Emerging Contaminants in Wastewater: Local Best Practices

Pima Association of Governments
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Presenters
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Drugs in the Water Cycle

- Hormones
- Pesticides
- X-ray contrast
- Sweetener
- Illicit drugs
- Solvents
- Personal care products
- Antibiotics
- Heart medications

Proper Disposal Take-Back Programs
> 34,823 lbs. of unused or expired drugs collected
More info – DEA.gov

Improper Disposal
May enter drinking water by
- flushing down toilet or drain
- tossing loose in trash
More info – epa.gov/ppc
A Healthy Pima County. Everywhere. Every day.

Agua Nueva Wastewater Treatment Train/Process

- Raw Sewage
- Influent Pump Station
- Flocculation/Aerated Grit Chambers
- Dissolved Air Flotation Units
- Thickened Sludge Storage
- Sludge and Scum
- Air
- Bioreactor Aeration Basins
- Step Feed
- Sludge Pumps
- Return Activated Sludge
- Final Clarifiers
- Disk Filtration Units
- Chlorine Contact Basins
- Return Activated Sludge Pumps

Flowchart:
- SRS: Screened Raw Sewage
- PE: Primary Effluent
- SE: Secondary Effluent
- DFE: Disk Filtration Effluent
- FE: Final Effluent

To Existing Outfall (Splitter at Sweetwater Wetlands)
Proposed Advanced Multi-Barrier Treatment Train

Secondary Effluent

Agua Nueva Wastewater Treatment Facility

Sweetwater Wetlands

Soil Aquifer Treatment
Organics, CECs, Pathogens, Solids

Ozone Treatment

BAC/GAC

Ozonation/Biological Activated Carbon (BAC) Granulated Activated Carbon (GAC)
Pathogens, Organics, CECs

Free Chlorine
Pathogens

Side Stream Nanofiltration
TDS, Organics, Pathogens CECs

Cartridge Filter

40%Q

60%Q

Nanofiltration

Drinking Water to Distribution System
## Treatment Impacts to Chemicals of Emerging Concern

### Before Advanced Treatment: Concentration of Trace Organics in ng/L

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<td>Benzotriazole</td>
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<td>Caffeine</td>
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<td>5.2</td>
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<td>&lt;4.1</td>
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<td>Carbamazepine</td>
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<td>Insect repellent</td>
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<td>Ibuprofen</td>
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<td>Iopamidol</td>
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<td>PFOA</td>
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</table>
Virus Removal by Soil Aquifer Treatment (SAT)

- PCR Method Used
- Concentration represents physical presence of viruses (live or dead), not infectivity
- > 4-log removal achieved through SAT

<table>
<thead>
<tr>
<th>Virus Type</th>
<th>Agua Nueva Secondary Effluent</th>
<th>After Soil Aquifer Treatment</th>
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<tr>
<td>Adenovirus</td>
<td>4</td>
<td>ND</td>
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<td>Pepper Mild Mottle Virus</td>
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<td>ND</td>
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<td>Aichi</td>
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<tr>
<td>Enterovirus</td>
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</table>

ADEQ Advisory Panel on Emerging Contaminants

Find it at:
The Dispose-A-Med Partnership

Protecting the Public and the Environment

Be a central resource to coordinate, educate and promote safe disposal, storage and use of medications to protect public health, the environment and drinking water quality.

Free ● Safe ● Secure ● Confidential
Program Profile

- A national, state and countywide program
- 2009 - Launch in Pima County
- Pioneered by Oro Valley Police to mitigate potential prescription drug abuse
- 2009 - Initially managed by Pima County Wastewater Reclamation to
  - build a coalition to address public health & safety
  - address potential environmental impacts
- 2011 - Program transferred to Health Department
- 2014 - Became a 501c3 non-profit organization
  - affiliated with Center for Pima Basin Sustainability
- Currently a community coalition of 60 members

A Healthy Pima County. Everywhere. Every day.
Improper storage & disposal of medications contributes to potential abuse and poses a threat to the environment and our water supplies:

- Non-medical use of prescription pain relievers is the second-most prevalent form of illicit drug use in the U.S.
- 400% increase in U.S. emergency room admissions & substance abuse treatment centers
- In 2016, 263 accidental and overdose deaths reported by the Pima County Medical Examiner
- The State of Arizona reported 1,493 deaths

This issue affects us all
Dispose-A-Med Specifics

- Secure Drop-off Boxes at Permanent Locations
- Free Community Drug Take-Back Events
- Special Disposal Info
- Outreach and Education
A Healthy Pima County. Every one. Everywhere. Every day.

http://bit.ly/PrescriptionDrugDropBox
Local Dispose-A-Med Take-Back Events

• Sat, June 30, 9 am – noon
  Walmart Neighborhood Market
  7951 N Oracle Rd, Oro Valley

• Sat, August 18, 9 am – noon
  Walmart Neighborhood Market
  7951 N Oracle Rd, Oro Valley

• Tue, September 11, 2018, 9 am – 11 am
  Sun City Oro Valley
  1565 E Rancho Vistoso Blvd, Oro Valley

• Tue, November 13, 2018, 9 am – 11 am
  Sun City Oro Valley
  1565 E Rancho Vistoso Blvd, Oro Valley

• Sat, December 8, 2018, 9 am – noon
  Walmart Neighborhood Market
  7951 N Oracle Rd, Oro Valley

Event info & more is available at
www.DisposeaMed.pima.gov
(520) 724-7911
Special Disposal Tips for:

**ITEMS LABELED**

ACID, FLAMMABLE, CAUSTIC, POISON, CAUTION, TOXIC, DANGER OR WARNING

Drop off at a Household Hazardous Waste site
tucsonaz.gov/es/household-hazardous-waste
(520) 888-6947

**SHARPS NEEDLES, SYRINGES, LANCETS**

- Place sharps in a puncture proof plastic container with a screw-on lid (for example: a rigid detergent bottle)
- Clearly label the container “NON-RECYCLABLE”; secure the lid with duct tape
- Place in a trash container. DO NOT RECYCLE

**LIQUID MEDICATIONS**

- Pour liquid medication into a water-tight container, such as an empty margarine tub
- Mix in used coffee grounds, kitty litter or soil
- Seal it with duct tape
- Place in a trash container. DO NOT RECYCLE
Results: Positive Impacts

Local

- To-date collected **45,049 lbs.** unused/expired drugs
- Participated in **15 National Take-Backs**, 2010-2018

State

- To-date collected **144,885 lbs. (over 72 tons)** unused/expired drugs

National

- To-date collected **9,964,714 million lbs. (4,982 tons)** of unused/expired drugs
- 15th National Prescription Drug Take Back Day destroyed close to **1 million lbs. - 475 tons**

1 lb = 850 pills
45.9 million pills (Pima Co)
20% Opioid = 9.1 million pills

Source: DEA.gov (http://www.dea.gov/divisions/phx/phx.shtml)
Call to Action: Ways You Can Help

- Sponsor a Take-Back Event or a Drop-off box
- Secure drugs in your home
- Volunteer to assist with Take-Back Events
- Properly dispose of medicine, sharps, etc.
- Share info with others about take-back events, drop-off boxes
PAG 2008 Survey Summary

• Responses were primarily from long term facilities (although many other types were contacted).

• Some responses from hospices and hospitals. Difficult to find point of contact with hospitals, might approach corporate offices instead of local branches

• 6.3% dispose in a sink or toilet

• 83% were interested in a take-back program, primarily in site pick up, 55% interested providing feedback about it

• 90% were interested in information about disposal (to share with employees and promote to residents)

• The 2006 report, Hospitals for a Healthy Environment, stated that at hospitals, pharmaceutical waste is generally discarded down the drain or landfilled, except chemotherapy agents.
“How do you envision the Dispose-A-Med Partnership collaborating with EPAC to develop incentives that encourage best practices for disposal by medical facilities and businesses?”
Contact Information

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Jeff Prevatt (520) 724-6040
Jeff.Prevatt@pima.gov

More info is available at
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(520) 724-7911