**Introduction**

Approximately 13,000 ICD-9 diagnosis codes will be replaced with 68,000 ICD-10 codes in the near future. Specifically, the Department of Health and Human Services has mandated the transition to ICD-10 for reporting diagnoses and inpatient procedures effective October 1, 2013. Since many research tools use diagnosis (and procedure) codes, we wanted to examine one popular score based on ICD-9 diagnosis codes—the Charlson/Klabunde score—to see how the change would impact its derivation. We first look at the mappings of ICD-9 and ICD-10 diagnoses codes and then discuss the Charlson/Klabunde score. We then analyze the switch-over.

The inception of the Charlson score is discussed in “A new method of classifying prognostic comorbidity in longitudinal studies.” Development and Chronic Diseases, 40 (1987), pp. 373-383. The score takes into account the number and seriousness of comorbid diseases. It was originally developed to predict risk of death from comorbid disease in a cohort of 685 patients with breast cancer between 1962 and 1969. The scoring uses a weight indexed with weights of 1, 2, 3 and 6 for each of the existing comorbid diseases to derive a total score. The score is useful for adjusting the risk of subjects with comorbidity conditions. The index can classify patients according to risk of death. The Charlson Index has been used in many research studies, with many patient populations. From “Advanced Practice Nursing Data Collection Toolkit,” http://apnbookkit.mnmaster.ca/index.php?option=com_content&view=article&id=119:charlson-comorbidity-index&catid=40:general-health&Itemid=58, we’ve looked at how replacing the ICD-9 codes with ICD-10 codes will proceed for the Charlson/Klabunde score. We first look at the mappings of ICD-9 and ICD-10 diagnoses codes and then discuss the Charlson/Klabunde score. We then analyze the switch-over.

**Charlson/Klabunde Score**

Later R.A. Deyo adapted the Charlson score to be based on ICD-9 codes from claims. (R.A. Deyo, D.C Cherkin and M.A Ciol, “Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases.” Journal of Clinical Epidemiology, 45 [1992], pp. 613-619.) Klabunde was a further modification of this approach to use physician claims and to take care of the number and seriousness of comorbid diseases. It was originally developed to predict risk of death from comorbid disease in a cohort of 685 patients with breast cancer between 1962 and 1969. The scoring uses a weight indexed with weights of 1, 2, 3 and 6 for each of the existing comorbid diseases to derive a total score. The score is useful for adjusting the risk of subjects with comorbidity conditions. The index can classify patients according to risk of death. The Charlson Index has been used in many research studies, with many patient populations. From “Advanced Practice Nursing Data Collection Toolkit,” http://apnbookkit.mnmaster.ca/index.php?option=com_content&view=article&id=119:charlson-comorbidity-index&catid=40:general-health&Itemid=58, we’ve looked at how replacing the ICD-9 codes with ICD-10 codes will proceed for the Charlson/Klabunde score. We first look at the mappings of ICD-9 and ICD-10 diagnoses codes and then discuss the Charlson/Klabunde score. We then analyze the switch-over.

**Summary**

An examination of our analysis indicates that:

- Three (3) Klabunde fields are affected significantly:
  - Myocardial Infarction - Decrease of codes to ICD-10
  - Cerebrovascular - Increase of codes to ICD-10
  - Diabetes with Sequelae - Numerous combinations of ICD-9 to ICD-10
- Other affected fields are Dementia and Various Liver
- Only a few fields had a high number of Combinations (this indicates complex conversions)
- Many of the fields had a high proportion of Approximates (this indicates only an approximate, non-precise conversion)

In conclusion, research tools like the Charlson/Klabunde comorbidity index must be sufficiently analyzed for the effect of the transition to ICD-10 codes. It is not obvious if the transition will be smooth or not.