

Tribal-University Evaluation of Chemical Exposures to Improve Community Health

2014



Oregon State University Superfund Research Program's Tribal-University Partnership includes the Samish Indian Nation, Swinomish Indian Reservation and the Confederated Tribes of the Umatilla Indian Reservation.

Community Engagement Core

Many tribal communities face substantial health disparities related to exposure to environmental hazards. The purpose of the Community Engagement Core (CEC) is to build scientific capacity in Tribal communities and cultural capacity within the research community to evaluate chemical exposures that are a concern for Pacific Northwest Tribes. This requires improved risk assessment models that account for tribal land-use scenarios and unique exposure pathways. By translating this knowledge into effective and culturally appropriate risk reduction strategies, we seek opportunities to reduce environmental exposures and contribute knowledge for self-protection, pollution prevention, and remediation. This information is important for protecting Tribal health and can be used by other communities that confront environmental injustice.

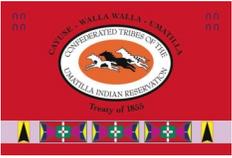
Core Activities

1. Address Tribal concerns regarding their environmental exposures, build Tribal capacity to measure environmental pollutants, and develop risk reduction strategies that will improve health without adversely affecting cultural practices.
2. Build tribal capacity in analytical methods used by the Confederated Tribes of the Umatilla Indian Reservation and help both the Swinomish Tribal Indian Community and the Samish Indian Nation to improve their understanding of PAH and other chemical exposures.
3. Collaborate with other SRP Centers, EPA regional offices, the Agency for Toxic Substances and Disease, the Office of Tribal Affairs, and other stakeholders to disseminate our research findings and the principles of community-based environmental health research with tribal populations that reside on contaminated lands.
4. Meet on annual basis with interdisciplinary advisory group who will provide overall guidance to project.

2 CTUIR

3 Swinomish & Samish

4 Collaborations



Traditionally Smoked Fish Metabolism Study

Measuring PAH exposures in volunteers who eat traditionally smoked salmon

Background

In 2011-2012, two members of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) volunteered to allow scientists to observe them while they smoked salmon using traditional methods. Each volunteer wore air sampling equipment and provided urine samples to find out if they were exposed to polycyclic aromatic hydrocarbons (PAHs). PAHs are a family of chemicals produced by burning organic material such as wood or fossil fuels. The data collected in this study showed the air in the smoking structures contained PAHs and that the two volunteers absorbed PAHs into their bodies after smoking one batch of salmon. This study also showed that PAHs were present in the smoked salmon.

The Project

People who eat traditionally smoked salmon are exposed to PAHs. Many PAHs are considered to be harmful. The probability of harm, however, depends on what types of PAHs are absorbed by their bodies, how many years a person eats smoked salmon, and how much of it they eat. This is why it is important to learn about what chemicals are present in the body after an exposure occurs, such as eating traditionally-smoked salmon.

In June, 2014 scientists from the CTUIR's Department of Science (DOSE) and Engineering collaborated with Oregon State University (OSU) CEC and trainees from Project 5 (Formation of Hazardous



CTUIR Tribal member preparing traditionally smoked salmon in a tipi wearing an active air sampler to monitor his exposure to PAHs.

PAH Breakdown Products in Complex Environmental Mixtures at Superfund Sites) to conduct the Smoked Salmon Metabolism Study. The purpose of this study is to measure how PAHs that are found in traditionally smoked salmon are processed by the body.

Nine non-smoking members of CTUIR volunteered to be in the study which lasted for two days. Throughout the study, volunteers were asked to refrain from eating any foods known to contain PAHs, such as grilled meats, and avoid second hand smoke exposure. On the morning of the second day, volunteers were asked to provide a baseline urine sample. They were then given breakfast which contained 50 grams of traditionally

Salmon is a healthy food and important to the subsistence of Native Americans living in the Pacific Northwest. The salmon run from spring until fall. Smoking is one way to preserve this seasonally abundant fish and is a traditional activity for Tribal members. Previous research shows that burning wood in the smoke sheds and tipis produces polycyclic aromatic hydrocarbons (PAHs). Many PAHs are considered to be harmful but the toxicity of each PAH can differ. The process of smoking salmon exposes people to PAHs who smoke the salmon and adds PAHs to the meat.

smoked salmon. For the final 24 hours of the study, volunteers were asked to provide five additional urine samples at fixed time intervals and to complete a short survey about exposure to other PAH sources during the study.

The urine samples were brought to OSU and are being analyzed by chemists in Core D (Chemistry Support Core). The data, which belongs to CTUIR, will be shared with OSU SRP scientists. Together, scientists at DOSE and OSU will determine what types of PAHs are created, absorbed, and excreted by people who eat traditionally smoked salmon.

Mathematical models will be created using this information to evaluate the potential for human health risks from these PAHs.



Passive Sampling and Butter Clams Study

Monitoring chemical contaminants in traditional shellfish beds

Background

Butter clams (*Saxidomus gigantean*) are traditional food for the people of the Swinomish Indian Reservation and the Samish Indian Nation. They are also an important commercial resource for these Tribes. Shellfish beds in Fidalgo Bay are underused despite being the usual and accustomed fishing areas of these Tribes. This is because of concerns regarding the contamination from the two nearby oil refineries that are located directly adjacent to their shellfish harvesting areas. The last sampling event in 2002, conducted by the Swinomish Department of Environmental Protection, identified increased levels of toxics in butter clams at sites within Fidalgo Bay.

The Project

Scientists in Project 4 (Bridging Superfund Site Based Bioavailable Extracts with Biology) and Core D (Chemistry Support Core) have developed unique passive sampling devices that can be placed in the environment where they will absorb chemicals.

In August, 2014 OSU scientists and trainees visited four sites on Swinomish and Samish beaches within Fidalgo and Similk Bay to collect butter clams and deploy passive pore-water samplers in the sediment. These samplers will be left in the sediment for four weeks to equilibrate with their surroundings. They will then be collected and brought to OSU for chemical analysis. The data, which belongs to the

Tribes, will be shared with OSU SRP scientists in order to identify contaminants that may be present in the butter clams. Scientists will also see if the new samplers mimic butter clams. If successful, this would enable environmental managers to determine shellfish contamination by putting out passive samplers instead of collecting clams. This would further protect this important resource and the samplers are cheaper, faster, and less harmful to the local ecosystem than collecting resident organisms like clams. The CEC will work closely with the Tribes to explain these research activities and the use of passive sampling devices for environmental monitoring, as well as, help communicate the findings to the community.



OSU scientists and trainees working with clam diggers from the Samish Indian Nation to collect butter clams and place passive pore water samplers in the traditional shellfish beds located in Fidalgo Bay, WA which are close to oil refineries (top). A butter clam collected by the research team (top left). Deploying a passive pore-water sampler (bottom left).

Virtual Tribal Lab Consortium

Pooling resources for Tribal communities to conduct environmental health studies

We are currently seeking input from the community and potential partners regarding the development of a Virtual Lab Consortium. This is an idea that would establish a linkage between Pacific Northwest Tribes, Tribal Colleges, Universities that have tribal research partnerships, and the EPA Manchester Lab. This consortium would focus on sharing resources and knowledge regarding tribal environmental laboratory resources and research capabilities so that Tribal communities can conduct their own environmental health studies. The consortium could also provide training opportunities to Tribal scientists. Please send any comments about this consortium to Dr Anna Harding.

Ethical Tribal—University Research

Tribes must be truly equal partners in study design, data collection, interpretation, and publication of data collected in Tribal studies. They can only do this if they understand the assumptions and methods of the proposed research. When conducting research with American Indian tribes, informed consent beyond conventional institutional review board (IRB) review is needed because of the potential for adverse consequences at a community or governmental level that are unrecognized by academic researchers. Subsequently, all studies undertaken by Oregon State University's SRP program with Tribal Nations is developed in partnership with Tribal representatives. It is then approved by the appropriate Tribe's Health Commission, the Portland Area Indian Health Board, and OSU's Institutional Review Board. Additionally, data sharing agreements are undertaken which clearly state that the data collected is owned by the Tribal partner and only shared with university researchers with strict guidelines on its use.



Core Personnel

Anna Harding, Ph.D., Core Leader
Oregon State University

Barbara Harper, Ph.D., Co-Leader
Confederated Tribes of the Umatilla Indian Reservation

Stuart Harris, B.S., Co-Leader
Confederated Tribes of the Umatilla Indian Reservation

Molly Kile, Ph.D., Co-Leader
Oregon State University

Michelle Burke, A.S., Tribal Assistant
Confederated Tribes of the Umatilla Indian Reservation

Jack Butler, M.S., Consultant,
Confederated Tribes of the Umatilla Indian Reservation

Jamie Donatuto, Ph.D., Community Liaison
Swinomish Tribal Community

Greta Frey, Superfund Trainee
Oregon State University & Confederated Tribes of Siletz
and Aleut Corporation

Diana Rohlman, Ph.D., Program Coordinator
Oregon State University

If you have any questions, please contact

Anna Harding, Professor
Oregon State University
College of Public Health and Human Sciences
101 Milam Hall, Corvallis, OR 97331
Telephone: (541) 737-6914

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