

The purpose behind *Environmental Health News & Notes* is to regularly provide updates on important environmental health topics and make that information available to a wide audience outside the academic scientific community.

This current issue covers some of the educational initiatives underway at the Center, with special focus on resources and outreach programs available for young students and professional development opportunities for K-12 teachers.

We appreciate your questions, comments & feedback.

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Science Education Partnerships

Promoting Life-long Science Learning



The Outreach and Education Office of the Center for Environmental Health Sciences is about to embark on the implementation phase of a 5-year Science Education Partnership Award received from the National Center for Research Resources, a division of the NIH. CEHS and its partners are using this grant to promote environmental health as an integrative context for science learning by disseminating resources related to water and air quality issues in the rural West. Special effort is being made to incorporate Native American perspectives and to develop educational materials and lesson plans that are cross-curricular in scope (math, science, language arts, social studies, health enhancement).

While our targeted audience is primarily students and teachers at grades 4-12, many of our school-based activities promote environmental health literacy using a public outreach approach to support a continuum in lifelong learning in our communities.



Key Projects

- Air Toxics Under the Big Sky → North Star High school pollution monitoring program examining levels of airborne contaminants, human health impacts, and factors affecting air quality in the Northwest US.
- Western Montana Watershed Education Integrates human health with watershed studies by focusing on Milltown Dam, western terminus of the 110-mi. long Clark Fork River Superfund complex.
- Small-Scale Chemistry Training Supplemental chemistry lessons and hands-on modules appropriate for grades 4-12, adaptable for differential instruction.
- Environmental Health Awareness Community events that bring attention to important issues and developments in environmental health.



All photos this page: 150 students from 7 schools in Montana & Idaho participated in the 4th annual Air Toxics Symposium jointly hosted by CEHS and the UM Dept. of Chemistry in May, 2008.

Teaching Science That Really Matters



Using the scientific approach to explore the world around them encourages young students' natural curiosity and can stimulate lifelong learning

Emphasis is on hands-on, inquiry-based activities relating to air quality issues in western Montana, water pollution and Superfund remediation and restoration. Students explore issues in the context of their own communities, using new technologies and collaborating in research teams. This brings rigor and relevance to their studies to hone skills needed in today's workforce.

Current efforts are focusing on disseminating environmental health information using educational games for classroom and informal learning and exploring delivery methods like distance learning and multi-media products.

The overarching goals of the CEHS outreach and education program: Offer innovative training experiences and career development opportunities in biomedical science; Increase enrollment in post-secondary science education; Improve science literacy by making information and materials culturally appropriate and comprehensible to a broad audience, including Native Americans and rural residents most affected by environmental health problems and disparities in health outcomes.

Supporting Teachers

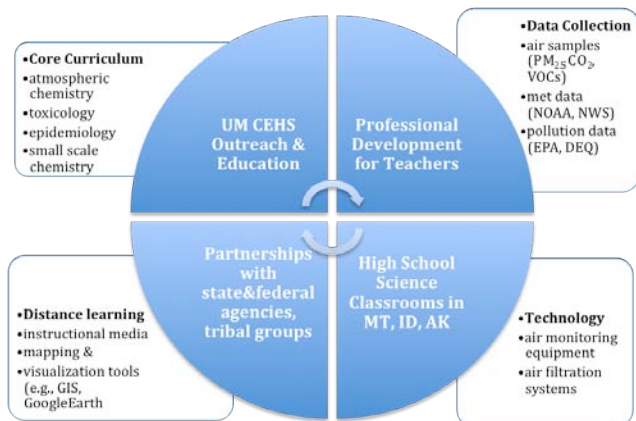
Using grant support from SEPA and the Toyota USA Foundation, CEHS has offered a series of workshops and institutes as professional development opportunities for rural teachers, presenting/developing ways to integrate environmental health topics into the curriculum.

Teachers acquire essential background knowledge about current environmental health research, then work alongside CEHS staff to develop and pilot culturally-appropriate instructional

materials. They, in turn, collaborate in conducting special activities for students such as symposia, Saturday Academies, laboratory tours, field trips, independent study projects, and internships.

Our ever-expanding school network brings tangible benefits to teachers, including grants and technology from Toyota Tapestry, Toshiba USA Foundation, 3M, Vernier, Best Buy, Plum Creek PPL Montana as well as several awards and scholarships from national science organizations.

Air Toxics



The Big Sky Model

Air Toxics Under the Big Sky ♦ North Star is a centerpiece of our inquiry-based science education program. High school students from Montana, Idaho, and Alaska are currently involved in research about indoor air quality as well as factors affecting ambient airsheds (wildland fires, woodstoves, and valley inversions). Symposium sponsors include the Montana Dept. of Environmental Quality, the Missoula City-County Health Dept., Region 10 EPA as well as private foundations. Approximately 1000 students have taken part in the program since its inception as a pilot project in 2002.

STEERing Youth Toward Science Careers

CEHS received a 5-year grant in 2008 to launch a new summer program called Short Term Educational Experiences for Research (STEER). The STEER grant was awarded by the National Institute of Environmental Health Sciences because of its shared mission with CEHS to understand how environmental agents affect human health and increase the risk of disease. The laboratory experiences and information exchange introduces undergraduate students to research on the human health aspects following

environmental exposure—how this alters biologic processes and influences the development and distribution of disease in populations. This program provides innovative research opportunities for motivated undergraduate students in the environmental health sciences, a research-oriented biomedical field not typically available to them through their regular courses of study.

Interested students can find more information at:
<http://www.umt.edu/cehs/Steer.html>

The STEER program is designed to foster student interest in pursuing graduate studies and professional careers in toxicology and the environmental health sciences.

Workforce training

The Silver Internship in Environmental Health Science provided a unique opportunity for undergraduate training this past academic year. This marks the second year that CEHS received generous support from the Morris and Helen Silver Foundation to enhance our research training program and academic pipeline for students interested in learning about the connections between our environment and health.

The Silver Internship program provides stipends to undergraduate students who are trained to operate state-of-the-art technology in CEHS labs. Interns then help with developing protocols for new air monitoring equipment also acquired as a part of the Silver award. Silver interns serve as role models to younger students learning about indoor air quality sampling and who participate in our annual high school research symposium.

Silver Internship

Under the mentorship of Dr. Tony Ward, the first Silver Intern, Emily Weiler, initially mastered laboratory techniques in processing and analyzing air samples using GC/MS technology. She subsequently branched out into several areas of air quality research, which contributed to her high level of productivity as an undergrad chemistry major and successful placement as a research staff member at CEHS.

Current intern Justin Keller hails from Lenore, Idaho, on the Nez Perce Reservation. A sophomore majoring in Health & Human Performance, Justin's internship will allow him to explore his research interest in rural health issues such as understanding the effects of contaminants involved in woodstove combustion.



Silver Intern Justin Keller (above) is helping develop protocols for monitoring CO₂ and PM_{2.5} levels in indoor environments. CEHS research specialist Emily Weiler demonstrates the operation of a Burkhard pollen sampler during a teacher workshop pictured below.



Some recent publications

Lacher S, Johnson C, Jessop F, Holian A, Migliaccio M. Murine pulmonary inflammation model: a comparative study of anesthesia and instillation methods. *Inhal Toxicol* (in press).

Adams, E., Ward, T, Vanek, D, Marra, N et al. 2009. Rural Indoor Air Quality: Guiding Student Inquiry. *The Science Teacher* 76(4): 40-45.

Adams, E Ward, T, Vanek, D, Marra, N, Noonan, C, Smith, G, Jones, D, Henthorn, M, and Striebel, J. 2008. Air Toxics Under The Big Sky: A real-world investigation to engage high school science students, *J Chem Ed*, 85(22): 221-224.

Ward, T, Vanek, D, Marra, N, Holian, A., Adams, E, Jones, D, & Knuth R. 2008. The Big Sky Model: A regional collaboration for participatory research on environmental health in the rural West. *J Higher Education Outreach & Engagement*. Vol 12(3): 103-115.

Jones, D, Ward, T, Vanek, D, Marra, N, Noonan, C, Smith, G, Adams, A. 2007. Air Toxics Under The Big Sky -- A high school science teaching tool. *Science Education & Civic Engagement: An International Journal* 1(2): 51-55.

For more information about education & outreach programs and resources, visit
http://www.umt.edu/cehs/k12_outreach.htm

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From the director

CEHS is committed to serving the community in multiple ways. Through its research activity CEHS provides new knowledge in health research that may translate to new therapeutic treatments for human diseases, new diagnostics, and improved understanding of potential risks to human health that certain chemicals in the environment may cause. In addition, we are actively engaged in providing resources and training to the next generations of students, teachers and investigators. Our various programs provide opportunities for students at all levels to benefit directly or indirectly from our activities. Our goals are to provide opportunities to engage students, teachers and the public to help in career decisions and provide information to better understand scientific advances. Please let us know how we can continue to improve ways to serve our community.

Andrij Holian, CEHS Director
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Our Mission..

The Center for Environmental Health Sciences brings together a critical mass of investigators to study mechanisms of human diseases such as asthma, lung fibrosis, chronic obstructive pulmonary disease, mesothelioma, immune and autoimmune disorders, cardiovascular disease, and neurodegenerative diseases.



2008 SEPA Conference. From left (standing): NCRR SEPA Prog. Officer Tony Beck and CEHS Director Andrij Holian; seated (facing camera): Corvallis HS teacher Brock Hammill, CEHS Education Coordinator Nancy Marra, SEPA evaluator Randy Knuth

The primary research mission of the CEHS is to advance knowledge of human diseases and environmental impacts on human health.