Green Pharmacy Campaign

Helping Communities
Safely Dispose of Unused Medicines

www.teleosis.org

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Why Green Pharmacy?

- Of the 4 billion prescriptions to be filled in the US in 2007, the elderly population will waste more than $1 billion of drugs\(^1\).
- On average, 40\% of prescription medicines are not used by patients and are flushed or thrown away.\(^2\)
- There are no city, state, or national programs available to safely recycle these medicines.
- Stored medications in the home are rapidly becoming a major source of accidental poisoning of small children, the elderly, and even pets\(^3\).
- Medication errors result in more than 700,000 emergency room visits each year.\(^4\)
- Drugs flushed down the toilet or thrown in the trash will eventually end up in our drinking water!

* Information sourced from the Community Medical Foundation for Patient Safety
The Problem

Global Pharmaceutical Sales, 1998-2005

Source: EyeforPharma (http://wiki.eyeforpharma.com)
# Global Pharmaceutical Sales by Region, 2005

<table>
<thead>
<tr>
<th>World Audited Market</th>
<th>2005 Sales (US$B)</th>
<th>% Global Sales</th>
<th>% Growth Year-over-Year (Constant $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>$265.7</td>
<td>47.0%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Europe</td>
<td>$169.5</td>
<td>30.0%</td>
<td>7.1%</td>
</tr>
<tr>
<td>Japan</td>
<td>$60.3</td>
<td>10.7%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Asia, Africa and Australia</td>
<td>$46.4</td>
<td>8.2%</td>
<td>11.0%</td>
</tr>
<tr>
<td>Latin America</td>
<td>$24.0</td>
<td>4.2%</td>
<td>18.5%</td>
</tr>
<tr>
<td><strong>Total IMS Audited</strong></td>
<td><strong>$565.9</strong></td>
<td><strong>100%</strong></td>
<td><strong>6.9%</strong></td>
</tr>
</tbody>
</table>

Source: EyeforPharma (http://wiki.eyeforpharma.com)
Emerging Evidence

- March 2008 Investigation by the Associated Press:
  - Traces of pharmaceuticals — including antibiotics, anti-convulsants, mood stabilizers and sex hormones — were found in the drinking water supplies of 24 metropolitan cities, affecting 41 million Americans.  

- 2002 Report from the U.S. Geological Survey:
  - 80% of the waterways sampled included common medications such as acetaminophen (24%), the hormone estrodial (16%), Ditiazwm – a blood pressure medication (13%), Codeine (11%), and antibiotics (10%).
A Growing Problem

- U.S. EPA Office of Research and Development’s Strategy Plan 2000 named pharmaceuticals and personal care products (PPCPs) as one of the top five “emerging” contaminants affecting human and ecological health

- The increase in drug use coincides with an increase in the amount of medications that enter into and contaminate the environment.
Drug Portal to the World

adapted by Daughton from Ternes (April 2000)
How Do Pharmaceutics Enter The Environment?

- **54%** of people throw medicines into the trash\(^8\)
- **35%** of people flush medicines down the toilet\(^8\)
- **95%** of antibiotics are excreted unaltered into the environment\(^9\)
  - 90% come from agricultural uses
- Wastewater treatment cannot remove medicinal compounds
Health of Ecology vs. Ecology of Health

- How the environment effects us!
- Research found that a mixture of 13 common medications found in drinking water inhibits cell growth and causes negative changes in human embryonic cells\(^{10}\)
- More research is needed!
- Precaution is required!
Green Pharmacy Pilot Program

Free and safe disposal for unwanted medicines
- Launched in May 2007
- 15 active take-back sites in the Bay Area
- Community recycling events
- Collected over 1000 pounds of unwanted medicines
- Pilot study documents all returned medicines

Educates the public and health professionals
- Educational brochures: Green Pharmacy Program; Drugs In Our Water
- Symbiosis Journal: Pharmaceutical Pollution Prevention Issue
- Teleosis Website & Newsletter
Purpose of Green Pharmacy

- Reduce pharmaceutical pollution
- Provide environmentally safe disposal solutions
- Assess the quantity and value of household pharmaceutical waste
- Document which medicines are most commonly unused
- Engage all stakeholders (manufacturers, health professionals, government, consumers, waste haulers, etc.)
- Promote cradle-to-cradle product stewardship
- Develop a program that can be replicated nationwide
- Foster a model health that uses personal wellness strategies in minimizing pharmaceutical waste
Preliminary Data
from 6/1/07 to 12/31/07

- 690 Pounds of drugs collected
- 101,359 Estimated number of returned pills, capsules, tablet
- $400,000 Estimated retail value of unused medicines
- 60.43% Prescriptions
- 39.14% Over-the-counter
- 2.15% Controlled substances (turned away)

Percentage of Medications Wasted
- 52% Over-the-counter medicines were unused
- 45% Prescription medications
Preliminary Data
from 6/1/07 to 12/31/07

- Reason for Return Medicines
  - Expired/outdated 72.14%
  - Patient died/moved away 15.74%
  - Patient didn’t want to take it 4.88%

- Origin of Returned Drugs:
  - Pharmacy 46.22%
  - Doctor’s office 30.85%
  - Hospital or clinic 5.67%
Preliminary Data 2007

Top 10 Therapeutic Agents Returned:

1) CNS agents (central nervous system) 22.62%
2) Nutritional products 14.29%
3) Psychotherapeutic agents 12.51%
4) Gastrointestinal agents 8.99%
5) Cardiovascular agents 8.77%
6) Respiratory agents 6.00%
7) Anti-infectives 6.00%
8) Alternative medicines 5.69%
9) Hormones 4.60%
10) Immunologic agents 2.85%
Preliminary Data 2007

Top 10 Brand Name/Generic Drugs Returned:
1) Acetaminophen
2) Aspirin
3) Tylenol
4) Vitamin E
5) Prednisone
6) Ibuprophen
7) Warfarin
8) Topamax
9) Etodolac
10) Gabapentin
Growth in Quantity of Prescriptions

Billions of Prescriptions

Pharmaceutical Expenditures and Cost of Waste 2008

- Pharmaceutical Expenditure $243 Billion Dollars

Costs of Collected Waste Based on Green Pharmacy 2008

- Cost to dispose $70 Million Dollars
- Average Retail Value $7.8 Billion Dollars

Potential Cost of All Available Pharm Waste in The US

- Cost to Dispose $610 Million Dollars
- Potential Retail Value $71 Billion Dollars
Pharmaceutical Expenditures and Cost of Waste

Projections are based on Green Pharmacy 2007 Preliminary Report 14
Cradle to Cradle Medicine

- In theory, waste occurs when the prescription isn’t effective
- If we get to the point where we have no leftover drugs, will that lead to improved therapeutic outcomes?
- Will learning about what is unused will improve the quality of medical care?
  - Christian Daughton, PhD  Senior Scientist EPA
Green Pharmacy Program

- A proactive, voluntary holistic stewardship program
- Cradle-to-Cradle Product Stewardship
- All sectors involved with the production, distribution, prescribing, marketing, and consuming of medicines should be involved with proper disposal.
Cradle-to-Cradle Product Stewardship

- Manufacturing Sector
  - Pharmaceutical Manufacturing
  - Reduce ecological footprint
  - Reduce packaging, extend expiration dates
  - Green Chemistry
- Health Care System
  - Hospitals
  - Primary Care
  - Hospice
  - Pharmacies
Cradle-to-Cradle Product Stewardship

- Government and Law Enforcement
- Waste Management Agencies
- NGO- Environmental Organizations
- Consumers
- Who pays
  - Pharmaceutical Industry
  - Waste management industry
  - Advanced Recycling Fee
  - Medical Profession
What Physicians Can Do

- Only prescribe the amount of medicine you would like your patient to take.
- Review and regularly reassess the patient’s total consumption of medication.
- Consider environmental impact when prescribing medications.
- Learn more about which drugs have large environmental impacts.
- Educate consumers about the importance of proper disposal of pharmaceutical waste.
- Educate patients about the value of health promotion and healthy lifestyle.
What We All Can Do!

- Dispose of unwanted medications at take-back sites or events
- Do NOT dispose of any medication down the toilet or in the trash
- Purchase drugs in small amounts, limiting expired medications
- Ask for medications with low environmental impact
- Encourage your provider to take-back unwanted drugs
- Share the message of safe disposal with family and friends
- Commit to wellness strategies to reduce your reliance on medications
References

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