Dr. Catherine Lang Receives NIH MERIT Award

The field of rehabilitation is making great strides in developing and translating rigorous assessment and measurement methods to enhance clinical practice and provide meaningful real-world benefits for patients. Catherine Lang, PhD, is a leader in neurorehabilitation who is pioneering the use of wearable sensors to directly measure the performance of upper limb activities in daily life for individuals after stroke, and the potential applications of her new research extend far beyond stroke rehabilitation.

As evidence of her outstanding research career to date, Dr. Lang, Vice President of the American Society of Neurorehabilitation (ASNR) and a Professor at Washington University School of Medicine, was recently selected to receive a prestigious MERIT Award from the National Institutes of Health's Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD). This grant mechanism is designed to provide stable, long-term funding to excellent investigators who are highly productive and show great potential for continuing to make important advances in their research fields. Dr. Lang will receive $2.7 million to continue her work investigating applications for wearable sensors in stroke rehabilitation over the next five years, with an opportunity to extend this funding for an additional five years.

Over the past decade, Dr. Lang and members of her research team have been working to better understand why there is a discrepancy between the activities people show they are capable of performing in a clinical or research setting and the activities they actually perform in their daily lives. They hope to use their findings to adjust current therapies or develop new interventions that have greater impacts on how patients move and function in the real world. When patients seek rehabilitation services after experiencing a stroke, they are typically interested in improving their ability to complete their usual functional and recreational activities. While a person may improve their capacity to perform movements or reduce their impairments during therapy, Dr. Lang's prior research shows that these changes often do not translate to positive changes in their performance in daily life. Despite advances in sensor technology and the availability of sensors, they are rarely used in research or clinical care to measure a person's normal activity throughout the day. A major barrier to widespread adoption of sensors to regularly assess real-world upper limb performance is a lack of clinical validation of this approach.

With support from her MERIT Award, Dr. Lang aims to identify and validate multivariate categories of upper limb performance in daily life in various patient populations using data from wearable sensors. While Dr. Lang and her team acknowledge that there will likely be substantial variability in upper limb impairments and functional capacities across patient populations, they hypothesizes that upper limb performance can be organized into a small number of distinct categories that could be monitored over time. Development of these categories would advance rehabilitation research and facilitate more personalized treatment. In prior studies, Dr. Lang's team identified preliminary categories in stroke. This new MERIT Award project will focus on

expanding and validating these categories into a variety of patient populations that seek upper limb rehabilitation, including multiple sclerosis, upper limb fracture, and breast cancer. Dr. Lang and her team will also examine how these categories of upper limb performance respond to change, and how the categories they identify in adults relate to upper limb performance in children.

This project is relevant across numerous clinical populations and has the potential to improve our ability to measure relevant, meaningful outcomes in both rehabilitation research and clinical care. “We are grateful to NICHD for their support of our research, and we are very excited to begin this next chapter of research, as it has the potential to transform and better optimize rehabilitation for so many people,” she remarked.