38218-01”, “38218-02”, “38497-00”, “38497-01”, “38497-02”, “38497-03”, “38497-04”, “38497-05”, “38497-06”, “38497-07”, “38500-00”, “38500-01”, “38500-02”, “38500-03”, “38500-04”, “38503-00”, “38503-01”, “38503-02”, “38503-03”, “38503-04”, “90201-00”, “90201-01”, “90201-02”, “90201-03”)
Additional Criteria	Exclude in-hospital death (and sepn_mode ≠ “05”)
Risk Adjustment	Sex, Conduction Disorders, Cerebrovascular Disease
<u>Acute Myocardial Infarction (heart attack) Long stays</u>	
Definition	<p>Long Stay Point = 12 Days</p> <p>For the purposes of this project, the long stay point was chosen as the day closest to the 90th percentile of all eligible length of stays. Long stays were used as the outcome rather than average length of stay because long stays were thought to be a more sensitive indicator of quality of care. Additionally, long stays are expressed as a rate making this indicator consistent with all of the other indicators used.</p> <p>Defined as the number of records where the number of patient days <i>equalled or exceeded</i> the long stay point, divided by the total number of records. Cases of in-hospital mortality prior to the long stay point were excluded from the calculation of the long stay rate, but patients who died on or after the long stay point were included for this indicator.</p>
Additional Criteria	Include Queensland residents only (state_id = “3”)
Additional Criteria	Initial admission must occur between 1 July 2005 and 31 May 2006 inclusive
Additional Criteria	Records with the following procedure codes (invasive coronary procedures) were excluded from the analysis (“35304-00”, “35304-01”, “35305-00”, “35305-01”, “35310-00”, “35310-01”, “35310-02”, “35310-03”, “35310-04”, “35310-05”, “38215-00”, “38218-00”, “38218-01”, “38218-02”, “38497-00”, “38497-01”, “38497-02”, “38497-03”, “38497-04”, “38497-05”, “38497-06”, “38497-07”, “38500-00”, “38500-01”, “38500-02”, “38500-03”, “38500-04”, “38503-00”, “38503-01”, “38503-02”, “38503-03”, “38503-04”, “90201-00”, “90201-01”, “90201-02”, “90201-03”)
Additional Criteria	Exclude in-hospital death (and sepn_mode ≠ “05”)
Risk Adjustment	Sex, Anaemia, Dysrhythmias, Heart Failure, Cerebrovascular Disease, Hypotension, Acute LRTI and Influenza

Fourth, all of the analyses will only be as accurate as the original data source. While both of these collections are conducted according to well-established guidelines and involve extensive data audits, it is still quite possible that variation in the indicators between hospitals could be due to differences in coding practices. Indeed, it is hoped that one of the by-products of this project will be further improvement in the standardisation of coding practices across hospitals.

<u>Heart Failure</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	I50
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Age	30 – 89 years (age_grp >= "07" and age_grp <= "18")
Overnight stay	Patients must have spent at least one night in hospital (end_date > start_date)
Length of stay	1 - 30 patient days (pat_day >= "1" and pat_day <= "30")
Admission source	Exclude transfers in (orig_ref_code ≠ "24")
Separation mode	Exclude transfers out (sepn_mode ≠ "16")

<u>Heart Failure In-Hospital mortality</u>	
Definition	Defined as the number of records where separation mode = "05" (death) and length of stay was less than or equal to 30 days (pat_day <= "30"), divided by the total number of records.
Risk Adjustment	Age, Septicaemia, Malignancy, Dementia (inc. Alzheimer's Disease), Hypertension, Ischaemic Heart Disease, Dysrhythmias, Acute LRTI and Influenza, Ulcer of lower limb or decubitus ulcer, Renal Failure, Hypotension and Shock, Cerebrovascular Disease

<u>Heart Failure Readmissions</u>	
Definition	Defined as the number of records where a readmission was identified divided by the total number of records. Readmissions were identified using probabilistic matching of identified data to allow inclusion of readmissions to a different facility as well as readmissions to the same facility within 30 days. Episodes were matched using patient name (first name, surname and phonetic version of surname), date of birth, address (street, suburb and postcode), age and sex. To be considered a match, patients were required to be of the same sex and to have at least four of the other eight variables matching. A manual check was also conducted of potential matches to eliminate any false matches. Records were matched for acute episodes only to avoid counting hospitalisation for rehabilitation as a readmission.
Additional Criteria	Include Queensland residents only (state_id = "3")
Additional Criteria	Initial admission must occur between 1 July 2005 and 31 May 2006 inclusive
Risk Adjustment	Age, Hypertension, Renal Failure

<u>Heart Failure Long stays</u>	
Definition	<p>Long Stay Point = 14 Days</p> <p>For the purposes of this project, the long stay point was chosen as the day closest to the 90th percentile of all eligible length of stays. Long stays were used as the outcome rather than average length of stay because long stays were thought to be a more sensitive indicator of quality of care. Additionally, long stays are expressed as a rate making this indicator consistent with all of the other indicators used.</p> <p>Defined as the number of records where the number of patient days <i>equalled or exceeded</i> the long stay point, divided by the total number of records. Cases of in-hospital mortality prior to the long stay point were excluded from the calculation of the long stay rate, but patients who died on or after the long stay point were included for this indicator.</p> <p>Include Queensland residents only (state_id = "3")</p>
Risk Adjustment	<p>Age, Septicaemia, Malignancy, Anaemia, Hyponatremia, Hemiplegia, Valvular Disorder, Dysrhythmia, Intestinal Disorders, Liver disease, Cellulitis, Ulcer of lower limb or decubitus ulcer, Renal Failure, Urinary Tract Infection, Other Urinary symptoms</p>

<u>Stroke</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	I61-I64
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Age	30 – 89 years (age_grp >= "07" and age_grp <= "18")
Length of stay	3 or more patient days (pat_day >= "3"), unless the patient had a length of stay of 1 or 2 patient days and died in hospital (pat_day >= "1" and pat_day <= "2" and sepn_mode = "05")
Admission source	Exclude transfers in (orig_ref_code ≠ "24") and changes of episode type (orig_ref_code ≠ "06")
Separation mode	Exclude transfers out (sepn_mode ≠ "16"). In the case of changes of episode (sepn_mode = "06"), immediately ensuing non-acute episodes (eg. rehabilitation) were appended to the original acute episode to form a complete record of the hospital stay, including non-acute episodes that extended into the next analysis period.
Procedures	Exclude carotid endarterectomy ("33500-00" or "32703-00")

<u>Stroke In-hospital mortality</u>	
Definition	Defined as the number of records where separation mode = "05" (death) and length of stay was less than or equal to 30 days (pat_day <= "30"), divided by the total number of records.
Risk Adjustment	Age, Septicaemia, Malignancy, Heart Failure, Acute LRTI and Influenza, Renal Failure.

<u>Pneumonia</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	J13-J16, J18.
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Overnight stay patients	Patients must have spent at least one night in hospital (end_date > start_date)
Age	20 – 89 years (age_grp >= "05" and age_grp <= "18")
Length of stay	1 - 30 patient days (pat_day >= "1" and pat_day <= "30")
Admission source	Exclude transfers in (orig_ref_code ≠ "24")
Separation mode	Exclude transfers out (sepn_mode ≠ "16")

<u>Pneumonia In-hospital mortality</u>	
Definition	Defined as the number of records where separation mode = "05" (death) and length of stay was less than or equal to 30 days (pat_day <= "30"), divided by the total number of records.
Risk Adjustment	Age, Septicaemia, Malignancy, Dementia, Parkinson's Disease, Disease of the circulatory system, Hypertension, Dysrhythmias, Heart Failure, Hypotension, Cerebrovascular Diseases, Other Chronic Obstructive Pulmonary Disease, Liver diseases, Ulcer of lower limb or decubitus ulcer, Renal Failure

<u>Fractured Neck of Femur</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	Principal diagnosis code of S72 with at least one of the following procedure codes: 47519.00, 47522.00, 47528.01, 47531.00 or 49315.00.
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Overnight stay patients	Patients must have spent at least one night in hospital (end_date > start_date)
Age	50 years or older (age_grp >= "11")
Admission source	Exclude transfers in (orig_ref_code ≠ "24")
Separation mode	Exclude transfers out (sepn_mode ≠ "16"). In the case of changes of episode (sepn_mode = "06"), immediately ensuing non-acute episodes (eg. rehabilitation) were appended to the original acute episode to form a complete record of the hospital stay, including non-acute episodes that extended into the next analysis period.
External Cause	Principal external cause of falls (ex_1 >= "W00" and ex_1 <= "W1999")

<u>Fractured Neck of Femur In-Hospital mortality</u>	
Definition	Defined records where separation mode = "05" (death) and length of stay was less than or equal to 30 days (pat_day <= "30").
Risk Adjustment	Sex, Age Group, Ischaemic Heart Disease, Dysrhythmias, Heart Failure, Acute LRTI and Influenza, Renal Failure

<u>Fractured Neck of Femur Complications of Surgery</u>	
Definition	Defined records where any of the external cause codes was between "Y60"- "Y6999" or "Y83"- "Y8499" for any episode of care within the entire hospital stay.
Risk Adjustment	Anaemia, Diseases of the circulatory system, Dysrhythmias, Intestinal disorders, Other urinary symptoms

<u>Laparoscopic Cholecystectomy</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	Any diagnosis code with at least 30445-00 as a procedure code
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Age	20 years or older (age_grp >= "05")
Length of Stay	0 - 30 patient days (pat_day >= "0" and pat_day <= "30")
Admission source	Exclude transfers in (orig_ref_code ≠ "24")
Separation mode	Exclude transfers out (sepn_mode ≠ "16")
Elective status	Include planned elective patients only (elect_status = "2")

<u>Laparoscopic Cholecystectomy Complications of Surgery</u>	
Definition	Defined records where any of the external cause codes was between "Y60"- "Y6999" or "Y83"- "Y8499".
Risk Adjustment	Sex, Age Group, Malignancy, Hypertension, Ischaemic Heart Disease, Dysrhythmias, Other Chronic Obstructive Pulmonary Disease, Peritoneal Adhesions, Liver Disease

<u>Colorectal Carcinoma</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	Principal diagnosis code of C18-C20 or C21.8 with at least one of the following procedure codes: 32000-00, 32000-01, 32003-00, 32003-01, 32004-00, 32005-00, 32006-00, 32006-01, 32012-00, 32015-00, 32024-00, 32025-00, 32026-00, 32028-00, 32030-00, 32033-00, 32039-00, 32051-00, 32051-01.
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Age	20 years or older (age_grp >= "05")
Length of stay	4 - 30 patient days (pat_day >= "4" and pat_day <= "30"), unless the patient had a length of stay from 1 - 3 patient days and died in hospital (pat_day >= "1" and pat_day <= "3" and sepn_mode = "05")
Admission source	Excludes transfers in (orig-ref-code ≠ 24")
Separation mode	Exclude transfers out (sepn_mode ≠ "16")

<u>Colorectal Carcinoma Complications of Surgery</u>	
Definition	Defined records where any of the external cause codes was between "Y60"- "Y6999" or "Y83"- "Y8499" for any episode of care within the entire hospital stay.
Risk Adjustment	Age, Septicaemia, Anaemia, Diseases of the circulatory system, Dysrhythmias, Acute LRTI and Influenza, Intestinal disorders, Peritoneal Adhesions, Renal disease, Other urinary symptoms

<u>Hip Replacement Primary</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	Any principal diagnosis code with at least one of the following procedure codes: 49318-00, 49319-00.
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Age	20 years or older (age_grp >= "05")
Length of stay	3 patient days or longer (pat_day >= "3")
Admission source	Exclude transfers in (orig_ref_code ≠ "24")
Separation mode	Exclude transfers out (sepn_mode ≠ "16"). In the case of changes of episode (sepn_mode = "06"), immediately ensuing non-acute episodes (eg. rehabilitation) were appended to the original acute episode to form a complete record of the hospital stay, including non-acute episodes that extended into the next analysis period.

<u>Hip Replacement Primary Complications of Surgery</u>	
Definition	Defined records where any of the external cause codes was between "Y60"- "Y6999" or "Y83"- "Y8499" for any episode of care within the entire hospital stay.
Risk Adjustment	Age Group, Anaemia, Diseases of the circulatory system, Renal disease, Other urinary symptoms

<u>Hip Replacement Readmissions</u>	
Definition	Patients readmitted to any Queensland hospital within 60 days of discharge to home / usual residence (sepn_mode= "01") for a condition that could be considered a consequence of the procedure. Relevant ICD codes are : G46 I21 I26 I50 I621 I633 I74 I80 I978 J15 J180 J189 J958 L039 L0311 L89 M256 M968 N13 N30 N390 R33 S7200 S7208 S73 T811 T813 T815 T816 T818 T819 T84 T8578 T8588 T859 T887 T89
Additional Criteria	Include Queensland residents only (state_id = "3")
Additional Criteria	Initial admission must occur between 1 July 2005 and 01 May 2006 inclusive
Risk Adjustment	Age

<u>Hip Replacement Long stays</u>	
Definition	Long Stay Point = 14 Days For the purposes of this project, the long stay point was chosen as the day closest to the 90 th percentile of all eligible length of stays. Long stays were used as the outcome rather than average length of stay because long stays were thought to be a more sensitive indicator of

	<p>quality of care. Additionally, long stays are expressed as a rate making this indicator consistent with all of the other indicators used.</p> <p>Defined as the number of records where the number of patient days <i>equalled or exceeded</i> the long stay point, divided by the total number of records. Cases of in-hospital mortality prior to the long stay point were excluded from the calculation of the long stay rate, but patients who died on or after the long stay point were included for this indicator.</p>
Additional Criteria	Include Queensland residents only (state_id = "3")
Additional Criteria	Admission must occur between 1 July 2005 and 01 May 2006 inclusive
Risk Adjustment	Age, Anaemia, Ischemic Heart Disease, Dysrhythmia, Hypotension, Ulcer of lower limb or decubitus ulcer, Renal Disease, Other Urinary symptoms

<u>Knee Replacement Primary</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	Any principal diagnosis code with at least one of the following procedure codes: 49518-00, 49519-00, 49521-02.
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Age	20 years or older (age_grp >= "05")
Length of stay	4 patient days or longer (pat_day >= "4")
Admission source	Exclude transfers in (orig_ref_code ≠ "24")
Separation mode	Exclude transfers out (sepn_mode ≠ "16"). In the case of changes of episode (sepn_mode = "06"), immediately ensuing non-acute episodes (eg. rehabilitation) were appended to the original acute episode to form a complete record of the hospital stay, including non-acute episodes that extended into the next analysis period.

<u>Knee Replacement Complications of Surgery</u>	
Definition	Defined as records where any of the external cause codes was between "Y60"- "Y6999" or "Y83"- "Y8499" for any episode of care within the entire hospital stay.
Risk Adjustment	Sex, Anaemia, Dysrhythmias, Acute LRTI and Influenza, Renal disease, Ulcer of lower limb or decubitus ulcer, Other urinary symptoms, Intestinal disorders, Thyroid, Hyponatremia, Parkinson's Disease, Diseases of the circulatory system, Acute upper RTI

<u>Knee Replacement Readmissions</u>	
Definition	Patients readmitted to any Queensland hospital within 60 days of discharge to home / usual residence (sepn_mode="01") for a condition that could be considered a consequence of the procedure. Relevant ICD codes are : I21 I26 I50 I74 I801 I802 I978 J151 J180 J189 J958 L0311 L892 M17 M23 M246 M256 N13 N390 R33 S7210 S820 S8344 S89 T81 T84 T8578 T8588 T887.
Additional Criteria	Include Queensland residents only (state_id = "3")
Additional Criteria	Admission must occur between 1 July 2005 and 01 May 2006 inclusive
Risk Adjustment	Diabetes, Renal failure

<u>Knee Replacement Long stays</u>	
Definition	Long Stay Point = 12 Days For the purposes of this project, the long stay point was chosen as the day closest to the 90 th percentile of all eligible length of stays. Long stays were used as the outcome rather than average length of stay because long stays were thought to be a more sensitive indicator of

	<p>quality of care. Additionally, long stays are expressed as a rate making this indicator consistent with all of the other indicators used.</p> <p>Defined as the number of records where the number of patient days <i>equalled or exceeded</i> the long stay point, divided by the total number of records. Cases of in-hospital mortality prior to the long stay point were excluded from the calculation of the long stay rate, but patients who died on or after the long stay point were included for this indicator.</p>
Additional Criteria	Include Queensland residents only (state_id = "3")
Additional Criteria	Admission must occur between 1 July 2005 and 01 May 2006 inclusive
Risk Adjustment	Age, Sex, Dementia, Diseases of the circulatory system, Hypertension, Dysrhythmia, Heart Failure, Other Chronic Obstructive Pulmonary Disease, Intestinal Disorders, Cellulitis, Ulcer of lower limb or decubitus ulcer, Renal Disease, Other Urinary Symptoms

<u>Prostatectomy</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	Procedure code of 37203-00
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Age	20 years or older (age_grp >= "05")
Length of Stay	0 - 30 patient days (pat_day >= "0" and pat_day <= "30")
Admission source	Exclude transfers in (orig_ref_code ≠ "24") Include same day patients
Separation mode	Exclude transfers out (sepn_mode ≠ "16").

<u>Prostatectomy Complications of Surgery</u>	
Definition	Defined records where any of the external cause codes was between "Y60"- "Y6999" or "Y83"- "Y8499".
Risk Adjustment	Anaemia, Diseases of the circulatory system, Dysrhythmias, Urinary Tract Infection (site not specified), Other urinary symptoms

<u>Paediatric Tonsillectomy and/or Adenoidectomy</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	Procedure code of 41789-00, 41801-00 or 41789-01
Residents	Include Queensland residents only (state_id = "3")
Separation Date	Initial admission must occur between 1 July 2005 and 15 June 2006 inclusive
Episode type	Acute patients (epis_type = "01")
Age Group	0 – 14 years (age_grp <= "03")
Length of Stay	0 – 30 patient days (pat_day >= "0" and pat_day <= "30")
Admission source	Exclude transfers in (orig_ref_code ≠ "24") Include same day patients
Separation mode	Exclude transfers out (sepn_mode ≠ "16") and exclude in-hospital death (sepn_mode ≠ "05")

<u>Paediatric Tonsillectomy and/or Adenoidectomy Readmissions</u>	
Definition	Patients readmitted to any Queensland hospital within 15 days of discharge to home/usual residence (sepn_mode="01") for a condition that could be considered a consequence of the procedure. Defined as records where a readmission was identified divided by the total number of records. Readmissions were identified using probabilistic matching of identified data to allow inclusion of readmissions to a different facility as well as readmissions to the same facility. Episodes were matched using patient name (first name, surname and phonetic version of surname), date of birth, address (street, suburb and postcode), age and sex. To be considered a match, patients were required to be of the same sex and to have at least four of the other eight variables matching. A manual check was also conducted of potential matches to eliminate any false matches. Records were matched for acute episodes only to avoid counting hospitalisation for rehabilitation as a readmission.
Risk Adjustment	Age, Sex

<u>Paediatric Tonsillectomy and Adenoidectomy Long stays</u>	
Definition	Long Stay Point = 2 Days For the purposes of this project, the long stay point was chosen as the day closest to the 90 th percentile of all eligible length of stays. Long stays were used as the outcome rather than average length of stay because long stays were thought to be a more sensitive indicator of quality of care. Additionally, long stays are expressed as a rate making this indicator consistent with all of the other indicators used. Defined as the number of records where the number of patient days <i>equalled or exceeded</i> the long stay point, divided by the total number of records. Cases of in-hospital mortality prior to the long stay point were excluded from the calculation of the long stay rate, but patients who died on or after the long stay point were included for this indicator.
Risk Adjustment	Sex, Age

<u>Selected Primiparea</u>	
Separation date	Between 1 January 2005 and 31 December 2005 inclusive (year = "2005")
Age of mother	20-34 years (moth_age_at_brth >= "20" and moth_age_at_brth <= "34")
Previous deliveries	No previous deliveries (pre_baby_alive < "1" and pre_baby_not_alive < "1")
Plurality	Singleton birth (plur = "1")
Gestation period	37-41 completed weeks ie 41 weeks and 6 days (gest_weeks >= "37" and gest_weeks <= "41")
Presentation	Vertex presentation (pres = "1")
Place of birth	Exclude planned home births (intend_place_birth ≠ "4" or fcly_id ≠ "00998"). Exclude other facilities (fcly_id ≠ "508" or fcly_id ≠ "515"). Exclude actual home birth (actual_place_birth = 1 or 2). Exclude emergency / unknown (fcly_id ≠ "00999")

<u>Selected Primiparea Caesarean Section Rate</u>	
Definition	Defined as records where method of delivery was lower section Caesarean section or classical Caesarean section (deliv_code = "4" or "5"). This outcome was only used for the selected primiparae (first-born) cohort, (records relate to singleton births). Social Caesarean sections are a subset of Caesarean sections.
Risk Adjustment	Sexually Transmitted Diseases, Pre-existing hypertension complicating pregnancy with superimposed proteinuria, Gestational diabetes, Gestational hypertension/pre-eclampsia, Prolonged rupture of membranes, Baby weight group, Placenta Praevia with Haemorrhage

<u>Selected Primiparea Induced Births</u>	
Definition	Defined records where onset of labour was induced (labour_onset = "2"), divided by the total number of records. This outcome was only used for the selected primiparae (first-born) cohort, (records relate to singleton births). Social inductions are a subset of all inductions.
Risk Adjustment	Baby weight group, Gestational Diabetes, Pre-existing hypertension complicating pregnancy with superimposed proteinuria, Gestational hypertension/pre-eclampsia, Prolonged rupture of membranes.

<u>Selected Primiparea Severe Perineal Tears</u>	
Definition	Defined as records where there was a 3 rd or 4 th degree laceration of the perineum (perinm = "4" or "5"). Births by Caesarean section were excluded. (3 rd or 4 th degree tear defined as a tear or laceration involving the anal sphincter or recto vaginal septum or anal mucosa or rectal mucosa).
Risk Adjustment	Baby weight group

<u>Abdominal Hysterectomy</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	Any principal diagnosis code with at least one of the following procedure codes: 35653-00, 35653-01, 35653-02, 35653-03, 35661-00, 35667-00, 35667-01, 35756-01, 35756-02
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Overnight stay patients	Patients must have spent at least one night in hospital (end_date > start_date)
Age	20 – 89 years (age_grp >= "05" and age_grp <= "18")
Length of stay	1 - 30 patient days (pat_day >= "1" and pat_day <= "30")
Admission source	Exclude transfers in (orig_ref_code ≠ "24")
Separation mode	Exclude transfers out (sepn_mode ≠ "16")
Medical conditions	Exclude any condition code (principal diagnosis or other diagnosis) of malignant neoplasm of female genital organs or pelvic area (Diagnosis ≠ "C18"- "C21", "C48", "C51"- "C58", "C64"- "C68", "C76.3", "C77.5", "C78.6", "C79.6", "C79.82")
Procedures	Exclude hysterectomies involving radical excision of pelvic lymph nodes (Procedure ≠ "35664-00", "35664-01", "35670-00")
Major Diagnostic Category	Exclude MDC 14 (pregnancy, childbirth and puerperium) and exclude MDC 15 (newborns and other neonates)

<u>Abdominal Hysterectomy Complications of Surgery</u>	
Definition	Defined as records where any of the external cause codes was between "Y60"- "Y6999" or "Y83"- "Y8499".
Risk Adjustment	Age Group, Anaemia, Hypotension, Other Chronic Obstructive Pulmonary Disease, Peritoneal Adhesions, Diseases of the circulatory system, Intestinal disorders, Renal disease, Other urinary symptoms

<u>Vaginal Hysterectomy</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	Any principal diagnosis code with at least one of the following procedure codes: 35657-00, 35750-00, 35756-00, 35673-00, 35673-01, 35753-00, 35753-01
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Overnight stay patients	Patients must have spent at least one night in hospital (end_date > start_date)
Age	20 – 89 years (age_grp >= "05" and age_grp <= "18")
Length of stay	1 - 30 patient days (pat_day >= "1" and pat_day <= "30")
Admission source	Exclude transfers in (orig_ref_code ≠ "24")
Separation mode	Exclude transfers out (sepn_mode ≠ "16")
Medical conditions	Exclude any condition code (principal diagnosis or other diagnosis) of malignant neoplasm of female genital organs or pelvic area (Diagnosis ≠ "C18"- "C21", "C48", "C51"- "C58", "C64"- "C68", "C76.3", "C77.5", "C78.6", "C79.6", "C79.82")
Procedures	Exclude hysterectomies involving radical excision of pelvic lymph nodes (Procedure ≠ "35664-00", "35664-01", "35670-00")
Major Diagnostic Category	Exclude MDC 14 (pregnancy, childbirth and puerperium) and exclude MDC 15 (newborns and other neonates)

<u>Vaginal Hysterectomy Complications of Surgery</u>	
Definition	Defined as records where any of the external cause codes was between "Y60"- "Y6999" or "Y83"- "Y8499", divided by the total number of records.
Risk Adjustment	Age Group, Anaemia, Hypertension, Peritoneal Adhesions, Diseases of the circulatory system, Urinary Tract Infection (site not specified), Other urinary symptoms.

<u>Hysterectomy</u>	
Principal Diagnosis and Procedure Codes ICD-10.4-AM	Any principal diagnosis code with at least one of the following procedure codes: 35653-00, 35653-01, 35653-02, 35653-03, 35661-00, 35667-00, 35667-01, 35756-01, 35756-02, 35657-00, 35750-00, 35756-00, 35673-00, 35673-01, 35753-00, 35753-01
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Acute patients (epis_type = "01")
Overnight stay patients	Patients must have spent at least one night in hospital (end_date > start_date)
Age group	20 – 89 years (age_grp >= "05" and age_grp <= "18")
Length of stay	1 - 30 patient days (pat_day >= "1" and pat_day <= "30")
Admission source	Exclude transfers in (orig_ref_code ≠ "24")
Separation mode	Exclude transfers out (sepn_mode ≠ "16")
Medical conditions	Exclude any condition code (principal diagnosis or other diagnosis) of malignant neoplasm of female genital organs or pelvic area (Diagnosis ≠ "C18"- "C21", "C48", "C51"- "C58", "C64"- "C68", "C76.3", "C77.5", "C78.6", "C79.6", "C79.82")
Procedures	Exclude hysterectomies involving radical excision of pelvic lymph nodes (Procedure ≠ "35664-00", "35664-01", "35670-00")
Major Diagnostic Category	Exclude MDC 14 (pregnancy, childbirth and puerperium) and exclude MDC 15 (newborns and other neonates)

<u>Hysterectomy on women <35 years</u>	
Definition	Defined as the number of records where age group was between "05" and "07" (i.e. 20-34 years), divided by the total number of records.
Risk Adjustment	Age Group, Diseases of the circulatory system, Renal Diseases

<u>Depression</u>	
DRG Codes	DRGs of U63B and U64Z
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Episode type	Includes only patients admitted to acute psych units (stnd_unit_code="PYAA").
Age	18-64 years
Length of Stay	2 patient days or longer (ie. same day patients excluded). Patients admitted for one night with a principal procedure code of 93340-02 or 93340-03 (Electroconvulsive therapy) were also excluded
Separation Mode	Include "Home / usual residence", "Correctional Facility" and "Residential Aged Care Service (sepn_mode = 01, 12 & 15)
Residence	Include Queensland residents only (state_id = "3")

<u>Depression Readmissions</u>	
Definition	Patients readmitted to any Queensland hospital within 28 days of discharge with a drg of depression. Readmissions were identified using probabilistic matching of identified data to allow inclusion of readmissions to a different facility as well as readmissions to the same facility. Episodes were matched using patient name (first name, surname and phonetic version of surname), date of birth, address (street, suburb and postcode), age and sex. To be considered a match, patients were required to be of the same sex and to have at least four of the other eight variables matching. A manual check was also conducted of potential matches to eliminate any false matches. Records were matched for acute episodes only to avoid counting hospitalisation for rehabilitation as a readmission.
Risk Adjustment	Age

<u>Depression Long Stays</u>	
Definition	Long Stay Point = 35 Days For the purposes of this project, the long stay point was chosen as 35 days as acute care certificates are 35 days
Risk Adjustment	Age, Intestinal Disorders

<u>Schizophrenia</u>	
DRG Codes	DRG of U61A and U61B
Separation date	Between 1 July 2005 and 30 June 2006 inclusive (year = "2005/2006")
Residence	Queensland resident (state_id = "3")
Episode type	Includes only patients admitted to acute psych units (stnd_unit_code="PYAA").
Age	18-64 years
Length of Stay	2 patient days or longer (ie. same day patients excluded). Patients admitted for one night with a principal procedure code of 93340-02 or 93340-03 (Electroconvulsive therapy) were also excluded
Separation Mode	Include "Home / usual residence", "Correctional Facility" and "Residential Aged Care Service (sepn_mode = 01, 12 & 15)

<u>Schizophrenia Readmissions</u>	
Definition	Patients readmitted to any Queensland hospital within 28 days of discharge with a drg of Schizophrenia. Readmissions were identified using probabilistic matching of identified data to allow inclusion of readmissions to a different facility as well as readmissions to the same facility. Episodes were matched using patient name (first name, surname and phonetic version of surname), date of birth, address (street, suburb and postcode), age and sex. To be considered a match, patients were required to be of the same sex and to have at least four of the other eight variables matching. A manual check was also conducted of potential matches to eliminate any false matches. Records were matched for acute episodes only to avoid counting hospitalisation for rehabilitation as a readmission. Transfers in and out were also excluded from the set to avoid counting transfers as a readmission.
Risk Adjustment	Age

<u>Schizophrenia Long stay</u>	
Definition	Long Stay Point = 35 Days For the purposes of this project, the long stay point was chosen as 35 days as acute care certificates are 35 days
Risk Adjustment	Age, Anaemia, Thyroid, Diseases of the circulatory system, Acute Upper RTI, Acute Lower RTI, Intestinal Disorders, Cellulitis

Chapter 5 - System Integration & Change

5.1 Overview

The systems and activities that comprise System Integration and Change are many and varied and therefore no report can be wholly comprehensive and include all possible performance indicators. The areas chosen by Queensland Health for performance indicator development were considered to represent current practice and to reflect trends in quality health service delivery.

Today's health care system is facing challenges that have not been faced before. Whilst Australia's health system has provided high quality care for decades, changes in health care delivery, technology and consumer expectations have placed pressure on the future capability and sustainability of the system. Rapid changes in health care delivery, escalating costs associated with advancements in the diagnosis and treatment of disease, serious shortages in health staff in selected areas, combined with the financial restraint imposed on the system compels Queensland Health to review the way services are delivered and to invest in innovation and change.

5.1.1 Review process

The Health Services Act amendments specify the reporting of hospital performance on a selection of additional indicators of efficiency, patient satisfaction, system integration and change, elective surgery and outpatients. These results will also be made available to hospitals and Health Service Districts. Where performance is identified as being significantly different from their peer hospitals, hospital administrators are encouraged to investigate these results, however no formal feedback will be required. These results will be presented to the Minister and incorporated into the Public Hospitals Performance Report 2006 which will be publicly available.

The System Integration and Change indicators for the 2006 Queensland Public Hospitals Performance Report have been selected to evaluate two broad questions.

1. How well placed are public hospitals to develop and implement new practices that meet future health care changes, demands and challenges? Indicators of this include:
 - benchmarking
 - quality and use of information
2. To what extent do major public hospitals integrate their services with other acute and community-based services? Indicators of this include:
 - integration with local community

Performance indicators were selected based on the following criteria:

- relevant to Queensland Health policy and practice;
- relevant to a significant aspect of hospital function;
- had a whole-of-population application;
- could be used to measure variation in hospital performance;

- were open to action so that a measurable change was attainable over time;
- were practicable in terms of cost and time;
- data available was of acceptable quality.

5.2 Data Sources

5.2.1 State-wide data collection

Initially, the data for indicator development was collected from existing data sources within Queensland Health. The state-wide data collection, Queensland Health Admitted Patient Data Collection is the source for the selected Quality and use of information indicators as further described in the table below (Table 3-1). Data for indicator development for Workforce Management was collected from the Human Resource Management Information System within Queensland Health and is also included in the table below.

Table 5.1 Indicators using data from existing Queensland Health data collections

<i>Description</i>	<i>Sub Indicators</i>	<i>Type of score</i>
Quality and use of information	Accuracy	Percentage %
	Timeliness - Number of months on time	Single score – months on time
	Timeliness - Number of days late per month	Single score-days late
Workforce Management	Sick Leave	Percentage % within Peer Group

5.2.2 Data Collection Instrument

A significant aspect to the performance indicators for System Integration and Change relates to processes at a hospital level. Most of this information is not captured in data collections either at hospital, district or state-wide level. The data for these indicators has been collected via the 2006 System Integration and Change Hospital Survey which allows the collection of data from the primary source. See Appendix A.

Indicators derived from the Hospital Survey are detailed in the table below (Table 5-2).

Table 5-2 Indicators using data from the 2006 System Integration and Change Hospital Survey

<i>Description</i>	<i>Sub Indicators</i>	Type of score
Benchmarking	Internal Benchmarking in selected clinical areas	Rating (1-5)
	External Benchmarking in selected clinical areas	Rating (1-5)
Local Community Integration	Consumer participation in health services	Rating (1-5)
	Community partnerships with health services	Rating (1-5)

Benchmarking and Integration with the local community ratings

- = Fully engaged: 90%-100% engagement/participation
- = Good progress: 75%-89.99% engagement/participation
- = Early stage: 50%-74.99% engagement/participation
- = Low effort: 10%-49.99% engagement/participation
- = Extremely low effort: <10% engagement/participation

The System Integration and Change Survey had been redeveloped in 2004 and has since undergone relatively minor changes based on feedback from presentations in all Health Service Districts, and input from Reference Group members. These changes include some minor adjustments to some questions, expansion of the detail of data collection in some areas and the inclusion of a small number of questions relating to new initiatives which have a quality focus. Minor additions to clinical areas included in the survey, were incorporated to potentially allow linking to clinical performance.

Scoring and weighting of questions within each indicator has attempted to reflect the relative importance of various aspects that have been combined to measure a particular indicator. Advice in relation to scoring and weighting has been sought from the relevant experts in each of the indicator areas. Further detail of scoring and weighting are described in more detail in section 5.3.

5.2.3 Data Verification

Data verification for the survey data was undertaken. Once the survey was completed, signed and returned, the responses were data entered into Microsoft Excel. If responses were unclear, wrongly entered as guided by instructions, inconsistent, or no response was given, respondents were emailed or telephoned to clarify responses. To ensure there was no data entry errors, the responses to the surveys were entered a second time into a separate workbook and compared to the original workbook. Any discrepancies were investigated and the appropriate workbook updated.

5.2.4 Statistical Analysis

Performance indicators were developed from data collected (hospital survey and existing data sources), that encompassed three indicator areas. The types of scores included single scores (days, months), ratings (values between 1-5) and percentage scores (values between 0 and 100). Scoring rules were developed for indicators where the combined responses to more questions in the survey generated one measure for each hospital. A detailed description of the scoring rules for each indicator is provided in this document.

5.2.5 Performance Allocations

The data generated for each indicator is one 'score' per hospital and therefore does not allow for rigorous statistical analysis. Identifying variation through peer hospital benchmarking allows for level of comparative analysis which can highlight areas for potential improvement and areas of exceptional performance. Peer group reporting was adopted for this report to reflect the different challenges according to size, accessibility and geographical location of hospitals within different peer groups, as not all indicators apply equally across all hospitals.

5.2.6 Data Presentation

The 2006 Queensland Public Hospitals Performance Report presents data for each indicator applicable to the facility. Quality and use of information indicators are presented using 2005/2006 data whilst the benchmarking and local community integration is presented using the 2006 System Integration Survey results. The Peer Group median and the State median are also presented for each indicator.

5.3 Definition of System Integration and Change Indicators

Quality and Use of Information - Accuracy of data	
Key Question	What percentage of records submitted from each hospital to the Queensland Hospital Admitted Patient Data Collection (QHAPDC) do not require editing?
Calculation	$\frac{\text{Number of accurate data items submitted to QHAPDC per hospital}}{\text{Total number of data items submitted to QHAPDC per hospital}}$
Numerator Source	Queensland Hospitals Admitted Patient Data Collection (QHAPDC)
Denominator Source	Queensland Hospitals Admitted Patient Data Collection (QHAPDC)
Type of Score	Percentage (%)
Definition of Key Data Elements	Records with no fatal errors are deemed to be accurate. A 'fatal' error is an error in the patient record that must be corrected by the hospital before the record can be considered 'correct'. A 'failed' episode has at least one fatal error. These records are not accepted until the error has been corrected.

Quality and Use of Information – Months on time (9 months monitored)	
Key Question	How often is data submitted by each hospital received on time by the Health Information Centre (HIC) within a 9 month period?
Calculation	Single Unit – Number of months data was submitted to HIC within the required period.
Numerator Source	Queensland Hospitals Admitted Patient Data Collection (QHAPDC)
Denominator Source	Not Applicable
Type of Score	Single score - months
Definition of Key Data Elements	The deadline for submission of data to HIC is five weeks (35 days) after the end of the reference month to which the data refers. All scores are expressed as the number of months which data submitted by hospitals is received on time by HIC. New software is released each year to cater for annual changes. Business Application Services liaises with hospitals to determine when the new software should be deployed. After the software has been up-loaded at sites, hospitals can then provide data to the Data Services Unit (for July extracts onwards). Selected time period for this indicator, October – June (9months)

Quality and Use of Information – Average number of days late	
Key Question	When data is submitted late to the Health Information Centre (HIC), what is the average number of days per month that hospital data is submitted late?
Calculation	$\frac{\text{Total number of days that data is submitted late to HIC}}{\text{Total number of months which data is submitted late to HIC}}$
Numerator Source	Queensland Hospitals Admitted Patient Data Collection (QHAPDC)
Denominator Source	Queensland Hospitals Admitted Patient Data Collection (QHAPDC)
Type of Score	Single score – days
Definition of Key Data Elements	<p>The deadline for submission of data to HIC is five weeks (35 days) after the end of the reference month to which the data refers. All scores are expressed as the average number of days late per month that hospitals submit data late to HIC.</p> <p>New software is released each year to cater for annual changes. Business Application Services liaises with hospitals to determine when the new software should be deployed. After the software has been up-loaded at sites, hospitals can then provide data to the Data Services Unit (for July extracts onwards).</p> <p>Selected time period for this indicator, October – June (9months)</p>

Workforce Management – Sick Leave	
Key Question	To what extent are hospitals experiencing adverse sick leave rates ?
Calculation	$\frac{\text{Total number of Sick Leave hours}}{\text{Total number of Ordinary Hours worked}}$
Numerator Source	Queensland Hospitals Human Resource Management Information System
Denominator Source	Queensland Hospitals Human Resource Management Information System
Type of Score	Percentage % within Peer Group
Definition of Key Data Elements	The percentage % Sick Leave measures the ratio of hours of sick leave to the ordinary hours worked of employees

Benchmarking - Internal benchmarking in selected clinical areas	
Key Question	To what extent does the hospital engage in internal benchmarking activities in 26 selected clinical areas?
Calculation	<p>Step One</p> $\frac{\text{Number of clinical conditions internally benchmarked}}{\text{Number of clinical conditions treated}} = X \% \text{ participation}$ <p>Step Two</p> <p>X % participation converted to a score from 1 - 5</p> <p>1 = Extremely Low Effort: 0% - 10% participation</p> <p>2 = Low Effort: 10% – 49.99% participation</p> <p>3 = Early Stage: 50% – 74.99% participation</p> <p>4 = Good Progress: 75% – 89.99% participation</p> <p>5 = Fully engaged: 90% - 100% participation</p>
Numerator Source	System Integration and Change Hospital Survey, Questions 16 column (ii) – Refer to Appendix A
Denominator Source	System Integration and Change Hospital Survey, Questions 16 column (i) – Refer to Appendix A
Type of Score	Category - values 1 – 5 (lower scores indicating lower participation)
Survey Question	<p>Question 16 Hospitals identified involvement in benchmarking for selected clinical areas</p> <p>(i) clinical area available</p> <p>(ii) internal benchmarking</p> <p style="text-align: right;">Refer to Appendix A</p>
Exclusions	*Calculations exclude clinical area/s not treated

Benchmarking - External benchmarking in selected clinical areas	
Key Question	To what extent does the hospital engage in external benchmarking activities in 26 selected clinical areas?
Calculation	<p>Step One Number of clinical conditions externally benchmarked ----- = X % participation Number of clinical conditions treated</p> <p>Step Two X % participation converted to a score from 1 - 5 1 = Extremely Low Effort: 0% - 10% participation 2 = Low Effort: 10% – 49.99% participation 3 = Early Stage: 50% – 74.99% participation 4 = Good Progress: 75% – 89.99% participation 5 = Fully engaged: 90% - 100% participation</p>
Numerator Source	Hospital Data Collection (System Integration and Change), Questions 16 column (iii) – Refer to Appendix A
Denominator Source	Hospital Data Collection (System Integration and Change), Questions 16 column (i) - Refer to Appendix A
Type of Score	Category - values 1 – 5 (lower scores indicating lower participation)
Question	<u>Question 16</u> Hospitals identified involvement in benchmarking for selected clinical areas (i) clinical area available (iii) external benchmarking. Refer to Appendix A
Exclusions	*Calculations exclude clinical area/s not treated

Integration with local community - Consumer participation in health services	
Key Question	Does the hospital have processes whereby carer and consumer groups participate with hospital and health service in discussion, documentation and joined initiatives?
Calculation	<p>Step One Number of selected strategies in place involving 11 carer and consumer groups ----- = X % participation Total score possible for that hospital on consumer participation</p> <p>Step Two X % participation converted to a score from 1 - 5 1 = Extremely Low Effort: 0% - 10% participation 2 = Low Effort: 10% – 49.99% participation 3 = Early Stage: 50% – 74.99% participation 4 = Good Progress: 75% – 89.99% participation 5 = Fully engaged: 90% - 100% participation</p>
Numerator Source	Hospital Data Collection (System Integration and Change) Question 18 - Refer to Appendix A
Denominator Source	Hospital Data Collection (System Integration and Change) Question 18 – Refer to Appendix A
Type of Score	Category - values 1 – 5 (lower scores indicating lower participation)
Question / Scoring Rule	<u>Question 18</u> Hospitals indicated the extent of carer and consumer participation for 11 selected groups: Responses received the following points:- Regular meetings/ discussions = 1 Documentation eg plans, written agreements = 1 Refer to Appendix A
Note	The “other” category was not used in calculating the scores, but was used to gather additional information for possible use in future surveys.
Exclusions	*Calculations exclude “ men’s health ” and “ aged care ” for Mater Mothers, Mater Children’s and Royal Children’s Hospitals. “ Women’s Health ” was also excluded for both Children’s hospitals.

<u>Integration with local community - Community partnerships with health services</u>	
Key Question	Does the hospital have processes that develop partnerships with general practice, other health care providers and community agencies?
Calculation	<p>Step One Number of selected strategies in place involving 7 community partners ----- = X % participation Total score possible for that hospital on community participation</p> <p>Step Two X % participation converted to a score from 1 - 5 1 = Extremely Low Effort: 0% - 10% participation 2 = Low Effort: 10% – 49.99% participation 3 = Early Stage: 50% – 74.99% participation 4 = Good Progress: 75% – 89.99% participation 5 = Fully engaged: 90% - 100% participation</p>
Numerator Source	Hospital Data Collection (System Integration and Change) Question 23 - Refer to Appendix A
Denominator Source	Hospital Data Collection (System Integration and Change) Question 23 – Refer to Appendix A
Type of Score	Category - values 1 – 5 (lower scores indicating lower participation)
Question / Scoring Rule	<p><u>Question 23</u> Hospitals indicated the extent of involvement with 7 community partner groups: Responses received the following points:- Regular meetings/ discussions = 1 Documentation plans, written agreements = 1</p> <p>Refer to Appendix A</p>
Note	The “other” category was not used in calculating the scores, but was used to gather additional information for possible use in future surveys.

Chapter 6 – Efficiency – Average cost per weighted separation

There are many ways to measure efficiency of performance in public hospitals. There is no single overall measure that is appropriate to compare all hospitals as every facility may be operating more efficiently than its peers in one particular area of service delivery but less efficiently in others. The number and complexity of cases treated in each hospital is different and this in itself complicates comparison of hospitals in a meaningful way.

The indicator used to highlight efficiency in this report is the **cost per acute weighted separation**.

6.1 Data Sources

The two main data sources used to derive this indicator are the Queensland Health Clinical Benchmarking System and the National Hospital Cost Data Collection (NHCDC) undertaken annually by the Commonwealth Department of Health and Ageing.

6.1.1 Clinical Benchmarking System

This is an implementation of Eclypsis Corporation's Sunrise Decision Support Manager System (SDSM Core). It has been implemented in the 21 largest Queensland Health operated Public Hospitals excluding Mt Isa. The Patient Administration System, major Clinical Systems including Emergency, Theatre, Pathology, Radiology, and Pharmacy, and the General Ledger and payroll systems are interfaced with the clinical benchmarking system to match cost data and details of services delivered to patients. Consequently, the SDSM system can calculate individual patient-level costs of service for all of the patient's treated by those hospitals.

The Queensland Health implementation of SDSM Core is the world's largest installation of this software outside the north-eastern United States. The unique feature of the Queensland Health implementation is the facility to join the data from each of the hospitals included into a consolidated corporate dataset.

6.1.2 NHCDC

This is a voluntary annual collection undertaken by the Department of Health and Ageing. One of the main objectives of this collection is to provide comparable estimates of activity and costs of public acute care hospitals throughout Australia. In the latest round released (for 2004-2005 Financial Year), the collection included 226 public hospitals and represented 87% of the acute episodes of care for the year.

6.2 Weighted Separations

From cost estimates like those from the NHCDC or the patient-level costs from the Clinical Benchmarking system, it is possible to develop cost weights for acute care. These cost weights relate to the ARDRG (Australian Refined Diagnosis Related Group) to which each episode of care is assigned as a result of the clinical coding of a

patient's diagnoses and procedures. By counting the cost weight for each episode of care, it is possible to produce an activity measure for each hospital which takes account of the different numbers and complexity of treated cases. This measure is called weighted separations.

Definition of Efficiency Indicator – Average Cost per Weighted Separation

Name	Average Cost per Weighted Separation
Description	Average Cost of acute inpatient separations adjusted by National AR-DRG cost weights.
Numerator	Total Cost of Acute inpatient separations in Clinical Benchmarking System for Financial Year (2005-06)
Denominator	Number of acute separation adjusted by NHCDC national cost-weight Round 9 (2004-05)
Data Exclusions	
Data Inclusions	NHCDC Hospital reference manual Round 9 (2004-05)
Data Source	Clinical Benchmarking System
Data Definition	NHCDC Cost Report Round 9, 2004-05
Notes	The methodology used is consistent with that used for the estimates in the Ministerial Portfolio Statement. Results can be viewed via report published in QHERS: Clinical Benchmarking\Corporate Reports\Consolidated Reports\Cost\MPS Cost per Weighted Separation (P7_R5) Parameters: Phase 9, NHCDC Round 9, 12 Months, DFY – 2006, Include - All
Contact	Casemix Funding and Analysis Team (07) 3234 1366 Data Management and Analysis Team (07) 3636 9889

Chapter 7 - Glossary of Terms

Term	Definition	Source of Definition
Acute	A short and relatively severe course of illness.	Fourth National Report on Health Sector Performance Indicators
Benchmark	A level of care set as a goal to be attained. Internal benchmarks are derived from similar processes or services within your own organisation; competitive benchmarks are comparisons with the best external competitors in your field and generic benchmarks are drawn from the performance of similar processes in other industries	Quality and Outcomes Indicators for Acute Healthcare Services
Benchmarking	The ongoing systematic process to search for and introduce best practice into an organisation.	First National Report on Health Sector Performance Indicators (1996) [QHOID]
Casemix	A classification of patients into categories reflecting differences in type of illness and/or resource consumption. In Australia, casemix is described using the AN-DRG classifications system.	Quality and Outcome Indicators for Acute Healthcare Services / Fourth National Report on Health Sector Performance Indicators
Clinical Indicators	A measure of the clinical management and outcome of care. It is an objective measure of patient care in quantitative terms.	ACHS, 1999
Clinician	Doctors, Nurses and Allied Health professionals	NSW Health
Cohort	The component of the population born during a particular period and identified by period of birth so that its characteristics (eg. Causes of death and numbers still living) can be ascertained as it enters successive time and age periods.	A Dictionary of Epidemiology
Comorbidity	Disease(s) that coexist(s) in a study participant in addition to the index condition that is the subject of study.	A Dictionary of Epidemiology
Complication	An adverse patient event related to medical intervention, especially an event that is an expected consequence of, or that sometimes occurs in relation to, the patient's disease or its treatment.	Quality and Outcomes Indicators for Acute Healthcare Services
Confidence Interval	A range of values for a variable of interest, eg. a rate constructed so that this range has a specified probability of including the true value of the variable.	A Dictionary of Epidemiology
Confidence Limit	The end points of the confidence interval	A Dictionary of Epidemiology
Cost Effectiveness	The relationship between resources consumed and the outputs. Cost-effectiveness measures can highlight how well the costs of interventions are translated into outputs.	NAO 2001
Credentialing	Credentialing is a process by which a service provider, such as a hospital, determines what it will permit a particular practitioner to do in terms of the role of that hospital. Credentialing is usually based on evidence of educational qualifications and	Final Report of the Taskforce on Quality in Australian Health Care,

Term	Definition	Source of Definition
	further specific training and practice.	1996
Diagnosis	The process of categorising a patient or deciding the nature of a disease based on the patient's characteristics, symptoms, signs and signals.	Quality and Outcomes Indicators for Acute Healthcare Services
Diagnostic Related Groups (DRGs)	Groupings of diagnoses (or procedures) in a hospital that have the same propensity to consume resources.	Quality and Outcomes Indicators for Acute Healthcare Services
Efficiency	Producing the maximum output for any given set of inputs. Alternatively, using the minimum inputs for the required service.	AC 2000
Episode of Care	A phase of treatment. There may be more than one episode of care within the one hospital stay. An episode of care ends when the principal clinical intent changes or when the patient is formally separated from the facility.	Queensland Health Data Dictionary (1997) [QHOID]
Exclusion criteria	Characteristics or conditions that make patients ineligible for review with a specific performance measure or a specific criterion within a performance measure.	Quality and Outcomes Indicators for Acute Healthcare Services
Hospital	A health care facility established under Commonwealth, State or Territory legislation as a hospital or a free-standing day procedure unit and authorised to provide treatment and/or care to patients.	Queensland Health Data Dictionary
Length of Stay	The length of stay of a patient is calculated by subtracting the date the patient is admitted from the date of separation. All leave days, including the day the patient went on leave, are excluded from the calculation. A same-day patient should be allocated a length of stay of one day.	Queensland Health Data Dictionary
Long Stays	The high trim point was chosen as the day closest to the 90 th percentile of all length of stays within the cohort, excluding cases of in-hospital mortality which were not included in the analysis of long stays.	
Mean (average)	A measure of central tendency which is commonly referred to as the average. It is calculated by the sum of the observations divided by the number of observations.	A Dictionary of Epidemiology
Median	A measure of central tendency. The simplest division of a set of measurements is in two parts – the lower and the upper half. The point on the scale that divides the group in this way is called the “median”.	A Dictionary of Epidemiology
Morbidity	Any departure, subjective or objective, from a state of physiological or psychological well-being.	A Dictionary of Epidemiology
Observed Rate	This is the rate at which the event that is being measured actually occurs during the study period.	
Outcome Indicators	Reports on the overall effectiveness of a program's outputs. Provides an indication of the extent to which the desired outcomes are being achieved (effectiveness) and the cost (efficiency).	Performance Reporting Guidelines (1997) [QHOID]
Outcomes	Measures of the value changes caused by the process of care. Impacts or effects on the community as a result of producing	Fourth National Report on Health Sector Performance Indicators State Social

Term	Definition	Source of Definition
	<p>outputs.</p> <p>The results of production processes which precede them in space or time, acting on inputs in a given environment. In healthcare, the term “outcome” usually refers to post-intervention results or measurements – the observed outcomes of an intervention – whether or not one can confidently attribute those results to the preceding intervention (process).</p>	<p>Development Strategy (draft 1997) [QHOID]</p> <p>Quality and Outcome Indicators for Acute Healthcare Services</p>
Patient Satisfaction	The subjective sense of quality, particularly regarding the interpersonal aspect of care that patients experience after one or more health care interventions or encounters.	Quality and Outcomes Indicators for Acute Healthcare Services
Peer Grouping	The way in which hospitals are categorised has important implications for the validity of benchmarking data. A number of factors affect the outcomes of services provided by hospitals. For instance, there is a significant body of evidence which shows a correlation between the numbers of certain procedures conducted by clinicians, their skill in performing the procedure and associated outcomes for patients. Similarly, the size of a hospital and its location (eg. provincial city, capital city) will affect the types of services that are provided by a hospital, the range of clinicians employed and their level of skill. By categorising hospitals into groups of hospitals which are a similar size, provide similar types and volumes of services and which are located in similar areas, the influence of these factors on patient outcomes is reduced. This allows for the services provided across the hospitals in a group to be compared in terms of quality and outcomes in the fairest possible manner.	
Performance Indicator	<p>A measure that quantifies the level of performance for a particular aspect of (health) service provision and allows comparison between service providers, modes of service provision or both.</p> <p>Provides a specific measurable way of assessing progress towards goals. The selection of a measure or indicator to assess a health outcome is dependent on why the information is being collected and who it is to be used by (eg. service providers, service funders).</p>	<p>Fourth National Report on Health Sector Performance Indicators</p> <p>Better Health Outcomes for Australians (1994) [QHOID]</p>
Procedure	Any medical or healthcare intervention, especially one that involves manipulation or a series of steps to accomplish.	Quality and Outcomes Indicators for Acute Healthcare Services
Quality	The totality of a product’s or service’s characteristics that bear on its ability to satisfy customers’ desires.	Quality and Outcomes Indicators for Acute Healthcare Services
Quality of Care	The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.	Lohr and Shroeder, 1990
Rates	A way of expressing performance in a quantitative form. A rate contains a numerator and a denominator.	Quality and Outcomes Indicators for Acute Healthcare Services
Re-admission	This occurs when a person is readmitted to the same hospital within 30 days of separation for that hospital stay.	
Risk	The chance of something happening that will have an impact	Risk Management

Term	Definition	Source of Definition
	upon objectives. It is measured in terms of consequences and likelihood.	(AS/NZS 4360) [QHOID]
Risk Adjustment	A statistical procedure that “adjusts” for the association between one or more risk factors and a performance measure.	Quality and Outcomes Indicators for Acute Healthcare Services
Sample	A relatively small set of observations or individuals drawn from a larger universe of potential observations or individuals. The sample is usually assumed to have all the essential characteristics of the larger population from which it is drawn, but this does not always happen in practice. Samples are used when the costs of data collection and analysis for an entire population are high.	Quality and Outcomes Indicators for Acute Healthcare Services
Separation	The process by which an admitted patient completes an episode of care. In general, a separation is synonymous with discharge. The number of separations is a measure of hospital activity.	Fourth National Report on Health Sector Performance Indicators
Transfers Out	The number of records where separation mode is “02” (transfer to other hospital, non-contract)	
Validity	Whether an indicator measures the concept that it is suppose to measure.	De Vaus (1995)
Variable life adjusted display (VLAD)	A tool for monitoring clinical outcomes which is designed to flag issues for further investigation.	

APPENDIX A

SYSTEM INTEGRATION & CHANGE

HOSPITAL SURVEY 2006

EXTRACT

Benchmarking

Internal benchmarking involves benchmarking within your hospital. This may involve a process where you compare variations in clinical practices and outcomes between individuals, clinicians or teams within your hospital and/or comparisons over time.

External benchmarking involves comparing your performance including variations in clinical practices and outcomes with other comparable organisations.

Question 16: For each of the clinical conditions listed, please indicate by ticking all boxes that apply for each row:

Clinical Conditions	Tick ALL boxes that apply for each row		
	(i) Clinical condition treated	(ii) Internal benchmarking	(iii) External benchmarking
a Total hip arthroplasty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b Total knee arthroplasty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c Fractured neck of femur	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d Appendicectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e Cholecystectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f Herniorrhaphy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g Mastectomy / lumpectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h Day surgery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i Transurethral prostatectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j Antenatal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k Caesarean section	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l Vaginal birth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m Neonate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n Hysterectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o Adult Asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
p Diabetes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
q Pneumonia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
r Stroke	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
s Heart failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
t AMI (heart attack)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
u Paediatric asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
v Paediatric gastroenteritis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
w Paediatric bronchiolitis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
x Paediatric tonsillectomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
y Schizophrenia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
z Depression	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Consumer participation

Integration of hospital health services with the community can be supported through consumer and carer participation

Question 18: For each of the representative groups listed, please indicate which of the following strategies are in place at your hospital to involve carer and consumer group participation. (Note: The strategies may be specific to a particular group or in a general consumer forum)

- (i) regular meetings or discussions
- (ii) documentation eg plans, written agreements
- (iii) joint initiatives involving shared resources

Consumer representatives	Tick ALL boxes that apply for each row		
	(i) Regular meetings / discussion	(ii) Documentation eg plans, written agreements	(iii) Joint initiatives involving shared resources
a Aboriginal and Torres Strait Islander	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b Australian South Sea Islander	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c Pacific Islander	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d African	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e Other Multicultural	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f Disability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g Mental Health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h Women's Health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i Men's Health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j Child and Youth Health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k Aged care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l Other (specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Community partnerships

Processes that develop partnerships with general practice, other health care providers and community agencies can lead to an improvement in access and continuity of care for patients.

Question 23: For each of the community partners listed, please indicate which of the following strategies are in place at your hospital to enhance the integration of health services in your area

- (i) regular meetings or discussions
- (ii) documentation eg plans, written agreements
- (iii) joint initiatives involving shared resources

Community partners	Tick ALL boxes that apply for each row		
	(i) Regular meetings / discussion	(ii) Documentation eg plans, written agreements	(iii) Joint initiatives involving shared resources
a. Local division of GPs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Government community health service providers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Non-government community health service providers –	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Government agencies – non health services (eg education, aged care etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Non-government agencies – non health services (eg housing, disability agencies etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Local industry / business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Regional Managers Coordination Network	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Other (specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>