Thesis:	Monitoring Performances of Surgeons Using Risk-adjusted Exponentially Weighted Moving Average Charts		
By:	Janice Ang Jieni	**Matric Number:**	A0102751U
Supervisor:	A/P Gan Fah Fatt	**Final Submission Date:**	06/04/2017

ABSTRACT

Monitoring surgeon performances is important for the improvement of healthcare standards. Charting procedures such as the exponentially weighted moving average (EWMA) charting scheme and the cumulative sum (CUSUM) charting schemes have been traditionally developed and used in the manufacturing industry for quality control. However, unlike the manufacturing industry where the raw materials are of homogenous quality, surgical patients have varying health conditions and risk of death. Therefore, risk-adjustment is necessary. Recently, the cumulative sum (CUSUM) likelihood charting procedure has been developed to monitor surgical performances. In this paper, we explore two ways in which we can use risk-adjusted statistics with the EWMA charting procedure to monitor surgical performance. We derive the theoretical properties of both types of EWMA charting scheme, explore the average run lengths (ARL) of each charting procedure with different chart parameters and analyse the performance of seven surgeons.

KEY WORDS: Quality control; Average run length; Odds ratio; Parsonnet scores;

Binary logistic regression model; Risk-adjusment; Surgical outcomes.