

**CONNECTING THE MESSAGES**  
**Pharmaceutical Awareness As a Pathway To Wastewater Education.**  
Dendra J. Best & Dr. Richard Otis

**ABSTRACT**

In April of 2008, EPA Region 5 issued the Great Lakes Earth Day Challenge: “to collect and properly dispose of old and unused, expired or unwanted medicine. EPA's goal was to collect at least 1 million pills to keep contaminants out of the Great Lakes.” **(The total actually collected exceeded 4.5 million...)** Onsite Wastewater of Northwest Michigan 501(c)3 [OWNWMI] considered taking part in this one day event but chose instead to invite community leaders to discuss creating a regional, collaborative program that would provide a continuing solution rather than a one day event.

In response to this idea, Grand Traverse Regional Community Foundation [GTRCF] awarded two grants to OWNWMI in 2008. Grant One funded a 130,000 print run of “Water To Waste” a biennial wastewater education publication “Water = Energy! If Water is the new currency, do we have enough water to waste?” Available in web format at [www.michigan-onsitewastewater.org](http://www.michigan-onsitewastewater.org) In plain english, this 16 page newspaper insert provided public education on how wastewater treatment systems work; the relationship of wastewater system choices to land use and development; the science of how biology, chemistry, and technology treats wastewater returning potable water to the environment; and the responsibility of both government and individuals to become knowledgeable and make informed decisions.

A two page section was devoted to the public’s unsubstantiated assumption that wastewater systems, be they home septic or municipal plants, safely break down and treat ever multiplying sources of man made compounds. GTRCF Environmental Fund expressed concern that detectable levels, albeit in miniscule quantities, are consistently found in area ground and surface waters. The short and long term consequences, plus cumulative activity in the food chain, in water systems and native species are of increasing concern for water-rich northwest Michigan. Do we know enough to be concerned? How do we raise awareness of the potential impact of pharmaceutical products?

As a result of positive feedback from “Water To Waste”, GTRCF awarded a Second Planning Development Grant to form a “Pharmaceutical Collection and Safe Disposal Public Education Task Force.” Rather than organize a one-day ‘bring back’ event, OWNWMI’s intent was to seek collaboration to pool resources and create an ongoing, sustainable program for collection and safe disposal of pharmaceutical products. We saw this as an opportunity for motivating both existing and new partners, plus the general public, to think about how wastewater systems were designed to work and why the toilet should not be used as a trash can.

A timely, three-part, Associated Press series on drug traces in America's drinking water supplies and growing concerns about their effects, prompted an overwhelming consensus that, though the consequences of long term exposure to many pharmaceutical products is unknown at this time, addressing education and prevention at the source should be the first step. This paper discusses how we coordinated our efforts to “connect these messages” and with what results.

## **INTRODUCTION**

Onsite Wastewater of Northwest Michigan [OWNWMI] is a 501(c)3 regional collaborative of regulatory, environmental, local government and professional organizations who share this public education purpose: *“To increase awareness, that water quality is directly linked to the use of appropriate wastewater systems and their management.”* OWNWMI seeks out opportunities to build partnerships with stakeholders and agencies - many of whom would normally either be in competition with, or opposition to, each other or may not have seen the advantages of partnering in the first place..

We have been extremely fortunate, and thankful, for the support of Grand Traverse Regional Community Foundation Land Use and Conservation Planning Endowment Fund. Our mutual interest, to focus on the potential environmental impact of pharmaceutical products, stems from the fact that our area has developed into one of the top 100 medical communities in the country. A major employer, and reason for an ever increasing influx of retirees, we have a premier hospital system, associated specialty clinics, a burgeoning satellite system of primary and specialist providers, retirement and assisted living facilities and a wealth of home care options. Our area is obviously has the potential to be impacted by transfer of pharmaceuticals to the waste/water stream: either by ingestion or disposal. This paper describes our choice to focus on the latter.

We needed to connect the message that WWTP’s discharge to surface waters and septic systems discharge back to groundwater from which communities and individuals derive drinking water. To accomplish this, the project began with the following questions: who is testing surface, drinking or discharge waters from both WWTP’s and onsite systems?, what are they testing for?., what do we know?., what would we like to know?, - how can we coordinate a regional pharmaceutical collection and safe disposal program?, how do we educate the public why and how to use it?

The challenge was to be informative without being alarmist or sensationalize the topic. Medical progress prolongs life and the quality of life but pharmaceutical residuals have the potential to fundamentally alter ecosystems and consequently, human health. We determined that we simply do not have sufficient data that are locally relevant to prove evidence of toxic levels of Rx in surface or groundwater. Therefore, we commenced our own research and education. The Team agreed not to wait until to start connecting the messages but to be proactive.

## **METHODS**

In 2008, GTRCF awarded a Management and Organizational Development matching grant to Onsite Wastewater of Northwest Michigan to assess the feasibility of forming a “Pharmaceutical Collection and Safe Disposal Public Education Task Force”. We were required to match the award and were able to do so from Joyce Foundation funds, which covered the consulting services, and from the in-kind contribution of participants.

In preparation for the project, OWNWMI Board Members and Staff created a desired list of participants. Organizations and individuals were identified from across a broad spectrum of water and wastewater providers, regulators, environmental groups, physician and pharmaceutical providers, and local government. Prospective participants were contacted in person to assure them that their specific professional constraint and expertise was valued, that no one was commencing this project from any preconceived viewpoint, and that the intent was not to view anyone as an adversary. The final Team partners received a written invitation together with a short list of resource reference materials. [See Appendix 1 and 2] Invitees included: Munson Medical Center, area clinics, Commission on Aging, Conservation District, Resource Recovery Agency, major Health Insurance companies, municipal water and wastewater providers, watershed and environmental agencies, Sea Grant, Michigan Department of Environmental Quality Pollution Prevention, Michigan Rural Water Association, Michigan Environmental Health Association, State and City Police and County Sheriff, Michigan Water Environment Association (MWEA) Onsite Wastewater and Public Education Committee Chairs, Michigan Veterinarian Medical Association, and all local Health Departments.

Our first task was to establish and agree to guiding, shared, principles for our work.

They were:

- not to reinvent the wheel but review other successful pharmaceutical collection programs.
- to be sensitive to the medical community and not present them as the ‘problem’.
- to determine what testing for pharmaceutical residuals was currently being done in area surface waters - and the potential cost and scope of testing.
- to create a branding logo and an agreement that each participant would relay the same consistent message.
- to create a plan that was workable, simple, cost effective and coordinated existing providers.
- to use the issue of pharmaceutical disposal as a means to conduct companion water resource appreciation/conservation education. If ‘we are what we eat’ then we are also ‘what we drink’!
- to involve local law enforcement because collecting and disposing of unwanted and unused prescription drugs is of equal importance to them. Street value and abuse of prescription drugs has soared as have home and pharmacy break ins.
- become knowledgeable of law governing collection and disposal of controlled substances as defined by Drug Enforcement Agency and the issues this presents for collection programs.

At that meeting, it was determined that embarking on a scientific, rigorous program of testing fell outside the scope of this project. Moreover, with millions of combinations of pharmaceutical

chemicals likely to be present, what to test for and the potential prohibitive cost gave rise to considerable discussion. Of equal concern is the inability to point to a definitive research study which lists universally accepted standards for cumulative health risks. Without being able to answer the public's obvious question "how much is dangerous?" The team believed that raise concerns without conclusive data would be less effective than developing a plan for the simple purpose of preventing pharmaceutical transfer at the source. We were also sensitive to the fact that alleviating a medical condition outweighs the potential of violating the public's sense of decency and privacy over frank discussion of how to use the toilet. As a future goal, antibiotics, endocrine disrupters, anti inflammatory medications, cancer treatment compounds, and pharmaceuticals used to treat psychological conditions were listed as a priority for local research funding applications both to determine residual levels and also best methods for water treatment. To minimize waste, and for ease of reference, all resource documents were burned to a CD and a PDF reference web site was created to enable partners to post additional contributions.

Although we had hoped for widespread support of invitees there were some notable absences. We are still working to engage 2 critical partners - and are sensitive to the probability that those choosing to stay on the sidelines may be doing so because the negatives are perceived as outweighing the benefits. There is still work to be done to bring certain stakeholders to the table.

Following the first day long meeting, however, a core group of partners emerged. It consisted of Local Health Departments, environmental groups, Resource Recovery (who coordinate local Household Hazardous Waste Collection Days), Commission on Aging, Michigan Department of Environmental Quality Pollution Prevention, Michigan Rural Water Association, Michigan Environmental Health Association, together with John Campbell of Big Fish LLC, a private septage receiving facility in Charlevoix, MI. Big Fish is currently engaged in a research program to examine pharmaceutical residuals in septage influent and effluents with Dr. Joan Rose of Michigan State University.

A graphic was designed to be an immediate attention grabber.

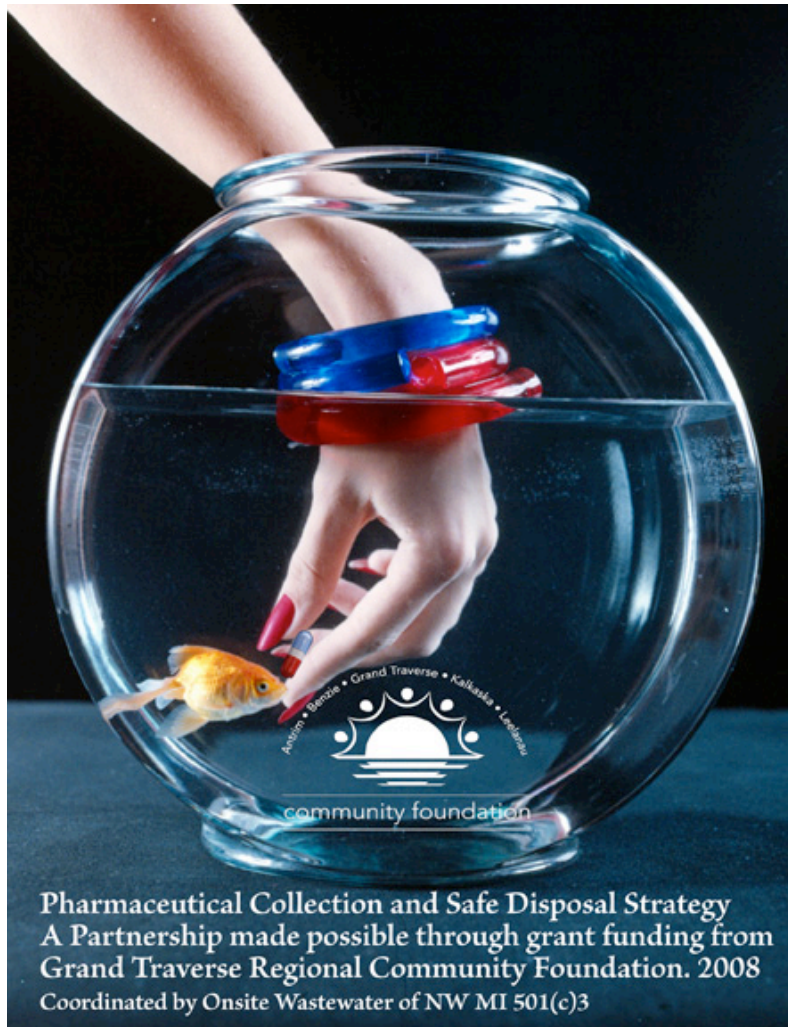


Figure 1. Image used for branding. ©Jupiter Images.

The graphic intentionally leaves top space for participating partners to insert their own logos.

The Team reviewed many similar programs from throughout the US and chose to emphasize the following:

- Medications save lives or greatly improve the quality of life - but individuals are responsible both for proper use, securing their prescriptions to prevent theft or abuse, and proper disposal of unused and unwanted items.
- To avoid sensationalizing the message but identify specific ramifications of residual pharmaceutical products in the environment AND OFFER SOLUTIONS!  
i.e: we know that large amounts of certain products can effectively kill the natural processes at work in a standard septic system - but whether this is considered as a potential problem assumes system owners know how those processes work in the first place!
- What technologies exist to filter products in a septic system or at the WWTP? Dr. Otis would liaise with the Wisconsin Onsite Wastewater Recycling Association's septic tank testing research.
- As far as possible utilize already existing materials [as distributed to all on the resource CD]

- All literature has to be factual, legal, workable.
- Agree that each Team partner mirror the same web page - each entity should have editorial review rights, recognizing that each brings specialty knowledge to the subject and the issue is too important not to be consistent.
- Consult with Long Term Care and Hospital facilities concerning EPA's Information Collection Request concerning Effluent Limitation Guidelines.
- Questions: a) what is your current practice, what would you like it to be?  
See: <http://www.epa.gov/waterscience/guide/304m/2008/hsi-icr-200807.html>

## **Background**

In the final 2006 Effluent Guidelines Program Plan, published in December 2006, EPA announced plans for a study of the health care industry. EPA is very concerned about how pharmaceuticals enter our nation's waterways. To address this issue at the source, EPA must first understand the extent of disposal of unused pharmaceuticals into our nation's waterways and the factors that contribute to this. For many years, a standard practice, sometimes mandated by law, at many health care facilities was to dispose of unused pharmaceuticals by flushing them down the toilet or drain.

To build on what programs are currently available:

- i. One area County Sheriff had unilaterally instituted a 'no questions' bring back program with items collected being manifested as seized evidence and disposed of via incineration.
- ii. An independent local pharmacy, Eastland, now offers individual bubble-pack prescriptions. See Figure 2. The pharmacist was asked if they would accept returns of unused prescriptions if they were so packaged. An early concern of the Team was that not being able to legally return or recycle unwanted or unneeded products was a deterrent to a bring-back program. Bubble packing should, in theory, protect the contents from tampering, ensure they were date stamped, identify the contents and facilitate return and reuse.  
The bubble-pack manufacturer, MTS Medication Technologies, ([www.mts-mt.com](http://www.mts-mt.com)) serves more than 3,000 institutional pharmacies in the long-term care and correctional facility markets. See Figure 2  
Unfortunately, regardless of the secure nature of this type of packaging, current Michigan regulation does not permit the return and reuse of unwanted human pharmaceutical products. There is an ad hoc agreement at certain VA facilities, if the Rx was prescribed there and area veterinary clinics will dispense returned animal Rx materials on a charitable basis.

All Team Members were concerned about the high cost of medications and the morality of waste and destruction of desperately needed and perfectly viable products. Mindful of the legal ramifications of taking on Drug Enforcement and Tort Law this was an issue we will address at a later date, but the ultimate responsibility lies with state and federal government.

See the current legislative approach developed by Oregon Association of Clean Water Agencies at [www.oracwa.org](http://www.oracwa.org)



Figure 2. Examples of individual prescription packaging.

## RESULTS

How to ensure collection locations were safe and posed minimal liability to the host, while at the same time not deterring returns, gave rise to the greatest discussion. Health Departments were seen as the most ‘user friendly’ - but the least secure. Living in a rural region with minimal police coverage, most health departments were reluctant to assume the added cost of collection and security. The Team grew to include a local independent pharmacy and law enforcement.

Burglaries at local pharmacies and veterinary clinics are routine occurrences - mainly seeking oxycontin and GHB. Michigan passed a statewide referendum in 2008 to legalize the medicinal use of marijuana. Although dispensing details are still to be resolved, this was seen as another reason to be wary of asking pharmacies to be host ‘drop box’ sites.

The Team chose to begin its collection initiative in cooperation with area County Sheriffs, basing a pilot ‘drop box’ collection system funding application on the funding model in place at the City of Pontiac Police Department, Michigan.

Although the pharmaceutical collection planning grant has now expired, it has more than met its goal. A Pharmaceutical Collection and Safe Disposal Team is now in place and is actively:

- coordinating existing programs with resource recovery and law enforcement
- seeking funding to place at least 4 steel collection boxes at County Sheriff offices
- seeking funding for a unified print and media marketing campaign
- coordinating a ‘no flush’ message
- cooperating across a variety of professional, regulatory and environmental groups to state: water matters, we all care and we all have a part to play in sending this message.
- preparing an application for EPA “Community Action For A Renewed Environment Program” (CARE) funding to coordinate a 2 year development of future sustainability.
- Preparing a pharmaceutical research project to expand the WOWRA scope of study.

## CONCLUSION

Operating on a particularly lean organization budget, we seek to find funding for projects which build bridges and collaborations through identifying a common purpose. Our message is simple - whether municipal or individual, wastewater systems should be operated, maintained and perform to the highest standard. Regulators, government and the system owner have an equal responsibility to act from a position of knowledge and informed consent. Our actions often blur the line between what would traditionally be seen as a 'wastewater' project. In so doing, we seek to counteract the turf battles which so often confuse or alienate the public, divide the players and often result in costly, wasteful duplication of effort. We are also mindful that without clear, consistent, rationale communication, the message gets muddied or lost altogether. That message is simple: water matters, we all care, and we all have a part to play in sending this message.

Our original directive from the Joyce Foundation, whose support founded our organization, was equally as simple: engage in activities which change thinking and lead to sustainable water and land use activities. Far too often, the wastewater industry, in particular the onsite community, seems to isolate itself from engaging in public interaction. It seems we find more to disagree than agree on. Our approach is to consider the wider implications, find common ground, engage healthy discussion and debate while recognizing differing viewpoints and differing constraints.

OWNWMI's Mission is to be an education leader for our region. Ignoring turf and protectionism, it is our purpose to make available to our region the best resources available from throughout the water/wastewater/land use/environmental communities both in and out of Michigan. There are inevitable disagreements, and mandated regulation can be a hindrance to our goals, but it is our intent that, through finding common ground, consensus can be reached to move forward on common sense solutions. The threat to our water resource is simply too important to be squabbling over as to who should do what. Funding organizations seem to think the same way.

### *Authors:*

*Dendra J. Best, Executive Director OOWNWMI, is a member of NOWRA, WEF, MEHA and Chairs the MWEA Onsite Committee.*

*Dr. Richard Otis P.E Ph.D., DEE. is OOWNWMI Technical Consultant, current NOWRA Vice Chair, past chair of the Small Community Committee of the Water Environment Federation and the Technical Practices Committee of the National Onsite Wastewater Recycling Association, and a diplomat in the American Academy of Environmental Engineers.*

## Appendix One.

### Reference Resources:

NOAA Center of Excellence for Great Lakes and Human Health: Unwanted Medicine Disposal: Doing it the Right Way

[www.glerl.noaa.gov/res/Centers/HumanHealth/docs/medicine\\_disposal\\_workshop](http://www.glerl.noaa.gov/res/Centers/HumanHealth/docs/medicine_disposal_workshop)

Illinois / Indiana Sea Grant Program: [www.iisgcp.org/unwantedmeds/](http://www.iisgcp.org/unwantedmeds/)

USEPA - Pharmaceutical and Personal Care Products: [www.epa.gov/ppcp/](http://www.epa.gov/ppcp/)

Also: EPA <http://www.epa.gov/waterscience/ppcp/>

“EPA Continues Work to Understand Potential Impacts of Pharmaceuticals in Water. EPA is seeking comment on an Information Collection Request (ICR) that will be used in a detailed study of unused pharmaceutical disposal methods by hospitals, long-term care facilities, hospices and veterinary hospitals. EPA is seeking more information on the practices of the health care industry to inform future potential regulatory actions, and identify best management and proper disposal practices. This is one of several actions the agency is taking to strengthen its understanding of disposal practices and potential risks from pharmaceuticals in water.”

Water Environment Research Foundation: Trace Organics:

[http://www.werf.org/AM/Template.cfm?Section=Trace\\_Organics](http://www.werf.org/AM/Template.cfm?Section=Trace_Organics)

WERF Key Activities on Trace Organic Compounds, Lola Olabode, WERF  
Technical Brief on Trace Organic Compounds and Implications for a  
Wastewater Treatment, Paul Anderson

Fate of Pharmaceuticals and Personal Care Products through  
Wastewater Treatment Processes, Joan Oppenheimer, MWH

Development of Indicators and Surrogates for Chemical Contaminant  
Removal during Wastewater Treatment and Reclamation, Jörg Drewes,  
Colorado School of Mines

Wisconsin Onsite Waste Recycling Association Report Removal of Organic Wastewater  
Contaminants in Septic Systems Using Advanced Treatment Technologies.

Jeffrey D. Wilcox and Jean M. Bahr University of Wisconsin - Madison.

Curtis J. Hedman, Jocelyn D. C. Hemming, and Miel A. E. Barman Wisconsin

State Laboratory of Hygiene. Kenneth R. Bradbury Wisconsin Geological and

Natural History Survey . Published in J. Environ. Qual. 38:149–156 (2009).

doi:10.2134/jeq2007.0365 Received 10 July 2007.

See: <http://www.takebackexpress.com/> in response to HYPERLINK "[http://www.cawrecycles.org/issues/current\\_legislation/sb966\\_07](http://www.cawrecycles.org/issues/current_legislation/sb966_07)" [California Senate Bill 966](#) signed by Governor Schwarzenegger October 12, 2007. : “Take Back Express is the industry's "one-stop-solution" for the growing problem of improper disposal of unused and expired pharmaceutical drugs.”

Oregon Pharmaceutical Take Back Stakeholder Group Executive Summary.

Complete report available at [www.oracwa.org](http://www.oracwa.org)

## Appendix Two: Team Invitation Letter



*Mission Statement: To increase awareness, that water quality is directly linked to the use of appropriate wastewater systems and their management.*

P.O Box 792, Traverse City  
MI 49685-0792

E-Mail: [secretary@michigan-onsitewastewater.org](mailto:secretary@michigan-onsitewastewater.org)  
FAX#: (231) 882-2204  
*Previously Northwest Michigan Onsite Wastewater Task Force*

Invitation To Pharmaceutical Safe Disposal - Program Development Task Force Meeting  
Monday July 21, 2008. 10 am. Minerva's Board Room, Park Place Hotel, Traverse City  
Made possible through the generous support of Grand Traverse Regional Community Foundation

Dear Ms. XXXX,

In April of this year, EPA issued the Great Lakes Earth Day Challenge: "to collect and properly dispose of old and unused, expired or unwanted medicine. EPA's goal is to collect at least 1 million pills to keep contaminants out of the Great Lakes."

Onsite Wastewater considered taking part in this one day event - but the Board chose instead to invite community leaders to meet and discuss creating a regional program that would address this growing issue throughout the year. Through the generous support of a planning development grant from Grand Traverse Regional Community Foundation, the first of three meetings will take place Monday, July 21, 2008, 10 am - 4 p m. Minerva's Board Room, Park Place Hotel, Traverse City.

Because of your professional expertise, we are respectfully requesting your participation.

Northwest Michigan is a water rich tapestry of wetlands, rivers, streams, lakes and bays - all connected via groundwater. Our health and economy rely upon preserving this resource. Although there is still considerable debate concerning the cumulative effects of human and agricultural pharmaceutical residues - as witnessed by the disposal guidelines issued by US Fish And Wildlife Service and Pharmaceutical Research and Manufacturers of America - their presence in area water sources is of considerable concern. In addition, and of equal concern, is the illicit and illegal use of stolen or scavenged unused pharmaceutical products by area drug addicts.

By agreeing to participate in this initial planning meeting you will be helping to put in place a sustainable, long term response to both. Onsite Wastewater will act as the facilitator for this 3 meeting series, 2 in Traverse City, one via the web. Our purpose in doing so is to draw attention to evidence that pharmaceutical products enter our water systems via our wastewater systems.

**Appendix Two Continued:** The Moderator will be Dr. Richard Otis P.E Ph.D., DEE..

Dr. Otis is Onsite Wastewater Technical and Engineering Consultant. Dr. Otis is past Vice President of Applied Technologies of Ayres Associates. He was a key participant in developing the EPA Voluntary Guidelines for Responsible Management of Onsite Systems. He has been research director and project manager of wastewater facility projects since 1970. Dr. Otis has been involved in research and demonstration of wastewater collection, treatment, and disposal alternatives including development of alternative natural treatment systems and alternative collection sewers and assessment of the environmental impact of these technologies. He has developed design manuals and presented training seminars regarding onsite treatment systems, alternative sewers, natural systems for wastewater treatment, innovative and alternative technology assessments, and regulatory models for their effective management.

Dr. Otis is active in several professional organizations. He is past chair of the Small Community Committee of the Water Environment Federation and the Technical Practices Committee of the National Onsite Wastewater Recycling Association, and a diplomat in the American Academy of Environmental Engineers.

**AGENDA.**

- 9.30 - coffee, breakfast pastries and introductions  
10 - Assessment of the Emerging Issues of Concern regarding Pharmaceutical Products  
Attendees are requested to review the following background resources:

[www.glerl.noaa.gov/res/Centers/HumanHealth/docs/medicine\\_disposal\\_workshop](http://www.glerl.noaa.gov/res/Centers/HumanHealth/docs/medicine_disposal_workshop)

Illinois / Indiana Sea Grant Program: [www.iisgcp.org/unwantedmeds/](http://www.iisgcp.org/unwantedmeds/)

USEPA - Pharmaceutical and Personal Care Products: [www.epa.gov/ppcp/](http://www.epa.gov/ppcp/)

- 10.45 - Identification of Information: Known and Unknown  
a) current resources - listing of who should be a participant in developing a program  
b) components of a 5 county regional education, collection and safe disposal program

Lunch:

1 p m - 4 p m - Identification of assets required for a successful and sustainable program

- a) Lead Agencies  
b) Funding for identified program components  
c) Verification of scientific accuracy  
d) Ongoing Research  
e) Best Management Practices  
f) Public Education Activities  
g) Collection Protocols: see Milwaukee Metropolitan Sewerage District:  
In just four hours, more than 2,000 people delivered 3.5 tons of unused medication to collection sites in Milwaukee, Ozaukee, Racine, and Washington Counties for the third annual Medicine Collection Day <http://v2.mmsd.com/NewsDetails.aspx>  
h) Disposal and Destruction - available facilities and fees

We look forward to your participation in this most important discussion.

William A. Crawford. Board Chair & Director Benzie-Leelanau District Health Dept.  
Dendra Best. Executive Director. Onsite Wastewater of Northwest Michigan.