

## **Global Perspectives Report**

**Award Period:** September 2015 to April 2016

**Principle Investigator(s):** Mariah Ehmke, PhD

**Department:** Agricultural and Applied Economics

**Email:** mehmke@uwyo.edu

**Project Title from Application:** Environmental Influences on Indigenous Infant and Child Health

**Amount spent:** \$3,950

**Non-technical summary (max 1500 characters plus spaces):** Recent research findings reveal genes play a smaller role in determining life outcomes than once thought. Environmental, social, and cultural measures need to be examined to understand not only how genes influence development, but how life experiences influence gene expression. The long-term research objective is to create economic household models incorporating gene expression and human development.

A challenge to this work is obtaining data linking early childhood and infant experiences and environmental conditions to gene expression and later health outcomes. Longitudinal, epidemiological studies often provide missed opportunities—they may contain early and later medical outcomes with little information about family living conditions or behavior. One exception is the Growing Up in New Zealand study (GUiNZ). Launched in 2007, GUiNZ follows an ethnically diverse group of 7,000 New Zealand children from the last trimester of their mother's pregnancy to now. Their data include measures of maternal and paternal health, behavior and beliefs; and the home's social, cultural and environmental situation.

This Global Perspectives funding took Dr. Ehmke to the University of Auckland's School of Population Health to meet with the GUiNZ team. She worked out a data sharing agreements to between the University of Auckland and University of Wyoming. In August 2017, the agreements were approved. The data will be transferred to the University of Wyoming in 2017. She will use the data to create household economic models of health production incorporating household characteristics, cultural and psychological measures, and health outcomes. The results may inform child and family health policy in the United States and abroad.



**Figure 1: Outside University of Auckland's School of Public Health in April 2016**

Recent research findings reveal genes play a smaller role in determining life outcomes than once thought. In the classic, nature versus nurture debate, scientists find neither nature nor nurture can be understood in isolation. Environmental, social, and cultural measures need to be examined to understand not only how genes influence development, but how life experiences influence gene expression. Without a doubt, family economic status is one of the one of the primary factors determining our early life experience. It determines many of our opportunities and choices, big (e.g, housing and education) and small (e.g., dinner tonight). Family's navigation of these choices depends, in part, on their economic behavior and decision-making processes. These, in turn, are influenced by social and cultural experiences, family composition, and personal preferences. Consequently, a mixture factors play determine a child health and development.

Economists seek clarity of family economic status's and economic decision-making's role in infant and child health. From a public policy perspective, this is critical because certain diseases and conditions are more prevalent across different income and social groups. For example, low-birth weight infants are more likely to be born in low-income households and those with more exposure to certain environmental toxins. Low birth weight is one example of how early health experiences can have life-long economic implications for the society and the individual. Low birth-weight children typically go onto attain lower lifetime earnings and require an average of \$2,000 more per year in medical treatment than healthy weight children.

The long-term objective of this research is to construct economic models of health production across different households that

incorporate dimensions of parental decision-making and economic behavior; environmental considerations; nutrition; and economic well-being, social, cultural, and psychological measures. In order to accomplish this objective, the primary aim of this research was to acquire data for economic models to test theories around the role of the economic environment, economic behavior, and genetic processes in child development. Such data exists at the University of Auckland's Growing Up in New Zealand (GUINZ) study.

Launched in 2007, GUINZ follows an ethnically diverse group of 7,000 New Zealand children from the last trimester of their mother's pregnancy to now. Their data include measures of maternal and paternal health, behavior and beliefs; and the home's social, cultural and environmental situation. The data set provides several unique opportunities not available in data sets in America or other parts of the world. For example, every New Zealand citizen has a unique medical identification number to track their health and medical services usage from birth. Unlike longitudinal data from American studies, one can examine the study's measures



**Figure 2: Polynesian family, stock photo.**

in relation to actual health outcome and medical care needs. Such measures will inform more accurate economic models of household health production and outcomes.

Dr. Ehmke visited the GUiNZ group three times in 2015 and 2016. In September 2015, she met with Drs. Cameron Grant and Susan Morton of Auckland University, the GUiNZ principal investigators, and Dr. Carlos Carmago of Harvard University, head of the GUiNZ Expert Scientific Advisory Group. During these initial meetings, she obtained more detailed information about the GUiNZ to further refine her research objectives. Rather than focusing on broad child health and household health-related economics and decisions, Dr. Ehmke tightened her focus to principle health issues: immunization and breast feeding rates, and smoking in the household. In the future, less emphasis will be placed on indigenous health, except in the case of smoking, than originally planned due to cultural sensitivity issues.



**Figure 3: A child enjoying New Zealand's Ulva Island scenery.**

In a February 2015 visit, Dr. Ehmke continued on-site work with Drs. Grant and Morton to develop more detail research proposals for research on parental decisions to immunize their children, commit to breastfeeding for early nutrition, and cease smoking in the household during and after pregnancy. This working visit allowed her to use GUiNZ resources to develop detailed proposals.

Finally, in April 2016, Dr. Ehmke made a third, week-long visit to Auckland. This provided an opportunity to present the proposals to the GUiNZ team in a research seminar. Following these presentations, she then submitted data sharing paperwork to both

the University of Wyoming and University of Auckland. This paperwork was approved in August 2016. Now, Dr. Ehmke is initiating new proposals for funding to obtain the necessary data in person in 2017. In the meantime, Dr. Ehmke was asked to join the GUiNZ Expert Scientific Advisory Group. She will continue collaborative efforts with the GUiNZ staff and other global experts.

Through this Global Perspectives funding, Dr. Ehmke has built a bridge for collaborative work related to child health and nutrition policy at the University of Auckland. This improves the recognition of the University of Wyoming and its College of Agriculture and Natural Resources abroad.

Dr. Ehmke began this project comes after years of research examining United State's child nutrition policy. The travel allowed Dr. Ehmke to become more aware of similarities and short-comings for US and New Zealand child nutrition and food policy. In addition to the papers and presentations that may arise from the GUiNZ data-based research, she is also looking forward to more work on state and national level best practices for child nutrition and food policy. Eventually, these efforts are likely to making the University of Wyoming more competitive for health related funding and results in peer-reviewed journal articles in applied economics and public health journals.



**Figure 4: A little Kiwi on the go.**