

Mercury toxicity in the Peruvian Amazon

December 1 2017, by Joshua Grubbs



Credit: Duke University

This last year our team has actively been working on a project to evaluate the impact of a dietary intervention on mercury toxicity in the Peruvian Amazon. Our progress is the natural product not only of a committed team with passionate mentors, but also the diversity of academic backgrounds represented. True to the Bass Connections model, we proudly bring together the natural and social sciences in order to better understand a problem from all angles and offer a comprehensive solution.


For me, the opportunity to study a global health issue through chemistry promised to unite my own disciplines in a meaningful way. But an issue as extensive as [mercury](#) toxicity needed more than this. The mechanisms that bring people into contact with mercury are biological and social, and without those perspectives, my knowledge would not translate into a fully effective study or intervention. As a diverse team, my teammates with backgrounds in biology and psychology helped build a better understanding of mercury's flow through the food chain and how human behavior and motivations shape dietary habits.

During our summer fieldwork, we brought the collaboration from the classroom to the field and applied it to real-world situations by implementing a project that drew from our respective disciplines. The intervention had two equally important components: food basket provisions with locally acquired foods that could potentially mitigate [mercury toxicity](#), and education about mercury and risk factors for toxicity. Both sites received the former, whereas one site participated in both components. The goal was to assess the biochemical efficacy for both groups and to see if complementing the process with positive-reinforcement educational workshops would further improve results. We measured blood mercury and mercury knowledge pre- and post-intervention in order to paint a more complete picture of the project outcomes. The blood samples are still being tested, but the educational component showed increased knowledge in the group that participated in our workshops. We are excited to see if we can tie our educational insights to biochemical outcomes, but right now have to wait for the lab work to reach completion.


The interdisciplinary nature of the endeavor cannot be emphasized enough. The chemical properties, biological effects and social impact were all critical elements that built upon each other to create a study that reflected the complexity of the real world. We recognize the importance of these perspectives and also acknowledge the many other ones that

implicitly contributed to our work. As we continue to push forward with this project and in our future efforts, we will carry along the lessons we learned about the value of interdisciplinary research.


Evaluation of a Dietary Intervention for Chronic Methylmercury Exposure Among Communities in Madre de Dios, Peru




Madre de Dios, Peru



PERÚ
Ministerio de Salud
Dirección Regional de Salud Madre de Dios



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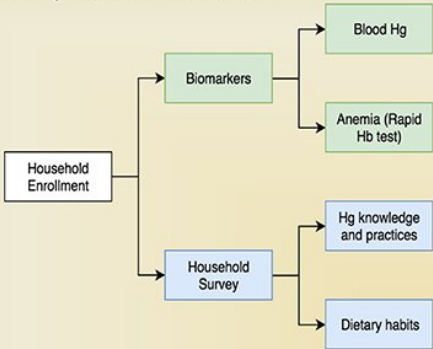


DUKE GLOBAL HEALTH INSTITUTE

Project Summary: During the summer of 2017, the research team worked with two communities from Madre de Dios, Perú in a pilot study to assess the effectiveness of a dietary intervention at reducing mercury levels in the body. Participants were provided with supplemental food baskets on a weekly basis and their blood mercury levels pre- and post-intervention were evaluated. One community received an educational component to see how it might improve intervention results.


PRIMARY OBJECTIVES

- Evaluate effect of dietary intervention (supplemental nutrition rich in selenium, dietary fiber, lycopene, and antioxidants) on blood methylmercury concentration
- Evaluate the effect of educational workshops of the efficacy of the dietary intervention



PRELIMINARY RESULTS

- Individuals who participated in educational workshops demonstrated increased Hg knowledge
- Relationship between education and intervention efficacy still pending, awaiting blood Hg assays
- Food baskets do not have significant effect on anemia
- Blood Hg results are forthcoming




RESEARCH SITES

- Communities and Sampling Sites
- Madre de Dios River
- Tributaries to Madre de Dios River
- Madre de Dios Region
- Cuacamaayo Mining Area
- Huapetahu Delta-1 Mining Areas
- Protected/Undefined Use
- Forestry Concessions
- Subsistence Agriculture
- Castaño/Brazil Nut Concessions
- Mining Concessions

METHODOLOGY

- Twenty-one households from two communities were interviewed on their diet, Hg knowledge, and health pre- and post-intervention
 - Of these households, blood samples were collected from 30 individuals and a rapid anemia test offered to all participants regardless of if they gave venous blood
- Both communities received same food baskets
- Education group participated in 3 workshops about Hg



MEASURING HEIGHT AND WEIGHT

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Credit: Duke University

Provided by Duke University

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