

# Tripartite Term Enrichment Analysis of Multiple Sclerosis Patient Reported Outcomes

Mackenzie T. Smith<sup>a</sup>, Lauren M. Wishnie<sup>a</sup>, William D. Duncan<sup>a</sup>, Mark Jensen<sup>ab</sup>, Alexander D. Diehl<sup>a</sup>

<sup>a</sup> *Department of Biomedical Informatics, University at Buffalo, Buffalo, NY, USA*

<sup>b</sup> *CUBRC, Inc., Buffalo, NY, USA*

## Abstract

The Multiple Sclerosis Patient Data Ontology (MSPD) is designed to represent both clinical measures and patient reported outcomes (PRO) associated with the patient data registry used by centers participating in the New York State Multiple Sclerosis Consortium (NYSMSC). MSPD is an application ontology that provides a set of classes for the annotation of data obtained from the enrollment forms used by the NYSMSC. The underlying semantic model used in MSPD is based on the design pattern for the classes ‘assay’ and ‘conclusion based on data’ in the Ontology for Biomedical Investigations. We previously reported an ontology-driven retrospective analysis of patient records in the NYSMSC registry using a term enrichment method in order to spot significant patterns in patient-reported and clinical outcomes tied to particular subsets of patients as compared to the NYSMSC patient population as a whole. Our prior work was oriented towards patients in this population whose reports about the effects of MS on their motor functioning, daily life activities, or affective states met a high threshold. We have extended this analysis now to include PRO results from all patients in the population regardless of the level of reported effects. We have coupled our analysis to an enhanced method of graphically displaying the term enrichment results to simultaneously display low, intermediate and high levels of reported effects of MS for selected patient populations. This allows us to detect and visualize patterns in the patient data that we had not noted previously, such as the inverse relationship between PRO about motor functioning vs. those about affective states.

## Keywords:

multiple sclerosis, patient reported outcomes, term enrichment

## Reference

Jensen M, Cox AP, Ray PL, Teter BE, Guttman BW, Ruttenberg A, Diehl AD. An ontological representation and analysis of patient-reported and clinical outcomes for multiple sclerosis, Proceedings of the 5th International Conference on Biomedical Ontology. 2014. [http://ceur-ws.org/Vol-1327/icbo2014\\_paper\\_44.pdf](http://ceur-ws.org/Vol-1327/icbo2014_paper_44.pdf)