

Report on the San Francisco Bay Area's Safe Medicine Disposal Days

***Organized by the Bay Area Pollution Prevention Group
August 2006***

Participating Agencies and Organizations

****Members of the Bay Area Pollution Prevention Group***

City of Belmont	Palo Alto Regional Water Quality Control Plant*
City of Berkeley	San Francisco Department of Environment
City of Fremont	San Francisco Public Utilities Commission*
City of Los Altos	San Francisco Regional Water Quality Control Board*
City of Menlo Park	San Jose/Santa Clara Water Pollution Control Plant*
City of Millbrae*	San Rafael Fire Station
City of Mountain View	Save The Bay
City of Oakland	South Bayside System Authority*
City of San Leandro	Union Sanitary*
City of San Jose	Walgreens
City of Sunnyvale	
County of Marin	
East Bay Municipal Utility District*	

Executive Summary

In May 2006, the Bay Area Pollution Prevention Group (BAPPG) piloted a first-of-its-kind regional collection event for residential pharmaceutical waste. Throughout the Bay Area, more than 1,500 residents disposed of 3,634 lbs of pharmaceutical waste at 39 locations. The BAPPG coordinated this pilot program with 17 agencies that managed the collection event details, which included location, staffing, police presence, and documentation of controlled substances.

Residents were asked to participate in a survey at each collection event. The survey results found that one quarter of participants had previously disposed of medication down the sanitary sewer, while close to half previously disposed of medication in the trash.

Overall, the Safe Medicine Disposal Days held 5 press events, garnering five television clips, nine print articles, and four radio spots. The numbers of participants in this pilot event were small compared to the 7 million people who live in the Bay Area; however, the increase in awareness is immeasurable. Approximately 2 lbs per resident who participated in the pilot were collected. This amount reflects the need for wastewater and solid waste agencies to work together to find a long-term sustainable disposal solution.

Table of Contents

Overview.....	1
Background.....	2
Pre-event Summary.....	3
Regional coordination.....	4
Local event planning.....	4
Event Details.....	4
Advertising.....	1
Regional Advertising.....	1
Local Advertising.....	2
Media Coverage.....	2
Results.....	2
Regional Website and Phone Hotline.....	2
Number of Participants and Amount Collected.....	3
Staff Time and Costs.....	4
Survey Results.....	6
Demographics.....	6
Storage of Medication and Reason for Disposal.....	7
Previous Disposal Practices.....	7
Marketing Effectiveness.....	7
Successes and Lessons Learned.....	9
Successes.....	9
Lessons learned.....	10
Conclusions and Recommended Next Steps.....	11
Next steps.....	11
Long Term Goals.....	11
Appendix A: Letter from Federal Drug Enforcement Administration.....	12
Appendix B: Examples of Regional Advertising.....	14
Appendix C List of Local Newspapers.....	16
Appendix D: Local Outreach Strategies.....	18
Appendix E: Press Release and Press Event Handouts.....	21
Appendix F: Select Newspaper Articles.....	24
Appendix G: Participant Survey Form.....	32
Appendix F: Detailed Survey Results.....	33

Overview

The Bay Area Pollution Prevention Group¹ (BAPPG), a consortium of 39 wastewater agencies throughout the San Francisco Bay Area that focuses on pollution prevention, decided to address potential water quality issues arising from improper residential pharmaceutical waste disposal. BAPPG originally wanted to create a regional outreach campaign urging residents to dispose of unwanted medications at their local household hazardous waste events. Unfortunately, not all household hazardous waste facilities in the San Francisco Bay Area accept pharmaceutical waste. Since this could not be a regional solution, BAPPG initiated a region- wide dialogue in mid-2004 amongst staff of wastewater treatment agencies, household hazardous waste facilities (HHW), county health programs, Regional Water Quality Control Board (San Francisco Bay Region), Federal Environmental Protection Agency, California Department of Toxic Substances Control (DTSC), and California Department of Health Services (DHS). The group concluded that if wastewater treatment plants advertise HHW programs as disposal options for waste pharmaceuticals, then adequate funding must be found for the HHW programs to perform this task.

In 2004, BAPPG staff worked with DHS staff as well as staff from DTSC to clarify the regulatory requirements for residential pharmaceutical waste disposal. DHS and DTSC staff concluded that residential pharmaceutical waste is not regulated by either agency. In 2004-2005 BAPPG also contacted the Federal Drug Enforcement Administration (DEA) regarding the small subset of pharmaceuticals that are “controlled substances”. BAPPG received a letter from DEA regarding the proper handling of controlled substances; this particular letter has been circulated throughout the nation (Appendix A).

“The DEA has no objection to the consortium’s disposal of controlled substances as long as the law enforcement agency which takes possession of the surrendered controlled substances destroys them in the same manner in which that agency destroys seized contraband drugs such as cocaine or heroin.”

In 2006, the BAPPG group decided to pilot a regional collection event for residential pharmaceutical waste that complied with the Federal DEA’s requirements for the proper handling of controlled substances. Multiple BAPPG agencies hosted 39 Safe Medicine Collection Events in five counties within the San Francisco Bay Area. BAPPG coordinated the regional aspect of the event, which included advertising, media campaign, and uniform data collection. This report will summarize the results from the regional Safe Medicine Collection Days in the following sections:

- Background
- Pre-event Summary
- Event Details
- Advertising
- Media Coverage
- Results
- Successes/ Lessons Learned
- Conclusions/ Next Steps

¹ For more information contact Jennifer Jackson, East Bay Municipal Utility District, jacksonj@ebmud.org, 510-287-0818 or Karin North, City of Palo Alto, Karin.north@cityofpaloalto.org, 650-494-7629.

Background

During the past decade there have been growing questions about potential adverse effects from the environmental release of pharmaceutically active compounds. Small concentrations of hormones, antidepressants, antibiotics, and chemicals from personal care products have been found in various waterways nationwide, including the San Francisco Bay, according to reports from the U.S. Geological Survey (USGS)² and the San Francisco Estuary Institute³.

While many pharmaceuticals may not typically persist in the environment, continual input into the aquatic environment keeps the concentrations relatively constant.⁴ While they may not cause acute toxicity in aquatic organisms, they may interfere with endocrine systems, particularly when exposure occurs during developmentally sensitive times such as before birth. There are several well-documented cases of endocrine disrupting effects on fish and wildlife,⁵ and several studies have shown that exposure to certain pharmaceuticals results in abnormal development and reproduction in fish and other wildlife.

- Western mosquitofish (*Gambusia affinis*) exposed to the antidepressant Fluoxetine delayed development of young.⁶
- Masculinization of fish has been associated with pharmaceuticals in ocean waters in Orange County.⁷

The continual, multi-generational exposure of aquatic life to multiple pharmaceuticals has unknown consequences.

Pharmaceuticals enter surface waterways from various sources:

- Plants that treat household, industrial, and commercial businesses waste water (wastewater treatment plants)
- Industrial dischargers
- Commercial animal feeding operations
- Surface application of manure and biosolids⁸

Because of the large number of pharmaceuticals and the high cost of testing, relatively little data is available on the presence of pharmaceutical products in natural water bodies. The most recent extensive study of pharmaceuticals in surface waters was performed by the USGS in 1999 and

² Kolpin, Dana et al. (2002) Pharmaceuticals, hormones and other organic wastewater contaminants in U.S. Streams, 1999-2000: A National Reconnaissance, *Environmental Science and Technology* v. 36: 1202-1211.

³ Oros, Daniel and David, Nicole (2002). Identification and Evaluation of Unidentified Organic Contaminants in the San Francisco Estuary, *San Francisco Estuary Regional Monitoring Program for Trace Substances*, SFEI Contribution 45

⁴ Daughton, C.G. and Ternes, T.A. (1999) Pharmaceuticals and Personal Care Products in the Environment: Agents of Subtle Change. *Environmental Health Perspectives*, Vol 107, Supplement 6: 907-938 [available: <http://epa.gov/nerlesd1/chemistry/ppcp/images/errata.pdf>]

⁵ <http://www.ourstolenfuture.org>

⁶ Black, M.C., Rogers E.D., and Henry, T.B., 2005. Endocrine Effects of Selective Serotonin Reuptake Inhibitors (SSRIs) on Aquatic Organisms. Abstract available at <http://es.epa.gov/ncer/publications/meetings/8-23-2005/abstract/black1.html>.

⁷ Irwin, M., Reyes, J., Steinert, S., Hwang, W., Armstrong, J., Sakamoto, K., Kelley, K. and Schlenk, D., 2005. Relationships between reproductive endpoints measured in flatfish collected near an outfall in Orange County, California. Abstract available at <http://abstracts.co.allenpress.com/pweb/setac2005/category/?ID=57549>.

⁸ Origins and Fate of PPCPs in the Environment, by the US Environmental Protection Agency, Office of Research and Development, <http://www.epa.gov/nerlesd1/chemistry/pharma/images/drawing.pdf>.

2000.⁹ This nationwide reconnaissance study surveyed 139 streams throughout the United States in locations that were thought to be susceptible to contamination from agriculture or urban activities. The USGS analyzed water samples from waterways for 95 organic chemicals usually found in wastewater from the sources listed above. In 80% of the samples analyzed, one or more of the pharmaceuticals were detected, albeit at very low concentrations. Examples of medications found included:

- Acetaminophen was found in 24% of samples analyzed
- Steroids and hormones were also commonly found, with 17-ethynyl estradiol (a hormone used in birth control pills) found in 16% of samples analyzed
- Diltiazem (blood pressure medication) was found in over 13% of samples analyzed.
- Codeine was found in 11% of samples analyzed
- Antibiotics and antimicrobials such as erythromycin, lincomycin, sulfamethoxazole, and trimethoprim were found in over 10% of samples analyzed
- Ibuprofen was found in 10% of samples analyzed

Wastewater treatment plants are designed to remove conventional pollutants such as suspended solids and biodegradable organic material, but they are not designed to remove low concentrations of synthetic pollutants such as pharmaceuticals. Limited testing suggests that certain types of treatment substantially remove some pharmaceuticals. Removal efficiencies of pharmaceuticals appear to be chemical-specific, especially since many synthetic compounds are designed to be resistant to biological degradation. There appears to be no single wastewater treatment technology that will remove all of these compounds.

Pharmaceuticals enter the sanitary sewer from two sources: (1) excretion of partially metabolized pharmaceuticals by the human body and (2) disposal of unused or expired medications down the sewer. The two largest sources of pharmaceuticals entering the sewer systems are from hospitals and residents. Therefore, one way to reduce the level of pharmaceuticals in surface water is to educate hospitals and residents that unused or expired pharmaceuticals should not be disposed of down the sewer. For a more comprehensive discussion on the sewerage of pharmaceutical waste, see the Santa Clara Basin Watershed Management Initiative's Emerging Contaminants Workgroup Discussion Paper on Pharmaceutical Disposal to Sewer Systems.¹⁰

Pre-event Summary

Regional event planning began in earnest in the fall of 2005. Participating agencies gathered information on DEA regulations on controlled substances, draft outreach materials and examples of successful, legal medicine disposal events elsewhere in the country. BAPPG project coordinators presented to Bay Area agencies how local events should be conducted to comply with DEA regulations and discussed BAPPG's role in regional coordination.

Subsequent planning meetings occurred in January and April 2006 for information sharing for local event planning and to coordinate regional outreach efforts.

⁹ Reference info.... http://pubs.acs.org/hotartcl/est/es011055j_rev.html

¹⁰ Available at http://www.moea.state.mn.us/hhw/resources/WMI_Pharm_White_Paper_Final.pdf

Regional coordination

BAPPG coordinators were responsible for the following aspects of the Safe Medicine Disposal Days campaign:

- Coordination with California Pharmacist Association for volunteer pharmacist involvement
- Recruiting Walgreens as a partner
- Setting up a regional website with event information
- Setting up a regional phone hotline with event information
- Regional media work through press releases and media advisories
- Regional press event
- Regional newsprint and transit station advertising
- Regional email and websites postings

Local event planning

Each participating agency was responsible for the following aspects of their local events:

- Choosing event locations, dates and times
- Coordination with local Walgreens pharmacists and store managers
- Coordination with local police department regarding disposal of controlled substances
- Non-controlled medicine disposal through medical waste hauler or hazardous waste facility
- Local outreach to customers through flyers, bill inserts, newsletters
- Local press releases, events and advisories

Event Details

The Safe Medicine Collection events occurred during the week of May 13-21, 2006 at 39 locations throughout the Bay Area. The overall goals of the events were to:

- Provide residents with an easy disposal option for their unwanted pharmaceutical waste
- Increase residents' understanding that items placed in the toilet and sink eventually ends up in the Bay

Individual agencies were responsible for coordinating and staffing their local collection events that were held at Walgreens, Senior Centers, and City Halls. A complete list of locations is in Table 1. Partnering with Walgreens was key to the success of the program for the following reasons:

- Support by corporate Walgreens enabled multiple stores to participate.
- Point of purchase is a logical place to hold collection events.
- Name recognition -- many residents know the location of Walgreen stores.
- Free advertising at all Walgreens throughout the Bay area, many agencies had the pharmacists place a flyer about the event in every prescription that was filled.
- Walgreens volunteered two hours of pharmacist's time at each location.

The Safe Medicine Disposal events were typically staffed by more than one agency staff, who greeted residents, helped fill out a survey, and helped them dispose of their unwanted medications. Most sites pre-sorted the medication into prescription and over-the-counter medications, which greatly reduced the pharmacist's workload. At the end of the event, pharmacists¹¹ sorted and counted the controlled substances and law-enforcement handled the disposal of the controlled substances.¹²

Table 1: List of locations that participated in the Safe Medicine Collection Events.

<i>Location</i>	<i>Address</i>	<i>Date</i>	<i>Time</i>
<i>San Francisco County</i>			
<i>Walgreens</i>	25 Point Lobos @ Geary Blvd, SF	May 19-20	10am-2pm
<i>Walgreens</i>	3201 Divisadero Street @ Lombard Street, SF	May 19-20	10am-2pm
<i>Walgreens</i>	3601 California Street @ Spruce Street, SF	May 19-20	10am-2pm
<i>Walgreens</i>	1344 Stockton Street @ Broadway Street, SF	May 19-20	10am-2pm
<i>Walgreens</i>	1750 Noriega Street @ 24th Avenue, SF	May 19-20	10am-2pm
<i>Walgreens</i>	199 Parnassus Avenue @ Stanyan Street, SF	May 19-20	10am-2pm
<i>Walgreens</i>	1899 Fillmore Street @ Bush Street, SF	May 19-20	10am-2pm
<i>Walgreens</i>	825 Market Street @ 4th Street, SF	May 19-20	10am-2pm
<i>Walgreens</i>	1333 Castro Street @ 24th Street, SF	May 19-20	10am-2pm
<i>Walgreens</i>	2550 Ocean Avenue @ Junipero Serra Blvd.	May 19-20	10am-2pm
<i>Walgreens</i>	1189 Potrero Avenue @ 24th Street, SF	May 19-20	10am-2pm
<i>Walgreens</i>	5300 3rd Street @ Van Dyke Street, SF	May 19-20	10am-2pm
<i>Walgreens</i>	965 Geneva Avenue @ London Street, SF	May 19-20	10am-2pm
<i>Alameda County</i>			
<i>Green Home Expo</i>	Civic Center Park, Berkeley	April 26	12am-5pm
<i>Oakland City Hall</i>	One Frank Ogawa Plaza, Oakland	May 17	11am-2pm
<i>Walgreens</i>	5055 Telegraph, Oakland	May 20	9am-1pm
<i>San Leandro City Hall</i>	835 East 14th St, San Leandro	May 20	11am-4pm
<i>Walgreens</i>	3860 Decoto Road, Fremont	May 19-20	10am-2pm
<i>Walgreens</i>	41400 Blacow Road, Fremont	May 19-20	10am-2pm
<i>Walgreens</i>	2600 Mowry Ave, Fremont	May 19-20	10am-2pm
<i>Santa Clara County</i>			
<i>Walgreens</i>	300 University Ave, Palo Alto	May 19-20	10am-3pm
<i>Walgreens</i>	2605 Middlefield Rd, Palo Alto	May 19-20	10am-3pm
<i>Walgreens</i>	301 2nd Street, Los Altos	May 19-20	10am-3pm
<i>Walgreens</i>	121 El Camino Real, Mountain View	May 19-20	10am-3pm
<i>Cypress Senior Center</i>	403 Cypress Ave., San Jose	May 15	1pm-4pm
<i>Walgreens</i>	1376 Kooser Rd., San Jose	May 18	10am-7pm
<i>Walgreens</i>	2105 Morril Ave., San Jose	May 20	10am-4pm

¹¹ Volunteer pharmacists were from Walgreens, Alta Bates Medical Center and Kaiser Permanente.

¹² Even though the organizing agency requested law enforcement presence in order to comply with the Drug Enforcement Administration, some law enforcement agencies did not participate. The San Mateo Narcotics Task Force handled the controlled substances for one agency in San Mateo County.

**Table 1: List of locations that participated in the Safe Medicine Collection Events
(continued)**

Location	Address	Date	Time
Sunnyvale			
Community Center / Senior Center	550 Remington Drive, Sunnyvale	May 19	8am-2pm
San Mateo County			
Chetcuti Room	450 Poplar, Millbrae	May 15	10am-2pm
Walgreens	643 Santa Cruz Avenue, Menlo Park	May 18	noon-7pm
Ravenswood Family			
Health Center	1798A Bay Road, East Palo Alto	May 17	10am-3pm
Walgreens	900 Ralston, Belmont	May 17	10am-4pm
Marin County*			
(Pharmacies listed below do not accept controlled substances)			
Jack's Drug Store	121 Tunstead, San Anselmo	Every Day	Business Hours
Marin Medical Pharmacy	750 Las Gallinas, San Rafael	Every Day	Business Hours
Ross Valley Pharmacy	2 Bon Air Road, Larkspur	Every Day	Business Hours
Walgreens Pharmacy	227 Shoreline Highway, Mill Valley	Every Day	Business Hours
Walgreens Pharmacy	820 Sir Francis Drake Blvd., San Anselmo	Every Day	Business Hours
Walgreens Pharmacy	830 Third Street, San Rafael	Every Day	Business Hours
Safeway Pharmacy - Terra Linda	950 Las Gallinas, San Rafael	Every Day	Business Hours

* Marin County's locations are part of an on-going disposal event that is funded and operated by the County of Marin. BAPPG helped advertise their program but they did not participate officially in the BAPPG Safe Medicine Disposal Days program.

Advertising

The Safe Medicine Disposal Days were advertised both regionally through BAPPG and locally by each participating agency. In order for the program to have a regional impact it was important that both the regional and local advertisements had a similar look and feel. Therefore, the program's name and graphics were the same for all the advertisements; examples are located in Figure 1 and Appendix B. One way the group cut down advertising costs was by using graphics that were previously designed by the City of Palo Alto.



Figure 1: Example of flyer developed for regional outreach.

Regional Advertising

The Bay Area Pollution Prevention Group coordinated and paid for the regional advertising for the event. The regional ads informed residents that there were Safe Medicine Disposal Days occurring the week of May 13-21st. In order for residents to locate a site near them they needed to check the www.BayWise.org website or call the 1-888-BayWise phone number. The BAPPG spent \$11,170 on regional advertising, which consisted of the following:

- 13 SamTrans buses on the side of the buses that run up and down the peninsula.
- Bay Area Rapid Transit (BART) station ads at Daly City, Civic Center, Fremont, Oakland, and Downtown Berkeley.
- 2 Chronicle ads in Thursday and Sunday.
 - Thursday Bay Area News section, May 11, 2006
 - Sunday Bay Area News section, May 14, 2006
- 1 Mercury news ad.
 - Sunday News section, May 14, 2006
- Posters and fliers distributed to Walgreens throughout the Bay Area, see Figure 1.

Examples of newspaper advertisements and posters that were placed in Walgreens stores are located in Appendix C. In addition to the regional advertising, the BAPPG sent public service announcements about the event to 17 different radio stations.

Local Advertising

Most agencies that participated in the Safe Medicine Disposal Days supplemented the regional advertising with local advertising in newspapers and buses, flyers, posters, emails and direct mailers. In addition to the newspaper ads in the San Francisco Chronicle and the San Jose Mercury News, local agencies placed sixty ads in local newspapers (for a complete list of newspapers see Appendix C). The events were posted in 15 community calendars. More than 30,000 posters and flyers were posted and distributed at the following locations:

- Walgreens throughout the Bay area
- Schools
- Libraries
- Hospitals
- Eating establishments/coffee shops
- Save The Bay events
- Universities, Stanford and UCSF pharmacy school
- Civic and Community Centers
- Senior Centers
- Farmers' market
- Door to door

Many agencies also used email to share the information about the Safe Medicine Disposal Days. Some of the email lists and listservs that the information was sent to include:

- Save The Bay listserv
- Agency-wide emails
- Industrial waste dischargers who are permitted by wastewater plants often forwarded the email to their entire staff
- Mothers' groups
- Neighborhood associations
- School electronic newsletters
- Agencies public education contacts

In addition to this local advertising, many agencies informed residents through direct mail. Many agencies directly bill their residents; therefore utility bills were an inexpensive way to disseminate information about the events. More than 223,500 residents received information directly about the events, either on a utility bill or a postcard. A complete summary of the agencies outreach strategies is located in Appendix D.

Media Coverage

The regional and local advertising complimented by extensive media coverage educated the Bay Area residents not only about the events but also pharmaceutical disposal in general. The Media Relations Committee that is co-funded by the Bay Area Stormwater Association and the Bay Area Clean Water Associations orchestrated expansive media coverage for the Safe Medicine Disposal Days events. The Media Relations Committee focused on pitching the story to larger newspapers, television stations and some radio

shows. Regionally, the BAPPG hosted a regional press event at a Walgreens in San Francisco on Friday, May 12, 2006, to help kick off the event. The press event highlighted Susan Leal from San Francisco Public Utilities Commission, Jared Blumenfeld from San Francisco Department of Environment, Phil Bobel, Bay Area Pollution Prevention Group Representative, Robert Arenson and Dave Devencenzi from Walgreens, Bobbye Smith of the United States Environmental Protection Agency, and David Lewis from Save The Bay. The press release and press packet information is in Appendix E.

In conjunction with the regional press event, local agencies distributed their own press releases and held their own smaller press events. Overall, the Safe Medicine Disposal Days held 5 press events, garnering five television clips, nine print articles, and four radio spots. A complete list is in Table 2.

Table 2: Overview of media coverage and events for the Safe Medicine Disposal Program. Articles are located in Appendix F.

<i>Media Name</i>	<i>Title/ More information</i>	<i>Date</i>
<i>Press Events</i>		
<i>Regional Press Event</i>	Walgreens, 1189 Potrero Avenue @ 24 th St.	Friday, May 12
<i>San Jose Press Event</i>	Senior Center	Monday, May 15
<i>San Francisco Chinese Media Event</i>	1750 Noriega at 25 th Avenue at Walgreens	Thursday, May 18
<i>Sunnyvale Press Event</i>	Senior Center	Friday, May 19
<i>San Leandro Press Event</i>	City Hall	Saturday, May 20
<i>Television Clips</i>		
<i>KGO-TV</i>	Press conference coverage, 6PM evening news,	Friday, May 12.
<i>Univision-14</i>	Press conference coverage, 6PM evening news	Friday, May 12
<i>KPIX-TV</i>	"Health Watch," with Jeannette Pavini	Tuesday, May 9
<i>KTSF-TV (Ch 26)</i>		Saturday, May 13
<i>Print Articles</i>		
<i>San Francisco Chronicle</i>	"Don't Dump Old Medicine In Toilet Sewage Plants' Operators Ask Public To Change Habit," Jane Kay	Thursday, May 11
<i>San Francisco Examiner</i>	"Cities seek to keep drugs out of waterways," Beth Winegarner	Thursday, May 11
<i>San Jose Mercury New</i>	"Program aims to keep drugs out of the bay," Paul Rogers	Sunday, May 14
<i>Contra Costa Times</i>	"Program aims to keep drugs out of the bay," Paul Rogers	Sunday, May 14
<i>Examiner/ Independent</i>	"Cities seek to keep drugs out of	Tuesday, May 16

Table 2: Overview of media coverage and events for the Safe Medicine Disposal Program (continued).

	waterways,” Beth Winegarner	
<i>Los Gatos Daily</i>	“Discarding drugs safely-Medicines can be unhealthy for the bay,” Daniel Velton	Tuesday, May 16
<i>Palo Alto Daily</i>	“Drug disposal program aims to put a cap on bay pollution,” Daniel Velton	Tuesday, May 16
<i>SF Examiner, Op-Ed piece</i>	“Don’t Prescribe Your Prescription Drugs to the Environment,” Jared Blumenfeld & Susan Leal	Friday, May 19
<i>Sunnyvale Sun</i>	“Drop-off keeps medicine out of rivers,” Michelle Maghribi	Wednesday, May 31
Radio		
<i>KQED-AM</i>	Interview with Phil Bobel	Friday, May 12
<i>KOIT-FM</i>	Information carried	Friday, May 12
<i>KLIV-FM</i>	Interview with Phil Bobel	Monday, May 15
<i>KCBS-AM</i>	Interview with Save The Bay representative at collection event	Monday, May 15

Results

In order to compile the information regionally, consistent data collection was necessary. The following data was collected during the event:

- Regional website and phone call information
- Number of participants and amount of pharmaceuticals
- Disposal costs and staff time and
- Survey results.

One result that we were not able to capture is the increase in awareness regarding the proper disposal of pharmaceutical waste.

Regional Website and Phone Hotline

The media coverage and outreach materials drove residents to an easy-to-remember website and phone hotline: www.BayWise.org and 1-888-BayWise, which listed all pertinent event information by county.

The website received 10,605 visits in just over three months, as shown by Figure 2. The majority of the visits occurred the month of the event, which is when the majority of the advertising and media coverage occurred. In the tech-savvy Bay Area, it's not surprising that the phone hotline received far fewer phone calls – just 188 in two months, as shown in Table 3.

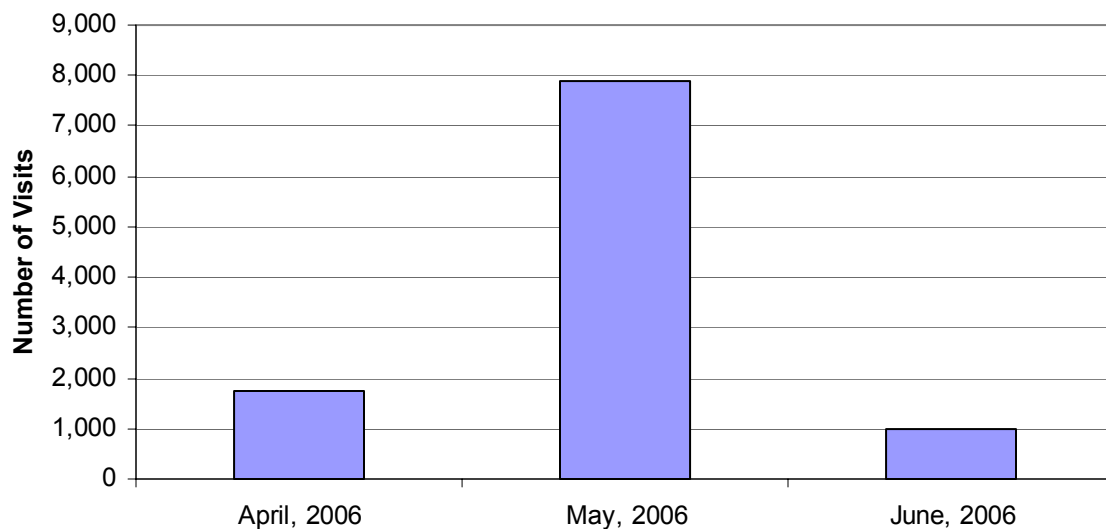


Figure 2: Summary of Baywise website visits.

Table 3: Summary of 888-BayWise hotline calls.

<i>Menu for callers</i>	<i>Number of calls received</i>	<i>Minutes</i>
<i>April phone calls</i>		
<i>Greeting</i>	64	64.65
<i>Main Menu</i>	69	17.43
<i>San Francisco Co.</i>	13	13.83
<i>Alameda Co.</i>	5	7.38
<i>Santa Clara Co.</i>	2	3.41
<i>San Mateo Co.</i>	1	0.08
<i>Marin Co</i>	1	0.10
<i>Future</i>	4	0.59
<i>General Mail Box</i>	4	0.36
<i>Total</i>	153	107.83
<i>May phone calls</i>		
<i>Greeting</i>	16	15.5
<i>Main Menu</i>	14	2.26
<i>San Francisco Co.</i>	2	4.49
<i>Alameda Co.</i>	3	4.79
<i>Total</i>	35	27.04

Number of Participants and Amount Collected

Because of the extensive outreach and media throughout the Bay Area region, the Safe Medicine Disposal Days events collected more than one and a half tons of medicine from residents, as shown in Table 4. Of that, only a small proportion of the collected material was controlled medication – 9% (median). The percent of controlled substances varied between 3% and 49%. Many of the controlled substances originated from a deceased relative. One location received an IV bag of liquid morphine, which significantly impacted the percentage of controlled substances, especially since liquid medication typically weigh more than pills.

Throughout the Bay Area, more than 1,500 residents disposed of 3,634 lbs of pharmaceutical waste (approximately 2.37 lbs each) at 39 locations. The number of people who participated in the event is rather small compared to the 7 million people who live in the Bay Area; however, the number of people who increased their awareness is immeasurable.

Table 4: Quantity of pharmaceuticals collected during Safe Medicine Disposal Days for each managing agency. Total amount includes medicine in their original container except for City of Millbrae whose weight is only pills.

<i>Leading Agency</i>	<i>Number of locations/ days</i>	<i>Weight (lbs)</i>	<i>% Controlled</i>	<i>Participants</i>	<i>lbs/person</i>
<i>San Francisco (SFPUC/ SF Department of Environment)</i>	13/2	1130	3% ^a	500	2.26
<i>City of San Jose</i>	3/1	828	11.59%	330	2.51
<i>Regional Water Quality Control Plant</i>	5/2	721	5.50%	270	2.67
<i>East Bay Municipal Utility District</i>	3/1	224	4.91%	56	4.00
<i>South Bayside System Authority</i>	2/1	186	12%	78	2.38
<i>City of Sunnyvale</i>	1/1	123	5%	51	2.41
<i>Marin County^b</i>	7	115	NA	NA	NA
<i>Union Sanitary District</i>	3/2	107	49%	112	0.96
<i>City of Millbrae</i>	1/1	100 ^c	30%	80	1.25
<i>City of San Leandro</i>	1/1	100	17%	56	1.79
<i>Total Amount</i>	<i>38/59</i>	<i>3634</i>	<i>15%</i>	<i>1533</i>	<i>2.37</i>

^a 3% controlled substances is based on a random sample – not all medications were sorted.

^b Marin County has 7 permanent collection locations at pharmacies that do not accept controlled substances or keep track of number of participants.

^c Weight represents pills only without pill containers.

Staff Time and Costs

A significant amount of staff hours and money were required to coordinate, develop, advertise and dispose of a regional pilot medicine disposal program. Regional- first-of-its-kind pilot projects require a substantial amount of staff time to complete the following items related to the project:

- Project planning meetings (with BAPPG and internal)
- Planning and communication with Police
- Planning and communication with Walgreens district managers (event logistics and outreach) and other event locations
- Planning and communication with Household Hazardous Waste staff or hazardous/medical waste disposal vendor
- Walgreens pre-event sites visits
- Recruiting and scheduling event staff
- Preparing training and training materials
- Staff trainings
- Regional and Local Outreach and Press Events
- Pre-event set-up (preparing and delivering supplies)

- Staffing events (typically 2 or more staff per event)
- Police and pharmacists time
- Event supervision and clean-up
- Medicine management: removing packaging/sorting/logging/preparing spreadsheet/preparing for shipment
- Compiling survey data/preparing spreadsheet
- Miscellaneous (research, purchasing supplies, other)

In order to achieve a well-coordinated successful event, agencies' staff spent a total of 1,980 hours on the above listed tasks. A complete breakdown of staff hours for each agency is located in Table 5. Most of the staff hours were spent tabling the actual events, since this is a requirement by the Drug Enforcement Agency. DEA required a law enforcement officer to work each event, many agencies law enforcement made the decision to have agency staff table the event and law enforcement show up at the end when the pharmacists sorted the medications.

Agencies were not only in charge of staffing the event, but they also managed the disposal of the pharmaceutical waste. Some agencies utilized local agencies to dispose of their pharmaceutical waste, which includes Fire Departments, Police Departments, Local Narcotic task forces or a local Household Hazardous Waste program. Five of the agencies directly paid for the disposal of the pharmaceutical waste, which amounted to \$3,645, or about \$1.81 per pound of material collected.

Since a significant amount of money was being spent on staffing the events, many agencies wanted to ensure good participation. Therefore, most agencies supplemented the regional advertising with local advertising. Approximately \$86,000 was spent on advertising for the Safe Medicine Disposal Days; the San Francisco PUC spent more than half of the total amount (Table 5). The survey data stated that most people in San Francisco heard about the event through an advertisement in their water bill. There does not appear to be a correlation between the amount of money spent on advertising and the quantity of medications collected. Smart advertising in water bills and local newspapers appeared to be more effective than the regional papers and transit advertising.

A complete summary of outreach strategies for each individual agency is listed in Appendix D.

Table 5: Agency staff time and costs.

Leading Agency	Participating Agencies	Staff Time (includes pharmacists and police)	Disposal Costs	Advertising Costs
BAPPG	SF Bay Area			\$11,170.00
City of Millbrae		120		\$2,500.00
City of San Leandro		50	\$300.00	\$816.00
City of San Jose		250		\$12,700.00
City of Sunnyvale		85		\$ -
East Bay Municipal Utility District*	Save The Bay, Oakland, and Berkeley	348	\$405.00	\$1,200.00
Regional Water Quality Control Plant*	City of Palo Alto, City of Mountain View, City of Los Altos, East Palo Alto Sanitary District, and Ravenswood Family Health Center	300	\$1,220.00	\$4,449.00
San Francisco (SFPUC/ SF Department of Environment)		655	\$1,600.00	\$50,000.00
South Bayside System Authority	City of Belmont, City of Menlo Park	50		\$775.00
Union Sanitary District	City of Fremont, Union City and City of Newark	122	\$120.00	\$2,750.00
Total		1980	\$3,645.00	\$86,360.00

*Staff time from the East Bay Municipal District and the Regional Water Quality Control Plant include the regional coordination since these two agencies were the project champions for BAPPG.

Survey Results

Each participant in the Safe Medicine Disposal Days was requested to fill out survey to gather demographic information, past history of disposal and how individuals learned about these events. The results below summarize the information collected from approximately one thousand surveys. A copy of the survey and a summary of the survey results are located in Appendix G and F.

Demographics

The majority of people who utilized the program were women who disposed of their household's medication that included both prescription and over the counter medications. Forty percent of the participants were over 74 years of age, as illustrated in Figure 3.

Storage of Medication and Reason for Disposal

Participants generally held onto their medication for more than a year (Figure 4). Residents typically disposed of their unwanted medication since it was expired/out of date or no longer needed (82% of the time). On average people disposed of approximately 13 containers per person.

Previous Disposal Practices

Figure 5 shows that more than 25% of participants had previously disposed of medication down the sanitary sewer, while close to half previously disposed of medication in the trash.

Marketing Effectiveness

Perhaps most importantly, the surveys indicated how residents had heard about the campaign. Surprisingly, transit advertising, the most expensive advertising vehicle, was the least important type of outreach, as shown by Figure 6. However, newspaper articles and ads and direct mail and flyers were the most important outreach vehicles.

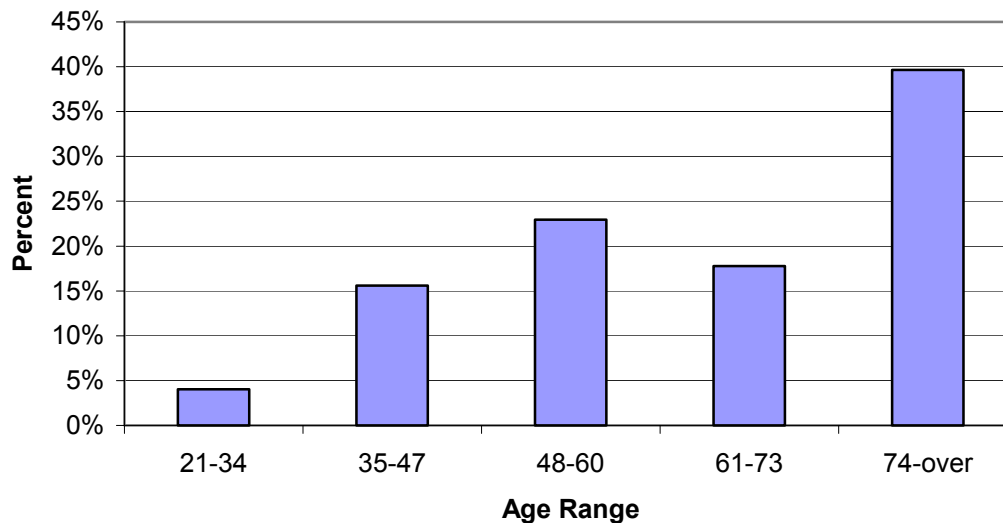


Figure 3: Age of residents utilizing programs

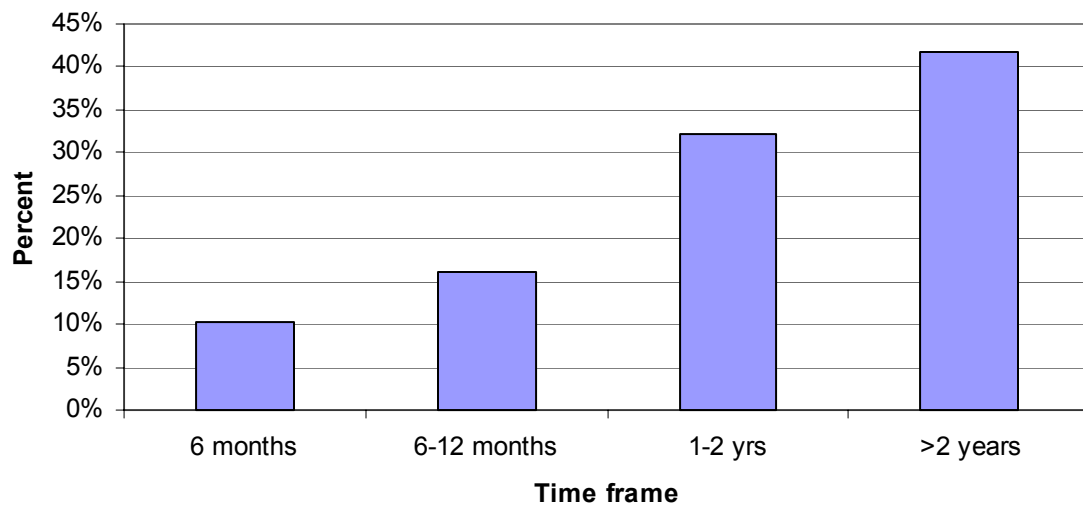


Figure 4: Storage of medications

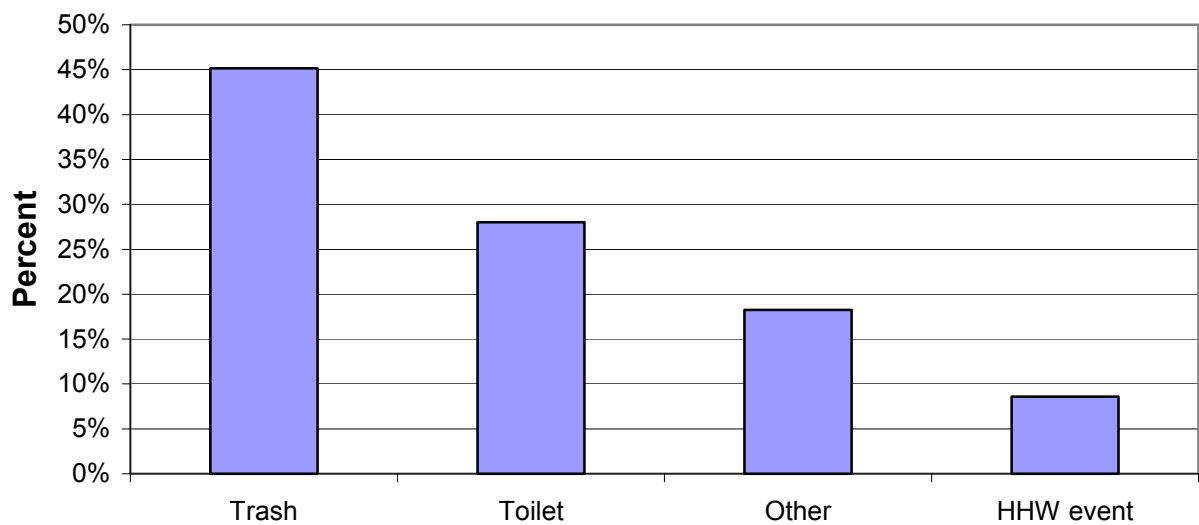


Figure 5: Past disposal practices

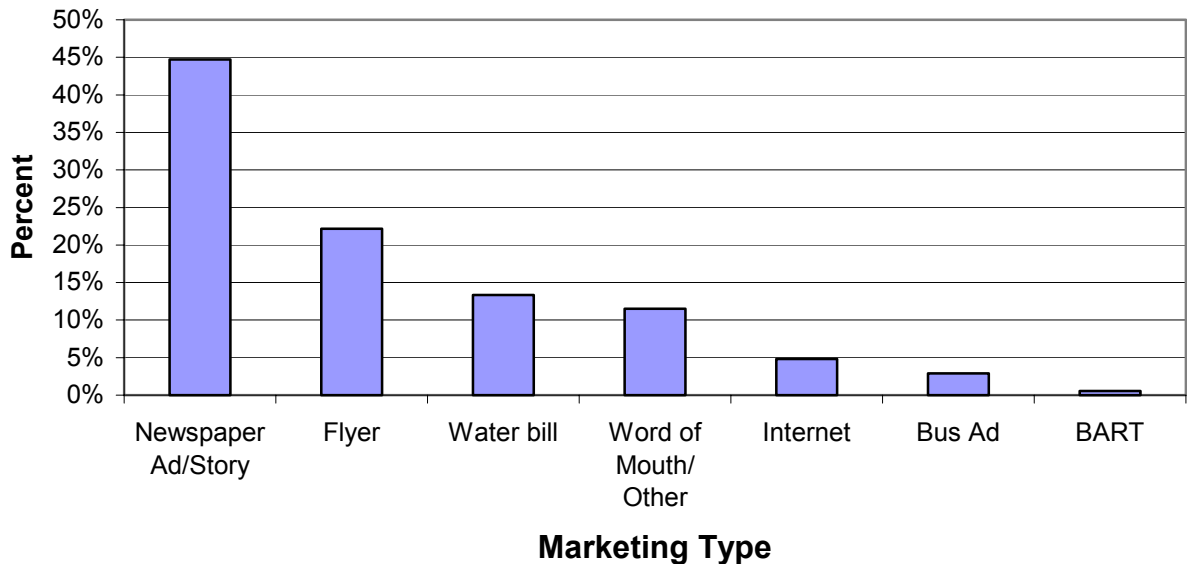


Figure 6: Marketing effectiveness

Successes and Lessons Learned

The Safe Medicine Disposal Days was the first truly regional campaign conducted by wastewater agencies in the San Francisco Bay Area. While our successes were many, participating agencies also learned many lessons about regional event planning in general, as well as the particular difficulties involved in collecting unwanted medication.

Agency staff generally felt that the number of hours required to make an event-based campaign successful was extraordinarily high. It took many hours to coordinate logistics, learn about the regulatory issues and conduct branded outreach, not to mention executing the events themselves. The additional requirement to coordinate with local police departments was frustrating and time consuming, especially given that the amount of controlled medication collected was disproportionately small overall.

Participating agencies and organizations confirmed that these events are extremely costly and are not effective as a long-term solution. DEA regulations on controlled medications make establishing permanent collection sites very difficult. Below is a summary of campaign successes and lessons learned as provided by participating agency staff.

Successes

- Partnership with Walgreens
- Raised awareness among public and store staff
- Collected important data on outreach and demographics
- Partnership with non-governmental organization Save The Bay extended outreach and supplied additional staff support

- Regional media was excellent
- Great to work with other agencies and good to collaborate on such a big scale
- Big learning experience to work on regional advertising
- Quantity of medicines collected
- Use of no-cost media to promote event, such as community calendars and getting news stories
- Walgreen's pharmacist quickly sorted out controlled substances
- Interest by media in the subject and collection event

Lessons learned

- Huge amount of staff time required – definitely need at least 2 staff per event
- Locations should be well-known and easy to find
- Some police departments would not participate
- Police involvement is not necessary for a safe, successful event – notification should be sufficient
- Difficult to predict attendance
- The media may omit important information in news stories and articles
- Always provide residents with information on future disposal
- Ensure flyers are clear and contain all event information (should not require going to a website or hotline)
- The public will return to the stores/pharmacy after the event (a point of purchase information piece needed)
- Medicine samples given to doctors' offices have excessive packaging, costing additional staff time for removal and additional cost for disposal
- Doctors and veterinarians need education on what to do with their excess medications/pharmaceutical samples
- Do not accept closed packages at events as there could be sharps and other inappropriate materials inside
- Place large signs at the collection tables and/or the store front
- The volume collected per resident is quite large
- From survey data:
 - direct outreach is more effective for participation (direct mail vs. bus ads)
 - more people were disposing of meds in the trash than down the toilet
- This is an inefficient way to have residents properly dispose of meds: San Francisco's total cost (advertising and staff time): \$87,000 ~\$175 per person served ~\$450 per pound disposed
- Difficult to strike a balance between local and regional media outreach
- How to get “credit” for local agencies when most of the “credit” is regional?
- Have event in same place over two days, don't switch locations, so that people can come back
- People brought medical equipment and sharps even though they were told not to
- Received better response when asking residents to “answer a few questions” as opposed to asking “would you mind filling out a survey”

- Solid Waste Agencies should be involved in finding a solution given the results of the survey showed more than twice as many residents dispose of unwanted pharmaceuticals in trash than by sewer.

Conclusions and Recommended Next Steps

Overall the program was a huge success. Based on the quantity collected there is a need for a long-term solution. The San Francisco Bay area has a population of approximately 7 million residents and based on the average amount collected per person there may be more than 15 million pounds of medication that needs to be disposed of properly.

The Safe Medicine Disposal Days pilot program was designed with the precautionary approach in mind. The media's attention helped build the case that wastewater agencies are trying to develop a long-term solution for a potential problem in the future.

Next steps

- Work with DEA to develop an approved pharmaceutical collection model that is legal and cost effective
- Explore the possibilities of having another pilot program where residents can drop off their unwanted medications all the time at a pharmacy.
- Explore working with a reverse distributor who is DEA registrants to facilitate transportation and disposal of residential pharmaceutical waste.
- Explore pre-paid mailer program opportunities.

Long Term Goals

- Develop a long term sustainable solution to the proper disposal of pharmaceuticals
- Provide a collection location at the point of sale of pharmaceutical waste
- Funding would be a partnership between government and pharmaceutical manufacturers.

Appendix A: Letter from Federal Drug Enforcement Administration



U. S. Department of Justice
Drug Enforcement Administration

www.dea.gov

Washington, D.C. 20537

FEB 07 2006

Mr. Phil Bobel
Manager, Environmental Compliance Division
Public Works Department, City of Palo Alto
P.O. Box 10250
Palo Alto, California 94303

Dear Mr. Bobel:

Thank you for your letter dated December 15, 2005, to the Drug Enforcement Administration (DEA) in which you state that your agency is leading a consortium of San Francisco Bay Area wastewater treatment facilities in developing a public outreach campaign to encourage the proper disposal of unused or expired medications by private individuals. The purpose of the campaign is to reduce the discharge of medications into the water system. You have outlined the procedures under which the disposal of the medications would be conducted. After reviewing your proposal, the DEA has no objection to the consortium's anticipated disposal of controlled substances.

You state that in the public outreach campaign the consortium will hold public events at which private individuals will have the opportunity to surrender unwanted personal medications to representatives of the consortium. You further state that at each public event the consortium's representatives will consist of at least one pharmacist and one duly-deputized law enforcement officer. The role of the pharmacist will be to identify and separate controlled substances from non-controlled substances. The pharmacist will create a document which records the name, strength, and amount of controlled substance being surrendered. The role of the duly-deputized law enforcement officer will be to take possession of any surrendered controlled substances and ensure that they are destroyed.

The DEA has no objection to the consortium's disposal of controlled substances as long as the law enforcement agency which takes possession of the surrendered controlled substances destroys them in the same manner in which that agency destroys seized contraband drugs such as cocaine or heroin. In addition, any methods used to destroy the surrendered controlled substances must comply with the established environmental standards of the U.S. Environmental Protection Agency (EPA).

Appendix A: Letter from Federal Drug Enforcement Administration

Mr. Phil Bobel

Page 2

If you have any further questions or concerns regarding this issue, please contact the Liaison and Policy Section, DEA Office of Diversion Control, at (202) 307-7297.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Joseph T. Rannazzisi', is written over a circular official stamp.

Joseph T. Rannazzisi
Deputy Assistant Administrator
Office of Diversion Control

Appendix B: Examples of Regional Advertising



Figure 1: Example of bus advertisement.



Figure 2: Example of BART station advertisement placed one month in advance of the Safe Medicine Disposal Days.

Appendix B: Examples of Regional Advertising

Safe Medicine Disposal Days
Safer for your family, safer for the Bay

Flushing expired or unwanted medicine down the drain may harm San Francisco Bay. Wastewater treatment cannot remove all medicine, but with your help, local agencies are protecting the Bay.
Drop off expired or unwanted medicine during our

Safe Medicine Disposal Days, May 13-21, 2006!
For locations, dates and hours, visit
www.BayWise.org
or call 1-888-BayWise. *The fish will thank you!*

Drop-offs at select locations in San Francisco, Palo Alto, Oakland, San Jose, Fremont, Mountain View, Belmont, Menlo Park and more!

BAY AREA POLLUTION
BAPPG PREVENTION GROUP

Walgreens
The Pharmacy of America

451297701

Figure 3: Chronicle newspaper ad.

Safe Medicine Disposal Days
Safer for your family,
safer for the Bay

Flushing expired or unwanted medicine down the drain may harm San Francisco Bay. Wastewater treatment cannot remove all medicine, but with your help, local agencies are protecting the Bay.

Drop off expired or unwanted medicine during our
Safe Medicine Disposal Days
May 13-21, 2006!
For locations, dates and hours, visit
www.BayWise.org
or call 1-888-BayWise.
The fish will thank you!

Drop-offs at select locations in San Francisco, Palo Alto, Oakland, San Jose, Millbrae, Sunnyvale, San Leandro, Fremont, Mountain View, Belmont, Menlo Park and more!

BAY AREA POLLUTION
BAPPG PREVENTION GROUP

Walgreens
The Pharmacy of America

Figure 4: Mercury newspaper ad.

Appendix C List of Local Newspapers

<i>Paper</i>	<i>Distribution Area</i>	<i># Ads</i>	<i>Paper Distribution</i>
<i>Regional Papers</i>			
<i>San Francisco Chronicle</i>	Bay Area	2	Daily
<i>San Jose Mercury News</i>	Bay Area	1	Daily
<i>San Francisco County</i>			
<i>Sing Tao (Chinese Paper)</i>	San Francisco	1	Daily
<i>El Tecolote (Spanish/English)</i>	San Francisco	1	
<i>Castro Star</i>	San Francisco	1	
<i>Central City Extra</i>	San Francisco	1	
<i>Haight-Ashbury Beat</i>	San Francisco	1	
<i>Marina Times</i>	San Francisco	1	
<i>Mission Dispatch</i>	San Francisco	1	
<i>New Bernal</i>	San Francisco	1	
<i>New Fillmore</i>	San Francisco	1	
<i>Noe Valley Voice</i>	San Francisco	1	
<i>North Beach Journal</i>	San Francisco	1	
<i>Richmond ReView</i>	San Francisco	1	
<i>San Francisco Bay View</i>	San Francisco	1	
<i>San Francisco Downtown</i>	San Francisco	1	
<i>San Francisco Observer</i>	San Francisco	1	
<i>Sunset Beacon</i>	San Francisco	1	
<i>West Portal Monthly</i>	San Francisco	1	
<i>West of Twin Peaks</i>	San Francisco	1	
<i>Western Edition</i>	San Francisco	1	
<i>Santa Clara County</i>			
<i>Palo Alto Daily</i>	Palo Alto	10	Daily
<i>Palo Alto Weekly</i>	Palo Alto	2	Weekly
<i>Mountain View Voice</i>	Mountain View	2	Weekly
<i>Los Altos Town Crier</i>	Los Altos	2	Weekly
<i>San Jose Mercury News</i>	South Bay	5	Daily
<i>Cupertino Courier</i>	Cupertino	1	Weekly
<i>Rose Garden Resident</i>	San Jose	1	Weekly
<i>Saratoga News</i>	Saratoga	1	Weekly
<i>Los Gatos Weekly-Times</i>	Los Gatos	1	Weekly
<i>Campbell Reporter</i>	Campbell	1	Weekly
<i>Willow Glen Resident</i>	Willow Glen	1	Weekly
<i>Almaden Resident</i>	Almaden	1	Weekly

Appendix C: List of Local Newspapers

<i>Paper</i>	<i>Distribution Area</i>	<i># Ads</i>	<i>Paper Distribution</i>
<i>Berryessa Sun/Senior Resource Guide</i>	Berryessa	1	Monthly
<i>Milpitas Post/Senior Resource Guide</i>	Milpitas	1	Weekly
<i>Milpitas Post</i>	Milpitas	2	Weekly
<i>San Mateo County</i>			
<i>Country Almanac</i>	Menlo Park	2	Weekly
<i>Redwood City Daily News</i>	Redwood City	3	Daily
<i>Alameda County</i>			
<i>San Leandro Times</i>	San Leandro	2	Weekly
<i>Argus</i>	Fremont	3	Daily

Appendix D: Local Outreach Strategies

<i>Leading Agency</i>	<i>Locations</i>	<i>Local Press Event/Release</i>	<i>Mailers</i>	<i>Flyer Distribution/Poster Placement</i>	<i>Local Newspaper Ads</i>	<i>Email Distribution</i>	<i>Other Advertising</i>
<i>City of Millbrae</i>	City Hall (one day)	Press release	Postcard sent to every residence in Millbrae	City Hall Earth Day events Senior center Walgreens	Working with Peninsula Pollution Group	Employee email	Teacher newsletters Local cable station City council support
<i>City of San Leandro</i>	City Hall (one day)	Press event and press release	Garbage Bill Inserts Direct mail	Homeowners Associations City facilities Walgreens Earth Day events	Ads in local newspaper		City newsletter Recreation Activities Guide Recycling hotline recorded message
<i>City of San Jose</i>	Senior Center 2 Walgreens (one day each)	Local press event and press release		Senior center Libraries Local employers Flyers handed out at doors	San Jose Mercury News and ads in 9 Local Papers	Local city employees	Senior guides – April 20 th Table skirt and banners
<i>City of Sunnyvale</i>	Senior Center (one day event)	Press event and press release	Utility bill inserts	Senior Centers	Free advertising in local Newspaper		

Appendix D: Local Outreach Strategies

Leading Agency	Locations	Local Press Event/Release	Mailers	Flyer Distribution/Poster Placement	Local Newspaper Ads	Email Distribution	Other Advertising
East Bay Municipal Utility District/ Save The Bay	Oakland City Hall Walgreens Berkeley Fair (one day each)	Press release City Council Members	EDMUD Newsletter	Earth Day City Hall 2100 Alta Bates Medical Center Agency Elevators		Email to EBMUD employees and Save The Bay members	Neighborhood Community groups Parents groups Website 6 community calendar listings
Regional Water Quality Control Plant	Health Center (one day event) 4 Walgreens (2 day events)	Press release		Distribution to students at East Palo Alto School District City facilities/ libraries Stanford University Walgreens 4 senior centers Farmers market Earth day events	Local advertising in 4 papers	Email to industrial waste dischargers, Neighborhood groups, Stanford staff, Palo Alto, Los Altos and Mountain View City staff	Email newsletters at local schools Website Local mothers clubs Community calendar listings
San Francisco (SFPUC/SF Department of Environment)	13 Walgreens (2 days each)	Regional and local Press Event (Chinese)/ Press release in English, Spanish and Chinese	Utility bill (172,000 residents) 598-mass mailing	Point of purchase pad and poster at all 57 Walgreens City facilities Libraries Senior centers Farmers market and community events	Ads in 18 local newspapers Opinion editorials	Email blast to employees and others	287 Bus Ads and 15 Bus Shelter ads- Muni SF Supervisors office

Appendix D: Local Outreach Strategies

<i>Leading Agency</i>	<i>Locations</i>	<i>Local Press Event/Release</i>	<i>Mailers</i>	<i>Flyer Distribution/Poster Placement</i>	<i>Local Newspaper Ads</i>	<i>Email Distribution</i>	<i>Other Advertising</i>
<i>South Bayside System Authority</i>	2 Walgreens (one day each)	Press Event		Walgreens	Newspaper ads in local papers Senior Center Libraries Bus Stops Country Almanac		
<i>Union Sanitary District</i>	3 different Walgreens (2 days each)			Earth Day Senior Centers Walgreens	2 local newspapers the day before	Email all outreach contacts School nurse, commercial, teachers etc.	

Appendix E: Press Release and Press Event Handouts



PRESS ADVISORY
April 27, 2006

CONTACT: Phil Bobel (650) 329-2285

DON'T FLUSH THAT LEFTOVER MEDICINE!

SAFE MEDICINE DISPOSAL EVENTS IN THE BAY AREA GIVE RESIDENTS A LESS-POLLUTING ALTERNATIVE FOR UNWANTED MEDICINE DISPOSAL

BACKGROUND:

Everyday, unwanted or expired medicine is disposed of via indoor drains—down the sink or in the toilet. Antibiotics, antidepressants and hormone medications are found in waterways nationwide. While scientists worldwide study the potential impacts on humans and marine life, action by residents and businesses will minimize these impacts.

The Bay Area Pollution Prevention Group is seeking to reduce the amount of prescription or over the counter drugs disposed of in wastewater. That's because wastewater treatment plants are designed to remove conventional pollutants, such as human wastes and other biodegradable organic materials, from waters. They were not designed to remove even low concentrations of synthetic pollutants, such as pharmaceuticals. Wastewater treatment plants will remove some drugs, but it is better if they are not disposed down the drain in the first place. The best choice for environmentally-friendly disposal is to take unwanted medicine to a collection event.

That is why more than nine local agencies are hosting 30 safe medicine disposal events throughout the region to keep these pollutants out of wastewater.

EVENTS:

Kick-off press events featuring water quality experts will be held as follows:

Friday, May 12, 10:30 am AND
Walgreens
1189 Potrero Avenue @ 24th St.
San Francisco

Monday, May 15th, 1 pm
Cypress Senior Center
403 S. Cypress Avenue
San Jose

Appendix E: Press Release and Pres Event Handouts

Safe medicine disposal events offering residents a safe way to dispose of old or unwanted medication are being held May 15-21, 2006, all over the Bay Area. The events are being organized by local municipalities in cooperation with local law enforcement. For a full list of events, go to www.baywise.org

###

Safe Medicine Disposal Fact Sheet

Are pharmaceuticals present in the environment?

- Pharmaceuticals have been found in waterways and wastewater effluent throughout the world.
- A 2002 U.S. Geological Survey (USGS) study found pharmaceutical and personal care product contaminants in 80 percent of 139 streams sampled in 30 states.¹
- A 2003 study by the San Francisco Estuary Institute detected Acetaminophen in San Francisco Bay.²
- While detected concentrations are very low (parts per billion and parts per trillion), many may be continuously introduced to the aquatic environment. Even those pharmaceuticals that break down quickly have a quality of persistence in the environment.

How do pharmaceuticals enter the environment?

- Residential and commercial pharmaceuticals can follow two primary pathways to the environment:
 - Excretion: Human excretion of drugs and their metabolites into the sanitary sewer
 - Direct Disposal: Disposal of unused pharmaceuticals to the septic tank, sewer or landfill

Do pharmaceuticals impact fish and wildlife?

- Several studies have shown that exposure to certain pharmaceuticals results in abnormal development and reproduction in fish and other wildlife.
 - Western mosquitofish (*Gambusia affinis*) exposed to the antidepressant Fluoxetine delayed development of young.³
 - Masculinization of fish has been associated with pharmaceuticals in ocean waters in Orange County.⁴
- Continual, multi-generational exposure of aquatic life to multiple pharmaceuticals has unknown consequences.

Don't wastewater treatment plants remove pharmaceuticals?

- Wastewater treatment plants are designed to remove conventional pollutants, such as human wastes and other biodegradable organic materials, from waters. They were not designed to remove even low concentrations of synthetic pollutants, such as pharmaceuticals.
- Wastewater treatment plants will remove some pharmaceuticals, but it is better if they are not disposed down the drain in the first place.

What is done with the medication after collection events?

- The medications are incinerated in regulated facilities to ensure that they are completely destroyed.

What should I do with unwanted or expired medication in the future?

- Look for safe medicine disposal events, where available.
- Some household hazardous waste facilities accept pharmaceutical waste.
- Some pharmacies accept unwanted medicine.
- The last resort is to place them in the trash in a sealed container.
- Please do not flush the medications down the drain!

Why don't pharmacies have collection bins for unwanted and expired medication?

- Collection at pharmacies on an ongoing basis would be a significant cost for them.
- Government officials greatly appreciate Walgreens willingness to conduct the pilot program in the coming weeks to help explore the possibilities.
- Local agencies are working to find a way to allow permanent collection sites for all pharmaceuticals.

¹ Kolpin, D.W., Furlong, E.T., Meyer, M.T., Thurman, E.M., Zaugg, S.D., Barber, L.B., and Buxton, H.T., 2002. [Pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams, 1999-2000--A national reconnaissance](#). *Environmental Science and Technology*, 36(6): 1202-1211.

² Oros, D., Jarman, W.M., Lowe, T., David, N., Lowe, S., and Davis, J.A., 2003. Surveillance for previously unmonitored organic contaminants in the San Francisco Estuary. *Marine Pollution Bulletin*, 46: 1102-1110.

³ Black, M.C., Rogers E.D., and Henry, T.B., 2005. Endocrine Effects of Selective Serotonin Reuptake Inhibitors (SSRIs) on Aquatic Organisms. Abstract available at <http://es.epa.gov/ncer/publications/meetings/8-23-2005/abstract/black1.html>.

⁴ Irwin, M., Reyes, J., Steinert, S., Hwang, W., Armstrong, J., Sakamoto, K., Kelley, K. and Schlenk, D., 2005. Relationships between reproductive endpoints measured in flatfish collected near an outfall in Orange County, California. Abstract available at <http://abstracts.co.allenpress.com/pweb/setac2005/category?ID=57549>.

Appendix F: Select Newspaper Articles

San Francisco Examiner

"Unused Prescription Drugs are Harming the Environment"

By Jared Blumenfeld and Susan Leal

May 19, 2006

Tylenol. Celebrex. Prozac. Noravir. We know these prescription drug brand names because they have proven so effective in combating human ailments from headaches and arthritis to clinical depression and HIV.

But few of us realize that, as evidence mounts that everything from Advil to Viagra is finding its way into San Francisco Bay and the Pacific Ocean, there is growing concern in the public health, environmental and scientific communities about the impact of these pharmaceuticals on our aquatic environment.

So who's prescribing these drugs for our environment? It turns out that, unintentionally, we all may be.

For years, often at the recommendation of doctors and health professionals, people have disposed of their expired or unwanted over-the-counter medications and prescription drugs by flushing them down the toilet.

But when it comes to pharmaceutical waste, everything that goes down the drain or ends up in the trash eventually ends up back in our environment. Even the most modern wastewater treatment plant is not designed to consistently remove pollutants like pharmaceutical drugs. Drugs thrown into the trash eventually end up in landfills, where drug residues can seep into groundwater.

A study conducted in 2002 by the U.S. Geological Survey sampled 139 streams across 30 states and found that 80 percent had measurable concentrations of compounds such as prescription drugs, non-prescription drugs, steroids and reproductive hormones.

Although the concentrations of most compounds found in the study were low – usually less than one part per billion – scientists have discovered that exposure to even lower levels of pharmaceuticals have had negative effects on fish and other aquatic species, both in the lab and in nature.

The San Francisco Public Utilities Commission, Walgreens and the San Francisco Department of the Environment are teaming up with Bay Area wastewater treatment, health and environmental agencies to promote "Safe Medicine Disposal Days" throughout the Bay Area.

Through Sunday, we're educating residents that it's no longer recommended to throw medications in the trash or toilet and encouraging them to bring their expired and unused prescription drugs and other pharmaceuticals to one of more than 35 participating Walgreens stores for safe disposal.

If these efforts prove effective, we will look at establishing year-round pharmaceutical drop-off centers around the Bay Area.

Appendix F: Select Newspaper Articles

In San Francisco, we're fortunate that our residents already have a year-round option for unwanted or expired pharmaceutical disposal – our Household Hazardous Waste Collection Facility. Pharmaceuticals collected from San Franciscans during "Safe Medicine Disposal Days" will be transported to this facility for safe disposal. Once collected, they will be transported for incineration through a process that prevents particulate matter and other contaminants from entering the air.

While The City is working hard to keep pharmaceuticals out of our environment, ultimately, it makes the most sense that the people who produce pharmaceuticals take responsibility for their safe disposal. In the long term, we hope to encourage pharmaceutical companies to pay for take-back programs.

Prescription drugs and pharmaceuticals have greatly improved our own health, but they're having a negative impact on marine ecosystems and aquatic life. Our doctors don't prescribe our drugs to the environment. Neither should we.

Contra Costa Times

" Drugs disposed of incorrectly could give Bay bad diagnosis"

By Paul Rogers, KNIGHT RIDDER

May 14, 2006

Finished with that old Advil? Done with the Lipitor? No need for those birth control pills anymore?

Don't flush them or wash them down the drain. They could end up in San Francisco Bay -- and fish and pharmaceuticals don't mix.

That's the message from a coalition of cities and sewage plant operators who are urging Bay Area residents to drop off old prescription and over-the-counter drugs at one of 30 locations for proper disposal.

Through May 21, a select group of Walgreens drug stores, along with senior centers and other community buildings, will accept discarded drugs.

The program is the first widespread effort in the Bay Area to collect unwanted medications to keep them out of sewer systems, said Phil Bobel, Palo Alto's manager of environmental compliance.

"We're finding all kinds of drugs that are showing up in waters of the United States and San Francisco Bay," Bobel said. "It's not a huge problem yet, but it is a scary thing. We've got some time to put procedures in place so we can avoid major problems."

Steroids, antibiotics, anti-depressants, hormones and other compounds are turning up in waterways nationwide. Sewage treatment plants don't filter them out, so they end up in bays and rivers.

Although the compounds are found in tiny quantities, some studies suggest they can harm fish and other animals. In the Potomac River, for example, scientists have found male smallmouth bass that produce both eggs and sperm, a characteristic researchers say could be linked to human drugs.

A 2003 study of San Francisco Bay waters found traces of flame retardants;

Appendix F: Select Newspaper Articles

acetaminophen; musk compounds from perfume and detergents; and DEET, a chemical used in mosquito repellent.

It is unclear if the pollutants, found in parts per trillion, are in large enough concentrations to harm fish, amphibians or other species.

No large-scale studies have been done because of lack of funding, said Daniel Oros, an environmental scientist with the San Francisco Estuary Institute who conducted the 2003 study.

"But if drugs do enter the bay," Oros said, "there is potential for causing harm."

Drugs collected at drop-off sites will be taken to an incinerator. When the drop-off event is over, officials urge people to put old drugs in sealed containers, like plastic bags, and throw them in the trash.

San Jose Mercury News

" Program aims to keep drugs out of the bay"

By Paul Rogers, Mercury News

May 14, 2006

Finished with that old Advil? Done with the Lipitor? No need for those birth control pills anymore?

Don't flush them or wash them down the drain. They could end up in San Francisco Bay -- and fish and pharmaceuticals don't mix.

That's the message from a coalition of cities and sewage plant operators who are urging Bay Area residents to drop off old prescription and over-the-counter drugs at one of 30 locations for proper disposal.

Through May 21, a select group of Walgreens drug stores, along with senior centers and other community buildings, will accept discarded drugs.

The program is the first widespread effort in the Bay Area to collect unwanted medications to keep them out of sewer systems, said Phil Bobel, Palo Alto's manager of environmental compliance.

"We're finding all kinds of drugs that are showing up in waters of the United States and San Francisco Bay," Bobel said. "It's not a huge problem yet, but it is a scary thing. We've got some time to put procedures in place so we can avoid major problems."

Steroids, antibiotics, anti-depressants, hormones and other compounds are turning up in waterways nationwide. Sewage treatment plants don't filter them out, so they end up in bays and rivers.

Although the compounds are found in tiny quantities, some studies suggest they can harm fish and other animals. In the Potomac River, for example, scientists have found male smallmouth bass that produce both eggs and sperm, a characteristic researchers say could be linked to human drugs.

A 2003 study of San Francisco Bay waters found traces of flame retardants;

Appendix F: Select Newspaper Articles

acetaminophen; musk compounds from perfume and detergents; and DEET, a chemical used in mosquito repellent.

It is unclear if the pollutants, found in parts per trillion, are in large enough concentrations to harm fish, amphibians or other species.

No large-scale studies have been done because of lack of funding, said Daniel Oros, an environmental scientist with the San Francisco Estuary Institute who conducted the 2003 study.

“But if drugs do enter the bay,” Oros said, “there is potential for causing harm.”

Drugs collected at drop-off sites will be taken to an incinerator. When the drop-off event is over, officials urge people to put old drugs in sealed containers, like plastic bags, and throw them in the trash.

Contact Paul Rogers at progers@mercurynews.com or (408) 920-5045.

San Francisco Chronicle

“Don’t dump old medicine in toilet”

By Jane Kay, CHRONICLE ENVIRONMENT WRITER

May 11, 2006

The Tylenol, antibiotics, ibuprofen and Prozac that people toss into the toilet or down the drain may be flowing straight to the bay and contaminating fish, warn local sewage treatment officials who want to stop it.

Sewage plant operators who have curtailed everything from industrial waste to household chemicals and pesticides and mercury from dental offices are now trying to reduce pharmaceuticals from homes by offering a safer disposal method for unwanted pills.

The out-of-sight, out-of-mind flush recommended for years doesn't work, say representatives for the 40 agencies that operate sewage plants around San Francisco Bay.

The plants are designed to treat human waste and other biodegradable organic materials -- not the medicines and chemicals in consumer products that make it through treatment and remain in the effluent that spills into the bay or ocean, and in the sludge that is used for landfill cover, incinerated or placed in farmland.

"Some of the pharmaceuticals are definitely making it through sewage treatment plants," said Phil Bobel, manager of the environmental compliance division for the city of Palo Alto and a spokesman for the agency-wide Bay Area Pollution Prevention Group.

Studies of fish in waterways near Denver, in Lake Mead and in London's Thames River have found changes in their reproductive systems that apparently are linked to pharmaceuticals that can disrupt the endocrine systems, sewer officials say.

While studies continue on the effects of the drugs on marine life and human health, Bobel said, "There's something simple we can do now to cut down on this stuff. ...

Appendix F: Select Newspaper Articles

Unfortunately, the advice of the past was, 'Dump it down the toilet.' Now we're trying to turn it around: 'Don't dump it down the toilet.' "

The group has organized 30 Bay Area events -- called Safe Medicine Disposal Days -- where people may take unwanted pills, starting Friday and continuing through May 21.

Banners at BART stations in Fremont, Berkeley, 12th Street Oakland, Civic Center San Francisco and Daly City advertise the events. Walgreen's drugstores, some of which are accepting unwanted pills, are distributing flyers. Alta Bates Summit Medical Center in Oakland and other hospitals are passing out information with prescriptions. Newspaper ads and SamTrans buses will carry the message.

The Bay Area events will accept all pharmaceuticals. In the future, sewage treatment districts will develop drop-off programs similar to those for hazardous and electronic waste. Most plants recommend that consumers put pills in the garbage until there are proper drop-off plans.

The Los Angeles County Sanitation Districts started a "No Drugs Down the Drain" program in March during National Poison Prevention Week. They accept pharmaceuticals except for controlled substances at hazardous-waste drop-off points. If people can't make it to the drop-off points, they ask for disposal in the garbage.

There is no evidence to show that the levels in effluent have any effect on human health. In fact, scientists are just beginning to look at the effects of pharmaceuticals on fish and other aquatic life. No such studies have been done in California.

Some of the best testing for pharmaceuticals in California's effluent comes from Los Angeles and Orange counties.

In surveys last year of effluent treated by the high-quality tertiary method, Southern California officials found detectable levels of ibuprofen; fluoxetine, the generic name for Prozac; and the antibiotics erythromycin, trimethoprim and sulfamethoxazole.

Tests also found low levels of the anti-arthritis drug diclofenac; the mosquito repellant DEET; the anti-cholesterol drug gemfibrozil; triclosan, an antibacterial agent in soap; and anti-seizure drugs.

A big question is how much of the medicines in effluent come from human excretion and how much are from direct disposal.

Ann Heil, supervising engineer for Los Angeles County Sanitation Districts, said she worked up data on the top 10 pharmaceuticals sold in the United States and figured out that about 90 percent of the individual drugs are used up in the body while 10 percent of them are excreted. In other California monitoring studies, the San Francisco Estuary Institute in Oakland published results of monitoring in the bay and delta in 2003 in which researchers detected Tylenol, or acetaminophen, DEET and the sunscreen octyl methoxy cinnamate, as well as plasticizers, fire retardants and herbicides.

Appendix F: Select Newspaper Articles

"There have been studies throughout the world that have found pharmaceuticals turning up in creeks, rivers and bays," said Jen Jackson, pollution prevention coordinator at East Bay Municipal Utility District who's been working to get people to the throwaway event.

"We're trying to be proactive."

Drug disposal

For more information on the Safe Medicine Disposal Days this month, go to www.baywise.org.

E-mail Jane Kay at jkay@sfchronicle.com.

San Mateo County Times

"Flushed meds could spur a fishy situation"

By Julia Scott, STAFF WRITER

April 20, 2006

REDWOOD CITY -- The view of the Bay is placid from the South Bayside System Authority sewage plant in Redwood Shores. But beneath the surface lurks a mysterious soup of chemicals, some of which could be affecting fish.

Local scientists have long been concerned that a class of drugs found to alter the sex characteristics of fish in other parts of the country could also be present in Bay Area waters, but they have no proof of it so far.

From Chesapeake Bay to the depths of the Potomac, scientists have been discovering that fish exposed to sewage effluent have developed a series of genetic mutations over time. Some male fish developed sexual defects after being exposed to chemicals used in birth control pills. Other fish, exposed to small concentrations of blood pressure medications, experienced thyroid problems or stunted growth.

A 2005 study found some of the same problems in fish caught off the coast of Orange County.

Environmental scientists attribute these effects to endocrine disrupters, a largely unstudied group of synthetic chemicals found in pharmaceuticals that reach the water in sewage effluent after being secreted by humans or flushed down the toilet. Modern sewage systems are not built to clean them out, and they can stay in waterways for years, building up in the tissue of bottom-feeding fish.

No studies have yet been conducted on endocrine disrupters in Bay Area waters, so the extent of their presence is unknown. But local water officials are taking action. They are encouraging residents to get rid of their unwanted or expired drugs by throwing them in the garbage or bringing them to a designated disposal site during the week of May 13-21.

Held locally in Millbrae, Menlo Park, East Palo Alto and Belmont, the Bay Area Pollution Prevention Group's Medicine Disposal Days are a first attempt to make

Appendix F: Select Newspaper Articles

residents aware of the dangers the drugs may pose to aquatic life.

There is also the fact that, in San Mateo County, every piece of litter and industrial pollutant that ends up in the streets flows directly to the Bay without being treated.

"We've realized it's an issue, and rather than be reactive, we're being proactive," said Karin North, head of the city of Palo Alto's Environmental Compliance Division.

North heads a Santa Clara County working group on emerging contaminants of concern in the Bay. The issue came to the group's attention over four years ago, but those involved have not made much headway in testing for endocrine disrupters, according to North.

With hundreds of chemicals to choose from, including hormones, antibiotics, pesticides and other industrial pollutants, and no test developed for them, it is difficult to discern which ones pose the greatest threat, said North.

And though no human effects have been documented, "you just don't know," said North.

A standard test for endocrine disrupters, however, is "several years away," said Bobbye Smith, regional science liaison for the Environmental Protection Agency's research and development division.

"The money is being spent to determine which of this enormous amount of chemicals poses the biggest problem," Smith said.

She added that pharmaceuticals would be a difficult class of pollutants to regulate, if it ever came to that; they have never been part of the EPA's responsibility.

The Bay Area's long industrial legacy has left other chemicals, such as animal hormones, commercial-strength pesticides and heavy metals at the bottom of the Bay, according to Rainer Hoenicke, deputy director of the San Francisco Estuary Institute. Samples of mussel and clam tissue taken from the Bay between 1999 and 2001 by the SFEI also revealed chemicals used in personal care products and detergents. Flame retardants, commonly used to protect couches and carpets, were detected at particularly high levels, said Hoenicke.

Dangerously high levels of mercury, a byproduct of mining activities, have prompted the state government to put up signs on local piers warning fishermen and residents about consuming too many predatory fish.

The results of the SFEI study "(S)howed that the way we manage our waste, the regulatory infrastructure, is inadequate to deal with newer drugs that come into the system, like pharmaceuticals," Hoenicke said.

He added that very few of the known chemicals present in the Bay, other than pesticides such as DDT, have been banned.

By joining the Bay Area Pollution Prevention Group's pharmaceutical-collection program, the South Bayside System Authority hopes to help residents of Belmont, San Carlos, Redwood City and other service areas take action, according to Norman Domingo, the plant's technical services supervisor.

Appendix F: Select Newspaper Articles

It is an important first step, but there's only so much individual districts can do, North said.

"Even if (the chemicals) are breaking down, there's always something being discharged into the Bay, seven days a week ... and we can't tell people to stop taking their medications," she said.

To find a medicine disposal location near you, visit <http://www.Baywise.org> .

Staff writer Julia Scott covers the coast and the environment. She can be reached at 348-4340 or at jscott@sanmateocountytimes.com .

Appendix G: Participant Survey Form

SAFE MEDICINE DISPOSAL DAYS

PARTICIPANT SURVEY

Zipcode _____ and/or Town/City of Residence: _____

1. Medication belongs to:

- | | |
|---|---|
| <input type="checkbox"/> Self | <input type="checkbox"/> Family or household member # _____ |
| <input type="checkbox"/> Friend # _____ | <input type="checkbox"/> Pet |

2. _____ # Medication containers

3. Reason for disposal?

- | | |
|---|---|
| <input type="checkbox"/> Expired/out-of-date | <input type="checkbox"/> Never used the prescription |
| <input type="checkbox"/> No longer needed/taken off | <input type="checkbox"/> Death (family member/friend) |
| <input type="checkbox"/> Cleaning house | <input type="checkbox"/> Other _____ |

4. How long have you been storing this medication?

- | | |
|---|--|
| <input type="checkbox"/> 6 months or less | <input type="checkbox"/> 1 to 2 years |
| <input type="checkbox"/> 6 – 12 months | <input type="checkbox"/> > 2 years or more |

5. Past disposal methods?

- ☐ Toilet
- ☐ Trash
- ☐ Gave to someone else for use
- ☐ Household hazardous waste collection event
- ☐ Other _____

6. How did you hear about this event?

- | | |
|--|---|
| <input type="checkbox"/> Flyer | <input type="checkbox"/> Water bill insert/ On water bill |
| <input type="checkbox"/> BART advertisement | <input type="checkbox"/> Friend/Word of Mouth |
| <input type="checkbox"/> Newspaper advertisement _____ | <input type="checkbox"/> Internet |
| <input type="checkbox"/> Newspaper story | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Bus posters/bus shelters | |

Sex

- ☐ Female
- ☐ Male

Type of Medication

- ☐ Prescription
- ☐ Over-the-counter (OTC)

Age

- ☐ 21 – 34
- ☐ 35 – 47
- ☐ 48 – 60
- ☐ 61 – 73
- ☐ 74 - over



BAY AREA POLLUTION
PREVENTION GROUP

Appendix F: Detailed Survey Results

	RWQCP	San Jose	San Leandro	Oakland	San Francisco	SBSA	Totals
Number of participants	251	331	56	46	407	78	1,169
Medication Belongs to:							
Self	179	191	31	33	210		644
Friend	17	11	39	5	14		86
Family #	136	217	3	24	171		551
Pet	24	8	8	3	12		55
Total	356	427	81	65	407		1,336
# Containers	4221	5057	468	578	Unknown	Unknown	10,324
Reason For Disposal							
Expired/out-of-date	204	239	52	34	252	X	781
no longer needed	159	176	25	29	161	X	550
cleaning house	34	4	11	8	45		102
Never used prescription	34	5	4	6	40		89
Death	29	2	5	4	36	X	76
Other	5	2	1	1	3		12
Total	465	428	98	82	537		1,610
Storage of Meds							
6 months	34	35	9	5	18		101
6-12 months	40	44	8	10	58		160
1-2 yrs	89	114	25	14	77		319
>2 years	114	132	8	18	143		415
Total	277	325	50	47	296	0	995
Past Disposal Methods							
Toilet	70	136	19	13	75	20	333
Trash	138	118	30	29	183	39	537
Gave to someone else	6	1	7	1	7	3	25
HHW event	43	15	8	4	21	11	102
Other	27	98	5	5	51	6	192
Total	284	368	69	52	337	79	1,189
How did you hear about event							
Flyer	44	82	53	10	85	7	281
BART	0	0	0	1	6		7
NewsAd	110	198	67		48	25	448
News Story	53	11	27	2		26	119
bus Poster	0	0	0	2	35		37
Water bill	11	0	29	3	125	1	169

Appendix F: Detailed Survey Results

	RWQCP	San Jose	San Leandro	Oakland	San Francisco	SBSA	Totals
Friend	16	9	1	10	16	7	59
Internet	22	4	1	11	10	13	61
Other	38	29	1	3	16		87
Total	294	333	179	42	341	79	1,268
Personal Information							
M	77	109		12	80	21	299
F	198	233		33	179	58	701
							1,000
Both		139			157		296
Pres	224	153		36	135	36	584
OTC	134	10		20	24	69	257
							1,137
21-34	12	14		4	11	4	45
35-47	52	46		12	55	9	174
48-60	65	86		20	66	19	256
61-73	57	109		6	5	21	198
74-over	66	76		4	271	25	442
Total	252	331	0	46	408	78	1,115

RWQCP – Regional Water Quality Control Plant – represents survey data from 5 locations in East Palo Alto, Palo Alto, Los Altos and Mountain View Locations

Oakland- represents East Bay Municipal Utility District and data from events held in Oakland

SBSA- South Bayside System Authority represents data held in Belmont and Menlo Park

San Jose- City of San Jose – represents data collected at 3 locations in San Jose Area.

San Francisco – represents data collected at 18 locations throughout San Francisco