QCMetrix QCDR – Analysis & Benchmarking

Introduction

QCMetrix was founded in 2001 on the vision of:

1. Serving hospitals, surgical collaboratives and surgical practices by collecting, validating and analyzing surgical data to achieve significant and measurable improvement in quality and financial performance and

2. To do so by providing the surgical data expertise, technical infrastructure via software hosted in **HIPAA/HITECH** compliant private clouds, related services and support excellence.

The centerpiece of QCMetrix' offering is the platform for data collection and data management, analysis and reporting, and dissemination of actionable information. QCMetrix's robust data capture platform ensures the highest quality data available anywhere. Quality is ensured by more than **1700+** rules and data validation techniques that are proprietary to QCMetrix and are continuously developed. These rules and techniques have been applied to over **1,000,000+** surgical procedures and the captured data has been analyzed, transformed and reported as actionable information. This information is crucial for improving treatment processes, achieving better patient outcomes, and lowering healthcare costs.

Data Analysis and Benchmarking

QCMetrix's real-time **Risk & Reliability Adjusted** reporting module provides timely feedback to hospitals and surgical practices. Clinicians can analyze and dynamically explore the outcomes data and compare their surgeons and their practices to other similar entities.

Report Models

QCMetrix has used various modelling techniques to generate **Expected** Values and **T-Statistics** for O/E ratios

- **Logistic Model** – For categorical outcomes we use PROC LOGISTIC (Forward selection, entry/exit p-value=0.05)
- **Linear Model** – For linear outcomes we use PROC GLMSELECT (Forward selection, entry/exit p-value=0.05)
- **Heckman Selection** – For highly skewed models with a high proportion of 0's, like we use a Heckman 2-stage selection model (SAS PROC QLIM)

Our reporting module enables clinicians to perform **Hospital** and **Surgeon** level comparisons to similar facilities. The module displays the following types of graphs for each outcome:

1. Trend – Shows trends in data overtime
2. Ranking – Displays relative rankings and confidence intervals

Users can generate charts by specifying a benchmarking criteria. The hover feature over a specific point on the chart displays a detailed popup describing the following model information for either the surgeon or the hospital:

- **Observed-to-Expected - O/E Ratio**

  O (Observed) – Raw or Actual number of cases satisfying a specific condition.

  E (Expected) – Expected average with a specific condition that are beyond the control of the hospital (Age, gender and other medical problems).

  O/E – Observed Rate is divided by the Expected Rate to create the O/E Ratio.

- **Confidence Interval (Upper & Lower)**

  Models are **95%** certain that the true O/E is between the upper and the lower confidence values.

- **T-Value**

  Summary and Measure of Significance of O/E, Confidence Interval (Upper) and Confidence Interval (Lower).

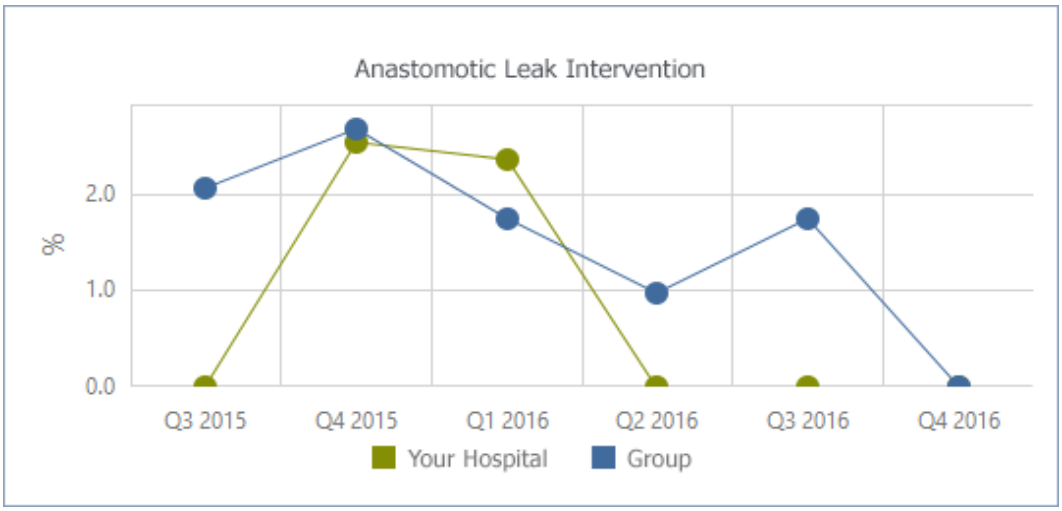
Pages 3 – 6 below provide a visual explanation of our reporting module for the following outcomes:

1. Anastomotic Leak Intervention
2. Hospital Readmission

Example 1 – Anastomotic Leak Intervention

The Trend Charts on the right display the **Anastomotic Leak Intervention** trend by quarter for the hospital and the group. The hover pop-up list displays the following information:

1. Observed Case Count
2. Total Case Count
3. Unadjusted Rate (%)
4. Adjusted Rate (%)
5. T-Value



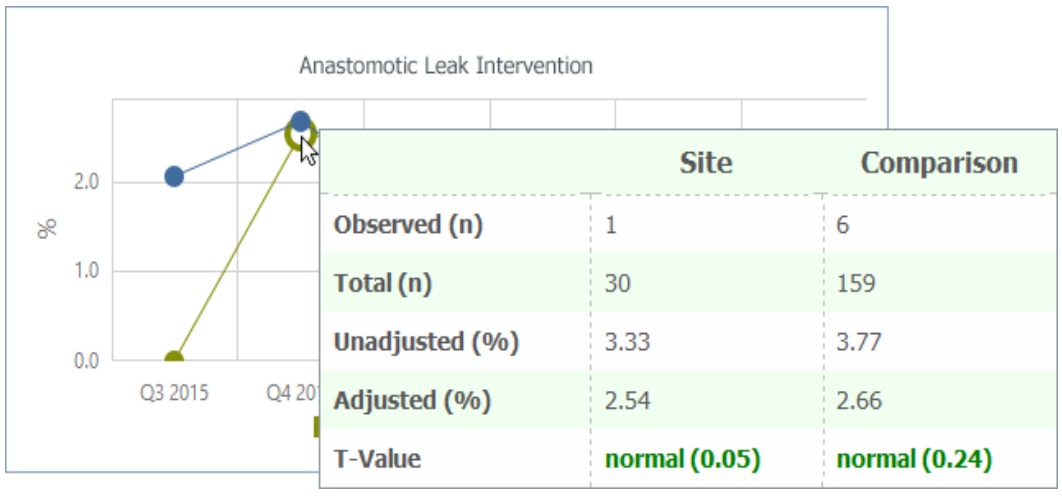
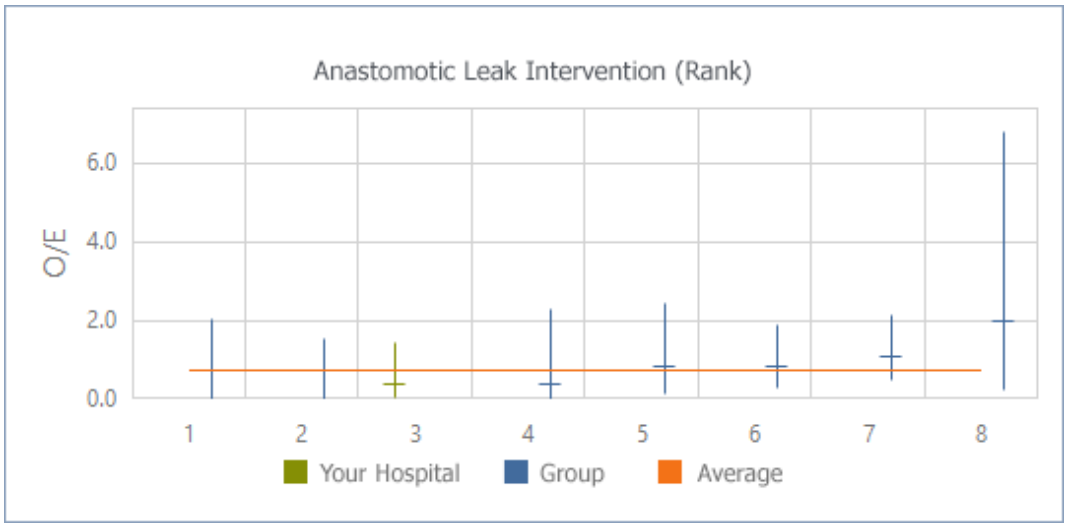


Figure 1 – Anastomotic Leak Intervention (Trend Charts with Pop-up)

The Ranking Charts on the right display the overall **Anastomotic Leak Intervention** ranking of all the hospitals. The hover pop-up lists the following for a specific hospital:

1. O/E
2. Confidence Upper
3. Confidence Lower
4. T-Value

The hospital's Anastomotic Leak Rate is **61% lower** than the average and the Models are 95% certain that the actual O/E is between **0.05** and **1.38**.



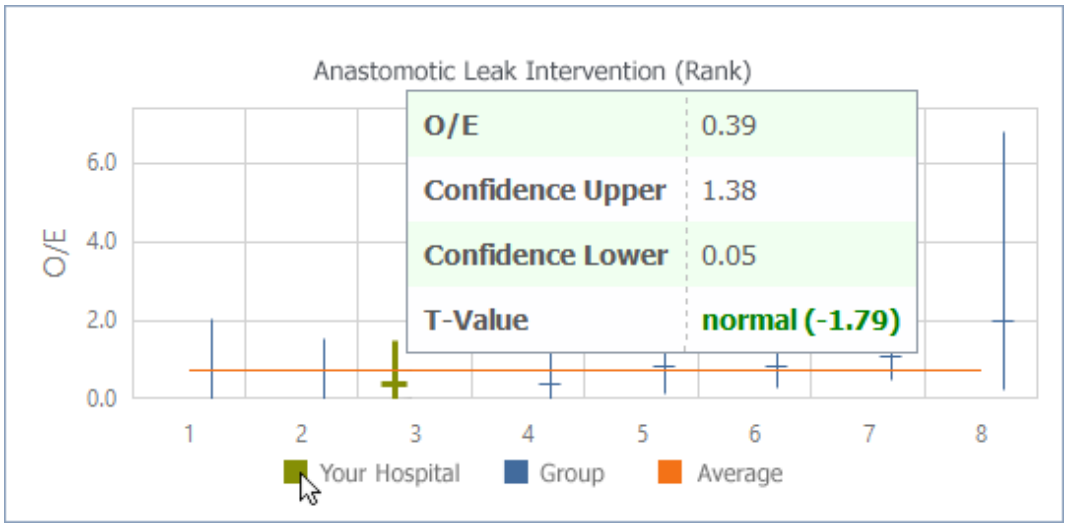
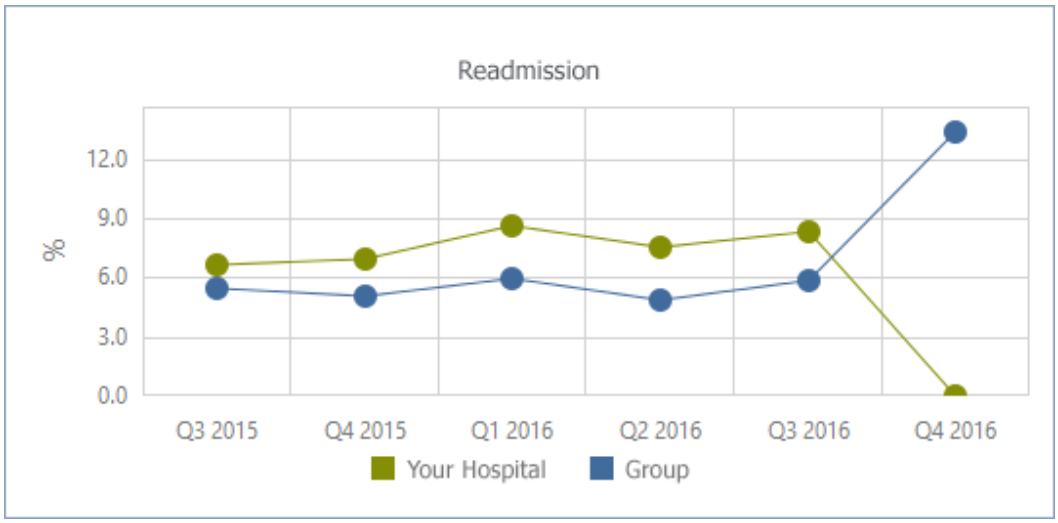


Figure 2 – Anastomotic Leak Intervention (Ranking Charts with Pop-up)

Example 2 – Hospital Readmission

The Trend Charts on the right display the **Hospital Readmission** trend by quarter for the hospital and the group. The hover pop-up list displays the following information:

1. Observed Case Count
2. Total Case Count
3. Unadjusted Rate (%)
4. Adjusted Rate (%)
5. T-Value



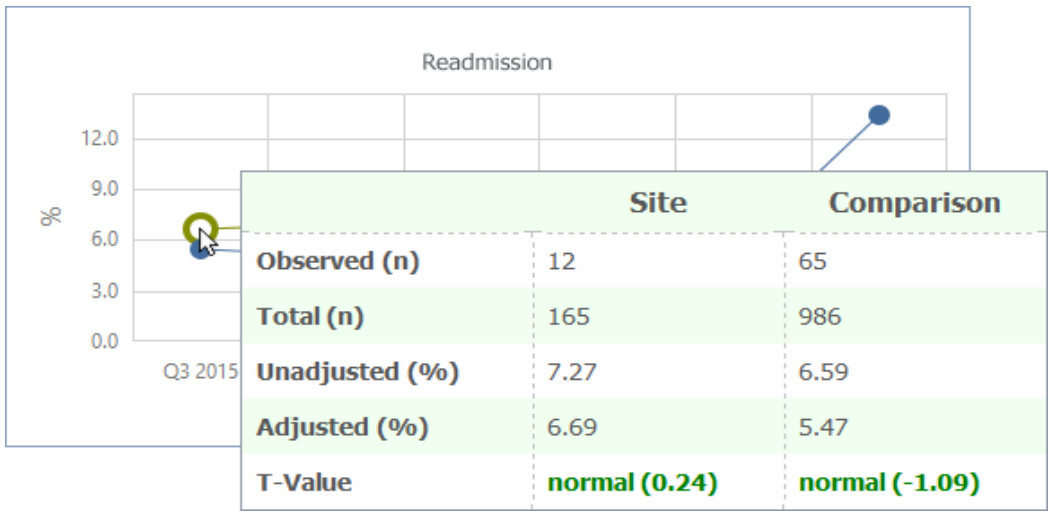
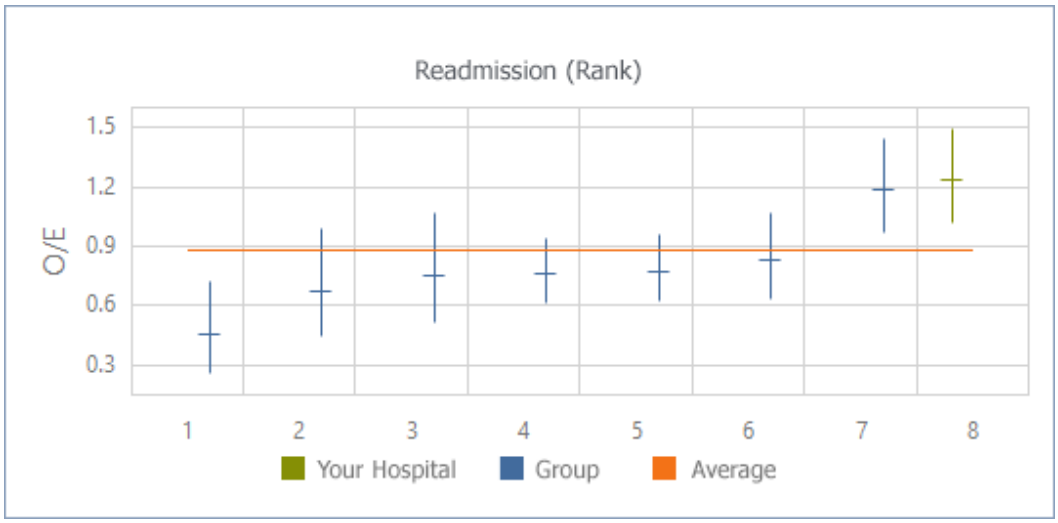


Figure 3 – Hospital Readmission (Trend Charts with Pop-up)

The Ranking Charts on the right display the overall **Hospital Readmission** ranking of all the hospitals. The hover pop-up lists the following for a specific hospital:

1. O/E
2. Confidence Upper
3. Confidence Lower
4. T-Value

The hospital's Readmission Rate is **24% higher** than the average and the Models are 95% certain that the actual O/E is between **1.02** and **1.48**.



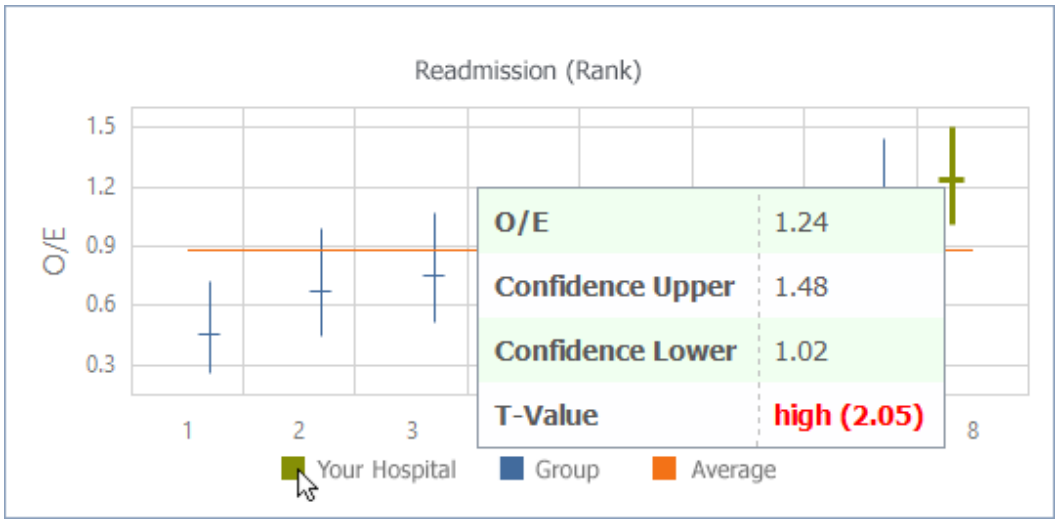


Figure 4 – Hospital Readmission (Ranking Charts with Pop-up)