

Editorial

Special Issue: Methods for Estimating Treatment Effects for Persons with Multiple Chronic Conditions

The objective of this Special Issue is to highlight advances in statistical sciences and its application to solve problems of human health and diseases, with the ultimate goal of advancing quality of the public health. Strategies to determine medication effects in patients with multiple chronic conditions (MCC) are needed to evaluate the effect of medications on cross-disease. Universal health outcomes such as survival, function, quality of life and cognition provide us the reasons to lay the foundation for an evidence-based approach for medication decision-making in case of patients with MCC. Approximately 75% of adults over the age of 65 years are affected by two or more chronic medical conditions in the United States. As the prevalence of older adults with chronic conditions increases, so do health care utilization, treatment burden, and the frequency of adverse drug events. Few clinical guidelines even acknowledge the role that co-occurring conditions play in forming treatment recommendations possibly because methods have not been developed to assist in this critical area. In their investigation of the guidelines of national specialty organizations, Boyd and coworkers found few instances in which authors discussed how treatment of the index disease might be modified by the presence of co-existing diseases [1]. Given the ever expanding availability of treatments designed to treat persons with MCC, it is imperative that we have methods that allow us to understand how treating the disease of interest might be related to the presence of co-existing diseases. The US Department of Health and Human Services publication *Multiple Chronic Conditions: A Strategic Framework* [2] identified goals of supporting research about individuals with MCC and effective interventions and equipping care providers with tools, information, and other interventions.

The articles presented in this issue address: 1) trial designs to estimate treatment effects for heterogeneous sample populations with MCC, including adaptive designs (Travison *et al.*) [3], 2) causal estimators for treatments using observational data (Murphy *et al.*, and Han *et al.*) [4], 3) the convergent and discriminant validity of quality of life impact attributions to specific diseases among adults with MCC (Ware *et al.*) [5], 4) time-dependent confounding (Murphy *et al.*) [6] and 5) an absolute risk calculator to select from multiple treatments for universal outcomes using causal methods for observational data (Allore *et al.*) [7]. This set of articles by internationally recognized researchers address these national priorities. Additionally, each of these articles provides a fertile ground for future work to meet their current limitations, extend the methods, and apply them to different MCC patient samples.

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