

A photograph showing medical supplies on a table. In the foreground, there are several white, round pills scattered on a piece of white gauze. A syringe with a green plunger is also visible. In the background, there is a roll of white gauze and a blue container. The lighting is soft and focused on the pills and syringe.

Proper Disposal of Household Prescriptions and Over-the- Counter Medications

Sara Grise`
Pennsylvania Sea Grant

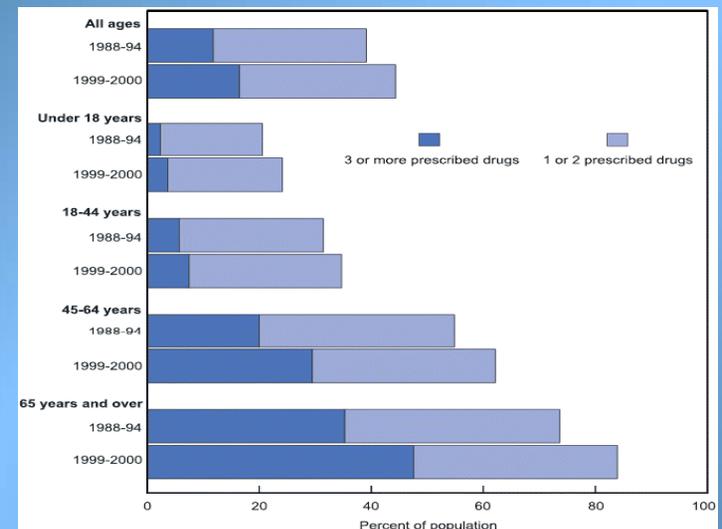
Pharmaceuticals and Personal Care Products (PPCPs)



- Prescription and over-the-counter (OTC) medications
- Cleaning agents
- Cosmetics
- Nutritional supplements
- Skin care products

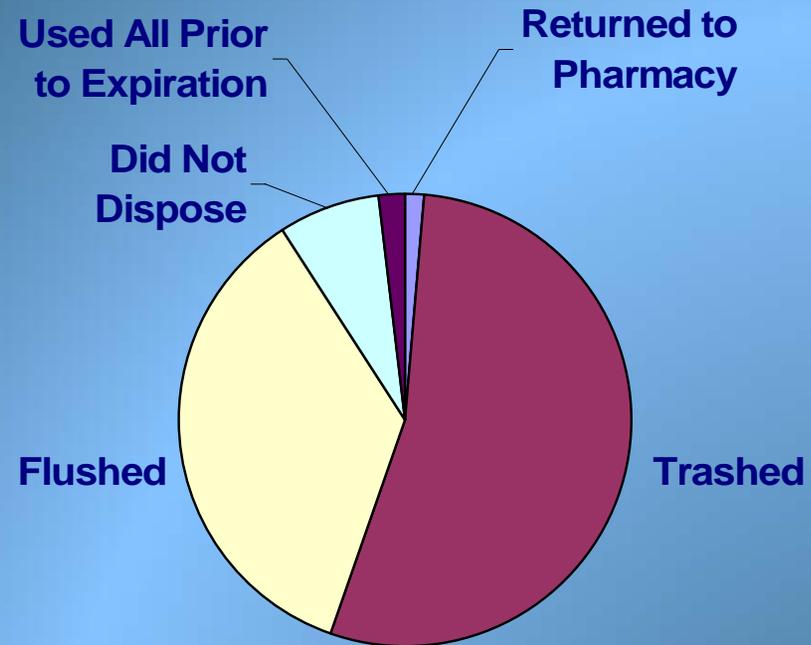
Disposal of Unwanted Medicines

- Medicines may not be entirely consumed due to:
 - Change in prescription
 - Patient's health improves before finishing
 - Patient death
 - Patient non-compliance
 - Bulk “discount size” containers contain more than what is needed before the expiration date



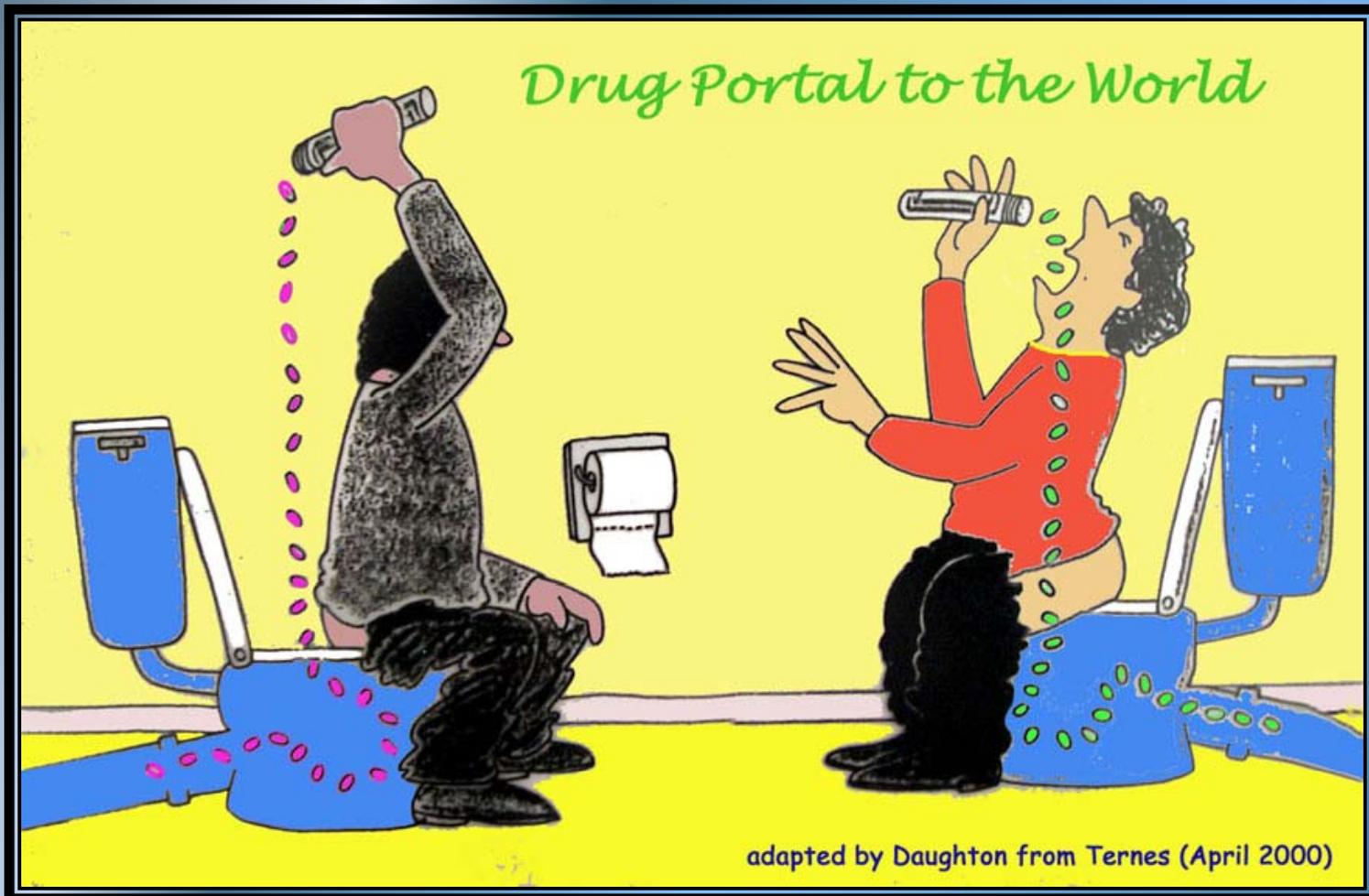
Expired Medicine Disposal Habits

- Survey of 100 pharmacies and 500 patients
- 54% disposed of medications in the trash
- 35.4% flushed drugs down the sink or toilet
- 7.2% did not dispose of medications
- 2% used all medication prior to expiration
- 1.4% returned medication to the pharmacy



*Boehringer, S. "What's the Best Way to Dispose of Medications?" (2004)

How are drugs getting into the environment?



Do NOT flush or Pour Unwanted, Unused, or Expired Medications Down the Drain

- Why Not Flush?
 - Flushed medications can get into our lakes, rivers, and streams
 - Fish and other aquatic wildlife are being adversely affected
 - Potential harm to human health

Medicine in our Drinking Water

Associated Press, 2008



- Medications found in the water supplies of 24 major metropolitan areas and the drinking supplies of at least 41 million Americans



- Some providers screen for only one or two pharmaceuticals

Medicine in our Drinking Water

Associated Press, 2008



- Watersheds are also contaminated
- Well water is not in the clear



- Bottled water and home filtration not in the clear

Medicine in the Environment

Effects on Aquatic Organisms

Feminization of Fish

- Male fishes producing egg yolk proteins and early stage eggs
- Linked to the presence of estrogens:
 - Natural
 - Synthetic (birth control)
 - Estrogen mimics
- Extremely small concentrations (parts per billion or trillion)



Medicine in the Environment

Effects on Aquatic Organisms

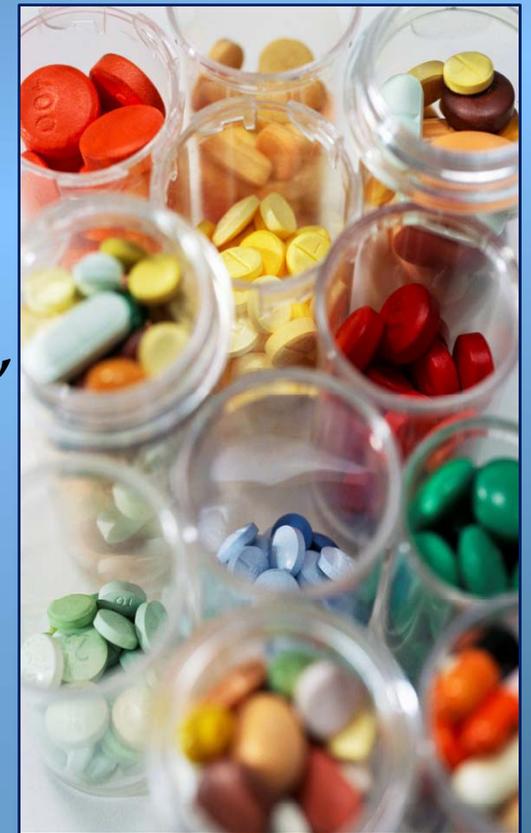
- What's not good for them is usually not good for us!!



- Freshwater mussels
- Hydras
- Zooplankton
- Vultures
- Fish
- Frogs

Effects on Human Health

- Researchers do not yet understand the exact risks
- Combinations of low level pharmaceuticals
- Some say: “no risk to human health”
- Others say potential risk to:
 - Embryonic kidney cells
 - Human blood cells
 - Human breast cancer cells



Disposal Options

Take your medications to a local collection event or take-back program

- Contact your local pharmacy, recycling coordinator, or municipality to find out if there is a collection event or take-back program near you
- While waiting for a collection event, keep all medications in a safe, secure place in your home out of reach of children



Federal Prescription Drug Disposal Guidelines Advise Americans to:

- If alternative methods of disposal are not available:
 - Take unused, unneeded, or expired prescription drugs out of their original containers
 - Mix with an undesirable substance
 - Put in sturdy, opaque, non-descript containers
 - Throw these containers in the trash
- Flush prescription drugs down the toilet *only* if the label specifically instructs doing so.
- **Talk to your Pharmacist**

The White House Office of National Drug Control Policy (ONDCP), Health and Human Services (HHS), U.S. EPA

CASE STUDY:

Keep Unwanted Medicine out of Lake Erie-Collection Event

- EPA funded
- Partners:
 - Erie-Times News
 - Lake Erie-Allegheny Earth Force
 - City of Erie
 - LECOM School of Pharmacy



**PROTECT LAKE ERIE—
We Drink It!**

More than 50 pharmaceuticals have been identified in PA waters

Medicine Collection Day
April 26, 2008
10:00 a.m. — 2:00 p.m.
Cruise Boat Terminal Building
-Behind the Raymond Blasco Library and the Intermodal Transportation Center

Pre-registration is **mandatory** by April 21, 2008. To pre-register call (814) 425-7773. Your medications will not be taken unless you have pre-registered.

NEVER FLUSH or pour unused medicine down the drain, unless otherwise directed. Bring it to the Medicine Collection Day.

- Protect Lake Erie—Our drinking water comes from it
- Prevent accidental childhood poisonings
- Reduce abuse of unused prescription drugs

Do NOT Bring:
Illegal Drugs, Biohazardous Material, Needles/sharps, Inhalers, Household Hazardous Waste (paint, pesticides, oil, gas)

You Can Bring:
Prescription Medication, Over the Counter Medication, Ointments, Creams, Vials, Pet Medications, and Personal Care Products

For more information about the collection call (814) 217-9015 or (814) 217-9011. For more pharmaceutical information visit www.iisgcp.org/unwantedmeds/. This effort is funded by a grant from the Environmental Protection Agency and facilitated by Pennsylvania Sea Grant.



Keep Unwanted Medicine out of Lake Erie-Collection Event

• Erie Times-News —Survey question April 13-20, 2008 —News in Education (NIE) page April 15, 2008

Learn about your environment

How PPCPs ARE DEFINED

Pharmaceutical and personal care products were first called "PPCPs" only a few years ago, but their toxic chemicals footprint has been on the rise for decades. Their effect on the environment is now recognized as an important area of research and concern.

PPCPs include

- Prescription and over-the-counter therapeutic drugs
- Veterinary drugs
- Fragrances
- Cosmetics
- Sun-screen products
- Diagnostic agents
- Nutritional aids (e.g., vitamins)

Sources of PPCPs:

- Human activity
- Residue from pharmaceutical manufacturing (well defined and controlled)
- Residue from hospitals
- Sewer drugs
- Veterinary drug use, especially antibiotics and steroids
- Agricultural uses

Changes in physiology and behavior have been documented in several aquatic species such as fish and amphibians consuming waters that contain these chemicals. Many fish become "sterilized," exhibiting less aggressive behavior and developing eggs primarily typically produced only in females. Though human contributions are a small part of this issue, comparing, controlling, and cleaning up operations and runoff from antibiotic factories, proper use and disposal of PPCPs should be a concern for all.

Source: EPA, into an associated piece

BY THE NUMBERS

80

Percent of the 130 streams tested by the United States Geological Survey in 2002 that were found to contain traces of hormonal, anti-depressant, antibiotic and other organic waste compounds.

28

Water providers of the 42 major cities contacted by EPA's "No Discharge" team based that drinking water for pharmaceuticals. Although the AP inquiry discovered that drugs have been detected in the drinking water supplies of 24 major metropolitan areas, the federal government assures that any testing and treatment is safe for the public.

Source: EPA, into an associated piece

LEARN MORE

When: Saturday, April 26, from 10 a.m. to 2 p.m.
Where: Chubb Center for the Environment and the International Transportation Center
Pre-registration is mandatory by April 21.
Pre-registration: Call (419) 421-7773 or (800) 541-0016.
Name: Prescription and over-the-counter medication, cosmetics, vitamins, pet medications, personal care products (shampoos, lotions, makeup, etc.)
Do not bring: illegal drugs, biohazardous material, needles/syringes, syringes, household hazardous waste (paint, pesticides, oil, gas)
For more information, call 217-9015.

What: "Plans for Riparian Buffers: Control of Invasive Plants" workshop
When: Wednesday, May 7, from 9:30 a.m. to 3:30 p.m.
For more information, contact Cindy Housh at ghoush@eas.org

yourSPACE

Boat tour touts cleaner lakes

E with Voyageur is a cooperative that attracts crowds of outdoors. This annual, a decade old tradition, has been checked at over 34 boats in the region.
The Lake Erie Region Conservancy and the Bigfoot Center for Science Studies will host the Earth Voyageur in Erie June 11. It's the 10th annual Healthy Lakes, Healthy Lives Tour.
The tour is organized by the Healthy Our Waters Great Lakes Coalition (HOW). With more than 100 organizations working together, HOW advocates for expanded federal funding to repair aging sewage treatment systems, construct innovative species and clean up land habitats around the Great Lakes.
Member organizations include fishing, boating, conservation, and environmental groups, as well as the National Wildlife Federation and the National Parks Conservation Association with generous funding support from the WAPA Foundation, the Erie



Earth Voyageur comes to Erie June 11-14.

Foundation and many other public and private institutions. Cooperating with and supporting the tour are dozens of state and municipal agencies, chambers of commerce, civic organizations, universities, and thousands of individual boat owners throughout the Great Lakes.
For more information about the tour and the tour's activities, visit the tour's website at www.earthvoyageur.org/

Medical checkup

Why scientists worry about drugs, personal care products polluting water

By ANNA MCCARTHY
annmccarthy@erietimes.com



Don't take that next drink of water for granted. Pharmaceuticals and personal care products (PPCPs) are ending up in the environment with negative consequences for wildlife. A recent Associated Press national investigation found traces of these drugs in drinking water. You take a prescription drug or an over-the-counter medicine. Your body absorbs some of it, but the rest passes through you and is flushed down the toilet. Add this to the ever increasing used and unused PPCPs that are washed down the drain, every day and you begin to understand the need to protect our ever-shrinking water resources.

These pharmaceuticals, pesticides, herbicides, insecticides, pet-care products, perfumes, and other products go to the wastewater treatment plant. Or in Pennsylvania there's a one-in-four chance they go into a private septic tank. However, these PPCPs don't just disappear. According to the U.S. Environmental Protection Agency, there are no average treatment systems in the U.S. specifically engineered to remove these chemicals and so they largely end up in the soil, rivers, streams, lakes and groundwater.

A United States Geological Survey study published in 2002 found traces of hormones, anti-depressants, antibiotics and other organic waste compounds in 80 percent of 130 streams tested. The AP reported that drugs were detected in drinking water supplies of 24 major metropolitan areas, including Philadelphia, where 56 pharmaceuticals or ingredients were identified. Federal scientists also know that PPCPs are made up of degraded aquifers that pose a threat to the nation's water supply. Very small levels of hormones, antibiotics and other drugs from aquifers near contaminant sources such as landfills and mines and have been found in 26 states.

The ultimate effect on our drinking water is unknown. That's why a national effort is under way to determine the world are increasingly troubled by studies showing the negative effects on wildlife. Fish and other organisms are

Drugs taken for pain, infection, asthma and a myriad of other health problems have been found in trace amounts in drinking water supplies around the country. These recent reports by the Associated Press National Investigation Team confirm a 2002 U.S. Geological Survey report of the first nationwide study of pharmaceutical pollution in the nation's rivers and streams. Changes in physiology and behavior in several aquatic species including fish and amphibians living in water which contains these chemicals are documented.

exhibiting altered gender ratios, sluggish behavior, and a change in reproduction rates resulting from exposure to pharmaceuticals and other pollutants that disrupt the body's hormonal system, according to a number of international studies. Although the concentration of PPCPs found in drinking water for an adult, testing has shown that the body's ability to filter out these chemicals is limited. In the long-term cumulative exposure to PPCPs that enters our water supply, very small levels of hormones, antibiotics and other drugs from aquifers near contaminant sources such as landfills and mines and have been found in 26 states.

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great facilitated by Pennsylvania's own Great and Proprietary partners, including the city of Erie, the U.S. Lake Erie Authority, Earth Force and the Erie Tri-State News Network in education program.
The U.S. when legislation pending in the Pennsylvania House of Representatives, Rep. John Hathorn, United States Representative for the 11th District, have co-sponsored House Bill 200 - the Pharmaceutical Drug Disposal Act. It would require retailers of pharmaceuticals to break or test for these products and either manufacture or house filtration systems.
In addition to continued research, education and action are critical. Over Lake Conservancy will participate in medicine collection events during Earth Week, April 18-27.
In Erie, a remaining local collection and collection day will take place April 26. The EPA is funding the collection with

ANNA MCCARTHY
Shoreport & Education coordinator can be reached at 800.527.9100

LECOM pharmacists will help dispose of meds

By ELLOTT COOK
elloccook@erietimes.com



Prevention is the best strategy for protecting our water. Register to bring your PPCPs to the Medicine Collection Day on April 26. See www.eric.edu/medcollection for details. Records were kept of all medicines received at the Medicine collection event that lasted 14 30-gallon drums.

Over the past five years, the number of U.S. prescriptions rose to a record 2.7 billion, a 12 percent increase. Despite prescription drug, purchase had almost doubled. Recent Associated Press articles reported small amounts of medications, including antibiotics, anti-inflammatories, mood stabilizers, and sex hormones, have been found in drinking water supplies of at least 41 million Americans.
Although medications may be practically undetectable in our drinking water, small amounts, over decades, may produce harmful effects. Researchers are still unsure of the long-term complications. While sewage and water treatment plants need to address this issue, we as the public can do our part to keep medications out of our water by not flushing them down the toilet or throwing them in the trash.
Proper disposal can decrease the load of these de-

medications will help dispose of meds. The approval forms will be the only ones accepted at the collection. To protect your identity, you will not be asked your name. You will be given a number and a 100 mg bottle of aspirin of PPCPs to the Chubb Center for Science Studies at the Erie County Library between 10 a.m. and 2 p.m.
ELLOTT COOK and SARA SIKKARI are content producers for the Department of Pharmacy Practice at the LECOM School of Pharmacy.

Erie Times-News in Education
SHEED non-profit organization
Check out these Web sites:
In Erie area:
www.eric.edu
www.eric.org/erietimes
<http://www.epa.gov/drugstake/>
www.eric.edu/medcollection
Go to www.eric.edu to participate in the current Erie Times-News survey or in the bottom right-hand corner to help document how medicine disposal is done and spread medicine.
Write a letter for "your class" with your comments or how to eliminate PPCPs from our water. Send to: med@erietimes.com

Keep Unwanted Medicine out of Lake Erie- Collection Event

- Pharmacy slips



PROTECT LAKE ERIE— We Drink It!

Federal Guidelines for Prescription Drug Disposal



- ▶ Ask your pharmacy if they will take your medication back.
- ▶ Take advantage of **community pharmaceutical take-back programs** that allow the public to bring unused drugs to a central location for proper disposal.
- ▶ Take unused, unneeded, or expired prescription drugs out of their original containers and throw them in the trash.
- ▶ Before throwing prescription drugs away make sure to mix them with an undesirable substance (coffee grounds or kitty litter) and put them into an impermeable, nondescript container to ensure that the drugs are not diverted.
- ▶ Only flush prescription drugs down the toilet if the label or accompanying information specifically tells you to.

For more information about Pharmaceuticals visit
www.iisgcp.org/unwantedmeds

Information taken from www.whitehousedrugpolicy.gov



Keep Unwanted Medicine out of Lake Erie-Collection Event



- Pharmacists identifying the medications

Keep Unwanted Medicine out of Lake Erie-Collection Event



- Pharmacists counting the medications

Keep Unwanted Medicine out of Lake Erie-Collection Event



- Collection of Controlled Substances

- Results:
 - 87 participants
 - 120 gallons of materials
 - 600 pounds of medicine and PCP's
 - 5 gallons of controlled substances
 - About 70,000 non-controlled pills
 - About 400 PCP's



Other Resources

**Illinois-Indiana Sea Grant Disposal of Unwanted Medicines:
A Resource for Action in your Community**

www.iisgcp.org/unwantedmeds

Office of National Drug Control Policy

http://www.whitehousedrugpolicy.gov/drugfact/factsht/proper_disposal.html

Department of Environmental Conservation

<http://www.dec.ny.gov/chemical/45083.html>



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