Unwanted Medicines and Educating our Communities: Experiences from the Great Lakes States

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Main Risks of Improper Disposal Practices

• **Environmental impact**
  • Accumulation in waterways leads to concern about continuous, multigenerational exposure to wildlife

• **Accidental ingestion**
  • Between 2004 and 2005, an estimated 71,000 children (≤18 years of age) were seen in EDs each year because of medication poisonings (excluding abuse and recreational drug use).

• **Illegal use or theft**
  • Appropriation of pharmaceuticals by family and friends, workers in homes, open houses, and burglars

• **Unnecessary waste of healthcare dollars**
Entry Pathways of Medicines into the Environment

- Outflow from wastewater treatment plants
- Surface application of manure and biosolids
- Commercial animal feeding operations and aquaculture
- Landfill leachate sent to wastewater treatment plants
- Septic systems

Figure adapted from A. Boxall, EMBO reports Vol. 5, No. 12, 2004
Unused Patient Medication Disposal

- 4 billion prescriptions are filled in the U.S. annually
- Non-compliance of medication use ranges 35 – 63%

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>2009 MWRD Chicago Survey (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throw Away</td>
<td>Unused or expired meds in household garbage ( n = 444 )</td>
<td>59.0%</td>
</tr>
<tr>
<td>Flush</td>
<td>Unused or expired medications down the toilet or sink ( n = 443 )</td>
<td>31.3%</td>
</tr>
<tr>
<td>Drop Off</td>
<td>Unused or expired medications at a Hazardous Waste Facility or Collection Event ( n = 443 )</td>
<td>8.4%</td>
</tr>
</tbody>
</table>
Medicine Waste Management: Issues and Barriers

- Communicating the issue
- Lack of conclusive research
- Safe disposal
- DEA: Controlled Substances Act
- Funding for staff, disposal & publicity
- Privacy of medical information
- Misinformation
- Convenience
Legislation

National

- National Prescription Drug Abuse Action Plan
- DEA rule changes

Illinois

- Household Pharmaceutical Disposal Fund and amends current legislation (HB2056)
- Illinois Food, Drug and Cosmetic Act Amendment (HB3090)
Outreach

Disposal of Unwanted Medicines: A Resource for Action in Your Community

Content:

1. Introduction to the issue
2. Case Studies of Take-Back Programs
3. How to Hold a Collection Event
4. Materials for Public Outreach and Education
5. Pharmaceutical Donation/Take-Back Legislation
6. International Policy on Medicine Donations
7. Bibliography on Pharmaceuticals, the Environment, and Human Health
8. PowerPoint Presentation

http://www.unwantedmeds.org
Education

• Medicine Chest Curriculum developed in partnership with the P2D2 Program at Pontiac Township High School

• Sensible Disposal Curriculum developed by Purdue Extension and IISG

• Integration of “Do Not Flush” message into displays, games, brochures, billboards, collection boxes
Funding Research

**Study 1:**
Quantifying estrogen compound and nutrient reduction in a coupled wetland and groundwater flow-through system

Illinois State University, Dr. Eric Peterson

**Study 2:**
Trace organics in Lake Michigan: Concentration and detection frequency of pharmaceuticals in the near-shore water column

Ball State University, Dr. Melody Bernot
Partnerships

Great Lakes Sea Grant Network

• Partnership between IISG, Pennsylvania Sea Grant, Ohio Sea Grant, and New York Sea Grant

• Funded by 2010 Great Lakes Restoration Initiative

• Main audiences:
  o Anglers
  o Teachers and students
  o 4-H leaders and youth members
  o Current and future medical professionals (e.g., medical, pharmacy, and veterinary students and practitioners)
What about Veterinary Medicines?

- **Similar risks involved**
  - Environmental impacts
  - Compliance and disposal issues
  - Accidental poisonings
  - Illegal use
  - Unnecessary waste

- **Confined Animal Feeding Operations (CAFOs)**
  - Hormones, steroids and Antibiotics
  - Sapkota et al. (2007)
  - Diclofenac kills vultures in India

- **Domesticated animals**
  - ~ 279 million pets in the US (2006)
  - Pharmwaste from Dog Parks?
<table>
<thead>
<tr>
<th>What we <em>planned</em> to do</th>
<th>What <em>actually</em> happened</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>Research</td>
</tr>
<tr>
<td>Contact Veterinary colleges throughout the US</td>
<td>Contact Vet colleges, only received 3 solid responses</td>
</tr>
<tr>
<td>UIUC Vet School and develop a service learning curriculum</td>
<td>Professors did not have enough class time to include this information, what was available was sparse</td>
</tr>
<tr>
<td>Students would learn the material and then train their peers</td>
<td>Directed to AVMA</td>
</tr>
</tbody>
</table>
Partnership with American Veterinary Medical Association

- Best Management Practices for Pharmaceutical Disposal
  - Minimize unused pharmaceuticals
  - Follow federal and state guidance for disposal
  - Promote use of incineration
  - Landfilling tips, if no alternative
  - Client education strategies

- How can education make a difference?
  - Potential to reach a larger audience through collaboration with Sea Grant
  - Pet owners and their pets
  - Professional membership base of 82,500 veterinarians, comprises ~ 83 – 85%
  - Veterinary student membership of ~ 95 – 100 %
Next Steps

• Memorandum of Understanding
  • In progress between National Sea Grant and AVMA

• How we plan to reach out to pet owners
  • Solidify key messages
  • Provide outreach materials
  • Website development
  • Incorporate the message in Veterinary offices
  • Branch out to other organizations
  • Continue to learn
Thank you!
Questions and comments?

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