



Your Health & the Environment

SPRING 2008 www2.envmed.rochester.edu/envmed/ehsc/outreach/COEPpubs/COEPpub.html

News from the University of Rochester Environmental Health Sciences Center (EHSC)

The Hazards of Pharmaceuticals in the Home and Environment

Several stories have recently appeared in the news about the effects of pharmaceuticals in the water supply. The reported negative impacts include hormone disruption in fish, raising questions about potential impacts on human health. There are concerns about the effects of long term human consumption of these and other chemicals. Household pharmaceuticals can get into the water supply because conventional waste and drinking water treatment does not effectively eliminate most of the pharmaceutical compounds such as endocrine disruptor compounds found in oral contraceptives. Some of these chemicals enter the wastewater system when they are excreted by people who take these drugs. In other cases, chemicals may get into the wastewater when people flush old or unwanted medicine down the toilet. Flushing has been recommended in the past as a way to safely dispose of pharmaceuticals. However, because treated wastewater is released into surface water bodies, chemicals remaining in the effluent may affect wildlife or if the water eventually enters a drinking water systems, humans may be affected. Below are two recent examples of how EHSC researchers and community outreach agencies are focusing on studying and eliminating pharmaceuticals in our environment.



It is important to safely dispose of unwanted pharmaceuticals to avoid accidental poisonings by children or others. Flushing them down the toilet is no longer a recommended method of disposal. People are discouraged from simply throwing unwanted medicines in the trash since children might pull them out of the trash, or once in a landfill, these chemicals may eventually seep out in drainage water. The only guidance issued to date by a federal agency regarding the disposal of medications (by consumers and other end users) is the guidance issued in February of 2007 by the White House Office of National Drug Center Policy: www.whitehousedrugpolicy.gov/drugfact/factsht/proper_disposal.html. However several states and localities have developed their own approaches to this issue. In Washington State, a coalition of local and state governments, and non-profit organizations, developed a pilot program in which pharmacies took back unwanted medicine, (www.medicinereturn.com). Legislation (HB 3064-the Secure Medicine Return Bill) that would have implemented this program on a statewide basis was introduced in 2007 but has not been passed. The New York State Legislature is also considering a bill (A00840A) that would regulate the collection and disposal of both prescription and over-the-counter drugs by manufacturers of such drugs. Until such a program is instituted, community collection days may be the safest option (See 'What can I do?' on page 5).

- In March 2008, 3rd year Toxicology graduate student **Fanny Casado** presented a talk called "**Endocrine Disruptors with estrogenic activity: Promises and Challenges.**" The presentation discussed the current widespread use of estrogen-based hormonal therapies that has opened opportunities to do epidemiological studies of the risks and benefits. Endocrine disruptor compounds (EDCs) are defined as chemicals, such as those found in oral contraceptives, that can alter the physiology of endocrine or hormone systems in wild-life and humans. When these chemicals were first introduced, disruptive effects were not fully appreciated. Several different lines of research have elucidated some of the mechanisms of action of these compounds, specifically the ones with estrogenic activity, giving rise to guidelines and restrictions on their use. Despite numerous investigations using *in vivo* models that provide information about exposure, the relationship between human diseases of the endocrine system and exposure to environmental EDCs is poorly understood.
- **Action for a Better Community (ABC)**, an EHSC Community Advisory Board member, teamed up with the **Ruth A. Lawrence Poison Control Center, the City of Rochester, Monroe County Department of Environmental Services, and the Center for Environmental Information** to take part in the Environmental Protection Agency's Great Lakes Earth Day Challenge on April 19th. This event provided opportunities for people to safely dispose of unwanted medicines as well as electronic waste. Over 55,000 doses of unwanted medicine were collected from 66 people at this event. On **June 7th, there will be a free Unwanted Pharmaceuticals Collection from 8:00am-1:00pm at the City of Rochester Water Bureau, 10 Felix Street. For more information about this collection, contact Ted Murray at ABC, 325-5116.**

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National Institutes of Health
NIEHS National Institute of Environmental Health Sciences
~ Your Environment is Your Health ~

Research Highlights

- Aremu DA, Madejczyk MS, Ballatori N: N-acetylcysteine as a potential antidote and biomonitoring agent of methylmercury exposure. *Environ Health Perspect.* 2008 Jan; 116 (1):26-31.
- Bernard MP and Phipps RP: CpG Oligodeoxynucleotides induce cyclooxygenase-2 in human B lymphocytes: implications for adjuvant activity and antibody production. *Clin Immunol*, 125 (2): 138-148., 2007. NOTE: An editorial accompanied this article.
- Caito S, Yang SR, Kode A, Edirisinghe I, Rajendrasozhan S, Phipps RP and Rahman I: Rosiglitazone and 15-Deoxy- Δ 12,14-prostaglandin J2, PPAR γ , agonists, differentially regulate cigarette smoke-mediated pro-inflammatory cytokine release in a monocyte/macrophage cell line. *Antioxidant Redox Signaling*, 10 (2) 253-260, 2007.
- Ryan EP, Bushnell TP, Friedman AE, Rahman I, and Phipps RP: Cyclooxygenase-2 independent effects of cyclooxygenase-2 inhibitors on oxidative stress and intracellular glutathione content in normal and malignant human B cells. *Cancer Immunol Immunother*, 57 (3): 347-358, 2007.
- Cholette JM, Blumberg N, Phipps RP, McDermott MP, Gettings KF, and Lerner NB: Developmental Changes in Soluble CD40 Ligand. *J Pediatr*, 152 (1): 50-54, 2008.
- Lehmann GM, Garcia-Bates TM, Feldon SE, Phipps RP: Regulation of lymphocyte function by PPAR γ : relevance to thyroid eye disease-related inflammation. *PPAR Research*, Article ID 895901, Volume 2008.
- Ray DM, Spinelli SL, Pollock SJ, Murant TI, O'Brien JJ, Blumberg N, Francis CW, Taubman MB, and Phipps RP: Peroxisome Proliferator-Activated Receptor γ and Retinoid X Receptor transcription factors are released from activated human platelets and shed in microparticles. *Thromb and Haemost*, 99 (1) 86-95, 2008.
- Spinelli SL, O'Brien JJ, Bancos S, Lehmann GM, Blumberg N, Springer D, Francis CW, Taubman MB, Phipps RP: The PPAR-platelet connection: Modulators of inflammation and potential cardiovascular effects, *PPAR Research*, Volume, 2008.
- *Babies Excrete Vaccine-Mercury Quicker than Originally Thought*, www.urmc.rochester.edu/pr/news/story.cfm?id=1848, Features research by Thomas Clarkson, Ph.D.
- *Potentially Harmful Chemical in Baby Products*, abcnews.go.com/Health/ReproductiveHealth/story?id=4230408&page=1, Features research by Bernard Weiss, Ph.D.

Recent Grants Awarded

Philip Morris External Research Program

"Molecular Mechanism Controlling Cigarette Smoke - Lump Sum Induced Lung Injury"

PI: Richard Phipps, Ph.D.

The goal of this project is to learn how cigarette smoke influences lung fibroblast survival.

NIH/NHLBI

"Role of Aryl Hydrocarbon Receptor in Lung Inflammation"

PI: Patricia J. Sime, M.D.

The goal of this project is to determine the mechanisms where the aryl hydrocarbon receptor regulates lung inflammation induced by respiratory toxicants including a cigarette smoke.

NCI R21 Grant

"A New Class of Mechanistic Risk Prediction Models for Cancer Treatment Outcomes."

PI: Li-Shan Huang, Ph.D.

The goal of this project is to combine statistical methods with cancer treatment mechanism, we propose to develop a new class of statistical regression models for predicting the probability and the timing of tumor recurrence by effectively taking account of information on treatment characteristics and post-treatment individual biomarkers. The new model is derived from an iterated cell birth and death process, mimicking the biological mechanism of tumor cells after treatments, and thereby invokes biological considerations in statistical model building and treatment outcome prediction. The methodology will be applied to clinical follow-up data of prostate cancer patients amassed at The University of Rochester Medical Center.

Research Highlights

•**Marc A. Williams, Ph.D.** Assistant Professor of Medicine and Environmental Medicine, Pulmonary and Critical Care Medicine, was recently appointed to the editorial boards of two journals.

- *The Journal of Innate Immunity* is a new front-line international journal from the Karger AG publishing house. Further information about this overdue and timely edition to the scientific press can be found at www.karger.com/JIN.

The journal will publish papers and reviews on all aspects of innate immunity including mucosal immunity, immunotherapy, pathogen-host cell molecular interactions, host response and inflammation, complement and coagulation, evolutionary and developmental immunology, septic shock, molecular genomics, development of vaccines and immune therapies, leukocyte biology, animal models of innate immunity as well as allergic and pulmonary immunity. Dr Williams will be editing a special focus edition of the March 2009 issue of the journal entitled *Innate Immunity and Airway Inflammation*.

- *The Journal of Receptor, Ligand and Channel Research* is a new international peer reviewed and open access journal from the Dove Press (Great Britain and New Zealand) publishing house. The journal welcomes laboratory and clinical findings in the fields of biological receptors, ligands, channel and signal transduction research including: Original research, reviews, symposium reports, hypothesis formation and commentaries particularly on receptors and signaling, ligands, biological response modifiers, transporters, pores and channels, ligand binding and activation, role of receptors in diseases and their treatment, molecular basis of membrane structure and functions, molecular models of membranes and molecular targets for drug treatments and pharmacological interventions.

•**Dr. Steve Bauer** (NIH Pulmonary Research Fellow) and **Dr. Smruti Killedar** (Instructor in Medicine), have both been recognized by The American Thoracic Society Annual Scientific Conference, Toronto, May 2008 for their submitted papers in the field of Environmental Medicine, Pulmonary and Critical Care Medicine. Dr Bauer and Dr Killedar are conducting research in the lab of Dr Marc A. Williams - Assistant Professor of Medicine and Environmental Medicine.

•**Dr. Smruti Killedar** will receive an award and cash prize for her paper entitled "*Involvement of the p38MAP Kinase and ERK 1/1/1 Kinase signaling pathways on activation of human dendritic cells by ambient particulate matter*".

•**Dr. Steve Bauer** will receive an award and cash prize for his paper entitled "*Monocyte Immunoparalysis in Septic Shock - Restoration of Toll-Like Receptor Signaling by Granulocyte-Macrophage Colony Stimulating Factor*".

Looking for more information on environmental health issues?

Michael D. Laiosa, Ph.D., Postdoctoral Fellow in Environmental Medicine, is one of ten outstanding scientists selected as a 2008 Science Communication Fellow for **Environmental Health Sciences**. The Fellows help increase public awareness and understanding of environmental health science as a part of a new program that aims to publish and promote new research findings to a general audience. The Science Communication Fellows publish at least one in depth article per week about recent cutting edge peer-reviewed research on the impacts of the environment on human health. These articles are found under the "New Science" headings on the website.



Dr. Michael Laiosa

Environmental Health Sciences, www.environmentalhealthnews.org, was founded to help increase public understanding of emerging scientific links between environmental exposures and human health, and the website aggregates links to articles in the world press about environmental health, with daily updates. Topics covered include a broad array of issues in environmental health, including: chemical contaminations, water quantity and quality, and climate change. Most of the sources are daily newspapers, news magazines, scientific journals and links to radio or television stories. This is Dr. Laiosa's second year as a fellow; he and **Dr. Richard Stahlhut** participated in the program in 2007.

EHSC Pilot Project Program

Integrating Environmental Medicine into the Medical School Curriculum

- The following is from a poster funded by an ESHC Pilot Project Grant and was presented at the November, 2007 Annual meeting of the American Association of Medical Colleges Medical Librarians Association.

Integrating Environmental Medicine into the Medical School Curriculum

CA Martina PhD, WS Beckett MD, S Tripler, MD, K Markakis MD, E Richard MD, MA Courtney PhD, C Fong PhD, D Ward, MD, PhD, D Lambert MD, R Epstein MD, J McCarthy.

We describe our efforts to integrate environmental medicine into the first and second year clerkships and courses of the medical school curriculum. Our primary objectives are: (a) to improve medical professional competencies by increasing medical students' knowledge and awareness of their patients' exposure to environmental health risks at home and work, and (b) to provide medical students with the necessary information so they will not misdiagnose nor overlook environmental disease/illness in patients.

- The following is from a poster funded by an ESHC Pilot Project Grant and will be presented at the May, 2008 Medical Librarians Association.

A Most Convenient Truce: Teaming up with Environmental Medicine to "Green" our Library Survivor Tour
Marilyn Rosen, M.L.S., Angela Dixon, M.L.S., Edward G. Miner Library, Camille Martina, PhD, Departments of Community and Preventive Medicine & Environmental Medicine.

The lead investigators of Integrating Environmental Medicine into the Medical School Curriculum (Camille Martina and William Beckett) invited the library liaison to join their steering committee. In previous years, the library had created a scavenger hunt, called The Library Survivor Tour, to replace the traditional orientation for first year medical students. Teams, while scouting out answers, became acquainted with each other, the physical and virtual library space, and responded to some website usability questions. The tour was the perfect opportunity to fulfill one of the goals of the grant, to expand the medical students' awareness of environmental health dangers at home and work. Librarians consulted with the researchers to identify these themes around which the questions would revolve: Water Pollution, Air Pollution, Lead Poisoning, Infectious Diseases, and Household Risks.

For more information or details of, please contact **Camille Martina**, Camille_Martina@urmc.rochester.edu

Community Outreach and Education Core (COEC)

Rochester Lead Effort a Model for Other Upstate Communities

News Release from URMC:



In February 2008, the community partners met in Rochester, NY.

The diverse grassroots partnership that was the catalyst for Rochester's historic lead law will now serve as a model for other upstate New York communities grappling with high rates of lead poisoning.

A \$139,771 grant from the New York State Health Foundation (NYSHealth) will enable staff from the **University of Rochester Environmental Health Sciences Center (EHSC)** to work with non-profit organizations in Auburn/Cayuga County, Elmira/Chemung County and Oneida County to help build lead poisoning prevention coalitions in these communities that will focus on planning, community education, and primary prevention.

"The goal is to help coalitions in these cities to achieve the critical mass and focus necessary to secure ongoing funding and sustainability," said **Katrina Korfmacher, Ph.D.**, Community Outreach Coordinator for the EHSC. "Ultimately, we want to create a

statewide model of how communities can come together to effectively address their environmental health problems with strategies that are tailored to their individual community."

The model for these efforts will be the Rochester Coalition to Prevent Lead Poisoning (CPLP). The CPLP – which is also a participant in the project – is an education and advocacy organization composed of diverse individuals and community organizations that has worked since to reduce the city's high rates of childhood lead poisoning. The CPLP will provide technical assistance and advice to community groups in each of the three counties to develop their local capacity in lead poisoning prevention. (continued on page 5)

COEC, continued from page 4

Through public education and outreach, research, and working with state and local government, the coalition was able to build the community-wide consensus and momentum necessary for changes in public policy. These efforts culminated in the passage of a historic lead ordinance by the city which went into effect in July 2006. A recent report by the Center for Governmental Research (CGR) indicated that, while much work remains to be done, the new law is already having a significant impact. The report estimated that 1,400 Rochester homes had been made “lead safe” at a cost to landlords and homeowners which was lower than anticipated. The CGR report also noted that the number of children with elevated levels of lead in their blood had decreased since the new law went into effect.

“I am thrilled that we were able to support the dissemination of this important model,” said James R. Knickman, President and CEO of the New York State Health Foundation. “Community coalitions are critical to addressing environmental health issues. Strengthening our health care infrastructure and improving the health of New Yorkers requires important investments, and NYSHealth is committed to supporting projects like this one.”

Cayuga, Chemung, and Oneida Counties all have large numbers of homes that were built before 1950, prior to the ban on lead paint, and are at high risk for lead hazards due to deterioration. Lead poisoning – which is most commonly due to exposure to lead in paint and dust in homes – poses a tremendous health risk for children six years and younger, potentially damaging their central nervous systems, kidneys and reproductive systems. Even low levels of lead are harmful and are associated with decreased intelligence, impaired neurobehavioral development, decreased growth, and behavior problems. The University of Rochester EHSC will work with **Catholic Charities of Chemung County, Mohawk Valley Community Action Agency (Oneida County), and Cornell Cooperative Extension in Cayuga County**. Over the next year, the groups will bring together individuals and organizations committed to addressing lead poisoning in their communities and implement primary prevention projects. The final product will be a strategic plan for preventing childhood lead poisoning in each county.

The NYS Health Foundation, www.nyshealthfoundation.org, whose mission is to expand health insurance coverage, increase access to high-quality health care services, and improve public and community health, was established by the State of New York with charitable funds from the privatization of Empire Blue Cross/Blue Shield.

The Hazards of Pharmaceuticals, continued from page 1

What can I do?

Proper Disposal of Prescription Drugs

Provided by the Center for Environmental Information

- DO NOT FLUSH prescription drugs down the toilet.
- Whenever possible, use COMMUNITY PHARMACEUTICAL COLLECTION PROGRAMS.

If this is not possible, follow these instructions:

- Remove medicines from their original container.
- Take unused, unneeded, or expired prescription drugs out of their original containers.
- Make the medicines unusable (for example, mix the prescription drugs with an undesirable substance, such as used coffee grounds or kitty litter).
- Put them in a sealable bag or other impermeable, non-descript containers and place in the trash.
- Storing expired and unwanted medications in your home increases the risk of accidental poisoning. Help protect your safety by disposing of medicines promptly.
- Got questions? Call the Poison Control Center at 1 800 222 1222
- View the DISPOSAL OF UNWANTED MEDICINES video at:
<http://www.whitehousedrugpolicy.gov/drugfact/disposal.mov>

If you have questions, comments, or would like further information about this newsletter, please contact Kate_Kuholski@urmc.rochester.edu