DECISION-ANALYTIC MODELING IN PARKINSON’S DISEASE
Siebert U, Bornschein B, Walbert T, Dodel R
1Harvard University, Boston, MA, USA; 2University of Munich, Munich, Germany; 3University of Bonn, Bonn, Germany

OBJECTIVES: To give a systematic overview on published decision-analytic studies and methodological approaches in the evaluation of therapies in Parkinson’s disease (PD) and derive generic recommendations for future PD decision models. METHODS: A systematic literature review was performed to identify studies that evaluated interventions for PD using mathematical models. Using a standardized assessment form, information on methodological framework, results, limitations and conclusions were extracted from publications and reported in systematic evidence tables. The evidence on strengths and limitations was summarized in recommendations for further PD modeling. RESULTS: We identified 8 studies [1–8] that used mathematical models to evaluate the effect of different pharmaceutical and surgical treatment options in PD in different settings and countries. Modeling approaches comprised mathematical equations as well as decision-trees and Markov models with a time horizon ranging from 5 years to lifetime. All models based progression on the evolution of clinical surrogate endpoints and included economic consequences. No model is currently available that encompasses both the underlying biologic disease progression and the spectrum of all relevant complications, and in addition, links them to patient preferences as well as to economic outcomes. CONCLUSIONS: A generic and flexible decision model for PD, that can be applied to different treatment strategies should consider the entire spectrum of clinically relevant outcomes and complications during an adequately long time horizon and should be externally validated. Models for economic evaluations adopting a societal perspective should include patient preferences and all relevant economic consequences including those of adverse events. Evaluating early diagnosis in combination with neuroprotective therapies requires the use of health states that represent the natural history of the disease in untreated patients such as Hoehn & Yahr off stages or histologically defined health states.