



**Clinical Practice Improvement Centre**

# VLADs

a more effective statistical tool, to assist in monitoring and improving the safety and quality of health care systems

*Kirstine Sketcher-Baker, Maarten Kamp, Stephen Duckett & Justin Collins*

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## Queensland - The Sunshine State

During 2008/2009 in Queensland Health

- 442,531 people admitted to same day
- 881,794 people admitted to hospital
- 43,210 babies born



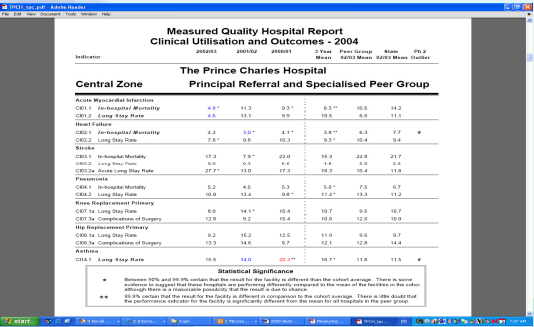


Queensland Population: 4.3 million

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## Prior to VLADs

(Hospital Risk Adjusted Rates per 100 seps.)



Indicator	2008/09	2007/08	2006/07	3 Year Peer Group Mean	State Mean	95% CI
<b>Central Zone</b>						
<b>Acute Myocardial Infarction</b>						
CSI 1 - In-hospital Mortality	4.8*	11.3	9.3	9.3*	10.5	14.2
CSI 2 - Long Stay Rate	4.6	13.1	9.9	10.5	9.5	11.1
<b>Heart Failure</b>						
CSI 1 - In-hospital Mortality	4.2	6.0*	4.1*	5.8*	4.3	7.7
CSI 2 - Long Stay Rate	7.8*	9.6	10.3	9.7	10.4	9.4
<b>Stroke</b>						
CSI 1 - In-hospital Mortality	17.3	19.4*	22.0	19.9	21.9	21.7
CSI 2 - Long Stay Rate	9.7	12.0	8.4	11.4	9.9	8.9
CSI 3a - Acute Long Stay Rate	27.1*	13.0	17.3	16.3	16.8	11.8
<b>Pneumonia</b>						
CSI 1 - In-hospital Mortality	5.2	4.6	5.3	5.0*	7.5	6.7
CSI 2 - Long Stay Rate	10.0	12.5	14.4*	11.4*	12.3	11.2
<b>Acute Respiratory Primary</b>						
CSI 1 - Long Stay Rate	6.0	14.1*	10.4	10.7	9.5	10.7
CSI 3a - Complications of Surgery	12.0	9.2	10.8	10.0	11.6	10.0
<b>Hip Replacement Primary</b>						
CSI 1a - Long Stay Rate	9.2	15.2	12.5	11.9	9.6	9.7
CSI 3a - Complications of Surgery	13.3	14.6	9.7	12.1	12.9	14.4
<b>Arthritis</b>						
CSI 1 - Long Stay Rate	15.5	14.0	15.3*	16.7*	11.9	11.6

**Statistical Significance**

- \* Between 95% and 99.9% indicates that the result for the facility is different from the subject average. There is some confidence to suggest that these facilities are performing differently compared to the mean or the facilities in the cohort.
- \*\* 99.9% indicates that the result for the facility is different in comparison to the subject average. There is little doubt that the performance indicator for the facility is significantly different from the benchmark and happens in this peer group.

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## Issues of pre-VLAD methodology

(Annual Cross-sectional analysis)

- **Timeliness** (10 - 22 month lag)
  - Relevancy of the data to current practice
  - Lag-time of 10-22 months in detecting potential issues
  - Lag-time of 2 or 3 years to assess if improvement initiatives implemented as a result of identifying issues from a previous review were effective
- **Limited Governance**
  - Data only reported once a year for review
  - Follow-up on identified issues could only be achieved annually
- **Lack of sensitivity**
  - Limited information provided in a single figure
  - Inability to detect and identify time periods where results improved or deteriorated

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## Variable Life Adjusted Display (VLAD)

A VLAD is a type of statistical process control chart that visually represents treatment outcomes for selected clinical indicators

- monitoring/screening tool
- displays trends
- compares individual hospitals to the state

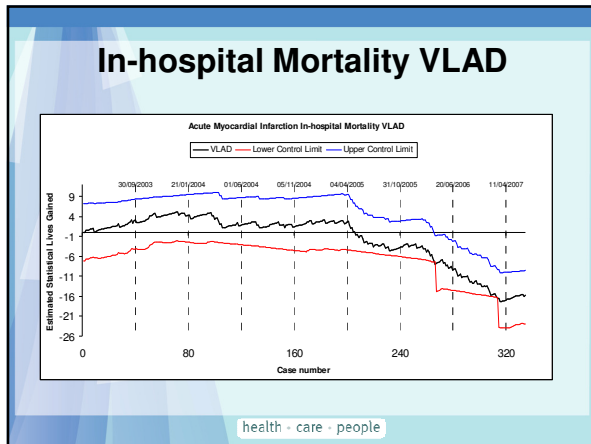
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## VLAD Characteristics

A VLAD investigates:

- ✓ A clinical indicator
- ✓ According to a particular outcome
- ✓ For a particular time period
- ✓ For a particular hospital (public or private)
- ✓ By each patient
- ✓ Against a particular cut-off for reactive increase or decrease

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### Making a VLAD Step by Step

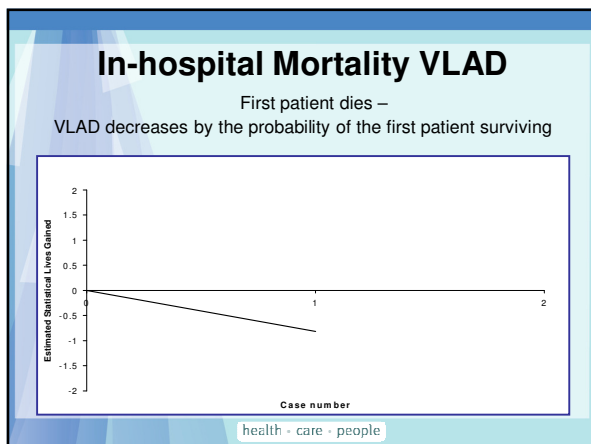
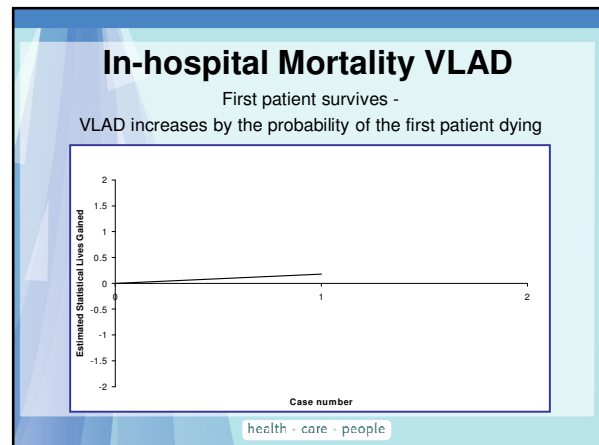
**Step 1:** Calculate the probability of the clinical indicator outcome for each patient

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### Making a VLAD Step by Step

**Step 2:** Plotting the first patient using their probability of outcome and if the outcome occurred

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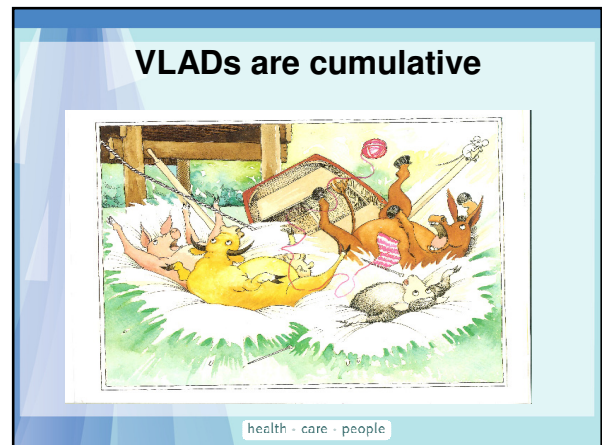
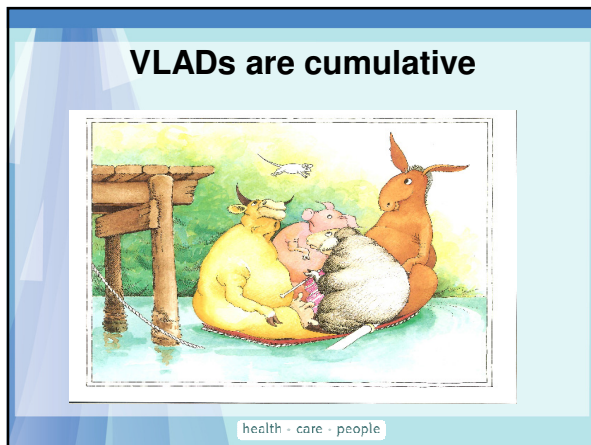
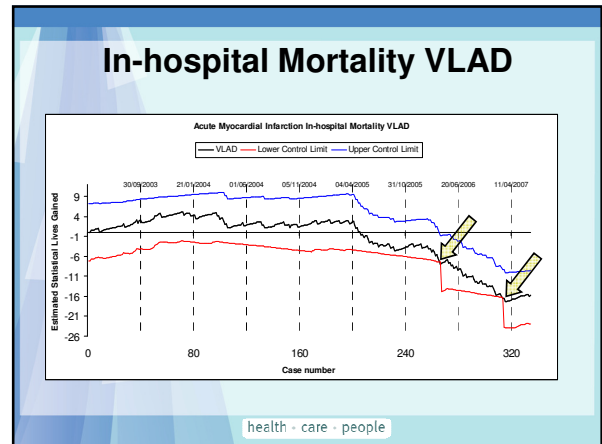
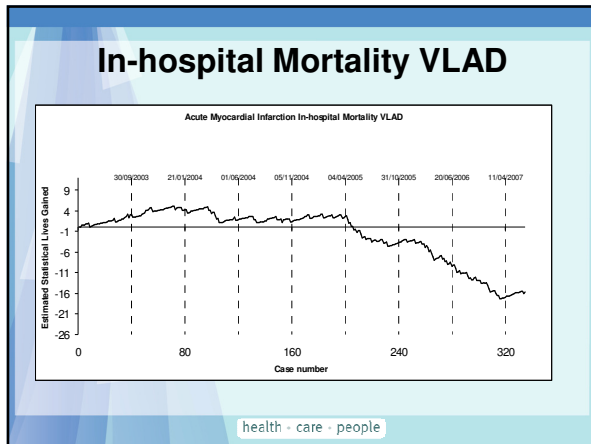


### Making a VLAD Step by Step

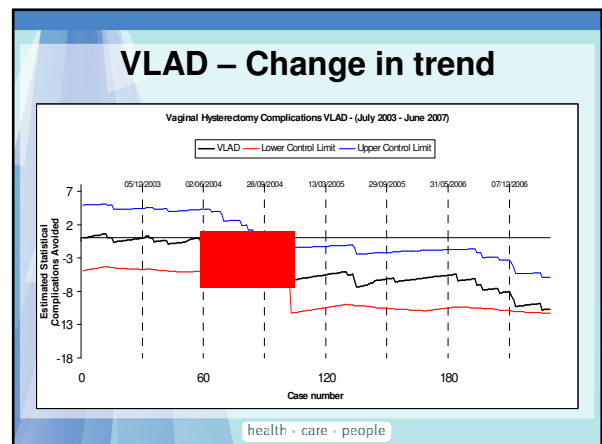
**Step 3:** Plotting subsequent patients

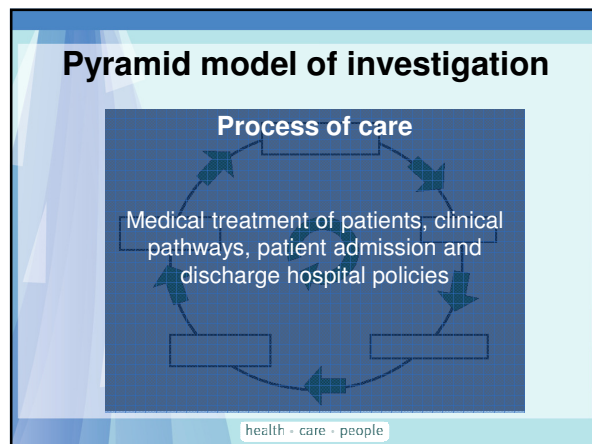
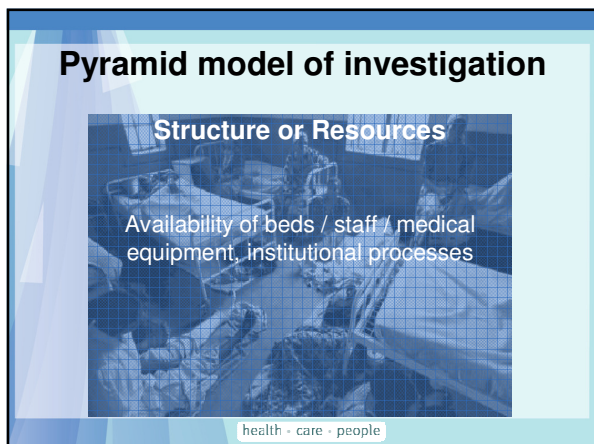
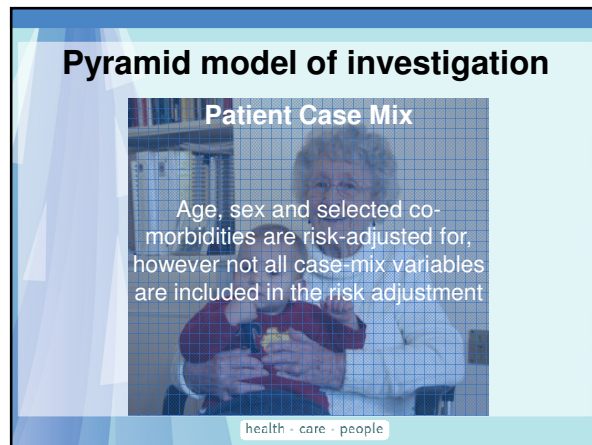
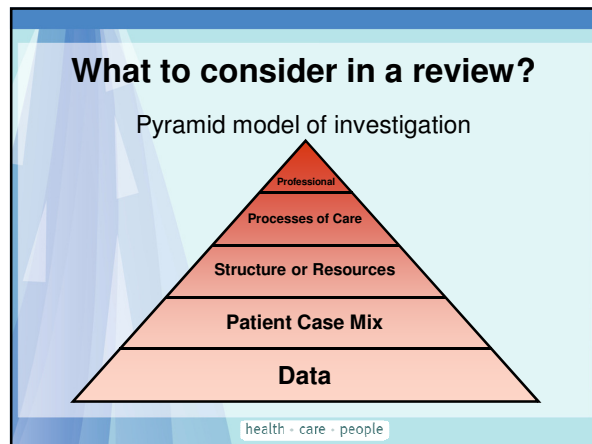
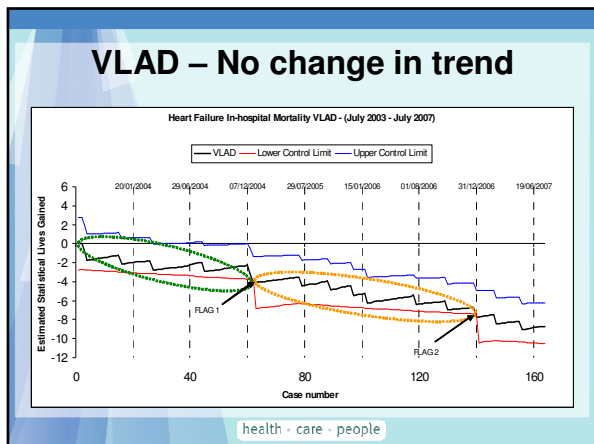
Using the same algorithm, the VLAD continues plotting patients until all of the information for the set period has been accounted for

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- ### Which patients are reviewed?
- Upper or lower flag
    - Upper – patients without the outcome
    - Lower – patients with the outcome
  - Change in trend or no change in trend
    - Change – from the patient where a change in trend occurred to the last patient flagged
    - No Change – from the last patient flagged (if a flag occurred before) to the patient flagged or from the beginning of the graph (if no flag has occurred before) to the last patient flagged
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## Pyramid model of investigation



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## A few 'vital signs' detected

Indicator

- Acute Myocardial Infarction Mortality Finding 

Hospital **higher** rate than state

- Delays in transferring of patients to other facilities

Hospital **lower** rate than state

- Reduction in time to lysis (patients were sent to Coronary Care for lysis.... patients are now given lysis in Emergency Dept)

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## A few 'vital signs' detected

Indicator

- Hip & Knee Replacement Complications 

Hospital **higher** rate than state

- Disposable sterile theatre drapes causing irritation and/or skin tear on frail skin

Hospital **higher** rate than state

- Lack of formal, clear processes in relation to risk assessment

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## The good, the bad and the ugly

(Pre-VLADs – annual cross-sectional analysis)

- **Pre-VLADs - the good**
  - Some measurement
  - Some accountability
  - Detected variances from the state/peer group
- **Pre VLADs - the bad & ugly**
  - Reviews only conducted annually
  - Limited governance
  - Large time delay between patient treatment and presentation of data
  - Some data analysis required by reviewers to determine relevant charts
  - Trends over time weren't easily visualised
  - Cabinet in Confidence – limited distribution
  - Perception of being punitively driven

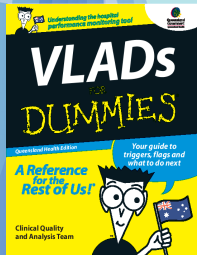
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## The good, the bad and the ugly

(VLADs - what we think!!)

- **VLADs – the good**
  - More measurement
  - More accountability (internal & external) & transparency
  - More governance (flagging at various levels over time is crucial)
  - Quicker detection of potential issues or quality improvements
  - Data presented to clinicians closer to patient treatment (provided monthly)
  - No data analysis required by reviewers (relevant patient URs provided)
  - Displays trends over time & compares to a benchmark
  - More focused investigation
  - Broad distribution to clinicians and coders (no cabinet in confidence)
- **VLADs – the bad & ugly**
  - Data inaccuracies (improving – action plans)
  - Potential oversensitivity (can adjust this through modification of control limits)
  - Some perception of being punitively driven (less than previous methodology)

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Queensland Health

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For a free copy of VLADs for Dummies or for more information....

Visit the website:  
<http://www.health.qld.gov.au/quality/vlad.asp>

or  
Email:  
[Kirstine\\_Sketcher-Baker@health.qld.gov.au](mailto:Kirstine_Sketcher-Baker@health.qld.gov.au)

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