Integrating Concept Dynamism Into Longitudinal Analysis Of Electronic Health Records[*]

Chris Smith and Alex Newsham
Leeds Institute of Health Sciences
University of Leeds

Policies that determine the data captured by clinicians and healthcare professionals in Electronic Health Records (EHRs) are subject to change over time. Changes may arise for a variety of reasons, including updated clinical practice, improved diagnostic tests, and the introduction or cessation of specific public health initiatives. EHRs may capture different clinical concepts, or use different representations for clinical concepts, as a result of these changes.

Longitudinal analysis of EHRs aims to identify patterns in health and healthcare over time to inform the design of interventions. Analysis is predicated on the ability to robustly identify the specific clinical concepts by which patients, interventions and outcomes are to be characterised. Due to policy changes, the presence and representation of these concepts may vary over the period of analysis. Moreover, the period of analysis may be relative to a specific health-related event, and therefore differ for each patient. To ensure that patients, interventions and outcomes are robustly characterised, dynamism in clinical concepts needs to be integrated into the longitudinal analysis of EHRs.

In this talk, we illustrate dynamism in clinical concepts using definitions provided in six successive versions of the Quality Outcomes Framework (QOF) - a set of policies that determine recording in Primary Care. We show changes in the inclusion of clinical concepts over time, and use Jaccard Similarity Coefficients to show the extent of changes in the clinical codes that are considered to represent particular clinical concepts over time. Effects on longitudinal analysis of EHRs are discussed and potential approaches to mitigate these effects are introduced. Finally, we motivate the need for tools and techniques that can integrate concept dynamism into the longitudinal analysis of EHRs.