Global expert panel identifies 5 areas where machine learning could enhance health economics and outcomes research

July 5 2022

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Value in Health, the official journal of ISPOR—the professional society for health economics and outcomes research—announced today the

publication of new guidance for health economics and outcomes research (HEOR) and decision makers in the use of an important class of artificial intelligence techniques. The report, "Machine Learning Methods in Health Economics and Outcomes Research—The PALISADE Checklist: A Good Practices Report of the ISPOR Machine Learning Task Force," is published in the July 2022 issue of *Value in Health*.

"Machine learning is a potentially valuable addition to the HEOR toolkit," said the task force co-chairs and lead authors William Crown, Ph.D., and William V. Padula, Ph.D. "It can facilitate the search for complex relationships in high-dimensional datasets, such as those generated by electronic health records or mobile health devices. These relationships can be used to improve detection and classification of disease, to identify cohorts of patients sharing characteristics that might not be obvious when considering only a small set of variables using traditional methods, and to forecast trajectories of health outcomes under alternative personalized treatment options. In this report, the task force focused on the potential applications of machine learning in HEOR."

The authors identified 5 methodological areas where machine learning could enhance HEOR:

1. cohort selection (i.e., identifying samples with greater specificity with respect to inclusion criteria)
2. identification of independent predictors and covariates of health outcomes
3. predictive analytics of health outcomes, including those that are high-cost and/or life-threatening
4. causal inference through methods, such as targeted maximum likelihood estimation or double/debiased estimation—helping to produce reliable evidence about real-world treatment

effectiveness more quickly

5. application of machine learning to the development of economic models to reduce structural, parameter, and sampling uncertainty in cost-effectiveness analysis

To examine whether machine learning offers a useful and transparent solution to [healthcare](#) analytics, the task force also developed the PALISADE Checklist. This checklist offers a series of considerations that researchers can use to explore whether machine learning adds value to traditional approaches to research. It can be a guide for balancing the many potential applications of machine learning with the need for transparency in methods development and findings.

"Our report presents all these considerations in an order reflecting a standard approach to performing HEOR: identifying a study population; classifying exposures that can alter outcomes; predicting the association between exposures and outcomes; assessing causal effects of interventions; and understanding whether or not interventions or healthcare policy decisions add value," said Crown and Padula.

"The intent is to introduce these concepts at a high level and refer readers to sources where they can learn more about theory and techniques that can support and advance the HEOR field. More collaboration between communities of HEOR scientists and computer scientists with machine learning expertise is encouraged to more rapidly enable learning from each other."

Background on the ISPOR machine learning methods in HEOR Task Force

As demand for studies on the application of machine learning in healthcare has grown, so has the number of researchers who are

conducting these studies and those using the findings from these studies. Researchers who conduct HEOR using machine learning methods come from diverse backgrounds and may lack basic training in the theory and methods for computer and data science. In addition, many of these researchers may not be aware of the range of machine learning methods available and the contexts in which they should be used most appropriately, recognizing both their strengths and limitations.

The Task Force's overall objective is to establish guidance for emerging good practices in the application of machine learning methodology to traditional ISPOR methods, including economic evaluation, decision sciences and outcomes research in order to improve the value of healthcare delivery.

More information: Machine Learning Methods in Health Economics and Outcomes Research—The PALISADE Checklist: A Good Practices Report of an ISPOR Task Force (2022).

Provided by ISPOR—The Professional Society for Health Economics and Outcomes Research