

**Technical Report on Reasonableness of Charges (ROC) Regression Analysis and
Draft Recommendation to Routinely Review Regression Results for Outliers**

Health Services Cost Review Commission
4160 Patterson Avenue
Baltimore, MD 21215
410-764-2605

August 11, 2011

This is a draft recommendation. Comments may be submitted to Mary Beth Pohl
(mpohl@hsrc.state.md.us) by August 31, 2011.

Introduction

The purpose of this report is to review technical findings regarding the Reasonableness of Charges (ROC) regression analysis in the fiscal year (FY) 2012 ROC and recommend routine review of regression results for outliers in future ROC calculations.

After adjusting each hospital's charges through a series of hospital-specific cost factors (e.g., markup, direct strip, labor market adjustor, case mix index, and capital), HSCRC staff conducts a regression analysis on the adjusted cost per equivalent discharge. The goal of the regression is to quantify in a regression coefficient the impact of IME and DSH on the adjusted cost per equivalent discharge. Staff then applies the statewide coefficient to each hospital to produce the ROC Comparison Cost used by the HSCRC to compare hospitals within their ROC peer group.

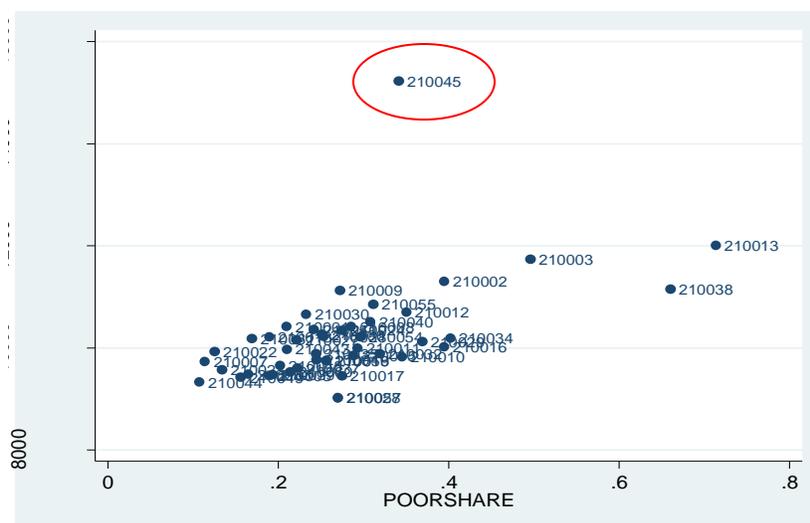
Regression Diagnostics, Outliers, and the FY 2012 ROC

In investigating preliminary ROC results for FY 2012, HSCRC staff ran multiple tests to determine the factors most influential in the ROC. In doing so, HSCRC staff conducted a regression diagnostic.

A regression diagnostic is a statistical tool that provides an understanding of potential data influencers and outliers among the observations. In the case of the ROC regression, each hospital is an equally weighted observation. If a single observation (i.e., a single hospital) is substantially different for the other observations, this one observation can greatly influence the overall regression analysis results.

The regression diagnostic, Chart 1, determined that one hospital, McCready Memorial Hospital (210045), was significantly different than the other observations in the regression.

Chart 1
Regression Diagnostic for the FY 2012 ROC IME and DHS Regression Analysis



While the regression diagnostic is an important tool in identifying potentially influential observations and outliers, HSCRC staff conducted further analysis to better understand the significance of McCready in the regression. Some examples of analysis include reviewing several years of data to understand trends and observing the overall differences of regression results both with and without McCready.

Based on our analysis, HSCRC staff concluded that McCready Memorial Hospital was an outlier in the ROC regressions. For the FY 2012 ROC, HSCRC staff recommended that the Commission remove the outlier from the regression analysis.¹ Staff then applied the resulting regression coefficient to all acute hospitals, including to McCready Memorial Hospital.

Staff Recommends a Routine Practice of Reviewing Regression Results for Outliers

HSCRC staff recommends that the Commission direct staff to routinely conduct regression diagnostics on preliminary regression results. When warranted, staff will remove significant outliers from the ROC regression analysis. HSCRC staff will apply coefficients resulting from the final regression analysis to all hospitals scaled by the ROC methodology, including those hospitals removed as outliers in the regression analysis.

HSCRC staff will clearly document any observation removed from a ROC regression analysis.

¹ Final Recommendation on the FY 2012 Reasonableness of Charges (ROC) Methodology and Scaling of the ROC, QBR, and MHACs. Commission approved the recommendation at the July 6, 2011 meeting.