MSU and INRB against Konzo Disease: A Global Partnership to Protect African Children from Toxic Food

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INSTITUT NATIONAL
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KINSHASA-GOMBE,
DEMOCRATIC REPUBLIC OF THE CONGO

(Above, from left) Mr. Robert Tukel, Psychiatry Department Research Assistant; Dr. Itziar Familiar-Lopez, Assistant Professor of Psychiatry; Dr. Michael J. Boivin, Professor of Psychiatry and of Neurology & Ophthalmology; Professor Alla Sikorskii, Professor of Psychiatry and of Statistics & Probability; Dr. Amara E. Ezeamama, Assistant Professor of Psychiatry and of Epidemiology; Professor Felicia Wu, John A Hannah Distinguished Professor of Food Science and Human Nutrition and of Agricultural, Food, and Resource Economics

(Left) DR Congo partner, Professor Desiré Tshala-Katumbay, Professor of Neurology at the Oregon Health and Sciences University and at the University of Kinshasa and at the Institute National of Research Biomedical (INRB)

The Community Engagement Scholarship Award Committee is pleased to recognize the scientific and humanitarian contributions of Dr. Michael Boivin (Michigan State University) and Dr. Desiré Tshala-Katumbay of the National Institute of Biomedical Research (Kinshasa-Gombe, Democratic Republic of the Congo [DR Congo]). Together, they have created a vibrant global partnership, uniting gifted health scientists from across the world to protect Congolese children and their communities from the toxic effects of cyanide in their food supply.

Dr. Boivin's research career in Africa began early in his career as a psychology professor. He and his family traveled to the Democratic Republic of the Congo (formerly Zaire) to visit his wife's, Grace's, parents. As he visited remote medical outposts with his father-in-law, a medical missionary, he was so moved by the plight of the children that he vowed to devote all of his energy and scientific knowledge to improving their health and quality of life.

African children face many risks to healthy brain development, including extreme poverty, malnutrition, disease, drought, and constant warfare. Studying them can teach us a lot about how these challenges affect the brain and which factors contribute to disease susceptibility or resilience under extreme conditions. For the past three decades, Dr. Boivin's work has focused on understanding the neuropsychology of these children, that is, the relationship between the physical structure of their brains, their thinking, and their behavior.

Dr. Boivin is a recognized expert in testing African children with chronic diseases (such as HIV/AIDS and cerebral malaria) to determine how well their brains perform tasks like memory and information processing compared to healthy children. Working with Dr. Desiré Tshala-Katumbay and his colleagues at DR Congo National Biomedical Research Institute (INRB), he contributed to a major breakthrough in understanding the effects of konzo disease on the brain. Konzo, a sudden-onset and incurable paralysis of the legs, is associated with poor rural people in Africa. It occurs when children with a protein-deficient diet eat flour made from insufficiently processed bitter cassava, a plant and a staple food in the region and for 600 million people worldwide, which contains cyanide. If the children eat enough cyanide, the nerves that control their legs become damaged, leading to paralysis.

Dr. Boivin, Dr. Tshala-Katumbay, and senior INRB scientists discovered that konzo toxicity also affects the brains of patients, leading to problems with how they process information. This damage may have a negative impact on school performance, social relationships, and their ability to develop into successful, independent adults.

The MSU-IRB study teams have demonstrated that it is possible to dramatically decrease new cases of konzo by training Congolese caregivers of young children to implement a simple method, called the *wetting method*, of carefully soaking cassava flour in water and then drying it, decreasing its cyanide levels and reducing the risk of nerve toxicity from consuming it. The National Institutes of Health (NIH) is a primary sponsor of this ongoing work. In 2017, Dr. Boivin and Dr. Tshala-Katumbay were among the inaugural awardees of MSU's new Alliance for African Partnership, an initiative that seeks to enable United States–African partnerships in scholarship and capacity building. The team continues to improve the training effectiveness for the *wetting method* and to conduct pioneering work with very young konzo patients (2-5 years old).

Through training workshops and exchange programs, these teams are preparing the next generation of African health scientists to continue the fight against konzo long into the future. Future plans include leveraging MSU's agricultural expertise to develop drought-resistant, nutritious, low cyanide variants of cassava and continuing to bring global attention and resources to food security challenges affecting hundreds of millions of people worldwide.