EPA Science Forum 2003
Partnering to Protect Human Health and the Environment

Pharmaceuticals and Personal Care Products (PPCPs) as Environmental Pollutants

Year of Water: Thirty Years of Progress Through Partnering

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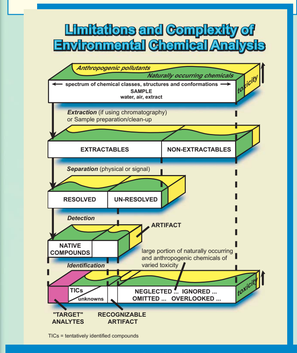
Is Our Conventional View of Chemical Pollution and Its Control Too Narrow?

Regulated pollutants represent but a small portion of the total numbers of manmade and naturally occurring pollutants to which humans are continually exposed.

Our limited understanding of the universe of chemical exposure is partly a result of the limitations of analytical chemistry.

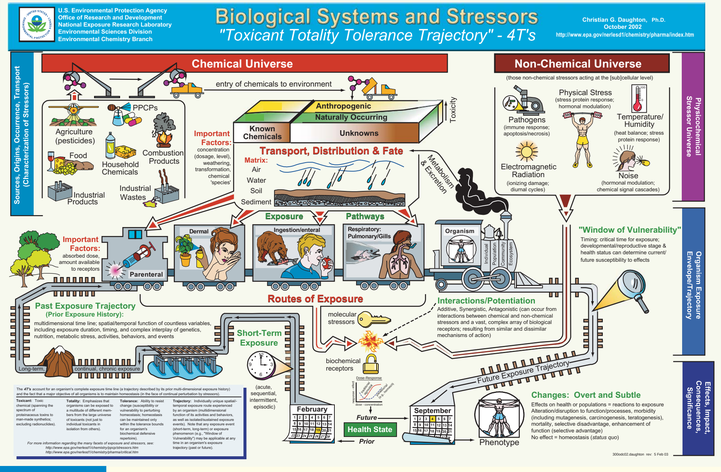


http://www.epa.gov/nerlesd1/chemistry/pharma/critical.htm

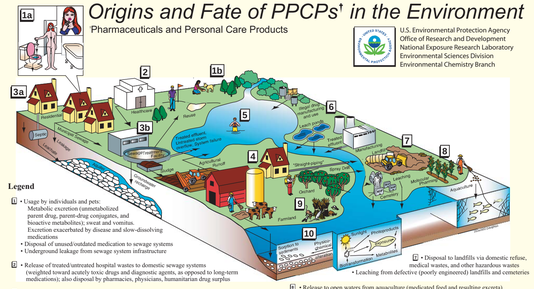
Countless previously unrecognized pollutants are often present in waters. These ubiquitous "micro-contaminants" occur at minute concentrations of parts-per-billion (µg/L) and below.

Toxicology has yet to reveal the human or environmental health significance of long-term, simultaneous exposure to multitudes of chemical stressors

(subtle effects such as behavioral changes are the primary concern).



http://www.epa.gov/nerlesd1/chemistry/ppcp/stressors.htm



http://www.epa.gov/nerlesd1/chemistry/pharma/images/drawing.pdf

- Pharmaceuticals and personal care products (PPCPs) comprise a diverse galaxy of micro-pollutants that gain entry to the environment by way of their usage in human and veterinary medicine as well as agriculture. PPCPs and metabolites are excreted and washed into sewage and waterways. Expired/unwanted medications are also directly disposed to toilets and trash.
- Pollution of water by PPCPs and many other previously unrecognized chemicals results primarily from the individually minuscule but significant combined impacts from consumerism.
- Sewage and drinking water treatment facilities are often not effective at removing PPCPs and other unregulated pollutants.

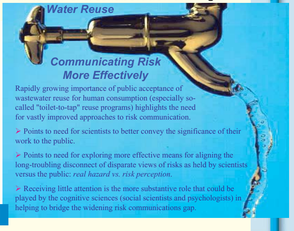
Impact of EPA's Efforts with PPCPs

- ***The PPCPs Web Site*** is the Agency's major resource for researchers and laity worldwide.
- Seminal publications have helped to lay the foundation for current and future research and regulatory attention in the U.S. for "emerging" contaminants.
- Pioneering efforts for a *Green Pharmacy* is fostering attention to the need for consumer-level environmental stewardship programs for PPCPs (pollution prevention).
- More attention is being devoted to the use of PPCPs as "tracers" or "markers" — tools for rapidly detecting trace levels of sewage contamination of waters (a major issue especially with regard to septic systems, "straight-piping," and POTW overflow events).
- Schools are using *PPCPs Web Site* materials to teach principles of environmental science and proper use of the literature ("literature forensics").

http://www.epa.gov/nerlesd1/chemistry/ppcp/greenpharmacy.htm

Future Activities and Research Needs for Assessing and Reducing Risk Posed by PPCPs

- Form interagency workgroup to address wide array of research needs regarding PPCPs as pollutants and for making progress toward a *Green Pharmacy*: EPA, FDA, USGS, CDC, USDA, DEA, USFWS, NAS-IOM, health care industry.
- Develop consistent nationwide guidance for disposal of unwanted PPCPs: collaboration among EPA's OSW, OPPT, Regions, and ORD.
- Innovate more effective approaches to risk communication, especially for groundwater recharge and water reuse.
- Design and implement a nationwide, universal early warning water monitoring system for "emerging" chemical pollutants (would serve double duty for Homeland Security).
- Develop holistic "systems-level" approaches for toxicological assessment more amenable to the subtle effects that come into play with ecological communities.



http://www.epa.gov/nerlesd1/chemistry/pharma/science-issues.htm#OneProposal

EPA's Leadership Role in Establishing the Significance of PPCPs as Pollutants

EPA's research role beginning in the late 1990s is largely promulgated from its design and maintenance of the world's only web site devoted to the many scientific and social aspects of PPCPs as pollutants.

http://www.epa.gov/nerlesd1/chemistry/pharma/

This work is complemented by:

- Publishing seminal articles in the peer-reviewed literature on the state of the science and future research needs.
- Championing the need for environmental stewardship programs (pollution prevention) to minimize the introduction of PPCPs to the environment - *The Green Pharmacy*.
- Presenting invited lectures at numerous international, national, regional, and academic scientific conferences and seminars.
- Catalyzing research worldwide by delineating research needs, promulgating funding opportunities, and fostering collaborations.
- Maintaining an in-house research program for improving the scope and sensitivity of chemical analysis approaches for problematic unregulated pollutants (including PPCPs).
- Devoting significant time to public outreach activities and education of the press.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Partnering to Protect Human Health and the Environment

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