Traffic light system helps reduce clinical uncertainty, improve treatment decisions

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Prof. Dr. Gustavo Saposnik, a neurologist at St. Michael's Hospital, a scientist at the hospital's Li Ka Shing Knowledge Institute and lead author of the study. Credit: Unity Health Toronto

A new study has found one in four clinical decisions made by physicians falls short of best practices, but when physicians reviewed a simple

traffic light system prior to making a clinical decision, uncertainty was reduced by 70 per cent and treatment decisions improved.

The study, published Tuesday in *JAMA Network Open*, explores the role of autonomic arousal, the stimulation of bodily functions that are unconsciously regulated such as pupil dilation or heart rate, in therapeutic decision-making.

Researchers at St. Michael's Hospital of Unity Health Toronto focused on an association between pupil dilation and treatment inertia. Treatment inertia means a more advanced treatment regimen isn't offered even when it is recommended by best practices, or evidence suggests the disease has progressed. Treatment inertia is a common phenomenon in clinical care associated with poorer outcomes and higher health care costs.

"Treatment inertia is a common phenomenon in medicine that leads to suboptimal or erroneous decisions impacting patients' well-being," said Prof. Dr. Gustavo Saposnik, a neurologist at St. Michael's Hospital, a scientist at the hospital's Li Ka Shing Knowledge Institute and lead author of the study.

To measure the certainty of physicians' decision-making, researchers studied 34 neurologists across Canada while they listened to 10 simulated case-scenarios and then made treatment decisions for patients with multiple sclerosis (MS). Eye trackers measured the pupil responses of the neurologists, and pupil enlargement was found to be associated with greater uncertainty, suboptimal decisions and a lack of intensifying treatment when warranted.

The researchers then had the neurologists listen to another 10 simulated case-scenarios, but intervened by showing them the traffic light system. The traffic light system is an image with a green, yellow and red light.

Each colour respectively corresponds with low, medium and high risk prognoses as a way to help clinicians identify the risk level of a patient and to decide if treatment should continue, be reevaluated or escalated. Use of the traffic light system, which has been previously tested and proven effective, showed a reduction in pupil dilation and uncertainty, led to a 35 per cent improvement in doctors' treatment decisions, and a 70 per cent reduction of treatment inertia in the neurologists.

"By taking advantage of existing colour-coded brain system pathways that couples a warning sign, such as the red color of the traffic light, with an action, our education intervention help doctors handle uncertainty, thus significantly improve treatment decisions," said Dr. Saposnik.

Researchers say the findings have practical implications for medical education, therapeutic decisions, and patient outcomes. They say more studies using functional MRI are needed to evaluate the specific areas of the brain that are involved in the decision process, and that more resources are needed to overcome knowledge and knowledge-to-action gaps in medical education.

Provided by St. Michael's Hospital