What’s the Cure for Pharmaceuticals in Wastewater?

California Perspective

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NACWA P3 Workshop
May 17, 2013

Central Contra Costa Sanitary District
Central Contra Costa Sanitary District (Central San)
About Central San

- ADWF of 33.2 MGD (2012)
- Serve 467,500 people and ~3,000 businesses in a 146 mi² service area 35 miles east of SF
- Household Hazardous Waste Collection Program
  - Collect ~2 million pounds of HHW each year
  - Pharmaceutical collection at 11 law enforcement partner agencies in our District (non-controls only)
  - Collected over 35,000 pounds of unwanted medications since program inception 2009
• Drug companies’ revenues climbed more than $200 billion between 1995 and 2010.
• Studies assign that growth to the industry spending $19 on promotion and marketing for every $1 spent on research.
• 2011 US prescription drug sales
  • $227,551,806,436
• 2011 CA prescription drug sales
  • $25,218,537,904
• US Prescription drug sales fell 1% in 2012
  • 1st time since tracking started in 1957
Legislative Efforts

- SB 966 (Simitian) 2007
  - There Ought to Be a Law Contest 2006
    - Intent was to require pharmacies to establish collection for unwanted medications
    - Developed “model program” guidelines
  - Final report to the legislature in December 2010 recommended EPR legislation
Legislative Efforts

- City and County of San Francisco Board Supervisor Ross Mirkarimi introduced a Safe Drug Disposal Ordinance in December 2010.
  - Passed 7-4 on first reading
  - Pharmaceutical industry intervened and persuaded Board to instead opt for a pilot collection program funded by PhRMA and Genentech ($110,000)
  - No major pharmacy chains participated (>70%)
  - 13 independent pharmacies and 10 police stations
  - SF adopted Ordinance requiring all pharmacies to advertise disposal locations
San Francisco’s 2012 Results

Total Pounds Collected:
11,624
Legislative Efforts

- Supervisor Nate Miley introduced Alameda County’s Safe Drug Disposal Ordinance in March 2012; passed 5-0 at first reading
- Industry intervened; complained of not being included in the process
- Series of stakeholder meetings held
- Organizing support was critical
- Adopted unanimously in July 2012, making Alameda the 1st County in the nation to pass an EPR Ordinance for unwanted medications

Supervisor Miley

Kamika Dunlap
LawsuitFiled 12/7/12

The New York Times

Article on 12/7/12 quotes complaint:
“The household trash can is a better and safer alternative, the drug makers say”

- PhRMA, Generic Pharmaceutical Association & Biotechnology Industry Association
- Filed in Federal Court claiming violation of the Commerce Clause of the Constitution
- Alameda filed initial response on 12/28/12
- Alameda just filed a cross-motion for summary judgment on 5/9/13.
Legislative Efforts

• April 2013 Senator Hannah-Beth Jackson (Santa Barbara) introduces SB 727, requiring producers to implement EPR

• Cosponsors include:
  • Clean Water Action
  • CA Product Stewardship Council
  • CA Alliance for Retired Americans
  • Alameda County
  • City and County of San Francisco
Lessons Learned

• The pharmaceutical industry’s lobby should not be underestimated.

• Their arguments against EPR will include:
  • Trash is the answer for drug disposal
  • Cost to implement a statewide program is “considered tremendous and non-absorbable”
  • End-of-life management of drugs is ingestion.
  • They will ask what problem you are trying to solve.
  • Commerce Clause violation

• To take on the pharmaceutical industry, support needs to be organized.
What is the “Cure?”

- Drugs are designed to impact biological systems at low doses.
- Drugs are not designed with the environment in mind.
- Treatment plants aren’t designed to remove dilute concentrations of complex chemicals.
- We can’t yank all existing drugs off shelves and insist that the manufacturers go back and redesign them.
- This is a long-term issue (no cure).
- However...
Do we have to wait until there is a water quality problem?
What is the “Cure?”

• We need to do what we can now to reduce the amount of pharmaceuticals entering the wastewater stream before we get to a problem.
  • Precautionary approach
• Unwanted and expired medications are the proverbial “low hanging fruit.”
Is Trash the Cure for Unwanted Medications?
Origins and Fate of PPCPs† in the Environment
Pharmaceuticals and Personal Care Products

Legend

1. Usage by individuals (1a) and pets (1b):
   - Metabolic excretion (unmetabolized parent drug, parent-drug conjugates, and bioactive metabolites); sweat and vomitus.
   - Excretion exacerbated by disease and slow-dissolving medications
   - Disposal of unused/outdated medication to sewage systems
   - Underground leakage from sewage system infrastructure
   - Disposal of euthanized/medicated animal carcasses serving as food for scavengers (1c)

2. Release of treated/untreated hospital wastes to domestic sewage systems
   - (weighted toward acutely toxic drugs and diagnostic agents, as opposed to long-term medications); also disposal by pharmacies, physicians, humanitarian drug surplus

3. Release to private septic/leach fields (3a)
   - Treated effluent from domestic sewage treatment plants discharged to surface waters, re-injected into aquifers (recharge), recycled/reused (irrigation or domestic uses) (3b)
   - Overflow of untreated sewage from storm events and system failures directly to surface waters (3b)

4. Transfer of sewage solids ("biosolids") to land (e.g., soil amendment/fertilization)
   - "Straight-piping" from homes (untreated sewage discharged directly to surface waters)
   - Release from agriculture: spray drift from tree crops (e.g., antibiotics)
   - Dung from medicated domestic animals (e.g., feed) - CAFOs (confined animal feeding operations)

5. Direct release to open waters via washing/bathing/swimming

6. Discharge of regulated/controlled industrial manufacturing waste streams
   - Disposal/release from clandestine drug labs and illicit drug usage

7. Disposal to landfills via domestic refuse, medical wastes, and other hazardous wastes
   - Leaching from defective (poorly engineered) landfills and cemeteries

8. Release to open waters from aquaculture (medicated feed and resulting excreta)
   - Future potential for release from molecular pharming (production of therapeutics in crops)

9. Release of drugs that serve double duty as pest control agents:
   - Examples: 4-aminopyridine, experimental multiple sclerosis drug used as avicide; warfarin, anticoagulant rat poison; azacholesterol, antilipidemics avian/rodent reproductive inhibitors; certain antibiotics used for orchard pathogens; acetaminophen, analgesic brown tree snake control; caffeine, stimulant cogito frog control

10. Ultimate environmental transport/fate:
    - Most PPCPs eventually transported from terrestrial domain to aquatic domain
    - Phototransformation (both direct and indirect reactions via UV light)
    - Physicochemical alteration, degradation, and ultimate mineralization
    - Volatilization (mainly certain anesthetics, fragrances)
    - Some uptake by plants
    - Respirable particulates containing sorbed drugs (e.g., medicated-feed dusts)
Is Trash the Cure for Unwanted Medications?

Where does leachate go?

NO!
Multi-pronged Approach

- Source control
  - Environmental standards for new drugs
  - Prescribing practices
  - Healthier lifestyles
- Better waste management (EPR)
- Public education
- Monitoring
  - Method development
Moving Forward

• Share information and experiences
• Speak the same language
• Speak the right language
  • “90% excreted vs. 10% direct disposal”
• Stand together and speak as one voice.
• Push hard
Need for Utilities to Push for Strong Action

**BIG SPENDERS:**
**TOP 10 LOBBYISTS OF 2012**

<table>
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<th>Organization</th>
<th>Spending</th>
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<tr>
<td>U.S. Chamber of Commerce</td>
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<td>National Association of Realtors</td>
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<td>Blue Cross/Blue Shield</td>
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Source: Center for Responsive Politics
Long-term Role for Wastewater Agencies
We need to think about what our next steps will be should the pharmaceutical industry prevail against Alameda County.