

The U.S. Environmental Protection Agency Meeting on Pharmaceuticals in the Environment

U.S. EPA National Exposure Research Laboratory
944 East Harmon Avenue
Las Vegas, NV 89119
August 23-25, 2005

AGENDA

OVERALL GOALS FOR THE WORKSHOP:

- Provide an opportunity for STAR grantees to present the results of their research. (Summaries of the grantees' projects can be accessed at: <http://epa.gov/nerlesd1/chemistry/pharma/star.htm>.)
- Identify research "gaps" important to addressing decisions and/or policymaking issues associated with pharmaceuticals in the environment.
- Provide an opportunity for information sharing among scientists and policymakers from EPA's Program Offices, Regions, and the Office of Research and Development, as well as from States, local agencies, research entities, and stakeholders, about the state-of-the science regarding the presence, fate, and effects of pharmaceuticals in the environment and techniques and tools for Regions' and/or States' monitoring programs.
- To the extent there is a problem, identify ways that EPA can be part of the solution by improving the understanding of "institutional barriers" and discussing programmatic approaches (headquarters and Regions).
- Explore the use of voluntary, collaborative approaches to reducing pharmaceuticals in the environment that include Regions and Program Offices, States, Tribes, other federal agencies, and stakeholders.

Tuesday, August 23, 2005

INTRODUCTION & OVERVIEW

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| 7:30 – 8:00 a.m. | Registration |
| 8:00 – 9:45 a.m. | Moderator: Angela Page , U.S. EPA, Office of Research and Development |
| 8:00 – 8:15 a.m. | Welcome
Christian Daughton , U.S. EPA, Office of Research and Development |
| 8:15 – 8:30 a.m. | Overview of the U.S. EPA's Office of Research and Development and the Science To Achieve Results (STAR) Program
Angela Page , U.S. EPA, Office of Research and Development |
| 8:30 – 8:50 a.m. | Overview Presentation from the U.S. EPA's Office of Water
Octavia Conerly , U.S. EPA, Office of Water |
| 8:50 – 9:15 a.m. | The EPA Regional Perspective – Why Pharmaceuticals in the Environment Are an Emerging Science Issue to EPA's Regions
Bobby Smith , U.S. EPA Region 9, National Regional Science Council |
| 9:15 – 9:45 a.m. | Overview of Science Involved with Pharmaceuticals: A Perspective from the U.S. EPA
Christian Daughton , U.S. EPA, Office of Research and Development |
| 9:45 – 10:05 a.m. | BREAK |

FATE, EFFECTS AND OCCURRENCE OF PHARMACEUTICALS IN THE ENVIRONMENT- Session A

- 10:05 – 11:55 a.m.** Moderator: **Angela Page**, U.S. EPA, Office of Research and Development
- 10:05 – 10:30 a.m.** Occurrence, Environmental Fate and Exposure Assessment of Selective Serotonin Reuptake Inhibitors (SSRIs) in Aquatic Environments
Presented by **Kevin Armbrust**, Office of the State Chemist, Mississippi State Chemical Laboratory, Mississippi State, MS (STAR Grant)
- 10:30 – 10:55 a.m.** Occurrence and Fate of Antibiotics and Other Pharmaceutically Active Compounds During Transport To and During Drinking Water Treatment
Presented by **Howard Weinberg**, University of North Carolina, NC (STAR Grant)
- 10:55 – 11:20 a.m.** Occurrence and Fate of High Volume Pharmaceuticals in Wastewater Impacted Environments
Grant Recipient: Bruce Brownawell. Presented by **Mark Benotti**, State University of New York at Stony Brook, NY (STAR Grant)
- 11:20 – 11:55 a.m.** Detection and Fate of Environmental Estrogens in Wastewater Impacted Surface and Groundwaters
Presented by **Bruce Brownawell**, State University of New York at Stony Brook, NY (STAR Grant)
- 11:55 – 1:30 p.m.** **LUNCH**

FATE, EFFECTS AND OCCURRENCE OF PHARMACEUTICALS IN THE ENVIRONMENT – Session B

- 1:30 – 4:20 p.m.** Moderator: **Cynthia Nolt-Helms**, U.S. EPA, Office of Research and Development
- 1:30 – 1:55 p.m.** Mechanisms of Tetracycline Resistance Development in the Environment as Detected by Real-Time PCR
Presented by **David Graham**, University of Kansas, Lawrence, KS (STAR Grant)
- 1:55 – 2:20 p.m.** Fate, Attenuation, and Effects of Fluoroquinolone Antibacterials in Aquatic Systems
Presented by **Charles Knapp**, University of Kansas, Lawrence, KS (STAR Grant)
- 2:20 – 2:45 p.m.** Adsorption of Beta-Blocker Anti-Hypertensive Pharmaceuticals to a Range of Mineral Surfaces
Presented by **Tohren Kibbey**, University of Oklahoma, Norman, OK (STAR Grant)
- 2:45 – 3:10 p.m.** Pharmaceuticals and Personal Care Products as Environmental Contaminants: Preliminary Environmental Risk Calculations and Method Development for Analysis in Environmental Media via GC/MS
Research conducted by **Lynn Roberts**; presented by **Kevin Bisceglia**, The John Hopkins University, Baltimore, MD (STAR Grant)
- 3:10 – 3:30 p.m.** **BREAK**
- 3:30 – 3:55 p.m.** Pharmaceuticals and Personal Care Products as Environmental Contaminants: Biodegradability Studies and Occurrence in Sewage Treatment Plant Influent and Effluent
Research conducted by **Lynn Roberts**; presented by **Jim Yu**, The John Hopkins University, Baltimore, MD (STAR Grant)
- 3:55 – 4:20 p.m.** Endocrine Effects of Selective Serotonin Reuptake Inhibitors (SSRIs) on Aquatic Organisms
Presented by **Marsha Black**, University of Georgia, Athens, GA (STAR Grant)
- 4:20 – 5:30 p.m.** **Poster Session**
Investigators will be available to discuss their posters highlighting research on pharmaceuticals in the environment.
- 5:30 p.m.** **Adjourn**

Wednesday, August 24, 2005

HAZARDS FROM WASTE PHARMACUETICALS: DETERMINING TOXICITY AND CHEMICAL ANALYTICAL METHODS FOR DETECTION

- 8:00 – 11:50 a.m.** Moderator: **Tammy Jones-Lepp**, U.S. EPA, Office of Research and Development
- 8:00 – 8:25 a.m.** Overview of a Framework for Assessing the Hazards of Human Pharmaceuticals in the Environment from a SETAC Pellston Workshop
Presented by **Marsha Black**, University of Georgia, Athens, GA
- 8:25 – 8:50 a.m.** Overview of ORD's Aquatic Toxicology Research on Endocrine-Active Pharmaceuticals
Presented by **Joseph Tietge**, U.S. EPA, Office of Research and Development
- 8:50 – 9:15 a.m.** Analytical Methods for Measurement of Pharmaceuticals in Drinking Water and in the Environment
Presented by **Mike Myer**, U.S. Geological Survey
- 9:15 – 9:40 a.m.** Environmental Risk Assessment of Pharmaceuticals in the Environment
Presented by **Chuck Eirkson**, U.S. Food and Drug Administration
- 9:40 – 10:05 a.m.** An Informatic Approach to Estimating Ecological Risks Posed by Pharmaceutical Use
Presented by **Mitchell Kostich**, U.S. EPA, Office of Research and Development
- 10:05 – 10:25 a.m.** **BREAK**
- 10:25 – 10:50 a.m.** Identifying Chemical Compounds from Wastewater Discharges
Presented by **Susan Glassmeyer**, U.S. EPA, Office of Research and Development
- 10:50 – 11:35 a.m.** **Research and Regional Needs Breakout Sessions**

BREAKOUT SESSION I: What Chemical Methods Are Needed for Monitoring Pharmaceuticals in the Environment? What Are the Barriers in Using Existing Chemical Methods for Monitoring Pharmaceuticals in the Environment?

Moderator: **Al Alwan**, U.S. EPA, Region 5

Breakout Questions:

- Can EPA's process for developing new chemical methods be modified to address the new pharmaceuticals?
- Should we evaluate other options outside of EPA? If so, which ones?
- What pharmaceuticals concentration would EPA use for baseline and target monitoring?
- Which pharmaceuticals should the Regions focus on monitoring?
- What can we do until there are EPA approved methods for detection of pharmaceuticals and personal care products?
- How do we find out the relative mass of unused versus excreted drugs that enter into wastewater treatment plants?

BREAKOUT SESSION II: What Environmental Exposure and Effects Methods Are Needed for Ecologic Receptors?

Moderator: **Bobby Smith**, U.S. EPA, Region 9

Breakout Questions:

- What new bioassays can the Regions and Programs use with existing resources?
- What pharmaceuticals should the Regions focus monitoring resources on?
- What EPA bioassay methods can be used?
- Are there other agency or stakeholder-sponsored assessment methods that would be useful?
- What are the method gaps?

11:35 – 11:50 a.m. Breakout Sessions Reports to Participants

11:50 – 1:00 p.m. LUNCH

ENVIRONMENTAL STEWARDSHIP FOR PHARMACEUTICALS IN THE ENVIRONMENT – Session A

1:00 – 5:00 p.m. Moderator: Octavia Conerly, U.S. EPA, Office of Water

**1:00 – 1:25 p.m. Research Needs and Gaps from the Perspective of the Major Water Societies
Djanette Khiari, AWWA Research Foundation**

**1:25 – 1:50 p.m. Perspectives from Drinking Water Suppliers
J.C. Davis, Southern Nevada Water Authority**

**1:50 – 2:15 p.m. Wastewater Treatment Plant Perspectives: Preliminary Data Suggesting Endocrine Disruptor
Effects of Wastewater Discharge into the Pacific Ocean
Jeffrey Armstrong, Orange County California Sanitation District**

2:15 – 2:40 p.m. BREAK

**2:40 – 3:05 p.m. Perspectives from the Drug Enforcement Administration on What Can and Cannot Be Done
via Drug Take-Back Programs
Vickie Seeger, U.S. Drug Enforcement Administration, Office of Diversion Control**

**3:05 – 3:30 p.m. Perspectives from the Pharmaceutical Industry
Mary Buzby, Merck & Co., Inc., representing the Pharmaceutical Research and Manufacturers of
America (PhRMA) PIE Task Force**

**3:30 – 3:55 p.m. Environmental Stewardship of Waste Pharmaceuticals from a Hospital Perspective
Charlotte Smith, PHARMECOLOGY**

**3:55 – 4:20 p.m. What Are the Barriers to Reducing Pharmaceuticals in the Environment?
(Panel of Rapporteurs from Days 1 and 2 will synthesize the “learnings”)**

4:20 – 5:10 p.m. Breakout Sessions on Identifying the Barriers

**BREAKOUT SESSION I: What Are the Barriers to Using Existing Bioassay Tools to Assess
Exposure and Effects of Pharmaceuticals in the Environment?**

Moderator: **Bobbye Smith, U.S. EPA, Region 9**

What can we do until there are EPA approved methods for detection of pharmaceuticals and
personal care products?

**BREAKOUT SESSION II: What Are the Programmatic and/or Regulatory Constraints to
Reducing Pharmaceuticals in the Environment?**

Moderator: **Chen Wen, U.S. EPA, Office of Pollution Prevention and Toxics**

What social and/or economic research needs to be performed to support action by EPA Regions or
Programs?

What agencies and stakeholders would have social and/or economic research that would assist
Regions and Programs in developing educational materials?

What are the key agencies and stakeholders to include in pollution prevention discussions?

5:10 – 5:30 p.m. Breakout Sessions Reports Shared Across Participants

5:30 p.m. Adjourn

Thursday, August 25, 2005

ENVIRONMENTAL STEWARDSHIP FOR PHARMACEUTICALS IN THE ENVIRONMENT – Session B

- 8:00 – 11:45 a.m.** Moderator: **Mary Dever**, U.S. EPA, Region 1
- 8:00 – 8:25 a.m.** Managing Emerging Contaminants: A Practical Approach
Al Alwan, U.S. EPA, Region 5
- 8:25 – 8:50 a.m.** The Metropolitan Water Reclamation District of Greater Chicago’s Efforts to Reduce Pharmaceuticals that Enter the Water Reclamation Plants
Catherine O'Connor, Metropolitan Water Reclamation District of Greater Chicago
- 8:50 – 9:15 a.m.** Collecting Unwanted Medications for Appropriate Disposal
Lynn Rubinstein, Northeast Recycling Council
- 9:15 – 9:40 a.m.** Maine: First U.S. Legislation for Unused Pharmaceutical Returns
Stevan Gressitt, Maine Association of Psychiatric Physicians, Medical Director of Northeast Occupational Exchange, Acting Secretary of the Maine Benzodiazepine Study Group
- 9:40 – 10:05 a.m.** Washington State and King County’s Perspective on Pharmaceutical Stewardship
David Galvin, King County Washington
- 10:05 – 11:30 a.m.** **Facilitated Discussion: What Are the Next Steps to Address the Issue of Pharmaceuticals in the Environment? How Can EPA Be Part of the Solution?**
Moderator: To Be Determined (Multi-Media Pollution Prevention Office and/or Office of Waste Water Management?)
Facilitator: Bobbye Smith, U.S. EPA, Region 9
Note Taker: To Be Determined
Rapporteur: To Be Determined
Panel of stakeholders, researchers, agencies initiate discussion with audience.
- Initial Discussion Questions:**
What can we do until there are EPA approved methods for detection of pharmaceuticals and personal care products?
What are the key agencies and stakeholders to include in pollution prevention discussions?
What internal EPA vetting needs to be done to develop a champion?
Are there existing “solutions” that could be piloted in other states, business sectors?
Are there cleanup and/or destruction (management) options that could be developed in cooperation with industry sectors?
What are the “tools” or approaches? Is there an “energy star”-like opportunity?
Product stewardship – how can those principals be made into business opportunities?
How to “green” the supply chain and/or reduce the waste stream volume?
How to engage with individuals to influence behavior (e.g., don’t flush drugs)?
How to address “distributed” health care (e.g., nursing homes, hospice, drug rehabilitation centers)?
How to find out the relative mass of unused versus excreted drugs that enter into wastewater treatment plants?
What will Regions, States, and Tribes do to monitor for pharmaceuticals?
Who will be the Headquarters and/or Regional “champions” to work for solutions?
- 11:30 – 11:45 a.m.** **Wrap-Up and Next Steps**
- 11:45 a.m.** **Adjourn**