Report on the VLAD Laparoscopic Cholecystectomy

Indicator Review

Summary of Activities

08 February 2012
BACKGROUND
The Variable Life Adjusted Display (VLAD) monitoring methodology was introduced in Queensland Health in 2007. The initial suite of clinical indicators included Laparoscopic Cholecystectomy Complications of Surgery.

Feedback from hospital staff identified issues with the indicator definition including:
- Inclusion of minor complications that were deemed not clinically significant,
- Perforation of gallbladder during Cholecystectomy regularly contributed to flagging.
- In a number of cases the complications were of other procedures either in the same episode of care or a previous admission.
- That the accurate and complete recording and coding of complications will not be encouraged if these complications are used as a performance indicator.

Investigations into flags for this indicator identified issues with the indicator definition rather than opportunities for improvement.

In February 2009, the Patient Safety and Quality Executive Committee endorsed the recommendation to suspend the Laparoscopic Cholecystectomy Complications of Surgery Indicator. The suspension allowed a thorough review to be undertaken of both the statistical validity and clinical usefulness of this indicator and to explore possible alternative indicator/s through an indicator working group. Whilst suspended, the Patient Safety and Quality Executive Committee recommended all cases that experienced serious complications resulting from Laparoscopic Cholecystectomy (e.g. returns to theatre, unplanned ICU admission) be individually reviewed at Health Service District morbidity and mortality meetings.

Laparoscopic Cholecystectomy VLAD Indicator Working Group
In April 2010, the Laparoscopic Cholecystectomy VLAD Indicator Working Group was formed to review the current Laparoscopic Cholecystectomy Indicator for clinical relevance. Following an Expression of Interest that was distributed to VLAD stakeholders across Queensland, the working group first met in April 2010. All staff that expressed interest were accepted to participate in the working group. Membership included four General Surgeons, Clinical Nurses, Safety and Quality staff, Health Information Managers, Coding Experts and Data Analysts. See Appendix D listing the meeting attendances.

This document outlines the review of the Laparoscopic Cholecystectomy Complications of Surgery Indicator and the proposed Laparoscopic Cholecystectomy Longstay and Readmission indicators.
Laparoscopic Cholecystectomy Indicator

INDICATOR REVIEW PROCESS
The review involved an iterative process of statistical and clinical debate and discussion. Using the indicator selection criteria, the indicator was rigorously evaluated.

Indicator Selection Criteria
The criteria used to evaluate the clinical indicators throughout the review process were:

- Clinical significance: The significance in terms of burden to the health system and individual patients
- Volume: Sufficiency of patient numbers to provide a statistically reliable measure
- Indicator clarity: The indicator definition must be clearly defined and reliable
- Responsive potential: The disease, condition or procedure type has to be able to be systematically improved
- Systematic Data Collection: The data used to derive the indicators must be collected systematically across hospitals e.g. Queensland Hospital Admitted Patient Data Collection

RECOMMENDATION FROM WORKING GROUP

1. As the VLAD Laparoscopic Cholecystectomy Complications of Surgery indicator lacks clinical relevance and there are critical limitations to the existing definition that can not be overcome, it is recommended that the indicator cease to be monitored. Further information is listed below.
2. It is recommended the production and monitoring of Laparoscopic Cholecystectomy Readmission and Longstay indicators commence. Information outlining the rationales for these indicators is given on page four.

As a result of the review process the working group recommended:

- Ceasing the Laparoscopic Cholecystectomy Complications of Surgery indicator, due to:
  - Lack of Indicator clarity due to the limitations with the definition that can not be resolved due to limitations of the coded data.
  - The complications indicator was unable to distinguish between a minor clinical complication and clinically significant complications.
  - Examples of minor clinical complications that were picked up as complications of surgery included intraoperative gall bladder perforation/puncture with or without spillage of gall bladder contents into abdominal cavity, and/or peritoneal lavage during the intraoperative episode of care.
  - Investigations into variation from state average performance have identified predominately Data (documentation/coding) and Casemix (inadequate risk adjustment) causal factors rather than a significant amount of practice improvement opportunities related to Structure or Resource, Process of Care or Professional. See Table 1 Laparoscopic Cholecystectomy Complication of Surgery Causal Factors (page four).

- Commencing the production and monitoring of the Laparoscopic Cholecystectomy Readmission indicator, and the Laparoscopic Cholecystectomy Longstay indicator.
  - It is believed that these two indicators will measure the quality of total care of Laparoscopic Cholecystectomy patients including significant complications of surgery that would effect either length of stay or cause readmissions. The definition of these indicators has been carefully chosen to give them good indicator clarity.
  - Incorporate clinically significant complications (i.e. bile duct injury) and return to theatre data as part of the case details for the Longstay indicator.

The indicator review process is outlined commencing from page five.
Summary of the indicator definition:
- A collated summary of the differences between the indicator recommended to be ceased (Complications of Surgery) and indicators recommended to commence (Readmission and Longstay) are outlined below on page five.
- Parameters of the new indicators (Readmission and Longstay) are highlighted in orange below on page five and include the indicators inclusions, exclusions and risk adjustments.

Table 1: Laparoscopic Cholecystectomy Causal Factors: Lower Level Flags
01/02/2007 - 14/10/2009

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Data</th>
<th>Casemix</th>
<th>Structure or Resource</th>
<th>Process of Care</th>
<th>Professional</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complications of Surgery</td>
<td>Freq</td>
<td>17</td>
<td>13</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>40</td>
<td>30</td>
<td>9</td>
<td>12</td>
<td>9</td>
</tr>
</tbody>
</table>
**INDICATOR DEFINITION**

<table>
<thead>
<tr>
<th>Old Definition</th>
<th>New Definitions</th>
<th>Longstay</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>Defined as the number of records where any of the external cause codes was between “Y60”-“Y6999” or “Y83”-“Y8499”.</td>
<td>Patients readmitted to any Queensland hospital within 30 days of discharge to home / usual residence, residential aged care service or correctional facility (sepn_mode= “01”, “12”, “15”) with a condition that could be considered a consequence of the procedure (for a list of the diagnosis codes see appendix). 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. Exclude planned readmissions - where a readmissions is elective and has a principal diagnosis of Calculus of the Bile Duct and where the possible readmission episode was a transfer in.</td>
</tr>
</tbody>
</table>

**Procedure Codes**

<table>
<thead>
<tr>
<th>Procedure Codes</th>
<th>Procedure codes 30445-00 (Laparoscopic Cholecystectomy)</th>
<th>Procedure codes 30445-00 (Laparoscopic Cholecystectomy) or 30446-00 (Laparoscopic Cholecystectomy proceeding to open Cholecystectomy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separation date</td>
<td>1 July 2006 onwards</td>
<td>1 July 2008 onwards</td>
</tr>
<tr>
<td>Episode type</td>
<td>Acute patients</td>
<td>no change</td>
</tr>
<tr>
<td>Age</td>
<td>20 years or older</td>
<td>no change</td>
</tr>
<tr>
<td>Length of stay</td>
<td>0 - 30 patient days</td>
<td>0 to 30 days post Laparoscopic Cholecystectomy</td>
</tr>
<tr>
<td>Admission source</td>
<td>Excludes transfers in</td>
<td>No exclusion - transfers in no longer excluded</td>
</tr>
<tr>
<td>Separation mode</td>
<td>Excludes transfers out</td>
<td>No exclusion - transfers out no longer excluded</td>
</tr>
<tr>
<td>Elective status</td>
<td>Planned elective patients only</td>
<td>No exclusion - emergency patients no longer excluded</td>
</tr>
<tr>
<td>State of usual residence</td>
<td>N/A</td>
<td>Queensland resident</td>
</tr>
<tr>
<td>Separation mode</td>
<td>N/A</td>
<td>Exclude in hospital deaths</td>
</tr>
</tbody>
</table>

**Risk Adjustment Co-morbidities**

<table>
<thead>
<tr>
<th>Risk Adjustment</th>
<th>ASA score, Emergency</th>
<th>Age group, sex, malignancy, hypertension, IHD, dysrhythmia, peritoneal adhesions, liver disease, renal disease, diabetes, ASA score.</th>
</tr>
</thead>
</table>

Laparoscopic Cholecystectomy VLAD Indicator Review
Summary of Activities
DISCUSSION OF INCLUSIONS AND EXCLUSIONS ISSUES FOR INDICATOR DEFINITION

Alternative Indicators
Longstay, readmission, combination (longstay and readmission), and/or return to theatre, bile duct injury, and mortality were proposed as outcomes to monitor for Laparoscopic Cholecystectomy indicator/s.

Options identified for an alternative indicator(s):
- Separate Longstay and Readmission Laparoscopic Cholecystectomy indicators,
- Combination Laparoscopic Cholecystectomy indicator for Longstay and Readmission, and
- Separate Laparoscopic Cholecystectomy indicator for:
  - return to theatre,
  - bile duct injury, and
  - mortality.

Analysis (each option had its strengths and weaknesses discussed at length, these include):

Separate Longstay and Readmission indicators:
Allows for each indicator to be monitored and measured in more detail and with more tightly defined definitions. The outcome rate for each indicator needs to be above 4% and preferably above 5% to utilise the VLAD methodology.

Combination Longstay and Readmission indicator:
Combination (long stay and readmission) indicator was suggested as the outcome rates for separate indicators may be too low (below 5%). This is dependent, however, on the cut off point for long stay and readmission and diagnosis codes selected by key stakeholders for a readmission indicator.
Combination of long stay and readmission Laparoscopic Cholecystectomy indicator was highlighted as an alternative indicator by a Danish study – Harboe, K.M., Anthonsen, K. & Bardram, L. (2009), Validation of data and indicators in the Danish Cholecystectomy Database, International Journal for Quality in Health Care, 21:3, pp. 160-168.
Alternatively an averaging of the outcome rate may occur when an increase in long stay outcome rate coincides with a decrease in readmission outcome rate.

Return to theatre:
The working group considered whether a return to theatre is a concern if the patient does not hit the long stay point or is not a readmission.
Laparoscopic Cholecystectomy return to theatre has a very low incidence rate.
The working group noted patients who return to theatre will either have a procedure to treat the adverse findings or the procedure fails to find anything adverse.
Data for return to theatre can only be collected for returns to theatre on the following day onwards and not on same day return to theatre.

Bile Duct Injury:
Due to the low frequency rate of bile duct injury, it is not suitable to monitor using the VLAD methodology. Occurrence of bile duct injury can be included in the case details data of a long stay indicator.

Mortality:
Laparoscopic Cholecystectomy mortality has a very low incidence rate and is a serious adverse event.
All in-hospital deaths are captured by district facilities through the death review process and/or a Mortality and Morbidity process.

Decision: Future Laparoscopic Cholecystectomy indicators should be separate long stay and readmission indicators. A combination long stay and readmission indicator was rejected. Return to theatre and bile duct injury cases are to be placed into case details of a long stay indicator.
**Issue: Principal Diagnoses in Disorders of the Gall Bladder, Biliary Tract and Pancreas**

**Analysis:** Working group members discussed that a Laparoscopic Cholecystectomy indicator target group should restrict to a Principal Diagnosis within the coding classifications of Disorders of the Gall Bladder, Biliary Tract and Pancreas so that a homogeneous group of patients is included in the population being monitored for the indicator.

**Decision:** Laparoscopic Cholecystectomy indicator should restrict to Principal Diagnoses in Disorders of the Gall Bladder, Biliary Tract and Pancreas as part of the target group.

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**Issue: Principal Diagnoses – Proceed to Open Cholecystectomy**

**Analysis:** Clinical representative feedback indicated individual unit rates for proceed to open as compared to Laparoscopic Cholecystectomy rates may vary amongst facilities. Discussion from clinical experts stated it would be prudent to include proceed to open based on intention to treat.

<table>
<thead>
<tr>
<th>Rates (%)</th>
<th>Long stay rate</th>
<th>Readmission rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Laparoscopic Cholecystectomy definition n=10,177</td>
<td>5.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Proceed to open n=198</td>
<td>24.6</td>
<td>11.1</td>
</tr>
</tbody>
</table>

**Decision:** Include 30445-00 Laparoscopic Cholecystectomy and 30446-00 Laparoscopic Cholecystectomy proceeding to Open Cholecystectomy patients as part of indicator definition based on intention to treat.

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**Issue: Readmission point**

**Analysis:** Readmissions were determined by probabilistic linkage conducted for reference admission. Of the 4,397 public hospital Laparoscopic Cholecystectomy patients in 2009/10 (public hospitals only), 345 (7.8%) were readmitted within 60 days with a principal diagnosis in the identified list. Approximately 50% of the readmissions occurred within 8 days.

**Decision:** Include the readmission cut off point of 30 days as part of the indicator definition.

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**Issue: Emergency patients**

**Analysis:** Clinical representative feedback indicated emergency and elective Laparoscopic Cholecystectomy patients are clinical groups with different risks and risk profiles. Some facilities only do elective Laparoscopic Cholecystectomy surgery which may favour these facilities with their outcome rates. It was agreed with input from clinical experts to include Emergency patients as they represent a significant proportion of Laparoscopic Cholecystectomy patients. Agree to include elective and emergency together in indicator inclusion criteria with emergency patients being risk adjusted according to outcome rates for Longstay and Readmission Laparoscopic Cholecystectomy VLAD indicators.

<table>
<thead>
<tr>
<th>Rates (%)</th>
<th>Long stay rate</th>
<th>Readmission rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Laparoscopic Cholecystectomy definition n=10,177</td>
<td>5.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Emergency patients n=3,152</td>
<td>22.7</td>
<td>7.0</td>
</tr>
</tbody>
</table>

**Decision:** Include elective and emergency together in indicator inclusion criteria with emergency patients being risk adjusted according to outcome rates for Longstay and Readmission indicators.
**Issue: Long stays based on total length of stay or post operative length of stay**

**Analysis:** Working group members indicated that long stays based on the post operative length of stay would be more clinically relevant.

**Decision:** Post operative length of stay to be used as reference point for length of stay.

**Issue: Long Stay point**

**Analysis:** Working group members indicated a long stay point of four (4) or more days (post operative Laparoscopic Cholecystectomy) would be the most appropriate. Four (4) or more days long stay point (represents 8.1% of all Laparoscopic Cholecystectomy patients) would be the closest to the 90th percentile with other VLAD long stay indicators having long stay points close to the 90th percentile.

**Decision:** Four (4) days or more to be used as long stay point.

Note: based on further analysis it was decided at the third meeting to change the long stay point to have different long stay points for elective and emergency patients.

**Issue: Long stay point (emergency and non-emergency patients)**

**Analysis:** Following long stay point further analysis, there was found to be a difference in the length of stay between emergency and non-emergency patients. 91.0% of non-emergency patients stay 2 days or less and 91.2% of emergency patients stayed 6 days or less. Across both types of patients 91.0% stay 3 days or less. Having different long stay points should make it easier for facilities to undertake investigations into the flags causative factors.

Post Laparoscopic Cholecystectomy length of stay for Emergency and non-emergency patients, 2008/9 to 2010/11

<table>
<thead>
<tr>
<th>Post Laparoscopic Cholecystectomy stay (days)</th>
<th>Non-Emergency</th>
<th>Emergency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freq</td>
<td>Percent</td>
</tr>
<tr>
<td>0</td>
<td>1560</td>
<td>7.0</td>
</tr>
<tr>
<td>1</td>
<td>15365</td>
<td>69.4</td>
</tr>
<tr>
<td>2</td>
<td>3238</td>
<td>14.6</td>
</tr>
<tr>
<td>3</td>
<td>815</td>
<td>3.7</td>
</tr>
<tr>
<td>4</td>
<td>370</td>
<td>1.7</td>
</tr>
<tr>
<td>5</td>
<td>253</td>
<td>1.1</td>
</tr>
<tr>
<td>6</td>
<td>162</td>
<td>0.7</td>
</tr>
<tr>
<td>7</td>
<td>132</td>
<td>0.6</td>
</tr>
<tr>
<td>8</td>
<td>62</td>
<td>0.3</td>
</tr>
<tr>
<td>9</td>
<td>51</td>
<td>0.2</td>
</tr>
<tr>
<td>10 to 30</td>
<td>145</td>
<td>0.7</td>
</tr>
</tbody>
</table>

**Recommendation:** to have different long stay points for emergency and elective admissions with non-emergency (elective) patients being a long stay if they stay more than 2 days post Laparoscopic Cholecystectomy and emergency patients being a long stay if they stay more than 6 days post Laparoscopic Cholecystectomy.
**Issue: Transfers Out**

**Analysis:** All group members agreed to include transfers out as these were likely to be the cases that had adverse outcomes as a result of surgery.

**Decision:** Include Transfers Out as part of indicator definition.

**Issue: Transfers In**

**Analysis:** Patients from small facilities are transferred into medium sized facilities to have a Laparoscopic Cholecystectomy procedure. Exclusion of transfers in would exclude these patients and some of the care in these facilities. The reference episode of care is when the Laparoscopic Cholecystectomy is performed. If this episode is a transfer in then they have not yet had the Laparoscopic Cholecystectomy so the transfer is not related to a possible complication or misadventure with the Laparoscopic Cholecystectomy. The population for the indicator is made up of the episodes of care where patients have had a Laparoscopic Cholecystectomy. Only the episode of care where the Laparoscopic Cholecystectomy was performed will be included in the population for the indicator.

<table>
<thead>
<tr>
<th>Rates (%)</th>
<th>Long stay rate</th>
<th>Readmission rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Laparoscopic Cholecystectomy definition n=10,177</td>
<td>5.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Transfers in n= 262</td>
<td>33.5</td>
<td>6.5</td>
</tr>
</tbody>
</table>

**Decision:** Include transfer in patients in indicator definition.

**Issue: Readmission Principal diagnosis codes**

**Analysis:** 1479 Principal diagnosis readmission codes were reviewed by clinical experts (General Surgeons). Of these, 245 readmission codes were accepted with frequency count considered prior to accepting Principal diagnosis as part of the indicator definition.

**Decision:** Include 245 readmission codes in the indicator definition – see Appendix C for list of agreed readmission codes.

**Issue: Planned readmission post Laparoscopic Cholecystectomy**

**Analysis:** There was some concern that we might pick up some planned readmissions as at some centres no attempt is made to remove the stones from the common bile duct (CBD) when performing the Laparoscopic Cholecystectomy, stones are identified and removed by ERCP later. Sometimes the removal of stones from the CBD is done in a different admission which would be identified as a readmission. It was suggested that readmissions with Elective Patient Status not Emergency and PD of Calculus of the Bile Duct be considered planned and not be counted as readmissions for the indicator. Of the 4,397 public hospital LC patients in 2009/10 financial year 345 (7.8%) were readmitted within 60 days with a principal diagnosis in the identified list. Of the 345 patients identified as a readmission, 34 patients met this “planned” readmission criteria.

**Decision:** Readmissions with Elective Patient Status and principal diagnosis of Calculus of the Bile Duct be treated as planned readmissions and be excluded as a readmission.
**Issue: Risk Adjustment**

**Analysis:**
The collated list of co-morbidities for risk adjustment to be investigated by CMT are:
- Age
- Gender (male)
- Malignancy (C00-C97),
- Hypertension (I10-I15),
- Ischaemic Heart Disease (I20-I25),
- Dysrhythmias (I46-I49),
- Peritoneal Adhesions (K660), and
- Liver Disease (K70-K77).
- ASA status
- Obesity (not consider as data not collected)
- Diabetes
- Emergency surgery
- Renal Disease
- Albumin
- Urea
- Functional status (not consider as data not collected)
- History of cholecystitis (not consider as data not collected)
- History of pancreatitis (not consider as data not collected)
- History of cholangitis (not consider as data not collected)
- History of upper abdominal surgery (not consider as data not collected)

The history of conditions are not coded in the QHPADC data collection (used to calculate VLADs), as such conditions need to be treated in the current episode of care.

**Decision:** The risk adjustment factors recommended by the review group to be investigated by CMT are:
- Age, Gender (male), Malignancy (ICD codes C00-C97), Hypertension (I10-I15), Ischaemic Heart Disease (I20-I25), Dysrhythmias (I46-I49), Peritoneal Adhesions (K660), Liver Disease (K70-K77), ASA status, Diabetes, Emergency surgery, and Renal Disease.

Risk adjustments not selected for investigations (not considered as data not collected in QHPADC):

The risk adjustments not selected for investigations are (poor documentation/ coding and questionable clinical relevance): Albumin and Urea.

The variables identified to be used for risk adjustment are included in the indicator definition summary (page 4).
**Issue: ASA Score and Emergency Modifier**

**Analysis:** Where any cerebral anaesthesia or Conduction anaesthesia procedures are coded the American Society of Anesthesiologists (ASA) score and the emergency modifier are coded. We can identify these procedures that occurred on the day of the Laparoscopic Cholecystectomy procedure but if there is more than one of these procedures on the same day we are not able to tell which happened for the Laparoscopic Cholecystectomy and which at another time. 81% of the Laparoscopic Cholecystectomy patients had a documented ASA score. This will limit the usefulness of this variable in risk adjustment.

Of the 27,693 Laparoscopic Cholecystectomy procedures between July 2007 and June 2010 there were 328 cases where they had more than one anaesthesia procedure on the day of their Laparoscopic Cholecystectomy. Of the 328 with more than one anaesthetic procedure 133 did not have the same ASA score and 60 did not have the same emergency modifier for all the anaesthesia procedures.

For deriving an ASA score and emergency modifier, the below approach was proposed to clinical experts:
- If a patient receives one General Anaesthetic and non-General Anaesthetic on the day of the Laparoscopic Cholecystectomy then use the ASA score and emergency modifier from the General Anaesthetic.
- Where there is more than one General Anaesthetic then use the healthiest ASA score and emergency modifier for the General Anaesthetic procedures.
- Where there are no General Anaesthetic then take the healthiest ASA score and emergency modifier from the non General Anaesthetic procedures.
- Where the ASA score is not documented use the ASA score for a normal healthy patient (i.e. ASA score = 1).

Note for ASA categories: (1) A normal healthy patient and (2) A patient with mild systemic disease will be combined in risk adjustment; this combined group will include the cases where the ASA score was not documented.

**Decision:** Include above proposed approach within indicator definition to determine ASA score and Emergency modifier where there is more than one procedure in one day and/or no ASA score is documented.

**Issue: How to identify emergency patients**

**Analysis:** Emergency care can be identified through either the Elective status variable that is coded for each episode of care and through the emergency modifier that is recorded as part of the ASA score. Both of these variables have issues with how accurately they are recorded.

There was a similar distribution of length of stay for patients that had either or both of these emergency identifiers, see appendix A.

**Recommendation:** Identify emergency patients as patients who were an emergency admission (identified through the elective status variable) or where an emergency modifier is recorded as part of the ASA score.

**Issue: Monitoring private facilities**

**Analysis:** When VLADs were initially produced readmission indicators were not produced for private facilities as it was not possible to undertake the linkage required to produce readmission indicators as the patient name and address was not reliably available. For indicators where the rate of occurrence of the indicator outcome is similar for private and public hospitals it is possible to produce the indicator for both sectors.

**Recommendation:** The working group did not identify any major concerns in regards to the production of Laparoscopic Cholecystectomy indicators for both (public and private) sectors.
Results for produced indicator definitions:
Applying these indicator definitions for Laparoscopic Cholecystectomy Readmission and Long Stay, the following flags have been identified:

<table>
<thead>
<tr>
<th>Count of flags</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower 2</td>
</tr>
<tr>
<td>Year</td>
<td>Episodes</td>
</tr>
<tr>
<td>Readmissions</td>
<td></td>
</tr>
<tr>
<td>all years</td>
<td>13224</td>
</tr>
<tr>
<td>2008/09</td>
<td>4120</td>
</tr>
<tr>
<td>2009/10</td>
<td>4476</td>
</tr>
<tr>
<td>2010/11</td>
<td>4628</td>
</tr>
<tr>
<td>Long Stay</td>
<td></td>
</tr>
<tr>
<td>all years</td>
<td>13234</td>
</tr>
<tr>
<td>2008/09</td>
<td>4124</td>
</tr>
<tr>
<td>2009/10</td>
<td>4480</td>
</tr>
<tr>
<td>2010/11</td>
<td>4630</td>
</tr>
</tbody>
</table>

Level 2 flags indicate that the facility outcome is 75% higher or lower than the expected rate. Level 3 flags indicate that the facility outcome is 100% higher or lower than the expected rate.

Discussion: Results were presented to the working group on the number of flags by facility and how sensitive the indicators were to flag and require investigation. The number of flags and sensitivity were similar to other indicators.

Recommendation: The working group deemed the flagging performance of the indicator appropriate.
APPENDICES

Appendix A – Percentiles for Post Laparoscopic Cholecystectomy stay by way emergency identified for 2008/9 to 2010/11

<table>
<thead>
<tr>
<th>Post Lap Chole stay (days)</th>
<th>Emergency admission but not score</th>
<th>Emergency admission and score</th>
<th>Emergency score but not admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% Max</td>
<td>29</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>99%</td>
<td>16</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>95%</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>90%</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>75% Q3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>50% Median</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>25% Q1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10%</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5%</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
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<td>0</td>
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<tr>
<td>Count</td>
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<td>2523</td>
<td>534</td>
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Appendix B - Method for determining risk adjustment co-morbidities

The risk adjustment co-morbidities are determined in a systematic manner as described below.
1. A data set of all episodes for the period 1 July 2007 to 30 June 2011 meeting the new definition is collated;
2. Age groups are collapsed to ensure there are at least 5 separations with and without the indicator in each group using data from the latest financial year (a statistical requirement);
3. A cross tabulation (with a Chi-squared test of significance) is performed for each potential co-morbidity with data from the latest financial year. Those having at least 5 separations with and without the indicator and a significant test result (at the 20% level) are shortlisted for consideration in the risk adjustment model;
4. Risk adjustment models (logistic regression) using the shortlisted co-morbidities are performed for each financial year and the significance of the included predictors is examined. Co-morbidities failing to be significant (at the 10%) for the majority of years are progressively dropped from the model or collapsed with other categories of the same variable and the process is run repeatedly until all predictors are significant for the majority of the period.
Appendix C – Laparoscopic Cholecystectomy Readmission Principal Diagnoses:

A047 Enterocolitis due to Clostridium difficile
A081 Acute gastroenteropathy due to Norwalk agent
A410 Sepsis due to Staphylococcus aureus
A411 Sepsis due to other specified staphylococcus
A412 Sepsis due to unspecified staphylococcus
A414 Sepsis due to anaerobes
A415 Sepsis due to other and unspecified Gram-negative organisms
A4150 Sepsis due to unspecified Gram-negative organisms
A4151 Sepsis due to Escherichia coli [E. Coli]
A4152 Sepsis due to Pseudomonas
A4158 Sepsis due to other Gram-negative organisms
A418 Other specified sepsis
A419 Sepsis, unspecified
C250 Malignant neoplasm of head of pancreas
C251 Malignant neoplasm of body of pancreas
C259 Malignant neoplasm of pancreas, part unspecified
D135 Benign neoplasm of extrahepatic bile ducts
D649 Anaemia, unspecified
D70 Agranulocytosis
D733 Abscess of spleen
D735 Infarction of spleen
E86 Volume depletion
I200 Unstable angina
I201 Angina pectoris with documented spasm
I208 Other forms of angina pectoris
I209 Angina pectoris, unspecified
I250 Atherosclerotic cardiovascular disease, so described
I251 Atherosclerotic heart disease
I2510 Atherosclerotic heart disease, of unspecified vessel
I2511 Atherosclerotic heart disease, of native coronary artery
I2512 Atherosclerotic heart disease, of autologous bypass graft
I255 Ischaemic cardiomyopathy
I256 Silent myocardial ischaemia
I258 Other forms of chronic ischaemic heart disease
I259 Chronic ischaemic heart disease, unspecified
I260 Pulmonary embolism with mention of acute cor pulmonale
I269 Pulmonary embolism without mention of acute cor pulmonale
I313 Pericardial effusion (noninflammatory)
I330 Acute and subacute infective endocarditis
I339 Acute endocarditis, unspecified
I450 Right fascicular block
I451 Other and unspecified right bundle-branch block
I452 Bifascicular block
I453 Trifascicular block
I454 Nonspecific intraventricular block
I455 Other specified heart block
I456 Pre-excitation syndrome
I458 Other specified conduction disorders
I459 Conduction disorder, unspecified
I48 Atrial fibrillation and flutter
I500 Congestive heart failure
I501 Left ventricular failure
I509 Heart failure, unspecified
I800 Phlebitis and thrombophlebitis of superficial vessels of lower extremities
I801 Phlebitis and thrombophlebitis of femoral vein
I802 Phlebitis and thrombophlebitis of other deep vessels of lower extremities
I803 Phlebitis and thrombophlebitis of lower extremities, unspecified
I808 Phlebitis and thrombophlebitis of other sites
I809 Phlebitis and thrombophlebitis of unspecified site
I950 Idiopathic hypotension
I951 Orthostatic hypotension
I958 Other hypotension
I959 Hypotension, unspecified
I978 Other postprocedural disorders of circulatory system, not elsewhere classified
J180 Bronchopneumonia, unspecified
J181 Lobar pneumonia, unspecified
J189 Pneumonia, unspecified
J22 Unspecified acute lower respiratory infection
J952 Acute pulmonary insufficiency following nonthoracic surgery
J953 Chronic pulmonary insufficiency following surgery
J958 Other postprocedural respiratory disorders
J959 Postprocedural respiratory disorder, unspecified
J981 Pulmonary collapse
J986 Disorders of diaphragm
J988 Other specified respiratory disorders
J989 Respiratory disorder, unspecified
K223 Perforation of oesophagus
K290 Acute haemorrhagic gastritis
K291 Other acute gastritis
K292 Alcohol gastritis
K2920 Alcohol gastritis, without mention of haemorrhage
K2921 Alcohol gastritis, with haemorrhage
K2961 Other gastritis, with haemorrhage
K2971 Gastritis, unspecified, with haemorrhage
K298 Duodenitis
K2981 Duodenitis, with haemorrhage
K2991 Gastroduodenitis, unspecified, with haemorrhage
K310 Acute dilatation of stomach
K315 Obstruction of duodenum
K316 Fistula of stomach and duodenum
K430 Ventral hernia with obstruction, without gangrene
K431 Ventral hernia with gangrene
K439 Ventral hernia without obstruction or gangrene
K521 Toxic gastroenteritis and colitis
K528 Other specified noninfective gastroenteritis and colitis
K529 Noninfective gastroenteritis and colitis, unspecified
K560 Paralytic ileus
Intestinal obstruction
Cholecystectomy
VLAD Indicator Review
Summary of Activities
Page 15 of 18
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>S365</td>
<td>Injury of colon</td>
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<tr>
<td>S3650</td>
<td>Injury of colon, part unspecified</td>
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<tr>
<td>S3651</td>
<td>Injury of ascending [right] colon</td>
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<tr>
<td>S3652</td>
<td>Injury of transverse colon</td>
</tr>
<tr>
<td>S3653</td>
<td>Injury of descending [left] colon</td>
</tr>
<tr>
<td>S3654</td>
<td>Injury of sigmoid colon</td>
</tr>
<tr>
<td>S3659</td>
<td>Injury of other and multiple parts of colon</td>
</tr>
<tr>
<td>S366</td>
<td>Injury of rectum</td>
</tr>
<tr>
<td>S367</td>
<td>Injury of multiple intra-abdominal organs</td>
</tr>
<tr>
<td>S368</td>
<td>Injury of other intra-abdominal organs</td>
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<tr>
<td>S3682</td>
<td>Injury of mesentery</td>
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<td>S3683</td>
<td>Injury of retroperitoneum</td>
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<td>T811</td>
<td>Shock during or resulting from a procedure, not elsewhere classified</td>
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<td>T813</td>
<td>Disruption of operation wound, not elsewhere classified</td>
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<td>T814</td>
<td>Infection following a procedure, not elsewhere classified</td>
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<td>T8141</td>
<td>Wound infection following a procedure</td>
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<td>T8142</td>
<td>Sepsis following a procedure</td>
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<td>T815</td>
<td>Foreign body accidentally left in body cavity or operation wound following a procedure</td>
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<td>T816</td>
<td>Acute reaction to foreign substance accidentally left during a procedure</td>
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<td>T817</td>
<td>Vascular complications following a procedure, not elsewhere classified</td>
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<tr>
<td>T818</td>
<td>Other complications of procedures, not elsewhere classified</td>
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<td>T819</td>
<td>Unspecified complication of procedure</td>
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<td>T82</td>
<td>Shock due to anaesthesia</td>
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<td>T83</td>
<td>Malignant hyperthermia due to anaesthesia</td>
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<td>T84</td>
<td>Failed or difficult intubation</td>
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<td>T85</td>
<td>Other complications of anaesthesia</td>
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<td>T86</td>
<td>Anaphylactic shock due to adverse effect of correct drug or medicament properly administered</td>
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<tr>
<td>T87</td>
<td>Unspecified adverse effect of drug or medicament</td>
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<tr>
<td>T88</td>
<td>Other specified complications of surgical and medical care, not elsewhere classified</td>
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<td>T889</td>
<td>Complication of surgical and medical care, unspecified</td>
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<td>Z034</td>
<td>Observation for suspected myocardial infarction</td>
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<tr>
<td>Z035</td>
<td>Observation for other suspected cardiovascular diseases</td>
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<tr>
<td>Z039</td>
<td>Observation for suspected disease or condition, unspecified</td>
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<td>Z480</td>
<td>Attention to surgical dressings and sutures</td>
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<tr>
<td>Z488</td>
<td>Other specified surgical follow-up care</td>
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<tr>
<td>Z489</td>
<td>Surgical follow-up care, unspecified</td>
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</table>
Appendix D – Meeting Attendance:
Meeting 1: 16 April 2010
Meeting objective: Discuss indicator review plan; introduce VLAD method; discuss issues with existing indicator

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Barry O’Loughlin</td>
<td>Director of Surgery, Royal Brisbane and Women’s Hospital (RBWH)</td>
</tr>
<tr>
<td>Corrie Martin</td>
<td>Convenor, Queensland Coding Committee</td>
</tr>
<tr>
<td>Tracey Matthies</td>
<td>Manager Coding Services, Nambour Hospital</td>
</tr>
<tr>
<td>Kirsty Calabro</td>
<td>Clinical Nurse Consultant Quality Data, RBWH</td>
</tr>
<tr>
<td>Justin Collins</td>
<td>Director, Measurement and Monitoring Directorate, Patient Safety and Quality Improvement Service (PSQIS)</td>
</tr>
<tr>
<td>Kirstine Sketcher-Baker</td>
<td>Manager, Clinical Monitoring Team, PSQIS</td>
</tr>
<tr>
<td>Graham Hall</td>
<td>Principal Project Officer, Clinical Monitoring Team</td>
</tr>
</tbody>
</table>

Apologies
Dr Craig Sommerville   General Surgeon, Gold Coast Hospital
Dr Robert Franz        Medical Director – General Surgery Programme, The Prince Charles Hospital
Dr Peter Woodruff      Surgical clinical representative – PSQEC VLAD Subcommittee

Survey: Survey sent out to indicator working group members to gain feedback on identified and queried issues.

Meeting 2: 14 April 2011
Meeting objective: Respond to proposed indicator queries

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>Dr Craig Sommerville</td>
<td>General Surgeon, Gold Coast Hospital</td>
</tr>
<tr>
<td>Dr Don Martin</td>
<td>Director – Governance Assurance Unit and Chair PSQEC VLAD Subcommittee</td>
</tr>
<tr>
<td>Patricia Moss</td>
<td>Proxy for Tracey Matthies - Manager Coding Services, Nambour Hospital</td>
</tr>
<tr>
<td>Anne Quinlan</td>
<td>Proxy for Tracey Matthies - Manager Coding Services, Nambour Hospital</td>
</tr>
<tr>
<td>Kirstine Sketcher-Baker</td>
<td>Director, Measurement and Monitoring Directorate, PSQIS</td>
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<tr>
<td>Graham Hall</td>
<td>Manager, Clinical Monitoring Team</td>
</tr>
<tr>
<td>Michael Findlay</td>
<td>Principal Data Analyst, Clinical Monitoring Team</td>
</tr>
<tr>
<td>Scott Taylor</td>
<td>Principal Project Officer, Clinical Monitoring Team</td>
</tr>
</tbody>
</table>

Apologies
Dr Robert Franz        Medical Director – General Surgery Programme, The Prince Charles Hospital
Dr Peter Woodruff      Surgical clinical representative – PSQEC VLAD Subcommittee
Dr Barry O’Loughlin    Director of Surgery, RBWH
Corrie Martin          Convenor, Queensland Coding Committee

Dr Robert Franz and Dr Barry O’Loughlin were unable to attend meeting 2 but provided valuable feedback in regards to the proposed indicators prior to the meeting. After meeting 2 Dr Robert Franz retired from the working group due to clinical commitments.

Discussions out of session between meeting 2 and 3: discussions were held with clinical experts (Dr Barry O’Loughlin and Dr Craig Sommerville) on the following items (principal diagnoses, identifying emergency patients, transfers in and out, readmission principal diagnosis codes, planned readmissions post Lap Chole, risk adjustment, ASA score, and Emergency modifier).

Meeting 3: 5 December 2011
Meeting objective: Finalise indicator definition

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Kirsty Calabro</td>
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<tr>
<td>Graham Hall</td>
<td>Manager, Clinical Monitoring Team</td>
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<td>Michael Findlay</td>
<td>Principal Data Analyst, Clinical Monitoring Team</td>
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<tr>
<td>Scott Taylor</td>
<td>Principal Project Officer, Clinical Monitoring Team</td>
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Appendix E – Meeting Plan:
Prior to the first meeting, a collation of feedback received regarding the indicator definition since 2007 was circulated.

At the first meeting the following issues were discussed
- VLAD methodology
- Current Indicator Definition
- Issues with current indicator
- Relevance of current indicator
- Findings from facility reviews into current indicator flags
- Proposed indicators

Following the distribution of minutes from the first meeting, the Clinical Monitoring Team (CMT) undertook analysis on data agreed to by the working group. CMT investigated aspects of data definition including:
- Options to adjust/exclude diagnoses from the denominator
- Distribution of diagnoses across different sized facilities
- Outcome rates by age and risk profiles

At the second meeting the following issues were discussed:
- Issues raised at meeting one
- Out of session data analysis
- The value in continuing the development of proposed indicators

Out of session discussion between meeting 2 and 3 included the following issues:
- Principal Diagnoses
- Emergency patients
- Transfers Out and Transfers In
- Readmission principal diagnosis codes (Appendix C)
- Planned readmission post Lap Chole
- Risk Adjustment (Appendix B)
- Emergency Modifier (Appendix A)

At the third meeting the following issues were discussed:
- Longstay point for non-emergency and emergency patients
- Indicator definition summary including risk adjustment model
- Results of produced indicator definitions – flagging frequency
- Monitoring private facilities