



Michigan Department of Environmental Quality

# Pharmaceutical Waste Tutorial



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**DEQ**



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# Environmental Assistance Center

**Phone:** 1-800-NO2-WASTE  
(1-800-662-9278)

**Hours:** 8:00 AM to 4:30 PM  
Monday – Friday

## Compliance Assistance Services Include:

Air  
Waste  
Water  
Site Clean-up

Environmental Audit Privilege  
Brownfield Redevelopment  
Release Reporting  
Permit Coordination



# Tutorial Topics

- ✓ **Environmental Concern**
- ✓ **Simplest Compliance Option**
- ✓ **Preferred Disposal Method**
- ✓ **Web Resources and Navigation**



# Why Be Concerned?

Pharmaceuticals were first detected at low levels in our nation's waters in the 1970's

Recent studies have confirmed the presence of pharmaceuticals in many lakes and streams, including Michigan's waters (see <http://www.epa.gov/ppcp/lit.html>)

**More information is showing they are present and persistent in our environment**





# Why Be Concerned?

Ground water and surface water is the *water resource* that is used for our drinking water supply





## Why Be Concerned?



Environmental testing has shown materials like sleep aids, blood pressure meds, birth control, antidepressants, and various other medications in our water.

The U.S. EPA continues to study the matter to determine a specific course of action on a grander scale as people take more and more medications.





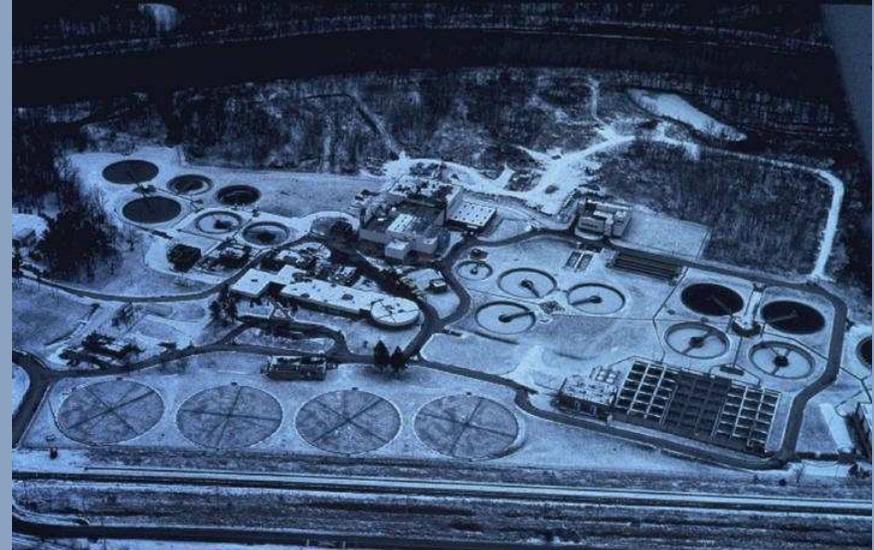
# Why Be Concerned?

Most of the medications end up in our wastewater system through excretion

Most of our wastewater treatment systems are not equipped to remove pharmaceuticals

A good amount of the pharmaceuticals we buy go unused and need to be disposed

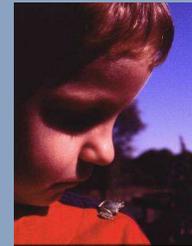
**Aerial Photograph of a  
Waste Water Treatment Plant**





# Why Be Concerned?

There are no known health risks to people at these low levels



Some research has shown impacts to amphibians, fish, and wildlife



Medication production and use is expected to continue to increasing each year

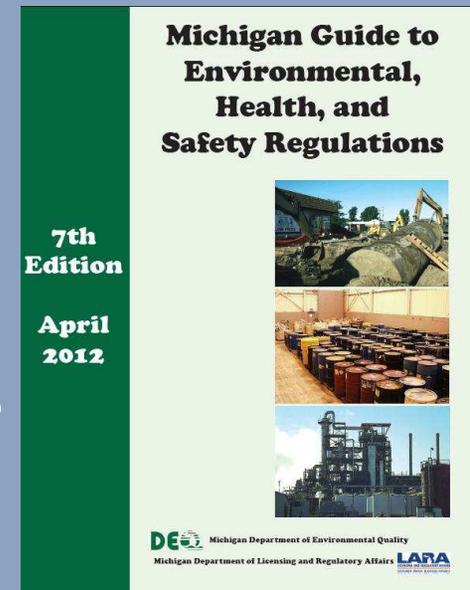




## Why Do I Need to Know All of This?

Hazardous and liquid industrial waste regulations...

- ✓ Apply to all businesses, including municipalities, hospitals, & service industries, not just manufacturing industries
- ✓ Are written broadly to address hazards posed by all waste streams



[www.michigan.gov/ehsguide](http://www.michigan.gov/ehsguide)



## Why Do I Need to Know All of This?

**Hazardous waste regulations require each business, by site to:**

- ✓ **evaluate the character & composition of their wastes**
- ✓ **determine the total weight of all hazardous waste generated monthly**
- ✓ **determine their legal disposal options**



# Why Do I Need to Know All of This?

Drugs are generally a ...

- ✓ **Hazardous Waste (Part 111 of Act 451) - listed or characteristic hazardous waste (ignitable, corrosive, reactive, or toxic); includes both solid and liquids**
- ✓ **Liquid Industrial Waste (Part 121 of Act 451) – non-hazardous, liquid waste**
- ✓ **Non-hazardous solid waste (Part 115 of Act 451) – non-hazardous, solid waste (regular trash)**

**WASTE MANAGEMENT GUIDANCE**

### WASTE CHARACTERIZATION

Businesses need to determine if the waste they generate is hazardous or non-hazardous. If the materials used, or the process generating the waste changes, or there are other impacts from business operations that may change the waste (e.g. cross contamination from aerosol overspray), it will be necessary to re-evaluate the waste characterization. The regulations do not require a specific timeframe (like annually) to re-evaluate the waste. You may want to check if the disposal company has a retesting schedule.

Keep any records obtained during waste determinations (i.e., test analysis results, material safety data sheet (MSDS), or other documentation such as product information from a supplier or manufacturer) at least three years from the time the waste stream was last sent for treatment, storage, or disposal.

**Who can do waste characterizations for a business?**

A business may either:

- ▶ Hire a consultant or use a disposal company's waste characterization services. Be aware the waste generator is still ultimately responsible for meeting the waste regulations.
- ▶ Characterize the waste themselves by either:
  - Using knowledge of the material and the process it came from, information from the material safety data sheets (MSDS), supplier and manufacturer literature, or other documentation may be useful when you have unused product needing disposal. A MSDS often provides information about the flashpoint, pH, or if a discarded product is a hazardous waste. A MSDS is not completely reliable for determining if a used material is hazardous waste because it does not include information about contaminants that might be in that waste. A waste stream may be presumed to contain certain constituents above regulatory thresholds for compliance purposes, but disposal facilities may still require testing before accepting a waste stream.
  - Having a representative sample of the waste tested.

**What are testing requirements?**

It is recommended a business or consultant contact the disposal company before testing. They might require specific tests or only accept data from specific laboratories. Ask the disposal company for a list of these tests, the purpose of the tests, approved testing methods, and acceptable laboratories. This step will prevent you from spending money on laboratory tests that are not necessary or do not meet the disposal company's requirements. The waste rules identify which laboratory methods can be used. If the waste is from cleanup activities, see the methods in the [Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria](#) but before testing discuss your cleanup situation with MDEQ staff.

It is wise to obtain estimates from two or more laboratories. In some cases, the tests will save you money by showing that you do not have hazardous waste. When hiring testing services, use a reputable firm and obtain a written contract. The contract should clearly identify which specific services the company will provide. For example, instead of vague language about sampling waste, identify:

- Who is responsible for collecting samples?
- Who will arrange to have it analyzed?
- Who will arrange to have an expert look at the analysis results?
- Who will determine if the waste is hazardous and at which regulatory limit?



## Why Do I Need to Know All of This?

Approximately 15% of pharmacy's inventory meets the definition of hazardous waste

Conditionally Exempt Small Quantity Generator – Only sites that meet the Requirements can lawfully handle their hazardous waste under less strict standards, and that's assuming a non-hazardous disposal facility can and will lawfully accept the exempted hazardous

### WASTE MANAGEMENT GUIDANCE

#### CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR REQUIREMENTS

The Waste and Hazardous Materials Division (WHMD) oversees requirements for Conditionally Exempt Small Quantity Generators (CESQG) of hazardous waste. Hazardous waste includes both characteristic and listed wastes as defined by the federal Resource Conservation and Recovery Act (RCRA) [40 CFR Part 261](#) and state regulations per [Part 111](#), Hazardous Waste Management, of the Natural Resources and Environmental Protection Act 1994 PA 451 (NREPA), as amended, and [Part 111 administrative rules](#) (see Part 2 Identification and Listing of Hazardous Waste).

To be a CESQG, a facility would:

- Generate in a calendar month less than 220 pounds (100 kg) of non acute hazardous waste. As an estimate of liquid waste, this is approximately 25 gallons or less depending on the density of the hazardous waste.
- Generate in a calendar month 2.2 pounds (1 kg) or less of acutely toxic or severely toxic hazardous waste. Acutely hazardous wastes have "P" in their waste number and severely toxic wastes are those with an "G" in their waste number. Additional acutely hazardous wastes are identified by an (H) in the hazard code column of other listings.
- Accumulate less than 2,200 pounds of non acute hazardous waste (approximately less than four 55 gallon drums), and less than 2.2 pounds of acutely toxic or severely toxic hazardous waste.

Only hazardous waste is counted when determining the generator status. This amount does not include used oil being recycled and other nonhazardous liquid waste. If the amount of hazardous waste generated or accumulated exceeds the above CESQG limits, the facility must manage the waste according to the [Small Quantity Generator \(SQG\)](#) or Large Quantity Generator requirements.

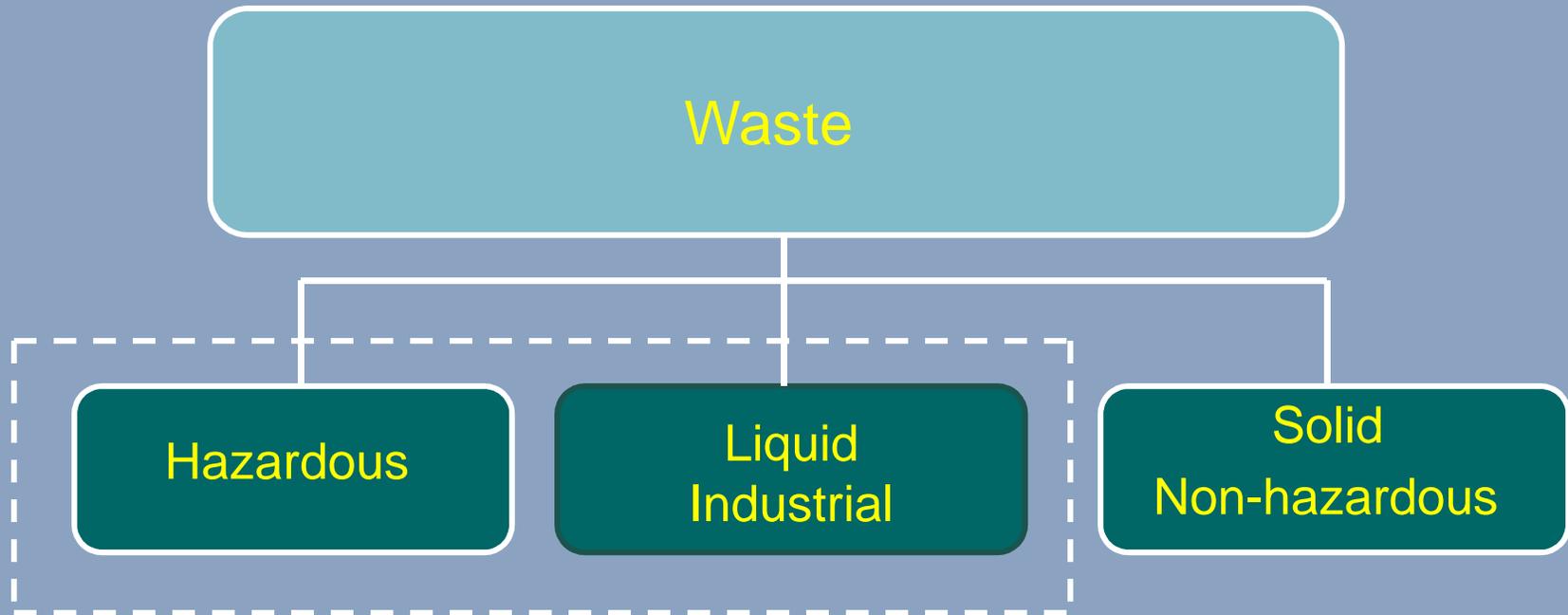
When CESQGs generate liquid hazardous waste, the company has the option to handle it as hazardous waste, but it is usually handled and shipped as liquid industrial waste per Part 121, Liquid Industrial Waste, of NREPA. There are some disposal companies that require it to be handled as hazardous waste.

This guidance summarizes CESQG requirements per administrative rule [R 289.3205, 40 CFR, Part 261.5](#), and non hazardous liquid wastes per [Part 121 of Act 451](#). Used oil has requirements under both Parts 111 and 121. The [Michigan State Police, Motor Carrier Division](#) and the [US Department of Transportation](#) (US DOT) oversee transportation requirements when the waste is a hazardous material under their regulations. CESQGs should contact the landfill or incinerator authority about what types of solid waste they accept and [banned waste](#), which is regulated under [Part 115 of Act 451 and rules](#), and whether or not they will take any hazardous waste in a solid form.

Links to the DEQ waste resources throughout this document are available at [www.michigan.gov/deq/waste](http://www.michigan.gov/deq/waste) "Hazardous & Liquid Industrial Waste" "Hazardous & Liquid Industrial Waste Management."



## Why Do I Need to Know All of This?



Subject unless excluded:

- Hazardous if listed or characteristic
- Liquid industrial if free liquids



## Why Do I Need to Know All of This?



Pharmaceutical waste includes **ONLY** waste medication or drugs

Pharmaceutical waste does not include infectious, regulated medical waste

Regulated medical waste includes things like blood, organs, body tissue, body fluids, and sharps



## Medical waste should not be mixed with pharmaceutical waste

When medical is mixed with pharmaceutical waste, the mixed waste:

must be managed to meet the requirements of both the pharmaceutical waste and medical waste regulations; and will drive a premium disposal cost





## Tutorial Topics

**This tutorial is limited to managing pharmaceutical waste**



**It does not apply to medical waste handling**

**It focuses on the handling requirements for pharmaceutical waste or drugs alone**

**For information on handling medical waste, go to [www.michigan.gov/deqmedwaste](http://www.michigan.gov/deqmedwaste)**



# Target Audience

- **Doctor Offices**
- **Veterinary Offices**
- **Retail Pharmacies**
- **Home Health Care Facilities  
with Pharmacy Dispensing**



# Simple Management Option

Tutorial advocates:

- ✓ **COMINGLING** all pharmaceutical waste (hazardous, non-hazardous, liquid, and solid) during collection
- ✓ Managing all pharmaceuticals as a **UNIVERSAL WASTE**



<b>universal waste</b>	
contents	_____
accumulation start date	_____
shipper	_____
address	_____
city, state, zip	_____



# Universal Waste Benefits

Primary benefits of managing materials as universal waste include:

- No documenting non-hazardous determination
- Longer storage time, generally (1 year)
- Weight of waste not counted in monthly hazardous waste generator status inventorying
- Reduced generator status (less regulation)
- less labeling



# Universal Waste Overview

- Place in compatible, good condition container
- Maintain container closed
- Segregate Incompatibles
- Date Container
- Label “Universal Waste Pharmaceutical”
- Ship to Universal Waste Handler or Universal Waste Destination Facility within 1 year
- Train to ensure employees properly handle waste and respond to emergencies
- Immediately clean-up any release and properly characterized for disposal





# Hazardous Waste

Cannot be managed as a universal waste:

- Spill clean-up from hazardous waste pharmaceuticals
- Contaminated personal protective equipment from hazardous waste pharmaceuticals





# Preferred Disposal Method

**The environmentally preferred disposal method for pharmaceuticals is incineration**



**It destroys the chemicals and prevents them from cycling in our environment**



# Cost Implications

- **Commingling is generally more cost effective for sites with smaller volumes of pharmaceutical waste**
- **Sites with larger volumes can offset increased training, container management, and drug labeling costs with greater reductions in disposal costs**





# Hazardous Waste Examples

Coumadin (Warfarin  $\leq$ .3%) – listed (U248)

Coumadin (Warfarin  $>$  .3%) – listed (P001)

Arsenic Trioxide – listed (P012)

Silver Nitrate cream – toxic, ignitable (D011, D001)

Selsun Blue – listed (U205)

Afrin – toxic (D009)

Rubbing Alcohol – ignitable (D001)

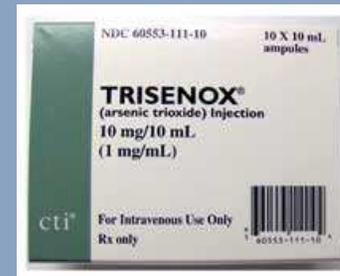
Preparation H – toxic (D009)

Nyquil – ignitable (D001)

Nitroglycerin – toxic (P081)

Nicotine & salts – toxic (P075)

Barium Hydroxide Crystals – toxic (D005)





# Hazardous Waste Examples

**Epinephrine – listed (P042)**

**Phentermine – listed (P046)**

**Chloral Hydrate – listed (U034)**

**Chloroform – listed (U034)**

**Strychnine – listed (P108)**

**Ammonia inhalants – ignitable (D001)**

**Alcohol (denatured ethyl, ethyl, isopropyl alcohol) – ignitable (D001)**

**Carbolic acid – corrosive (D002)**

**Clinatest – reactive (D003)**

**Dry Picric Acid – reactive (D003)**

**Benzoic Acid – listed (P188)**





# Liquid Industrial Waste Examples

## IV Solutions Containing:

- Potassium Chloride
- Sodium Phosphate
- Calcium
- Sodium Bicarbonate
- Dextrose
- Saline



## Non-hazardous liquid medications like...

- Benadryl
- Augmentin
- Amoxicillin
- Acetaminophen





# Non-hazardous Solid Waste Examples

## Non-hazardous solid medications like...

- Benadryl
- Zocor
- Augmentin
- Avandia
- Amoxicillin
- Acetaminophen



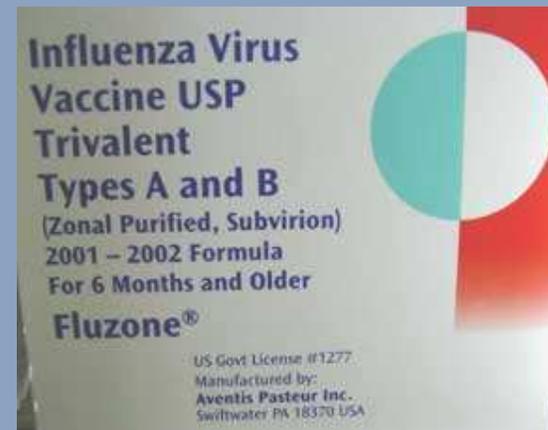


## Mixed Medical or Dual Waste Examples

**Influenza Vaccine, thimerosal preservative – toxic (D009)**

**Pneumococcal Vaccine, Phenol Preservative – toxic (U188)**

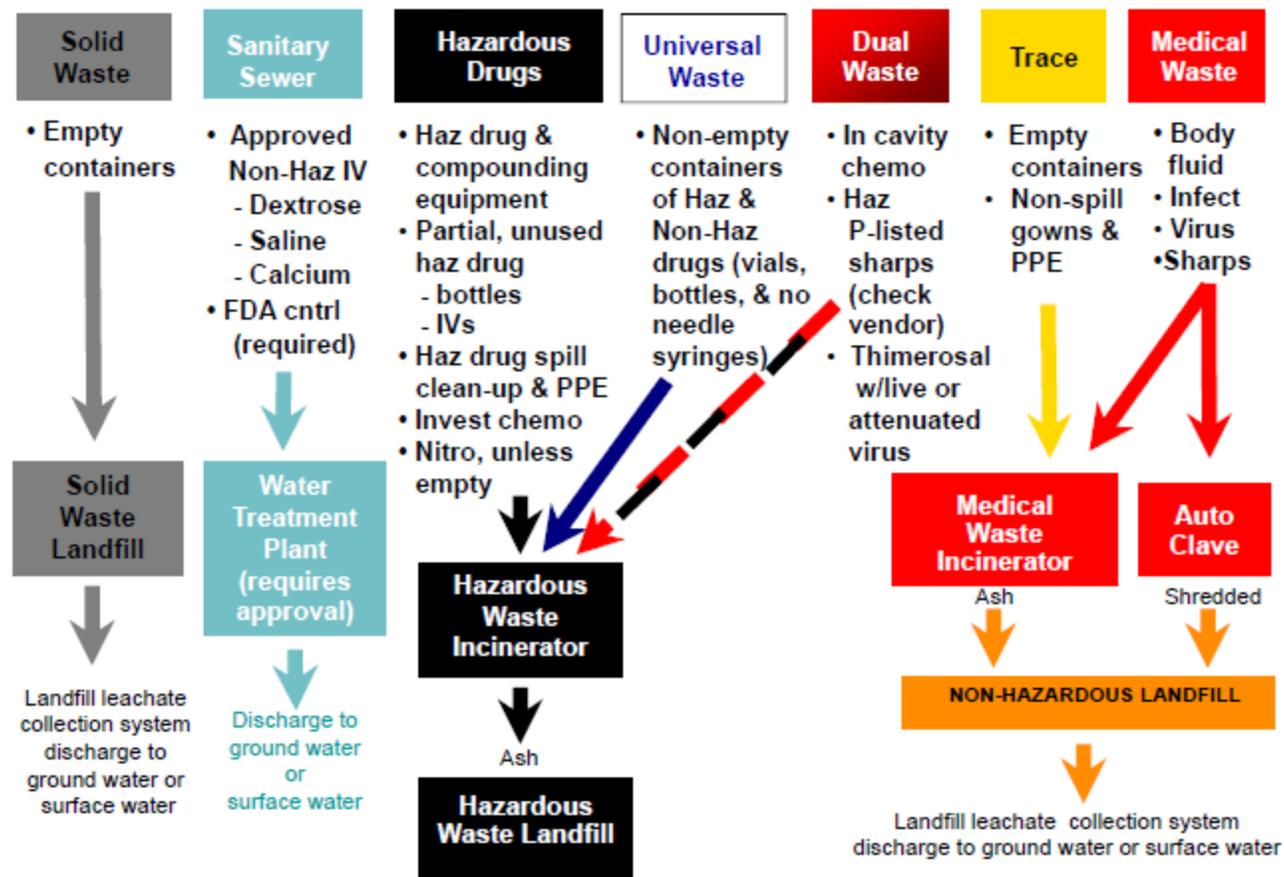
**Fluogen with thimerosal – toxic (D009)**





# Example Pharmaceutical Posting

## MHA Guide Example Pharmaceutical Chart





# How to Find Web Resources

Start at [www.michigan.gov/deqhealthcare](http://www.michigan.gov/deqhealthcare)

Note Pollution Prevention Resources are on the left and Compliance Assistance Resources are on the right

The tutorial under the “Announcement” heading along with the MHA Guide Webinar will be eventually be relocated to the “Waste Health Care Resources” Web page



# Resources Use

## Commingling –

- Read intro sections to the MHA Guide
- Review Universal Waste Guide Sheet (in MHA Guide)
- Read Universal Waste Guidance (use link from MHA Guide)

## Segregating –

- View Pharmaceutical Webinar
- Read entirety of MHA Guide along with all Guide Sheets and work with your disposal vendor



## Wrap Up

- **Simplest approach – commingle drugs and manage them as a universal waste**
- **Sustainable approach - send them for incineration**

**We can readily manage our drug waste inventory, but we can't easily control excreted pharmaceuticals**

-



# Compliance Resources

## More Questions?

Go to [www.michigan.gov/deqhealthcare](http://www.michigan.gov/deqhealthcare)

Contact the Environmental Assistance

Center at 1-800-662-9278 or [deq-assist@michigan.gov](mailto:deq-assist@michigan.gov)

Contact Christine Grossman at 517-373-0590 or  
[grossmanc@michigan.gov](mailto:grossmanc@michigan.gov)





# Additional Resources

## Pharmaceutical Pollution

- ✓ <http://www.epa.gov/ppcp/lit.html>
- ✓ <http://toxics.usgs.gov/regional/emc/>
- ✓ <http://www.epa.gov/oig/reports/2012/20120525-12-P-0508.pdf>

## Pharmaceutical Regulations

- ✓ [http://www.jointcommission.org/standards\\_information/jcfaqdetails.aspx?StandardsFAQId=91&StandardsFAQChapterId=64](http://www.jointcommission.org/standards_information/jcfaqdetails.aspx?StandardsFAQId=91&StandardsFAQChapterId=64)
- ✓ <http://www.epa.gov/waste/hazard/generation/pharmaceuticals.htm>

A young child with blonde hair, wearing an orange hoodie and blue jeans, stands on a rocky beach. The child is facing away from the camera, looking out at a large suspension bridge with two tall towers and green cables. The bridge spans across a body of water with white-capped waves. The sky is clear and blue. The text "THANK YOU FOR PROTECTING MICHIGAN'S ENVIRONMENT!" is overlaid in white, bold, sans-serif font on the left side of the image.

**THANK YOU  
FOR PROTECTING  
MICHIGAN'S  
ENVIRONMENT!**