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### Application of latent class analysis and latent transition analysis to pediatric symptom studies

Studying symptoms in pediatric health care is important. The terminology of “symptom cluster” in literature has different meanings. Symptom cluster may refer to a group of symptoms that are associated with simultaneous occurrence. Analysis of this kind of symptom cluster are variable-centered analytical approach. The present study focuses on “person-centered” symptom clusters that represent distinctive subpopulations/groups in the target population. Latent class analysis (LCA) is one of the person-centered analytical approaches that can be applied to identify potential latent classes/groups (subpopulations) that are a priori unknown in the population. Patients are similar within class, but differ in cross classes with respect to a set of symptom measures. When symptom measures are continuous (e.g., scale scores of depression), LCA becomes latent profile analysis (LPA). Applications of LCA and LPA to longitudinal data lead to latent transition analysis (LTA), in which latent classes or profiles can be identified simultaneously for each specific time point, measurement invariance over time can be tested, and transitions of symptom cluster/profile status over time can

be estimated, and factors that affect the transitions can be examined. This study applied LPA and LTA to identify distinctive latent profiles in children undergoing chemotherapy based on four PROMIS symptoms measures (depression, anxiety, pain, and fatigue). Our results show that two latent profiles (‘Less Severe Symptoms,’ ‘Severe Symptoms’) were identified throughout a chemotherapy (T<sup>1</sup>: start of the chemotherapy cycle; T<sup>2</sup>: mid-way through the cycle; and T<sup>3</sup>: after blood cell count recovery). The prevalence of severe symptom profile remained relatively unchanged from T<sup>1</sup> to T<sup>2</sup> but significantly declined at T<sup>3</sup>. A baseline single-item legacy fatigue score significantly predicted the child’s profile membership and its transitions over time.

#### Speaker Biography

Jichuan Wang has completed his PhD from Cornell University and Post-doctoral studies from the Population Studies Center, University of Michigan. He is a Senior Biostatistician at Children’s Research Institute, CNHS. He has published three statistical books and authored/coauthored more than 100 peer-reviewed journal articles. He has been serving as an Editorial Board Member for five academic journals.

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