Chapter 1
Introduction to Ranking Models

INTRODUCTION

In this text, we will discuss how patient risk adjustment models are defined, their shortcomings, and their benefits. We will also provide some innovative methods to improve on the currently used risk adjustment methods. Risk adjustment is necessary to examine the differences between healthcare providers. Suppose, for example, that hospital A has a higher mortality rate compared to hospital B. Without looking at whether or not hospital A treats sicker patients at higher risk for mortality compared to hospital B, it is impossible to determine whether hospital A has better or worse outcomes compared to hospital B for treating any one patient. According to the Society of Thoracic Surgeons, risk adjustment is a way of “leveling the playing field” to adjust for differences in risk among specific patients. Risk adjustment makes it possible to compare different healthcare providers in terms of quality.

However, because patients are so different from each other, it is very difficult to define the “typical” patient. How does a patient with severe heart disease compare to a patient with kidney failure? Do they have similar risk, or does the heart patient have a higher risk than the kidney patient? Without finding some way to determine “comparable risk”, there are just too many combinations of patient co-morbidities to compare two providers on a nearly identical patient.

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Because there are so many possible patient conditions, the results of risk adjustment are more likely to reflect the definition of the model rather than to reflect actual comparisons of patient severity. No matter what patient conditions are included in the model, there are many more excluded that could be just as crucial when considering patient risk. Moreover, the few that are included will cover only a small percentage of patients.

In addition, risk adjustment models only consider patient condition and not patient compliance with treatment. (Rosen, Reid, Broemeling, & Rakovski, 2003) This paper suggests that health status is dependent upon health behaviors and psychosocial factors as well as the social environment and socioeconomic status of the patients themselves. Therefore, a physician with more lower-income and minority patients will have health outcomes that are not as strong as a physician with mostly affluent patients. However, that brings up another issue. Just how should health behaviors be identified and ranked? In other words, risk is an extremely complex issue that has multiple dimensions, and all dimensions contribute to risk. Without looking at all of these factors and dimensions, risk adjustment models will continue to be questionable.

Moreover, any model that defines risk should be subject to strict scrutiny to determine its validity. Otherwise, it is possible to decide that heart patients are sicker than cancer patients, and both are sicker than dialysis patients. The degree of “sickness” is usually defined in a model by assigning weights to each condition. The greater the weight, the greater the sickness. However, this proposed model of heart, career, and dialysis patients uses three conditions only. Would it be a better model to include pneumonia and asthma? At some point, every model includes some conditions but excludes others. It is possible that excluded conditions can be more severe than included conditions.

In this text, we will discuss some common methods for defining patient severity and compare results using different models. In addition, we will propose a technique that uses all patient diagnoses and procedures to define a patient index. Since there are many different methods of risk adjustment, the different methods can give very different results. (L. Iezzoni, Shwartz, Ash, & Mackieman, 1994) However, if the results can be so different, how can any risk adjustment model be validated? Indeed, can it be validated when the results can be so different?

It is not enough to simply use a statistical measure to claim validation because of a number of problems, including over-fitting by including too many diagnoses. Another problem is caused by using too few diagnoses; unfortunately, both problems commonly occur. (Singh et al., 2003) A previously published edited text on risk adjustment discusses at length several indices with different choices of patient diagnoses. The chapter written by Lisa Iezzoni states that patients with comorbidities have higher risks of death and complications as is logical, usually have higher rates of functional disability, and often require additional diagnostic testing and treatment interventions. (Iezzoni, 2003) However, the text goes on to say that using comprehensive criteria to specify diagnoses is not reasonable, and that it is not possible to identify specific diagnoses usually because of a lack of knowledge or information. The number one issue for any model of patient severity is how to handle all possible combinations of diagnoses.

Using publicly available data and coded information about patient conditions, quality can be defined in many ways. However, it is primarily defined as the difference between predicted and actual mortality, although the ratio of predicted and actual mortality can also be used. (Ash et al., 2003) Other information might be given as well and used to modify the ranking. For example, the Texas Hospital Checkup makes available the following information: (Anonymous-TGBH, 2008; Arca, Fusco, Barone, & Perucci, 2006)